Jon Fauer ASC www.fdtimes.com Dec 2019 Issue 98

FILM AND 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
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Mirrorless Stills and Cine

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fortissimo, pianissimo
Kazuto Yamaki and Mark Amir

Sony α7R IV E-mount
61 Megapixel Full-Frame

Photo: Jeff Berlin

FILM AND DIGITAL TIMES

Art, Technique and Technology

Film and Digital Times is the guide to technique and technology, tools and how-tos for Cinematographers, Photographers, Directors, Producers, Studio Executives, Camera Assistants, Camera Operators, Grips, Gaffers, Crews, Rental Houses, and Manufacturers.

It's written, edited, and published by Jon Fauer, ASC, an award-winning Cinematographer and Director. He is the author of 14 bestselling books—over 120,000 in print—famous for their user-friendly way of explaining things. With inside-the-industry "secrets-of the-pros" information, *Film and Digital Times* is delivered to you by subscription or invitation, online or on paper. We don't take ads and are supported by readers and sponsors.

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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 seems 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.

ZEISS Supreme Prime Radiance

There are 7 lenses in the new ZEISS Supreme Prime Radiance set. They artistically emphasize ghosting (flares) that are consistent across the entire set. Based on Supreme Primes, Radiance lenses have a warmer color tone. But, they are not simply the same lenses with coatings removed. There is no loss of light and no uncontrolled "white-out." Instead, Radiance primes have newly formulated T* Blue coatings. While there are 13 focal lengths in a set of Supremes, a Radiance set consists of 7, from 21mm to 100mm, all T1.5. There will be limited production runs. So, be sure to order early.

Lens	Aperture	Close focus	Front Diameter	Length	Weight	Image Diagonal	Focus Barrel Rotation
21 mm	T1.5-T22	0.35 m / 14"	95 mm	119 mm / 4.7"	1.5 kg / 3.3 lb	46.3 mm	300°
25 mm	T1.5-T22	0.26 m / 10"	95 mm	119 mm / 4.7"	1.42 kg / 3.13 lb	46.3 mm	300°
29 mm	T1.5-T22	0.33 m / 13"	95 mm	121 mm / 4.8"	1.61 kg / 3.55 lb	46.3 mm	300°
35 mm	T1.5-T22	0.32 m / 13"	95 mm	119 mm / 4.7"	1.40 kg / 3.09 lb	46.3 mm	300°
50 mm	T1.5-T22	0.45 m / 18"	95 mm	119 mm / 4.7"	1.22 kg / 2.69 lb	46.3 mm	300°
85 mm	T1.5-T22	0.84 m / 2'9"	95 mm	119 mm / 4.7"	1.42 kg / 3.13 lb	46.3 mm	300°
100 mm	T1.5-T22	1.1 m / 3'9"	95 mm	119 mm / 4.7"	1.7 kg / 3.74 lb	46.3 mm	300°

Above: Benjamin Hagen, Marketing Project Leader at ZEISS headquarters in Oberkochen, taken with 50mm SPR (Supreme Prime Radiance).
Below: Ben Hagen; Christophe Casenave, Product Manager and Arato Ogura, ZEISS Cine Manager for Asia & Oceana, taken with 29mm SPR.

ZEISS Supreme Prime Radiance

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

Benjamin Völker taken with 29mm SPR on Sony a9.

ghosts heavily. I remember the new season of *Lost in Space* and several others. So, I was curious if we could do it in another way. Not the standard way by just omitting the coating. Most of all, I wanted to introduce ghosts in controllable shapes and colors and avoid the typical white haze and loss of light that results from omitting the coatings. Here in Oberkochen, we don't have vintage lenses that are interesting to DPs. So, we came up with the idea of visiting rental houses in Paris and Hollywood.

Christophe: We flew to Los Angeles two days before Cine Gear. Keslow Camera kindly hosted us behind closed doors. They set up a big table with a huge inventory of all kinds of lenses. We discussed characteristics and they explained which were popular and why.

Benjamin: I knew that there was demand for certain lenses, but as a designer, I didn't exactly know why. These were the questions we asked ourselves as we tested around 25 different lenses. They included K35, Baltar, Super Baltar Canon FD, Kowa anamorphics, Kowa sphericals, ZEISS Super Speeds and a bunch of others. We shot for two 10-hour days. I set up a rig and we panned each lens aimed at light bulbs, LEDs and Neon signs.

Ghosting depends a great deal on what light you use, at what position in the picture, how the background is illuminated and at what T-stop the lens is set. I got a feeling of what DPs maybe liked and what they did not like. We talked to DPs and staff working at the rental house. Then we returned back to Oberkochen. Going through all that footage was a very long and tedious process.

Christophe: I'd like to say that Benjamin worked the way a good product manager would work in any industry. Don't ask the customer what they want and you do it. The customer would tell you, "I want uncoated lenses." No. You ask the customer, "Tell me your problem, tell me what you want to achieve. And we will then work on the answer." Benjamin truly provided something valuable that addresses the needs of the customer. He acted not only as a product manager, but also as an artist. He designed something beautiful.

Jon: How did you do it?

Benjamin: The basic idea we had was to add ghosts—controllable, but not too much. That's really hard to achieve. Getting rid of ghosts completely is easy. Introducing them massively by doing uncoated elements is also easy, no work at all. But to find that certain level takes a lot of effort. And the other thing people always told us was they would prefer a bit of a warmer color rendering. So I tried to find a way to introduce all that at the same time and, of course, not to lose any light (because you lose about 1/3 of a T-Stop for every uncoated surface.)

Jon: Are all the elements treated this way?

Benjamin: No. We identified the surfaces that contribute the most to ghosting. A ghost originates from two surfaces. If you change the coating on those two surfaces, then the surfaces of all the other elements may be affected. The hard thing is to find the exact locations in the lens that are sensitive to the style that you want to add.

Jon: How did you get the color rendition warmer?

Benjamin: We developed a new T* (T-Star) Blue coating. It's our new way of introducing a coating onto the lens element that gives you bluish ghosts and at the same time gives you a warmer color rendering. If you take away blue light from the spectrum and use that for the ghosting, at the same time, your color rendering gets warmer. However, you have to be careful not to introduce a green or magenta color tint. Actually, it's a bit more complicated than that. You are not only taking away the blue light, but you are also taking care of the rest of the spectrum so it is still balanced in such a way that you get a warmer look.

Jon: So if you see blue flares, that generally makes the picture warmer?

Benjamin: Not necessarily. It's a combination of the light absorbed by the glass and the light reflected by the coatings.

Jon: Tell me again why did you not like the idea of flare sets?

Benjamin: It's limited and you can only achieve rather vague shapes in the flares.

Christophe: The Radiance lenses are a first for ZEISS doing something like this. We wanted to change the opinion about ZEISS doing only perfect things. We wanted to make something artistic. So that's why Benjamin had the possibility to exchange any lens elements he wanted, even to coat one surface with one recipe and another surface with another recipe.

Benjamin: Our idea was to find our own style. And it was only possible by having all the freedom that I was given.

Jon: How would you describe the style of these lenses to a DP?

Benjamin: The Supreme Prime Radiance lenses show a controllable blue-colored ghosting that will not destroy your contrast. Less contrast is lost than with a typical flare set. Radiance lenses are more versatile because you can use them throughout an entire production. If you don't want flares, you can just flag the light. You still retain the slightly warmer color. You do not lose light. The maximum apertures of the Supremes and the Radiance are the same, T1.5.

Jon: You and I both like Bordeaux and Bokeh analogies. How would you compare the regular Supremes to the Radiance?

Christophe: If we would have done completely uncoated elements, I would say we would have gone to a Saint-Estèphe, or perhaps Saint-Julien, on the left side of the Garonne estuary north of Bordeaux. Quite heavy. But for the Radiance primes, we have a comparison that fits quite well to my preferred wine.

Chateau Picque Caillou Pessac-Léognan 2015, Grand Vin de Graves, testing Christophe Casenave's theory of radiance the following day at superb Sparkling Bistro in Munich.

Jon: How convenient.

Christophe: I would say it is a very good Pessac-Léognan, from the northern part of the Graves region. When you go to this side of Bordeaux, the terroir is a mix of sand and gravel with round stones.

Jon (reading aloud) "Famous chateaux in the Pessac-Léognan region include Smith Haut Lafitte, Château Haut-Bailly and Château Haut-Brion (Premier Grand Cru Classé.) Eric Asimov writes in the New York Times, 'Fresh and lively, with pretty aromas and flavors of violets, red fruits, spices and minerals.' Wine Spectator says, 'Lush, rich, glorious and beautifully polished.' Robert Parker agrees, 'profound and arresting, a firm frame of very finely pixelated tannins and seamless freshness, finishing very long and achingly stunning.'

Christophe: Agreed. Maybe we'll have one tonight or tomorrow evening.

Jon: It is ironic that in talking about vintage lenses, we often think of the 1960s, 70s and 80s. But those lenses all had anti-reflective coatings. Uncoated lenses date back to the 1930s and earlier and the reason DPs avoided flares was because the image would often go to total white-out.

Benjamin: That was exactly the idea behind developing our new

coating that resembles mostly the possibilities you had in the sixties, seventies or eighties.

Christophe: Consider the ZEISS Super Speeds. They were originally made at a time (1975) where you could only do a single layer coating. That's a reason why they are often called "vintage."

Jon: Or maybe because of their weird triangular bokeh? Super Speeds are now cherished as vintage lenses. I owned a set with my 35BL and in those days they were considered clinical.

Christophe: If you were to ask my retired colleague Helmut, he would immediately tell you that those lenses are not vintage. He would say, "Put them on a lens projector. You see they are very sharp." But now people like them. They are softer at T1.3 or T1.4. But as soon as we stop down to T2.8, they are very sharp and the depth of field helps the focus. These days, people love the Super Speeds. And now, 44 years later, Benjamin has the possibility to play with old style and modern coatings with many more recipes. This is art and technology.

Jon: The Super Speeds were sharp at the focus plane, the eye of the actor. And everything else not in focus fell off a cliff. Very contrasty, rich blacks. Not romantic. So why do we call them vintage now?

Christophe: Well, the mechanics are certainly vintage and that is one of the issues about vintage lenses. The whole lens is vintage. The mechanical parts are old. The focus and iris mechanism are old. They can break on set. Not the Super Speeds, of course. They will not break on set.

Benjamin: Because they are ZEISS. [laughs]

Christophe: If you look at what's available, there are different choices to add character. Take a vintage lens. Sometimes they are very nice and the ghosts might even be on the same level as Radiance lenses. But you cannot control or match them as well. You have all the drawbacks of vintage mechanical design. Take the Super Speeds. They are really small but they don't have great ergonomics. Or Super Baltars: you never know when you start shooting if at the end of the shoot they will still be working because they are quite old. The K35 are also rather old lenses and unless you rehouse them, it's a risk for the DP. So we wanted to offer DPs a way to bring character to their productions without their having to take a risk.

There's another consideration. A select group of top DPs are confident enough to experiment and not worry about job security on features. And maybe no one will fire them if they mess up a shot

During assembly, every Radiance Prime is tested for consistency of ghosting to be sure each reflection matches across the entire set.

because a ghost obscures the face of an actor whom the producer has paid 40 million dollars. These are typically the DPs who like to step on the hornets' nests of really sketchy glass. Commercials seem more open to creative abandon. But let's say that the remaining populations of cinematographers need to work reliably and consistently and not tempt fate with reshoots. So the way they do it today is to take a reliable favorite, perhaps a Master Prime or Supreme Prime and put the "last mile of character in the image" either in post or with lighting or filters. The images will be nice.

Now, we are presenting a new series of lenses, the Supreme Prime Radiance, where DPs can add character to their images, with consistent and controlled ghosts, without fear of uncontrolled aberrations or controlled retribution from disappointed producers. That's how the idea came about. How we implemented it is another story. Benjamin will tell you more because it's something that ZEISS almost never did before in response to what customers told us.

Benjamin: It was really like picking the elements we wanted to ghost and putting a specialty coating on them while adding strong anti-reflective coatings on the surfaces that we didn't want to have ghosts. Furthermore, we treated the Radiance primes as a family. They needed to have very similar ghosting for all focal lengths. That was actually one of the hardest parts of the job: to achieve a comparable level so the ghosting behavior of a 100mm tele lens would be the same as a 21mm wide angle.

Jon: So you had to coat different elements in each lens to keep them consistent?

Benjamin: We had to develop that idea—how many elements in front of the iris, how many in the rear part, where do we position the ghosts exactly? What recipe do we use to get the color rendering to match across the whole family?

Jon: You call them ghosts and we DPs call them flares. We talked about that last year. Please explain it again.

Benjamin: For me, a ghost is a reflection between two optical surfaces that gives you a more or less sharp image of that reflection on the image sensor. Flare for me is more like stray light on mechanical parts like the inside of the lens barrel. I know that we use these words almost interchangeably among DPs and developers and we are not even consistent.

Jon: Last year, when you discussed the Supremes, I called you Dr. Ghost Buster. Now, with the Radiance primes, I think you are the Ghost Whisperer.

Christophe: I would a say he's a Ghost Painter. He's an artist. A Ghost Provocateur.

Jon: A Ghost Writer. A Writer with Flair. A Writer of Flares. So why is it that we DPs say that flares or ghosts add character? Is there something else that we are responding to when we say a lens has character? You gentlemen looked at a lot of lenses. What did you discover after your two days at the rental house? What is character?

Benjamin: It is, in some way, a kind of imperfection that you introduce so that your image is not clinically clean and you have to interpret imperfections that add emotion to the image.

Christophe: Let's say I am sitting in the front row of the cinema and I'm watching the images on screen. I don't want to see the same reality that I can see outside the theater. I do not want to see images so perfect that I would bump into the screen if I walked on stage. As a spectator, I think we appreciate everything that helps us consciously or unconsciously to step away from reality. A ghost from the lens is really a part of that disconnect from reality. As soon as I see a ghost, I say it has been painted by someone. It's not part of the reality.

Jon: I'm reminded of Claude's *Seaport* (1644, National Gallery, London.) The sun is setting and the light flares off the water.

Benjamin: You can use ghosts as a stylistic element. If you have a really bright light source and you film it, often that light source clips. You don't really have a perception of how bright it actually is because of the sensor's limitations. But with a ghost, you get a feeling that this light source is really bright.

Jon: I can imagine that as soon as the Radiance go out, customers may ask about customizing them. Because every DP and every rental house wants to be unique.

Christophe: I think we need to find a very good balance between introducing character and allowing the DP to still have possibilities of bringing additional interest with other elements like using filters. I remember testing the Supremes last year in Paris with Samuel Renollet of RVZ and Yves Angelo AFC, SBC. He talked

about making his own filters 30 years ago. He kept them in a custom wooden box. "You know you can only do this kind of thing if the lens is sharp enough," he said. "Otherwise, you can't really adjust anything."

I think we can offer a certain level of character you can't produce by just doing filtering or lighting differently. First we should provoke the ghosts. And then we can use the right lighting, the right filters, to achieve the other looks. I think that was more or less why we did the lenses like this.

Jon: I'm sure you experimented with the Radiance lenses a lot. Can you give us a lesson as to what the different things we can do by shining a light off access, on access, flagging it off, keeping flares out? What are the different possibilities that we have with this set of lenses?

Benjamin: If you want to increase the ghosting, bring the light source to the center. The further you move from center to the edge of frame, or even outside of frame, the ghosting will diminish, but it will not completely vanish. If you're outside the field of view, there's an area where you still get a controllable ghosting within the frame. And if you want to get more pronounced ghosting, then begin stopping down. The ghosting will become more structured once you stop down. And it becomes a bit softer when you open the iris up completely.

Jon: It sounds like you put in a lot of work and effort into the Radiance primes.

Christophe: Benjamin told you his side of the story—how he designed the lenses. Now, I will tell my side of the story. For me, it was scary, and I don't mean Halloween style ghosts. Benjamin was super happy, having a great time designing ghosts. He worked very hard, with very long hours. How many simulations did you do?

Benjamin: Many, many hundreds of hours of simulations.

Christophe: There were hundreds of simulation pictures. And then he would ask me, "Which do you prefer?" We would pick a few. Next, Benjamin would say, "But I can't guarantee this quite yet, and I'm not sure about the intensity." We were watching images of ghosts all the time. I would get home in the evening and when I closed my eyes I saw nothing but ghosts. Then the time came to make choices based on computer simulations. And Benjamin said, "My simulation program is rather good. But perhaps we should purchase a lot of different lens elements and test with real prototypes."

So we ordered three or four versions of each lens element for each focal length and coated them in different ways. Benjamin had pre-calculated his preferred version but there were many variations. It was like going to the optometrist where they flip various combinations of lenses in front of you. We basically ordered a hell of a lot of glass elements. To be honest, this was damned expensive. Uniquely made glass elements with special coatings took us at least four months. And then some of our favorite choices for some focal lengths turned out not to match others. So we needed to change. It was more than six months of trying, experimenting, deciding and then oops, back to the drawing board because we may have made the wrong decision. It was really something we were not used to. Normally we design the lenses, the simulations are solid, we build the lenses and it's done.

Benjamin: The point is there's only so much you can do in simulation. But you cannot describe every possibility in simulation. This was also the first time for me to spend so much time in the lab to actually measure every prototype and try it out under all the different lighting conditions.

Christophe: I would like to mention the fact that we have a whole bunch of lens elements that we never used. More than 500. So if anyone wants, maybe we should sell them. No, but seriously, this was so much fun. We would meet in the basement at ZEISS with flashlights shining in the lenses the way DPs do.

Benjamin: I think it was totally worth it because otherwise we wouldn't have found that style.

Christophe: This was a very rewarding experience and we look forward to sharing our excitement with cinematographers and customers everywhere.

It was 6 pm. We packed cameras and Supreme Prime Radiance lenses into inconspicuous backpacks. It was two months before launch and I was under serious NDA—Non Disclosure Agreeement.

We piled into Christophe's car for an evening of testing and tasting at the Michelin-starred Ursprung Restaurant. 15 minutes later, we arrived in the charming village of Zang. Chef Widmann and staff were extremely patient as we provoked radiant ghosts upon every dish their tasting menu had to offer. Story continues...

ZEISS SPR NDA at Ursprung

Photos on the following 4 pages were all taken with ZEISS Supreme Prime Radiance wide open at T1.5 .
Below: Arato Ogura provoking the ghosts with his adjustable LED flashlight.

ZEISS SPR NDA at Ursprung

Every detail of the radiant eight-course tasting menu was captured with these secret NDA pre-production Radiances primes: Danube freshwater salmon, tomatoes from the garden, trout with nasturtium, summer beets, venison with corn, apricot with lavender, and apple with walnut pastry.

Below: Christophe Casenave compared Radiance to Pessac-Léognan but encouraged us to expand our vocabularies with almost endless wine pairings.

Chef/Owner Andreas Widmann is a rising star. He was born nearby in Heidenheim, worked at stellar Atelier in Munich and opened Ursprung in 2015.

JON FAUER: How would you describe the style of the ZEISS Supreme Prime Radiance 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 Radiance 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 interested in shooting a demo for the Radiance 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

image a feeling of randomness that I think we respond to as members of chaotic Mother Nature.

Where was location? How many shooting days/nights?

I shot one day in an unused jail in Lancaster, CA, and one night around Boyle Heights in East LA. Our hours were very limited due to budgetary constraints. For the prison scenes, I had about 5 hours of shooting time. At the gas station and alley at night, I had about 7 hours.

How did you come up with the story?

The inspiration came from the work my wife Monica Chiapa, who is a Spiritual Psychologist, is doing with two different groups in prisons in California. They are the Compassion Prison Project and the Freedom to Choose Project. These groups focus on encouraging inmates to express their feelings and allowing themselves to be present and vulnerable. I think that hearing her talk about her experiences within prison walls was what made me imagine a story based on a man leaving prison after a long sentence. During the process of writing the script and later casting the short, I spoke with many former inmates and one Corrections Officer in an effort to be as accurate as possible. The stories I heard touched my heart very deeply, and that led to the final script I shot.

The title *R&R* is the acronym prisons use for Receive and Release, which is the area where parolees are let out and incoming inmates are processed.

Did ZEISS ask you to write and shoot scenes that would present these lenses in a certain way or did you come up with it?

They just described the characteristics of the lenses and sent me sample images of the flares of each focal length. But I came up with the story and the shots. They gave me total creative freedom.

The story certainly is helped by the look.

Thanks! It is an example of how you can't really separate the form from the content. In this film they are inextricably part of the whole.

Your focus puller was very good: I assume wide open while you were often handheld.

Hector Rodriguez was not only an excellent focus puller, he also contributed to the story with some of his own experiences growing up around gangs in East LA. The gas station setting was inspired by a situation a good friend of his witnessed. He also loaned us a shirt I liked when I was choosing costumes for one of the characters.

Camera notes?

Sony VENICE at 6K resolution, 1:85 aspect ratio.

Grading? LUTs, Looks?

On set I used the Sony Venice REC 709 LUT which has a pleasant, relatively low-contrast and soft color reproduction. I graded the film at Harbor Picture Company in LA with Katie Jordan. We used Harbor's film emulation LUT for the final grading. I approached the grading with a simple philosophy, accepting the response of the raw images to the LUT, and just doing general offsets with points of color and density as in photochemical color grading. Sometimes we would do windows to control certain areas, but only in instances where a white wall was too distracting, for example. I did not do any changes of contrast or color to the flares, allowing them to appear exactly as the lens and sensor responded to them with the LUT applied.

In conclusion?

I am extremely grateful to everyone who participated in this film. It was truly a labor of love. Everyone involved gave 100%, even while no one was making any money. Gaffer Pat Hochi, Key Grip Ryan Mcguire, First AC Hector Rodriguez and their teams were all excellent and fully committed. My production team, led by Jen Berry and Little Minx, was up for the task of making my ambitious script possible with limited resources. And the cast was incredible. All ex-cons except for one of the Corrections Officers, who was a real guard who took a day off to do his acting debut.

Production stills by Jeff Berlin

Takuro Ishizaka JSC on *Metamorphosis* with ZEISS Supreme Prime Radiance

Director Aki Mizutani at left. DP Takuro Ishizaka second from right. Photo: Arato Ogura.

by Arato Ogura.

On a very hot day in September, about forty crew members gathered at an abandoned brick factory in Honjo, 90 minutes from Tokyo by Shinkansen bullet train. They were there to shoot *Metamorphosis,* a short dance film to demo the new ZEISS Supreme Prime Radiance lenses.

The cinematographer was Takuro Ishizaka JSC. His credits include *Zhui bu (Manhunt)*, directed by John Woo, the wandering samurai *Rurôni-Kenshin* films and *Samurai Marathon (*loosely based on a true story about a race that continues to be held annually to this day. The Japan Times calls it "A sprint through Japanese history." The Hollywood Reporter notes, "There were times it was difficult to catch a breath.")

Speaking of breath, *Metamorphosis* was breathtakingly edited and directed by Aki Mizutani. Not coincidentally, she compares her editing style to "a comfortable flow of dance." Ms. Mizutani was honored recently among "40 Under 40" Leaders in Advertising and Marketing by Campaign Asia-Pacific.

For *Metamorphosis*, Aki and Takuro conceived a short film starring dancer KAKA that would benefit from the Radiance lenses under various lighting conditions and setups.

Takuro Ishizaka worked in many departments as camera assistant, camera operator, gaffer, and now DP. He has always been interested in new technology and never hesitated to try out new camera and lighting equipment on his projects. A year ago, he worked with ZEISS Supreme Primes on several feature film projects. He liked the clean and gentle look on ARRI, Sony and RED cameras so much that he became the first DP in Japan to personally own a set of Supremes.

So it was quite natural for ZEISS to approach him to shoot a demo film for the new Radiance. It was especially interesting because Takuro could immediately compare and identify the differences in look between the standard Supremes and the Radiance models. Takuro commented, "The colors that I get from Supreme Prime Radiance lenses are slightly warmer than standard Supremes, but still match nicely together."

Two technical notes: warmer lenses render cooler flares. Furthermore, the more you stop down the iris, the more defined the flares become.

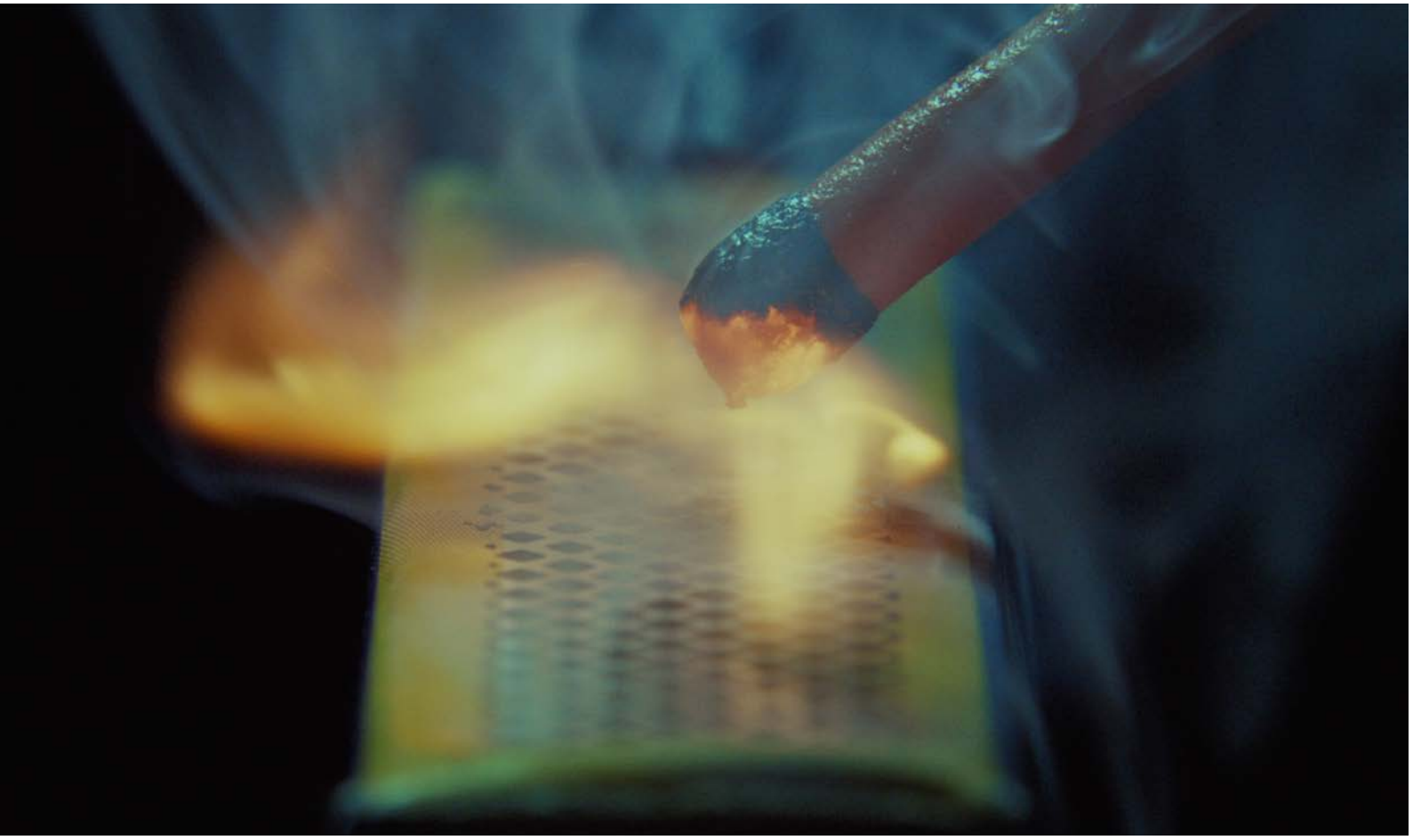
Takuro continued, "Initially, I thought only the wider lenses would provided great flares, but I found that even on tight lenses the flares maintain nice shapes. The charm I see in Radiance lenses is that they have nicely rolled-off focus compared to Supremes—but not too soft. It's just the right amount, and you don't need any optical filtration to achieve this look. I liked this slightly smoother characteristic, not only the flares."

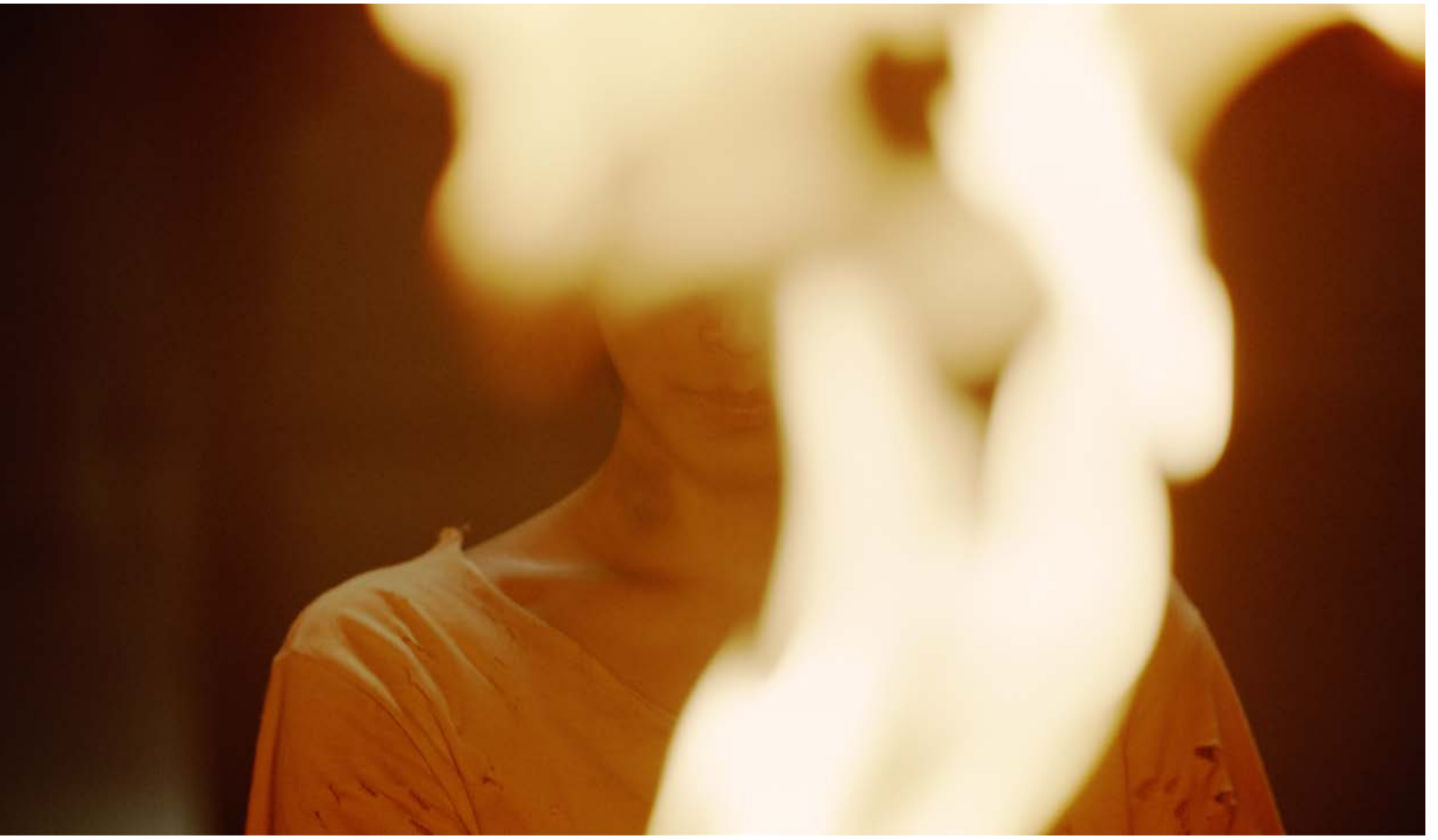
Aki Mizutani (Director, Editor)
www.freethebid.com/editors/aki-mizutani/

Takuro Ishizaka JSC
www.takuroishizaka.com

Metamorphosis Framegrabs

Metamorphosis Framegrabs





Metamorphosis Framegrabs

Metamorphosis Production Stills

Photos by Arato Ogura.

Metamorphosis Production Stills

Photos by Kozo Takahashi.

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

Leica SL2

The L-Mount was originally called T-Mount and it came with the Leica T mirrorless, interchangeable lens, APS-C format camera in 2014. A year later, 2015, the Leica SL (Type 601) was launched in Leica Format (Full-Frame, 36x24mm) with the same mount now renamed "L-Mount." The SL's autofocus and auto-exposure could capture decisive moments in a millisecond.

The new Leica SL2 (Type 2998) is the result of suggestions from photographers and SL owners for improved ergonomics, a more comfortable grip, in-body image stabilization, 47 MP sensor and 5K Full-Frame video. This is the pinnacle of Leica Format photography and it now includes superb cine capabilities.

The familiar three-button tactile controls and menus on the back unify Leica's ergonomic design concept across M, Q, CL and SL product lines. The L-Mount's 20mm shallow flange depth and the in-camera stabilization accommodate Leica M, S and R lenses. PL, LPL and other cine lenses not only fit but also benefit from the sensor's 5-axis image stabilization. Meanwhile, Leica continues to roll out an impressive series of new SL lenses that are among the finest Leica has ever created.

Dimensions: 146 x 107 x 42 mm LxHxD. 5.7 x 4.2 x 1.7 in.
Weight approx. 835 g (without battery). 29.5 oz.

Leica SL2

The L-Mount of the Leica SL2 accepts Leica SL and TL lenses as well as L-Mount lenses from SIGMA and Panasonic. By the end of 2020, the roadmap for L-Mount lenses includes 18 from Leica, 17 from SIGMA and 11 from Panasonic. SIGMA announced that their 13 High Speed T1.5 Full-Frame Cine Primes will be available with L-Mounts.

In addition, more than 170 Leica M, S and R series still photography lenses work with the SL2 by using mount adapters from Leica. Leica, SIGMA and other companies already have L-Mount to PL, LPL, XPL and other adapters for a multitude of cine lenses worldwide.

Below: Leica SL2 with M-Noctilux and Leica M to L-Mount Adapter. Photos courtesy of and copyright Leica.

Full Metal Body

The SL2 mirrorless L-Mount camera is designed and built in Germany. The body is made of aluminum and magnesium with a leatherette anti-slip, grippy cover.

Streamlined design with new status menus

Navigation and selection through menus is mainly done by buttons, wheels and joystick operation. Touch operation is limited to the functions that are practical—for example, sliders for exposure compensation. The newly designed status screen allows direct access to the selected function. There are status screens in both photo and video modes with preselected direct access buttons.

Improved ergonomics

The Leica SL2 is the same size as its predecessor. It has an IP54 rating for protection against spray and dust.

47 megapixel CMOS Sensor and no OLPF

The 47 MP sensor mode in Leica Format (Full-Frame) can be windowed to a 20 MP frame to be used with Leica TL or other APS-C format lenses. As for OLPF, Leica prefers to avoid Optical Low Pass Filters.

New Leica Object Detection Autofocus

Leica Object Detection AF includes, among various modes, face recognition and can even detect whether the subject is stationary or moving. It then switches between motion and focus priority.

Image stabilization and sensor-shift technology

The SL2 has a 5-axis stabilized sensor. It works with lenses that have internal optical image stabilization as well those without.

In multishot mode, you can shoot up to eight consecutive frames where the sensor is shifted in half-pixel increments between exposures. This results in 187 megapixel images: great for murals, background plates and billboards.

Leica EyeRes Viewfinder and Monitor

The 5.76 megapixel electronic viewfinder is even better than before. (The SL EVF was 4.4 MP.) The touchscreen monitor at the rear has increased in size from 2.95 to 3.2 inches diagonal, and from 1.04 to 2.1 megapixel resolution.

Maestro III processor

The new Maestro III processor enables autofocus to be much faster and shutter release to be immediate.

SD Card Slots

Two UHS-II SD card slots can simultaneously save photo files in RAW DNG and JPEG format.

L-Mount

The L-Mount is not only compatible with the ever-growing portfolio of SL-System lenses, but also with lenses of the TL-System and with the legendary lenses of Leica's M, S and R-Systems via adapters, providing more than 170 Leica lens options. The L-Mount Alliance expands this scope of possibilities even further by giving SL2 photographers access to L-mount-compatible lenses from Sigma and Panasonic.

Leica FOTOS App

The Leica FOTOS app for Android and iOS connects to the camera via Wi-Fi or Bluetooth (where available). It lets you access the camera's live view and to adjust aperture, ISO, shutter speed and exposure. It also allows wireless control of the shutter release.

Pictures can also be transferred to the Leica FOTOS app in DNG RAW data format. Many new features and an iPad version of Leica FOTOS will be available in version 2.0 on November 21, 2019.

Shipping this November

The Leica SL2 is available from November 21, 2019 at a recommended retail price of 5,990 Euros.

Leica SL2 for Cine

Leica SL2 with Leitz PL to L-Mount adapter and Leitz THALIA Large Format cine lens.

Lock Circle MJ2 (Metal Jacket 2) for SL2.

Available as basic cage or complete package with 15mm titanium grade 5 rods, baseplate and original Leitz PL to L-Mount. Also available with ARRI 19mm Baseplate (BP-8) Adapter.

Photo Mode, above, showing 1/250 sec shutter speed, 100 ISO, etc.
Video Mode, below: 180° shutter, 400 EI / ASA, timecode, audio levels.

Stephan Schulz, DGPh, Head of Product Management for Leica Professional Camera Systems, explains the SL2 Camera's Cine Capabilities.

Photo and Cine Modes

The SL2 camera menu is designed with 2 separate modes: "Photo" and "Cine (Video)." All settings for Autofocus, Sensitivity, White Balance, etc. are chosen separately for each mode and remain independent. So, when switching from Photo to Cine, there is no need to change settings. For example, with most other cameras (and with the previous Leica SL), when setting white balance in still mode, you had to redo white balance again when shooting video.

The SL2 camera's new Cine Mode speaks the way a DP might talk to the AC. Only manual exposure is available. All automatic exposure modes are disabled. Shutter speed is displayed in familiar and equivalent spinning mirror shutter degrees (11.2° to 358°).

In Still Photo mode, you'll see "ISO." In Cine Mode, you see "EI / ASA." (Those are familiar friends. For example, film cans were originally labeled with ASA and later EI. ARRICAM film camera magazines have a button to select the ASA rating.

Exposure settings are directly comparable to cine lenses with T-Stop engravings on the aperture ring. L-Mount lens apertures display true T-Stop values—the light loss is calculated.

ISO/ASA speed starts at 50.

We think the Cine mode may help to integrate the SL2 camera into motion picture productions.

Leica SL2 for Cine

In-Camera Body Image Stabilization

The 5-axis in-camera image stabilization does a good job not only with L-Mount lenses, but also with M, R, S as well as PL, PV and LPL Mount cine lenses among many others. In-camera image stabilization opens up exciting possibilities for smooth moves and steadier shots that previously were not possible with cine lenses and still lenses that lack O.I.S.

USB-C

The SL2 has a USB-C connector that lets you operate the camera with an external USB-C power source for longer run-times. This connection also enables USB-C charging of the camera battery when the camera is in standby or OFF. You can tether the SL2 to Lightroom with a plug-in and a USC-C cable.

Mic and Headphone Connectors

An external microphone and headphone can now be connected directly to the SL2's 3.5 mm jacks without needing an adaptor.

Hostile Environments

The camera is IP54 protected against dust and spray water and operates down to -10° Celsius.

No Fan

The SL2 does not have a cooling fan, which saves power and keeps things quiet. It is a very capable high-end cine camera with impressive bit-rates up to 400 Mbps.

Pixel Mixing

The SL2 sensor is 47.3 MP. How do we get 4K and FHD video images? The answer is pixel mixing, which is basically an algorithm to reduce the higher resolution of the sensor. (5K mode is full scan and cropped.)

Rolling Shutter

The camera has a rather fast rolling shutter (ca. 16 ms in Full-Frame mode). Super35 crop mode is expected to be even faster (maybe below 10 ms.)

Full-Frame and Super35 Crop Sensor Modes

All 4K (C4K and UHD) and FHD (Full HD) modes are possible in both Full-Frame and APS-C (Super35) crop mode. That means Super35 lenses or lightweight Leica TL autofocus lenses can be used without having to crop in post.

Frame Rates, Resolution, Bit Depth and Recording

- Frame rates for both C4K and UHD resolutions are 24, 25, 29.97, 50 and 59.94 fps at 10-bit 4:2:2.
- Up to 29.97 fps, 10-bit 4:2:2 can be recorded internally onto an SD card.
- 50 and 59.97 fps 10-bit 4:2:2 can be recorded externally via the full size HDMI connector.
- All 10-bit files can be stored in .MOV format at high data rates on the SD card with ALL-INTRA (low) compression. Every frame keeps all its information. This results in higher quality (but larger files.)
- FHD is available up to 150 -180 fps, but only 8-bit.
- The SL2 can record 5K in a 1.33:1 (4:3) aspect ratio in Super35 Crop Mode. This could be interesting for anamorphic lenses. Recording is 10-bit 4:2:0 on the internal SD card. (HDMI output is not capable of 5K.)
- The 10-bit 4:2:2 formats allow the use of Rec. 709, Rec. 2020 (HLG) and L-Log. Leica L-Log has been completely re-designed with improved characteristics. An internal and external LUT for preview is available.
- The SL2 also offers more compressed 8-bit 4:2:2 Long-GOP files in Rec. 709 .MP4 for immediate distribution or proxy editing.

Leica SL2 Cine

Some of the more than 37 Video Recording Permutations available on the SL2

Files	Mode	Format	Resolution	fps	Coding	Bitrate	Record on internal SD card	Recording on int. SD card and ext. via HDMI	Record externally via HDMI only
5K	S35	MOV	4992x3744	29.97p	Long GOP	200Mbps	4:2:0 / 10-bit	not available	down-converted to 4:2:2/10-bit 4K/29.97p
5K	S35	MOV	4992x3744	25p	Long GOP	200Mbps	4:2:0 / 10-bit	not available	down-converted to 4:2:2/10-bit 4K/25p
5K	S35	MOV	4992x3744	23.98p	Long GOP	200Mbps	4:2:0 / 10-bit	not available	down-converted to 4:2:2/10-bit 4K/23.98p
C4K	FF	MOV	4096x2160	59.94p	Long GOP	150Mbps	4:2:0 / 8-bit	4:2:0 / 8-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	50p	Long GOP	150Mbps	4:2:0 / 8-bit	4:2:0 / 8-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	29.97p	All-I	400Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	25p	All-I	400Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	24p	All-I	400Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit

Audio files for the above chart are LPCM. Among the other formats are UHD and FHD (up to 180 fps).

Panasonic LUMIX DC-S1H

Panasonic S1H

Panasonic S1H with
PL to L-Mount Adapter

Panasonic S1H

Partial List of some of the more than 90 Video Recording Permutations available

Files	Mode	Format	Resolution	Compression	fps	Coding	Bitrate	Record on internal SD card only
6K	FF	MOV	5952x3968	H.265	23.98p	Long GOP	200Mbps	4:2:0 / 10-bit
5.4K	FF	MOV	5376x3584	H.265	29.97p	Long GOP	200Mbps	4:2:0 / 10-bit
5.9K	FF	MOV	5888x3312	H.265	29.97p	Long GOP	200Mbps	4:2:0 / 10-bit
5.9K	FF	MOV	5888x3312	H.265	23.98p	Long GOP	200Mbps	4:2:0 / 10-bit

Recording in resolutions greater than C4K are not able to be output via HDMI at this time.

Panasonic mentioned that they are studying this carefully so that HDMI output might be available in all modes in the future.

Files	Mode	Format	Resolution	Compression	fps	Coding	Bitrate	Record on internal SD card and to external media via HDMI		Record externally via HDMI only
								Internal Rec	HDMI Output	
C4K	FF	MOV	4096x2160	H.264	29.97p	All-I	400Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	H.264	23.98p	All-I	400Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	H.264	29.97p	Long GOP	150Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit
C4K	FF	MOV	4096x2160	H.264	23.98p	Long GOP	150Mbps	4:2:2 / 10-bit	4:2:2 / 10-bit	4:2:2 / 10-bit

Panasonic S1H

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 ≥ 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.
- Netflex 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..."

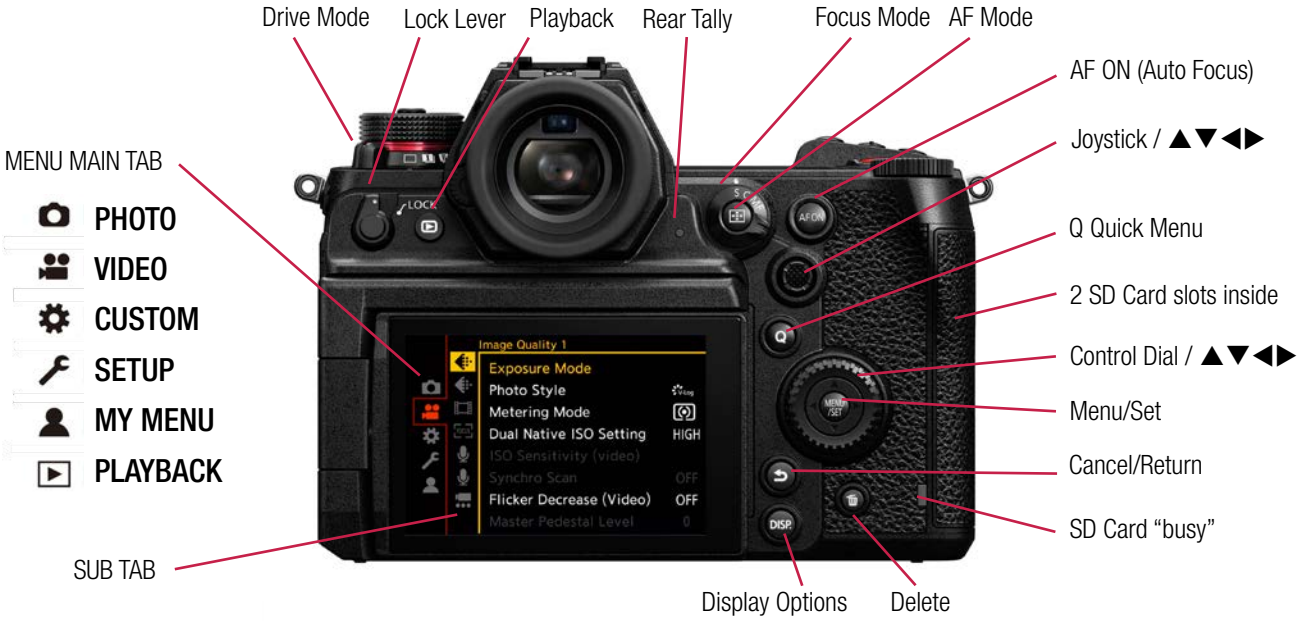
And so it was with typical DP distrust of directives that before reading the Netflix best mandate suggestions, I dissected the S1H settings and came up with the suggestions on the following pages.

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

Panasonic S1H

Still Photo Mode



Creative Video Mode

Because this article is about the S1H Video capabilities, we are going to set the MODE DIAL on top to CREATIVE VIDEO MODE.

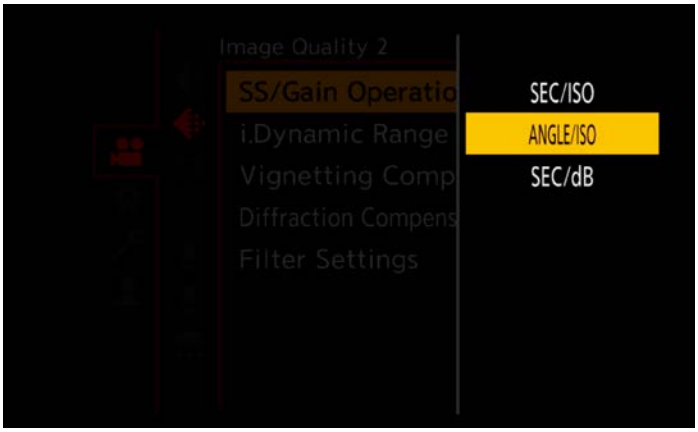
The rear display and top status display will now read out in the familiar language of cinema. In other modes, it speaks the language of still photography. You can start/stop recording with either the red video button or the black shutter release.

Screengrabs of menu settings on the following pages were done with AJA's superb HDMI to USB 3.0 U-Tap Video Capture Device.

Panasonic S1H

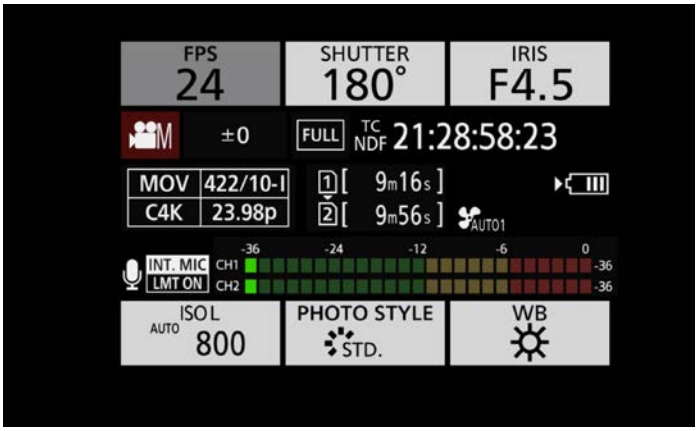
Setup to show Shutter Speed instead of Shutter Angle

MENU/SET ➡ [ ] ➡ [ ] ➡ Select [SS/Gain Operation]



1. Even in CREATIVE VIDEO MODE, you have to set shutter angle instead of shutter speed.
Push the MENU button. Select the VIDEO tab. In the sub tab, go to the second page, IMAGE QUALITY 2. Select SS/Gain Operation. Select Angle/ISO to have the camera display shutter angle and ASA...er...ISO. (MENU > VIDEO > IMAGE QUALITY 2 > SS/Gain Operation > ANGLE/ISO.

The S1H Speaks Cinematography or Still Photography



2. Your rear display should now look something like this

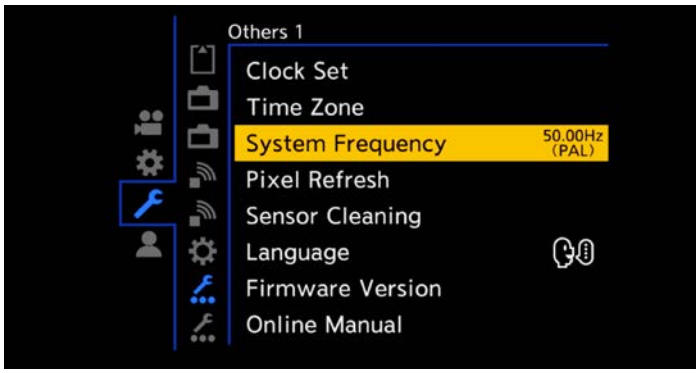
3. This is what the display looks like in still photo mode.

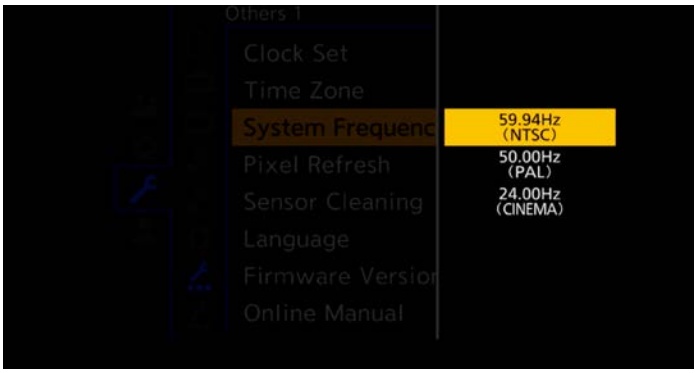
4. After a few more settings shown on the following pages, your viewfinder should look like this, at left, with some of the following information displayed:

- 2.39:1 Aspect Ratio
- C4K (DCI 4K, 400Mbps) (4096 x 2160)
- 4:2:2 10-bit ALL-Intra
- 23.98p
- Full-Frame
- Manual Focus
- Dual Stabilization On
- 180° Shutter (1/48 sec)
- F4.0
- ISO 800
- 9m 16s remaining

Panasonic S1H

System Frequency: NTSC, PAL or 24p

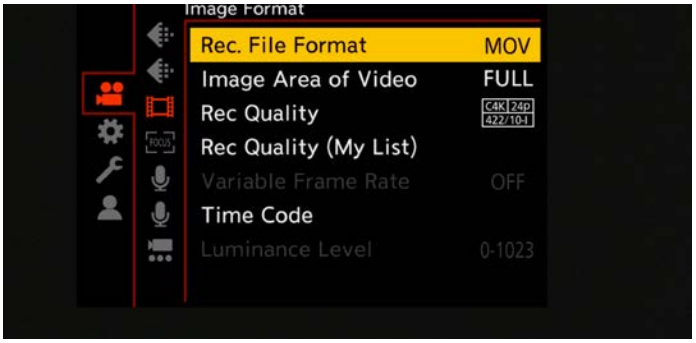




5. This is an important choice. MENU > SETUP > OTHERS 1 > SYSTEM FREQUENCY.

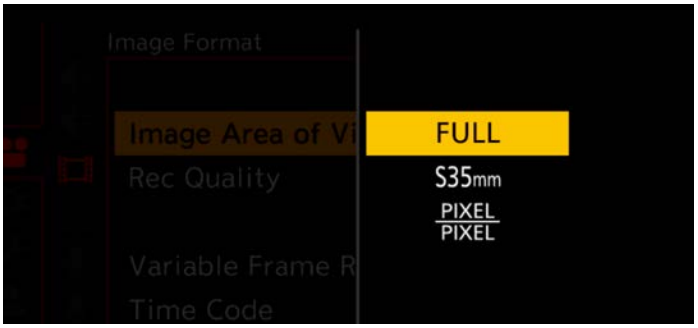
6. The System Frequency choices are: 59.94Hz (NTSC) for 23.98p, 29.97p, 47.95p, 59.94i, 59.94p or 119.88p
50Hz (PAL) for 25p, 50i, 50p or 100p
24.00Hz (CINEMA) for 24p or 48p

File Formats: MOV, MP4 or AVCHD

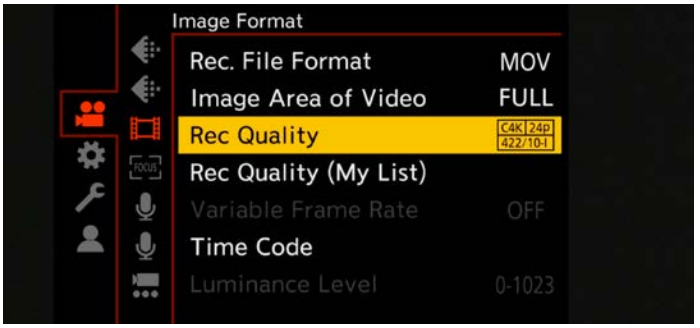


7. MOV H.264 have the highest bitrates (400 Mbps) on the S1H.

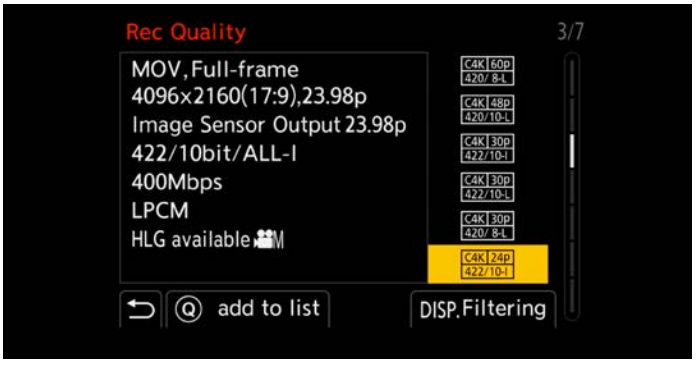
8. Image Area is the Sensor Mode: Full-Frame, Super35 or Pixel/Pixel



9. Of course, we're shooting Full-Frame :)



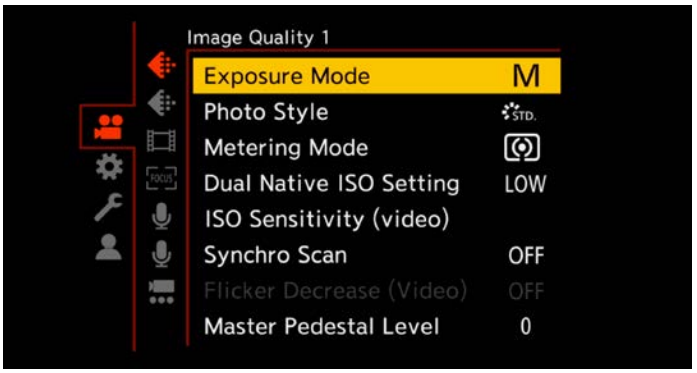
10. Rec Quality is a list containing more than 90 video recording permutations of resolution, frame rate, YUV and bit rate.

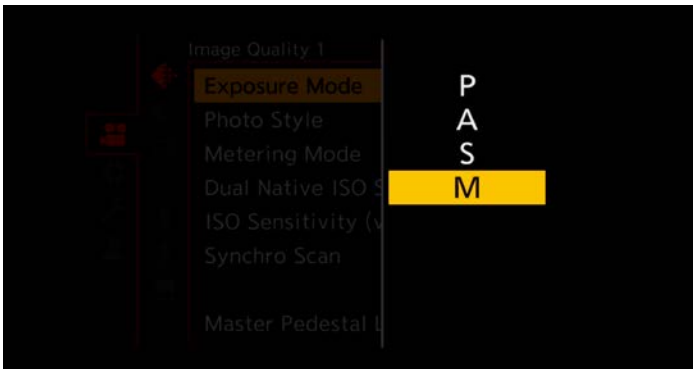


11. Let's choose what I consider the best image quality the S1H offers: MOV, Cinema4K Full-Frame 4096x2160 (17:9), 23.98 (shown as 24p in the yellow box), 4:2:2 10-bit, All-I (Intraframe), 400 Mbps, LPCM audio. There are 7 pages of recording permutations. Keep scrolling up or down to see them all. Push the DISP button to set filtering (not ND filters) to winnow down the number. You can add your favorites to a list.

Panasonic S1H

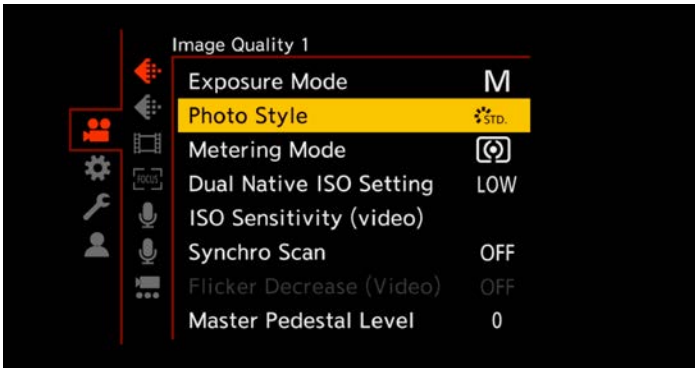
Exposure: Manual or Auto



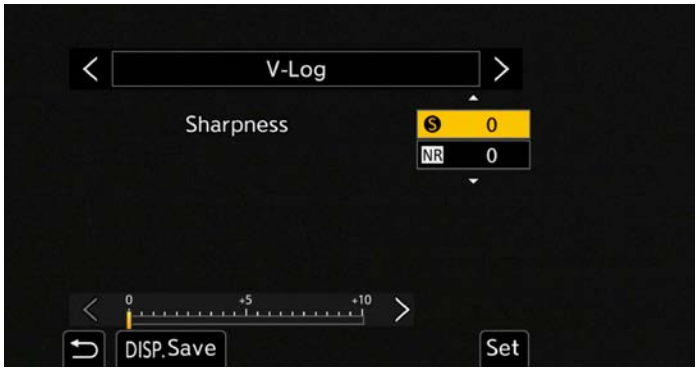


11. To choose how you'll expose: push the MENU button and then VIDEO > IMAGE QUALITY 1 > EXPOSURE MODE. Choose M for Manual.

V-Log

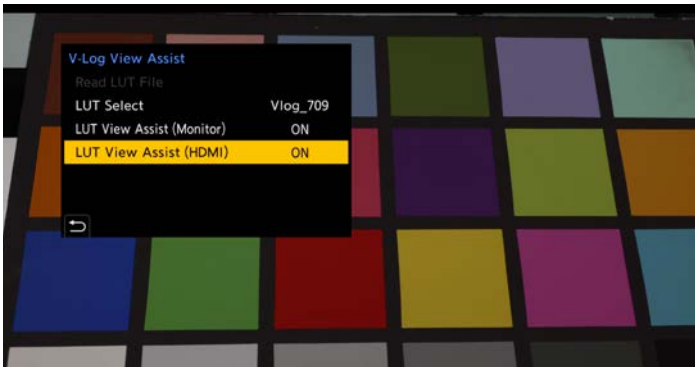


12. Let's enjoy the more than 14 stops of dynamic range on the S1H and also work in V-Log that is familiar from Panasonic VariCams. MENU > VIDEO > IMAGE QUALITY 1 > PHOTO STYLE > ... Scroll or joystick left or right until you come to V-Log.



13. Now, scroll or joystick down from V-Log to be sure that S (Sharpness) and NR (Noise Reduction) are set to 0.

14. Apply a LUT to view V-Log in the viewfinder or external monitors: MENU > CUSTOM > MONITOR/DISPLAY (VIDEO) > V-Log VIEW ASSIST

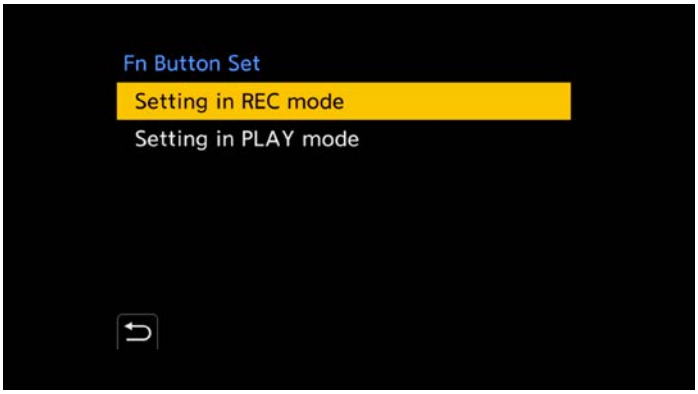


15. The S1H comes with 1 LUT loaded Vlog_709. Be sure to turn LUT VIEW ASSIST ON for Monitor (Rear Display + EVF) and HDMI external devices. From this same page, you can load up to 4 VaricCam style .vlt LUTs into the S1H with an SD card. The text (above left) is grayed out until you do.

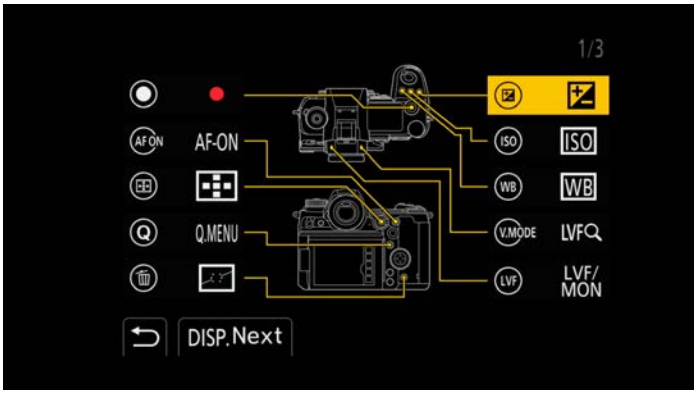
Panasonic S1H

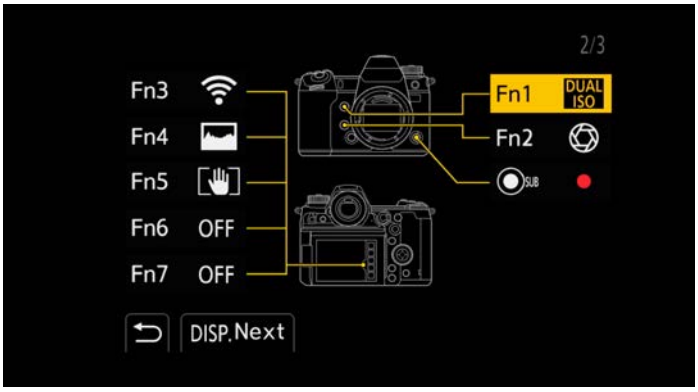
Dual Native ISO: 640 and 4000

15. S1H has Dual Native ISO as on VariCams. Assign Hi and Low ISO to a Function button: MENU > > CUSTOM > OPERATION > Fn Button Set.



Select SETTING IN RECORD MODE.





16. You'll see a graphic display of camera buttons. Let's assign Dual Native ISO to Fn1. Scroll down until you see the buttons on the front of the camera.

17. Select DUAL NATIVE ISO SETTING on page 1, IMAGE QUALITY 1.

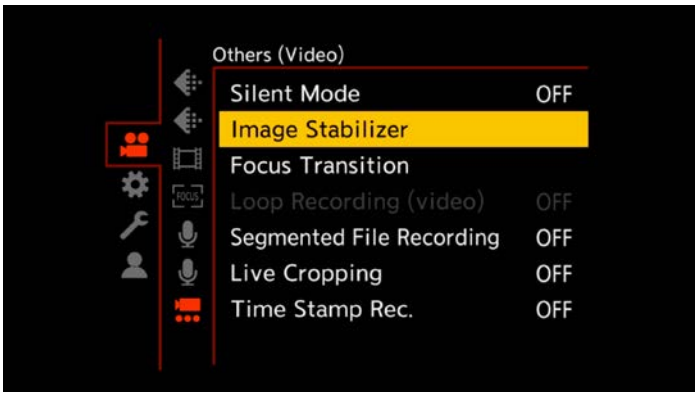
18. Fn1 Button, now assigned to switch Dual ISO from low to high.

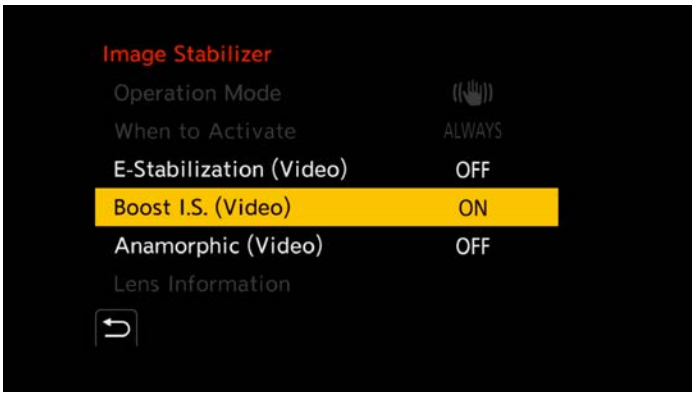
19. Now, when you push the Fn1 button, the rear screen offers a choice of LOW or HIGH ISO. Don't be a wimp and select AUTO.

20. The next step is to set the actual ISO. Push the ISO button on top. Then use the dials or joystick to go through the list and select one.

Panasonic S1H

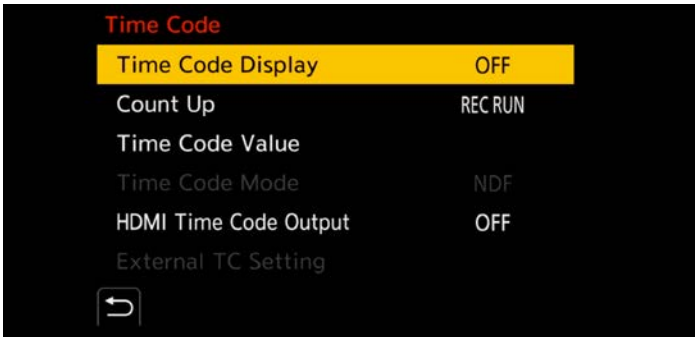
Image Stabilization



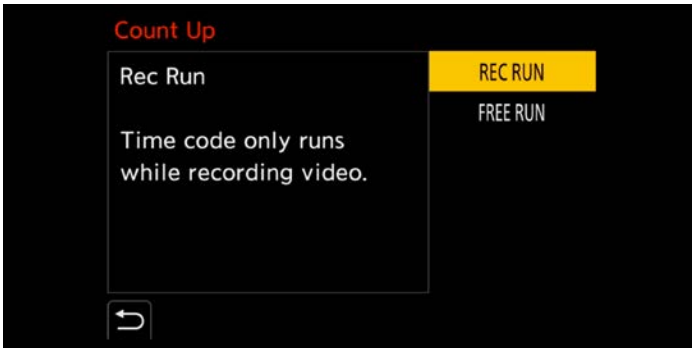


21. MENU > CAMERA > OTHERS (VIDEO) > IMAGE STABILIZER. Boost I.S. acts like a tripod in the sky. Long handheld interviews appear rock-steady and combined with an O.I.S. lens, makes shots from bouncing vehicles look almost as smooth as dolly tracks. E-Stabilization combines in-body, in-lens (when available) and electronic (image shifting) smoothing. E-Stabilization might enlarge the image slightly as it compensates.

Time Code

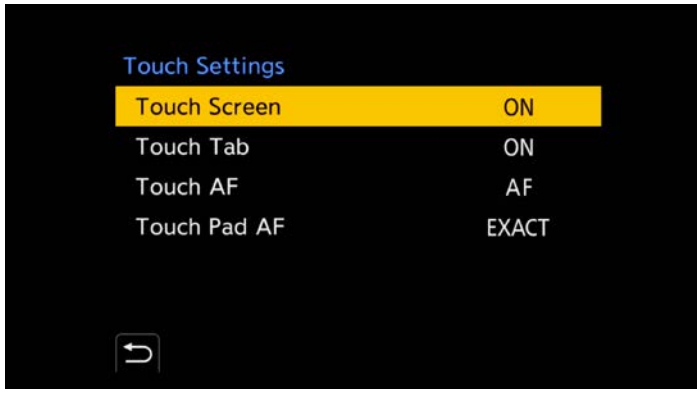


22. MENU > VIDEO > IMAGE FORMAT > TIME CODE. It is recorded to MOV or AVCHD files. DISPLAY means whether to show it or not.



23. Choose Record Run or Free Run. And use the BNC-to-flash-synchro socket cable supplied with the S1H to jam-sync or connect to other devices.

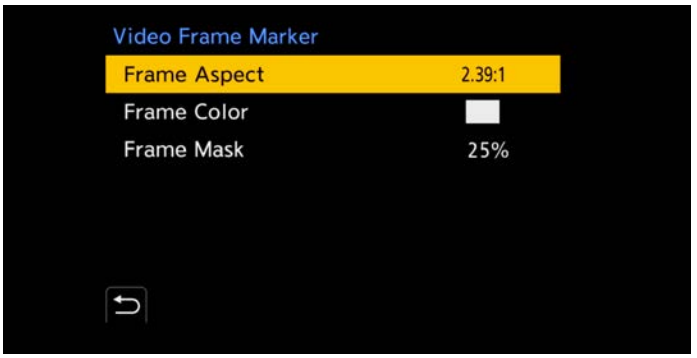
Touch Settings



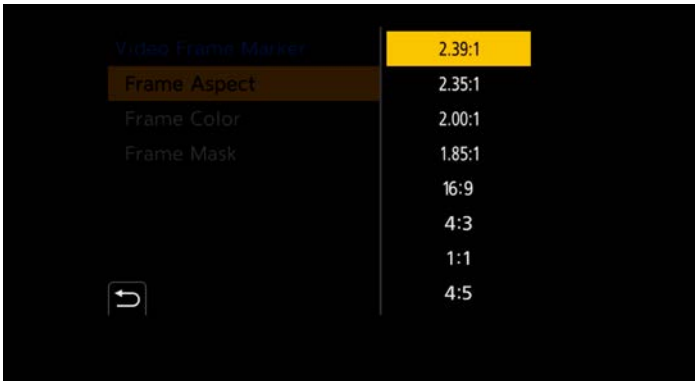
24. To avoid hearing the clicking of dials as you adjust settings on intimate sound takes, enable touch screen, tab, pad and autofocus settings.

Panasonic S1H

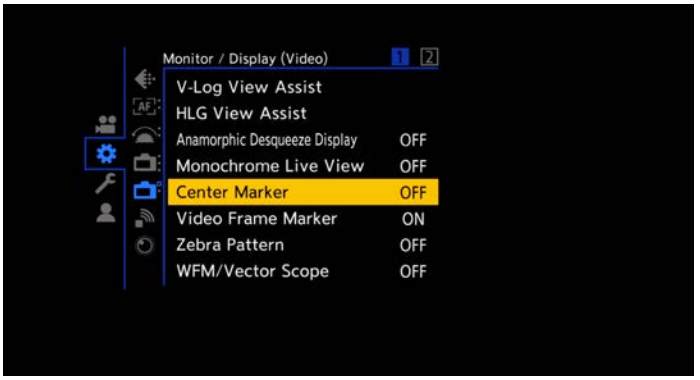
Set Framelines (Aspect Ratio)



25. MENU > CUSTOM > MONITOR / DISPLAY (VIDEO) 1 > Video Fame Marker > FRAME ASPECT. Frame Color gives you ten choices. Mask sets the amount of opacity outside of frame. Don't make the mask so heavy that you will not see errant C-Stands or impinging mic booms.



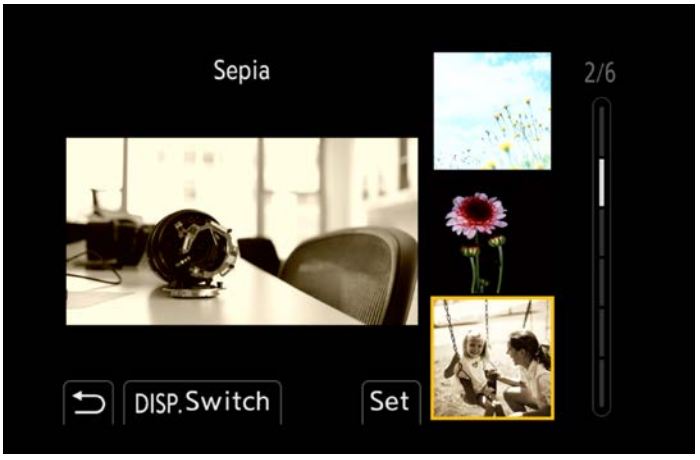
26. Choose from the list of aspect ratios.

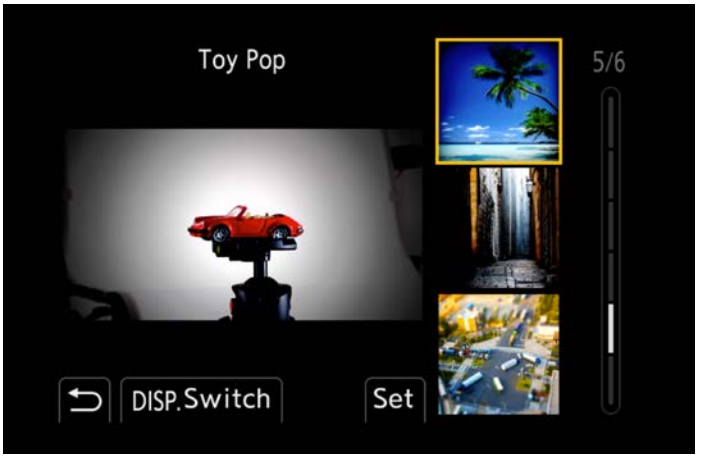


27. Center Marker = cross-hairs. Much less distracting turned off.

In-Camera Filter Effects

28. MENU > VIDEO > IMAGE QUALITY 2 > FILTER SETTINGS > SET. Filter Settings is a library of effects and looks.





29. There are 6 pages of effects, including Bleach Bypass, Monochrome, Sepia (above left) and Toy Pop (above right: peripheral shading).

S1H Image Areas and Dimensions

Sensor Area	Aspect Ratio	Mode	Actual Dimensions (mm)		
			Horizontal	Vertical	Diagonal
Full Fame	3:2	6K	35.4 mm	23.6 mm	42.5 mm
	3:2	5.4K	31.9 mm	21.3 mm	38.4 mm
	16:9	5.9K	35 mm	19.7 mm	40.1 mm
	17:9	C4K	35.6 mm	18.8 mm	40.3 mm
	16:9	4K	35.6 mm	20 mm	40.9 mm
	16:9	FHD	35.6 mm	20 mm	40.9 mm
Super 35mm	4:3	4K-A	21 mm	15.8 mm	26.3 mm
	17:9	C4K	24.5 mm	12.9 mm	27.7 mm
	16:9	4K	24.1 mm	13.6 mm	27.7 mm
	16:9	FHD	24.1 mm	13.6 mm	27.7 mm

S1H Image Areas and Sensor Modes

Full-Frame

FF 6K 3:2
35.4 x 23.6 mm
Ø 42.5 mm
5952 x 3968

FF 5.4K 3:2
31.9 x 21.3 mm
Ø 38.4 mm
5376 x 3584

FF 5.9K 16:9
35 mm x 19.7 mm
Ø 40.1 mm
5888 x 3312

FF C4K 17:9
35.6 x 18.8 mm
Ø 40.3 mm
4096 x 2160

FF UHD 4K 16:9
35.6 x 20 mm
Ø 40.9 mm
3840 x 2160

FF FHD 16:9
35.6 x 20 mm
Ø 40.9 mm
1920 x 1080

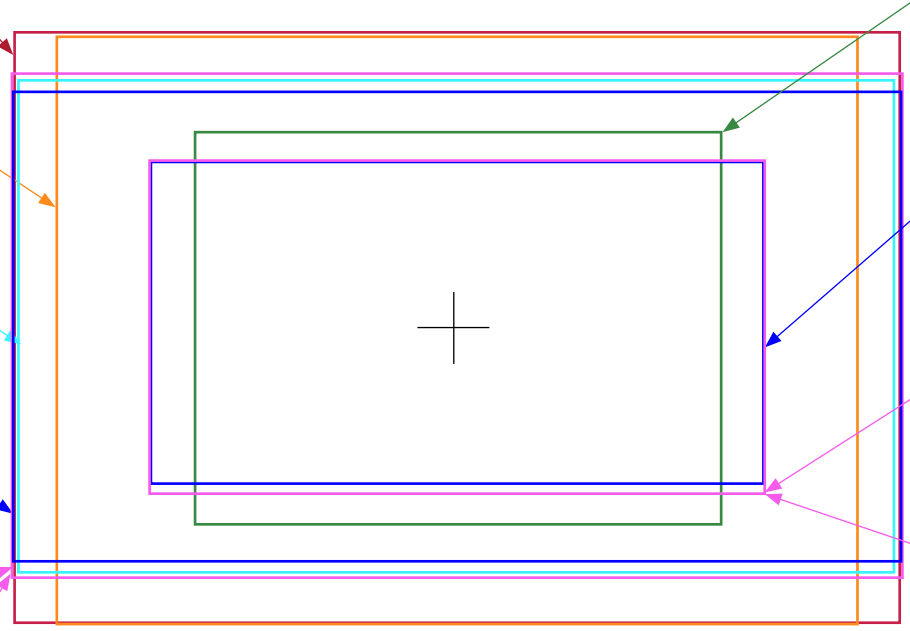
Super35

S35 4K anamorphic
4:3 2x squeeze
21 x 15.8 mm
Ø 26.3 mm
3328 x 2496

S35 C4K 17:9
24.5 x 12.9 mm
Ø 27.7 mm
4096 x 2160

S35 UHD 4K 16:9
24.1 x 13.6 mm
Ø 27.7 mm
3840 x 2160

S35 FHD 16:9
24.1 x 13.6 mm
Ø 27.7 mm
1920 x 1080



SIGMA fp

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

SIGMA fp: fortissimo pianissimo

Johannes Vermeer, *Young Woman with a Lute.* ca 1662-63.
Oil on Canvas. 51.4 x 45.7 cm. Metropolitan Museum of Art, NYC.

SIGMA fp speaks Italian, the language of music.

As Renee Montagne said, "Even when it isn't sung, the Italian language sounds like music, which is one of the reasons Italian words are used to tell musicians how to play."

Italian is what SIGMA CEO Kazuto Yamaki had in mind at the fp's launch. He explained the meaning of the name fp, "Fortissimo is a term in music meaning 'to be played very loudly.' Pianissimo means 'to be played very softly.' These words reflect the concepts of the fp nicely. It can be played very loudly to support professional cine production. And it can be played very softly as a compact camera for daily use."

As soon as a SIGMA fp landed here at FDT, it was time for a day at the Museum to photograph paintings with musical elements.

The single-source light through Vermeer's window, above, delicately diffused with bleached muslin cloth by his key grip, illuminates a young woman with a gold earring and pearl necklace playing her lute softly, pianissimo. Vermeer surely shot his SIGMA fp with the same settings as ours: 1/80 sec @ F2.8, 2500 ISO with a 45mm F2.8 DG DN | Contemporary lens.

SIGMA fp: fortissimo pianissimo piccolissima

Caravaggio, *The Musicians.* c. 1595. Oil on canvas. 92 cm × 118.5 cm. Metropolitan Museum of Art, NYC

A SIGMA fp camera's trip to the museum will be like music to any museum goer. It obediently fits in your pocket if the museum guard says no pictures please. Fortunately the Met allows photography, but no flash, no tripods.

Not suggesting mayhem or disobedience, but a backstory of Cinéma Vérité and the Nouvelle Vague was that shooting handheld in Paris, without a tripod, avoided having to get a film permit. When regulations state no tripods or big video equipment, that is when you want fp in CINE mode. Although fp stands for fortissimo pianissimo, we can also say it is for film and photo. All you have to do is slide the switch on top of the camera from STILL to CINE. When in Rome do as the Roman filmmakers do. Slide the sunroof open or hop on the back of a scooter with your piccolissima fortissimo pianissimo.

Meanwhile, back at the Met, Caravaggio's allegory of music , above, features a lute, violin, and the artist himself, second from right. He was only 20 years old when he painted *The Musicians*. Caravaggio can be forgiven his relatively flat frontal lighting, rescued by rich shadows and saturated colors. He surely set his SIGMA fp to CINE and VIVID color mode. We shot this picture of his picture at 1/50 sec, F2.8, 800 ISO.

Caravaggio's work became increasingly filled with contrast and shadow, ominously foreshadowing his own fortissimo behavior.

Full-Frame Camera and Full-Frame Cine lens:

SIGMA fp in CINE mode

with SIGMA MC-31 PL to L-Mount adapter

and SIGMA 40mm T2.5 Classic Art Prime

Kazuto Yamaki, Mark Amir and SIGMA fp

November 15, 2019. Mark Amir, president of SIGMA Corporation of America, celebrating 30 years with Sigma at historic King Cole bar in New York City. Photographed with SIGMA 45mm F2.8 DG DN | Contemporary lens and SIGMA fp camera at 5000 ISO, f/2.8 in 12-bit RAW.

"If it were not for my colleague Mark Amir, SIGMA would be experiencing a much better year," Kazuto Yamaki declared. "Mark-san should work much harder and sell more product. I do not understand why this is so difficult for him after 29 years with the company."

It was April 2018, the first evening of NAB in Las Vegas. A bunch of bigwigs were gathered for a moveable feast and serious cinematic conversation at the Michelin 3-star Restaurant Guy Savoy.

"We could have had a spectacular year," Mark riposted, "if only we would be allowed to charge customers the higher prices that SIGMA customers should be happy to pay."

You could almost hear the assembled executives' collective jaws dropping. The group sat in stunned silence wondering whether this was serious or some kind of stunt.

Of course it turned out to be a long-standing, odd-couple game of thrust and parry between Kazuto Yamaki, CEO of SIGMA and his good friend and colleague Mark Amir, President of SIGMA Corporation of America.

With that prolegomenon, let's pretend to overhear an imaginary tongue-in-cheek dialog as Mr. Yamaki and Mr. Amir might be debating the launch and pricing of SIGMA's new fp camera system.

"Kazuto-san," Mr. Amir begins. "If you consider the prices of recently launched cameras from the other L-Mount Alliance manufacturers, I am confident our customers would surely agree that the fp camera is worth a similar amount."

Mr. Yamaki answers, "Poor Mark-san, no matter how much you charge for our new camera and lens system, I imagine that even then you would not be able to improve the numbers of SIGMA Corporation of America. Therefore, I would prefer a more affordable price that lets more customers enjoy more SIGMA fp systems."

Ouch. It is worth noting that SIGMA Corporation of America is a wholly owned subsidiary of SIGMA GLOBAL VISION; they are the #1 subsidiary in turnover, with impressive numbers.

On October 25, SIGMA began shipping the Lilliputian L-Mount fp with an astonishingly low MSRP of $1899. You could almost hear thuds of industry pundits falling off their chairs in disbelief.

In corporate boardrooms everywhere, these are the eternal debates about cost versus quantity. One economic theory propounds that lower prices encourage more people to buy more product. Arguments to the contrary expound on the luxury brand mantra: the more expensive and more unobtainable, the more desirable. You see this on rue du Faubourg Saint-Honoré, Madison Avenue, Rodeo Drive and Omotesando—with fashion and cars and, of course, cameras.

Early reports indicate that SIGMA fp cameras are "flying off the shelves." Nevertheless, I expect that no matter how successful, Mr. Yamaki will continue to mischievously roast Mr. Amir.

SIGMA *fortissimo pianissimo decostruito*—deconstructed

1. *Piccolissima.* Pocketable.

2. *Senza Confini.* Switch from STILL to CINE.

Having explained the *fortissimo* and *pianissimo* of the *fp* name, SIGMA CEO Kazuto Yamaki discussed the initial concept behind building the camera: "The aim was a **deconstruction** of the traditional digital camera." With Italian the language of music and now the fp camera, let's continue with its *decostruzione.*

In the *ideazione* of the SIGMA fp, there are five unique features.

1. *Piccolissima*. Mini mini mini. The fp is a pocketable Full-Frame camera. As mentioned earlier, it is currently the world's smallest and lightest Full-Frame Mirrorless digital camera with interchangeable mount, according to SIGMA. It has a 35.9mm×23.9mm Full-Frame 24.6MP sensor in an incredibly compact and lightweight body of great versatility that allows mixing and matching a panoply of L-Mount and other lenses and accessories.

2. *Cine qua! Stills là!* The new fp breaks the boundaries between cine and still cameras. The slide switch on top takes you seamlessly from stills to video. Video UHD/4K 12-bit CinemaDNG RAW files can be recorded at 24 fps to an inexpensive SSD. Many more formats and slow motion video can also be recorded to the internal SD card.

3. *Scalabile*. Scalable. Because the fp is so small, compact and lightweight, it is comfortable when shooting long hours handheld or on a tripod, on a gimbal or drone, Steadicam or stabilizer, body only or with handgrip, mattebox, cage or sunshade.

Whether working with a large crew or alone, the SIGMA fp's versatile 20mm flange focal depth mirrorless mount accepts scores of lenses from the SIGMA, Panasonic and Leica L-Mount Alliance. Or you can attach a PL to L-Mount adapter for access to a world of PL cine lenses.

4. *Dati non Elaborati.* RAW. The SIGMA fp records UHD 4K CinemaDNG uncompressed RAW files. 10 and 12-bit files are recorded to an inexpensive SSD via the camera's USB-C connector. 8-bit Cinema DNG RAW files can be recorded internally to an SD card. At this time, the SIGMA fp is the only Full-Frame mirrorless camera we know of that does 4K uncompressed 12-bit RAW.

5. *Mirino da regista*. Director's Finder. Attach SIGMA's LCD Viewfinder accessory to the fp. The fp becomes a versatile Director's or DP's Finder. You can compose shots with framelines calibrated for various aspect ratios on: ALEXA LF, Mini LF, ALEXA 65, Venice, Monstro 8K, Helium 8K, Dragon 6K, Epic MX 5K, Gemini 5K, Arricam, ALEXA SXT, XT, Mini, Amira, etc.

3. *Scalabile.* Scalable.

With Leica M to L adapter and vintage Leica 35mm f/2.8 Summaron lens.

4. *Dati non Elaborati.* RAW.

With PL to L adapter and SIGMA Classic Full-Frame Cine lens.

5. *Mirino del regista.* Director's Finder.

SIGMA fp *configurazione*—configurations

SIGMA PL to L-Mount Converter MC-31

SIGMA EF to L-Mount Converter MC-21.

LEICA M to L (T) Adapter

If you have ever tried to tighten a PL mount but the lens still wobbled around, SIGMA has a nice adjustment in their M-31 PL to L-Mount adapter. Unscrew the 0.5 mm hex screw in the mount and you will be able to rotate the PL breech further clockwise to tighten.

Full-Frame SIGMA 40mm T2.5 Classic Art Prime cine lens with MC-31 PL to L-Mount Adapter on SIGMA fp camera.

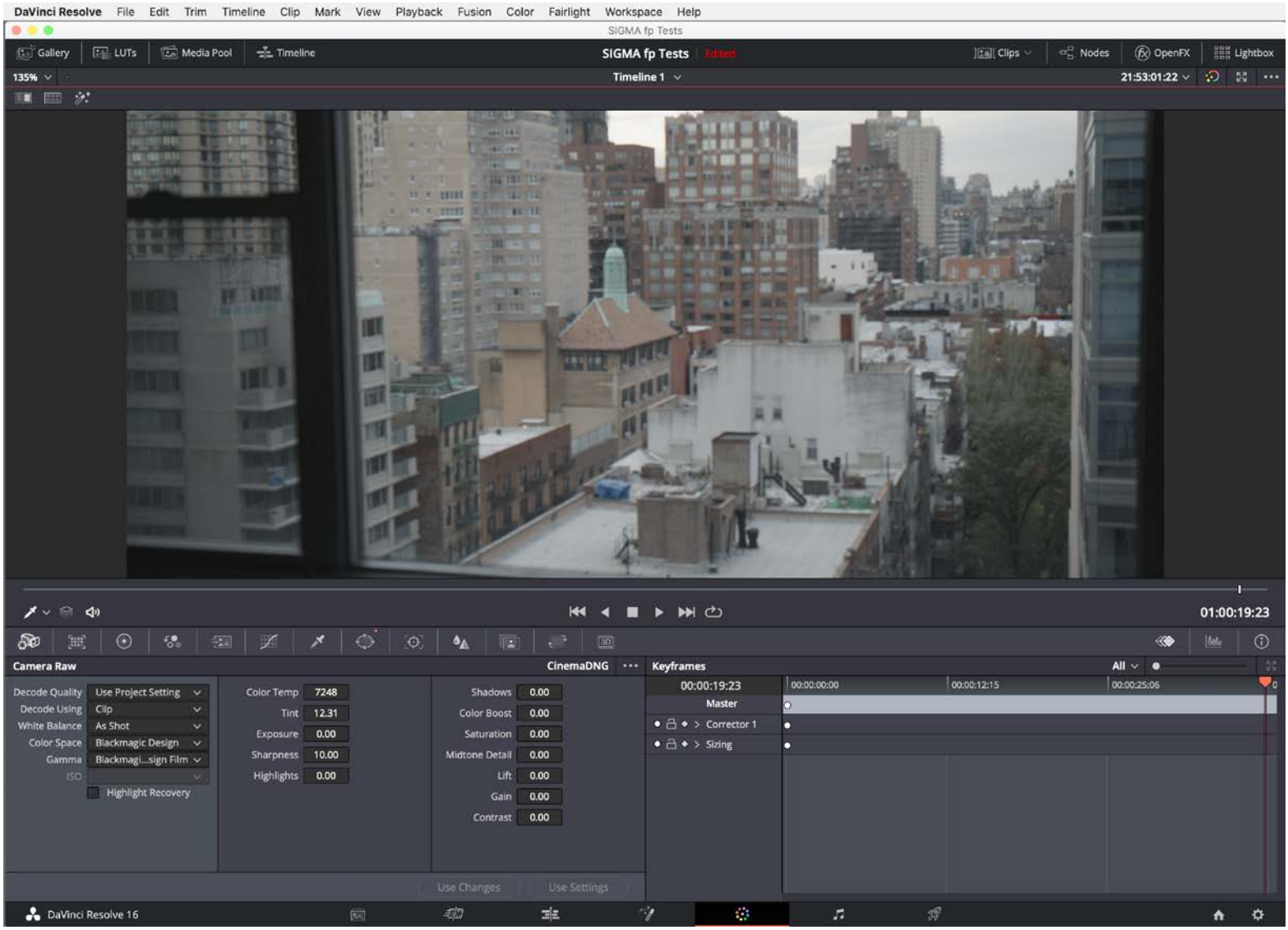
SIGMA LCD View Finder LVF-11 screws into the bottom ¼-20 thread of the fp to transform it into a Director's Finder. There's an adjustable diopter at the rear.

STILL mode

CINE mode in 2.39:1 Full-Frame full width aspect ratio

SIGMA 24-70mm F2.8 DG OS HSM | Art zoom lens with EF mount mounted to SIGMA fp with a SIGMA MC-21 Canon EF to L-Mount Converter. Optical Image Stabilization, Autofocus and Auto Exposure are fully functional.

SIGMA fp RAW settings for DaVinci Resolve



SIGMA fp Product Manager Takuma Wakamatsu suggests the following settings when importing fp's CinemaDNG RAW uncompressed files into DaVinci Resolve:

On DaVinci Resolve's Color Page:

1. Select **CAMERA RAW** tab (extreme left icon mid screen).
2. Set **Decode Quality** to **Use Project Setting**.
3. Set **Use for decoding** to **Clip**.
4. Set **Color Space** to **Blackmagic Design**.
5. Set **Gamma** to **Blackmagic Design Film**.

These settings reveal the original wide latitude of RAW.

If your project consists of only fp footage:

1. Begin with **FILE > PROJECT SETTINGS** and select **CAMERA RAW**.
2. Set **RAW Profile** to **CinemaDNG**.
3. Set **Decode Using** to **Project**.
4. Set **Color Space** to **Blackmagic Design**.
5. Set **Gamma** to **Blackmagic Design Film**.

The same results will now be obtained for the entire project.

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 ∅)

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 a7R 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.

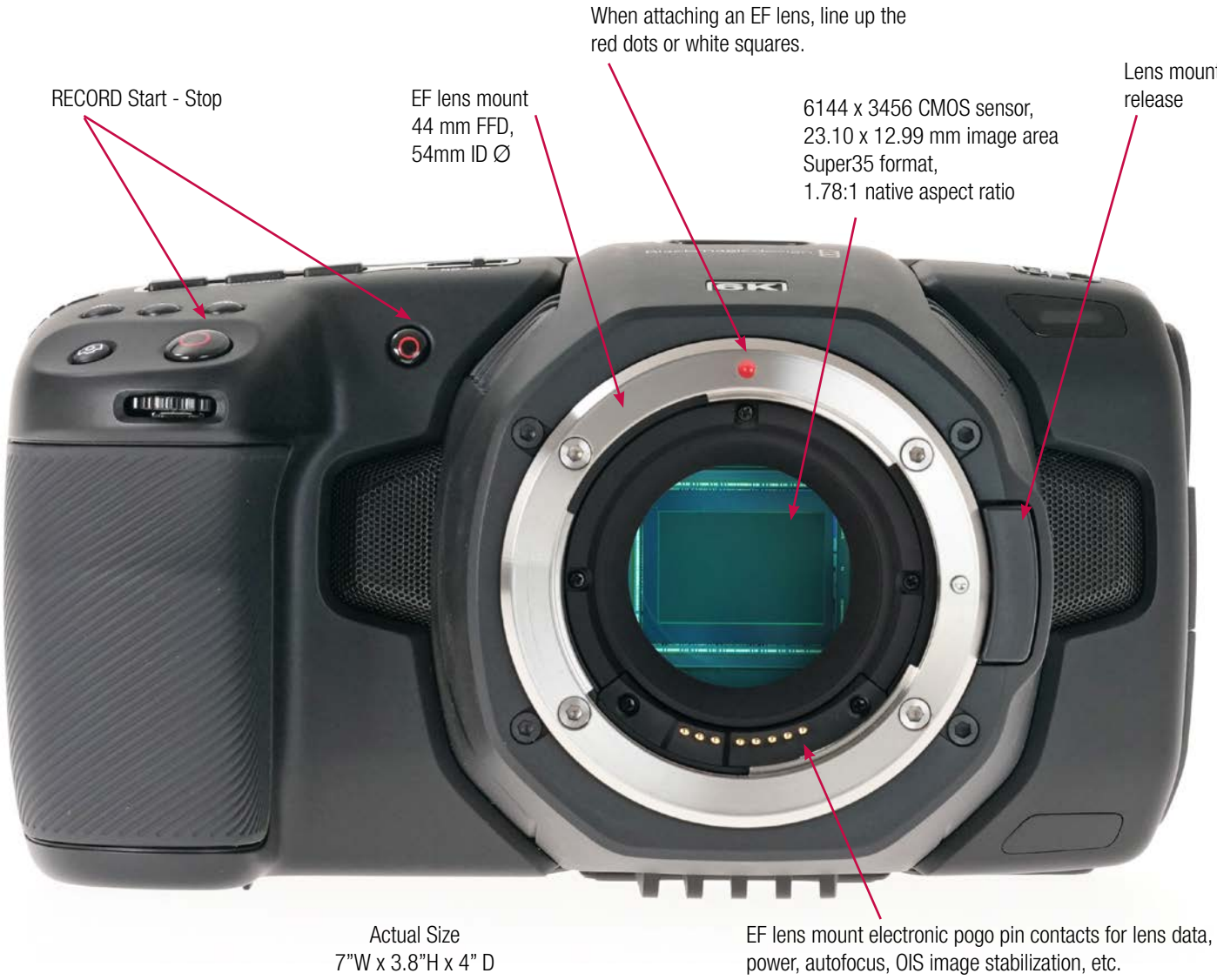
Blackmagic Pocket Cinema Camera 6K Main Features

- 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.

Pocket Cinema Camera 6K



The big news is the EF lens mount and Super35 sensor. The Pocket Cinema Camera 6K has the same Canon-style EF lens mount and a similar sensor size as Blackmagic's URSA Mini Pro 4.6K. Previous Blackmagic Pocket Cinema Cameras had Micro Four Thirds (MFT) mounts and smaller sensors.

At first glance, it looks like an ILMC—Interchangeable Lens Mirrorless Camera. The Blackmagic Pocket Cinema Camera 6K is about the same size and shape. Its lightweight, rugged carbon fiber composite body has a comfortable, ergonomic design.

The grippy handgrip's tactile buttons on top and knurled dial in front are within easy reach to select and adjust ISO, White Balance, Shutter, Iris or other settings. Inside the handgrip there's a standard Canon-style 7.2V battery capable of powering the camera for 45 minutes of 6K RAW at 24 fps.

Pocket Cinema Camera 6K Recording Highlights

Internal recording of 10-bit Apple ProRes files up to 4K and compressed 12-bit Blackmagic RAW up to 6K:

- up to 50 fps in 6144 x 3456 (16:9)
- up to 60 fps in 6144 x 2560 (2.4:1)
- up to 60 fps in 5744 x 3024 (17:9)
- up to 60 fps in 3728 x 3104 (6:5 windowed) S35 anamorphic
- up to 120 fps in 2868 x 1512 (17:9).

External recording via USB-C connector to SSD media:

- up to 50 fps in 6144 x 3456 (16:9) 12-bit Blackmagic RAW (Q0 compression)

Pocket Cinema Camera 6K

The CMOS sensor's 6144 x 3456 photosites occupy a 1.78:1 aspect ratio Super35 format area of 23.10 x 12.99 mm. Files are recorded to internal, removable CFast and SD (UHS-II recommended) media cards. A USB-C connector lets you record directly to an external hard drive, such as an SSD.

While some Blackmagic cameras record in most formats of ProRes and Blackmagic RAW (and in some cases DNxHD), Pocket Cinema Camera 6K supports a sub-set of formats in Blackmagic RAW and ProRes. For a complete list, refer to the Installation and Operation Manual found at: *blackmagicdesign.com/support/*

This compact camera also records the same Blackmagic RAW that URSA Mini Pro 4.6K does. Think of Blackmagic RAW as a film negative. The original sensor data is preserved. You get more options and flexibility in post. Files are relatively small and easy to manage. Looks are not locked in—you can unleash them easily in post.

Pocket Cinema Camera 6K Blackmagic 12-bit RAW formats use full, windowed or scaled sensor modes. Therefore, if you want the best quality image in a 17:9 aspect ratio release, for example, it makes more sense to shoot 5.7K Blackmagic RAW (windowed 16:9) than 4K DCI ProRes (scaled from 5.7K 16:9). You can downsample the 5.7K image to 4K in DaVinci Resolve during post production. This results in better image quality).

Blackmagic RAW (.braw) files save camera settings in their metadata. So, you can set ISO, white balance and exposure in camera—confident that you can change these settings later in post. DaVinci Resolve Studio, which comes free with the Pocket Cinema Camera 6K, has great tools for working with Blackmagic RAW files. And Blackmagic RAW Player is a free app for Mac OS X.

There's a 1920 x 1080, 5-inch monitor at the rear of the camera. It is bright, sharp and displays realistic images. You can touch to focus. Display overlays above and below frame show camera status, histogram, focus and peaking indicators, audio levels, frame guides, playback controls and more. Tap and swipe gestures take you to additional "pages" to choose ProRes or Blackmagic RAW recording, 3D LUTs, HDR, enter metadata, set timecode, and much more.

The Pocket Cinema Camera 6K can be jam-synced by an external source, such as an audio recorder, Denecke or Ambient timecode slate, Lockit or Tentacle Sync device. Plug the external timecode source into the camera's 3.5 mm audio jack. The camera will detect timecode and lock its "clock." Multiple Blackmagic Pocket Cinema Cameras are popular for car running shots, action sequences, stunts, and music videos. Dozens of them can be shooting simultaneously—economically. Timecode syncs them all together, and they maintain sync with the same matched timecode after many start-stops.

Pocket Cinema Camera 6K

Tap on any item on top or bottom of screen to activate or adjust setting. Swipe up or down for clean image without icons or text. Swipe left or right for Slate.

Tactile buttons to the right of screen for direct controls

The tactile MENU button summons up the Dashboard and its tabbed menus with settings for RECORD, MONITOR, AUDIO, SETUP and presets.

Shown here: we're shooting 6K 6144 x 3456 and Blackmagic RAW Constant Quality Q0. Q0 gives us the best quality. Its variable bitrate changes depending on the complexity of the scene. Bitrates will range from below 2:1 (for a scene that's difficult to compress) up to 6 or 7:1 for a scene that's simple to compress. Q0 averages around 3:1. The image quality never changes, no matter how much movement or fine detail you have in the scene.

Pocket Cinema Camera 6K

View of Camera left side with rubber covers open

Connections

3.5 mm Mic or Line Audio Input. Also Timecode IN for jam-syncing

3.5 mm Headphone Output

Full-size HDMI Output: for Monitoring with or without text and 10-bit 4:2:2 1080p HD video monitoring or external recording

External 12-20 V DC Power Input and Battery Trickle Charger

USB-C connector (up to 5 Gb/sec for recording to external drives—also to recharge battery and update software

Mini 3-pin XLR Mic and Audio Input

Blackmagic Pocket Cinema Camera 6K shown with Canon EF 70-300mm f/4-5.6 IS USM Full-Frame zoom.

The Pocket Cinema Camera 6K accepts both EF (Full-Frame) and EF-S (APS-C format) lenses.
EF-S is Canon's APS-C (Super35) series of smaller, lighter, more affordable cameras and lenses. Think of "S" in EF-S as "Smaller."

Canon EF 70-300mm f/4-5.6 IS USM Full-Frame zoom

Canon EF-S 18-135mm f/3.5-5.6 IS STM zoom

Red dot, white square

Blackmagic Pocket Cinema Camera 6K accepts both Full-Frame EF lenses and APS-C (Super35) EF-S lenses. Canon typically puts at red dot on Full-Frame EF lenses and at the 12 o'clock position on camera mounts. This helps you position the bayonet mount. Canon puts a white square on APS-C format EF-S lenses. This is located about 10 degrees clockwise from the red dot. Because most EF-S cameras accept both formats, you'll usually see both a red dot and white square on EF-S format cameras.

Before 2003, Canon lenses and cameras only had red dots for EF lenses. They covered Full-Frame 36 x 24 mm. Canon introduced their APS-C format EF-S lenses and cameras in 2003. EF-S lenses and APS-C cameras (initially film, then digital) offered lower cost and lighter weight alternatives to Full-Frame.

The APS-C image area is 25.1×16.7 mm (1.33:1 aspect ratio). Super35 motion picture film format is close in size: 24.89 × 18.66 mm (and also 1.33:1 aspect ratio).

The Pocket Cinema Camera doesn't have a white square for EF-S lenses (APS-C format), but you can add your own with a dab of white nail polish or piece of chart tape

Wooden Camera PL Mount Modification

Let's assume you have made the wise decision to buy a Blackmagic Pocket Cinema Camera 6K. Its EF mount gives you the ability to work with EF lenses and have autofocus, auto exposure, image stabilization and lens data readout.

But wouldn't it be nice, you might wonder, if the camera could also accept PL mount lenses. Now it can—with Wooden Camera's PL Mount Modification Kit for Blackmagic Pocket Cinema Camera 6K.

Minor surgery is required, but with Wooden Camera's clear video, included tools and the Pocket Cinema Camera 6K's thoughtful design, the process is simple, relatively quick and actually fun.

The PL Mount is made of stainless steel and aircraft grade aluminum and includes a PL cavity cap. Shims are provided.

The modification is reversible if you want to go back to EF mount. However, Wooden Camera cautions that switching back and forth may eventually strip the threads in the camera.

If you are not fond of "minor assembly required," you can have the nice folks at Wooden Camera perform the modification for an additional $250 on top of the PL mount's reasonable cost of $499. *woodencamera.com*

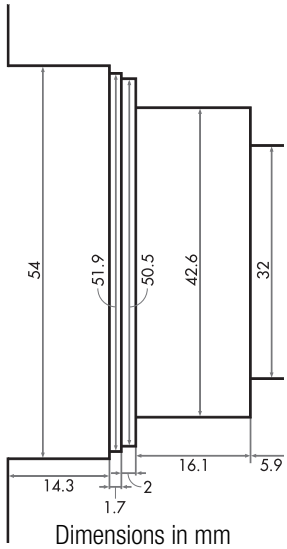
Many, but not all, PL mount lenses fit.

Do not use lenses whose rear elements protrude more than 40 mm from the PL flange into the lens cavity.

Other lenses may not fit because of the design of the Pocket Cinema Camera 6K's lens cavity.

Refer to the diagram at right as well as ``Wooden Camera's BMPCC6K Compatible Lens Chart: *tiny.cc/BMDPCC6K*

Cutaway view of Pocket Cinema Camera 6K's Lens Cavity



Dimensions in mm

Blackmagic Pocket Cinema Camera 6K with native EF mount

Blackmagic Pocket Cinema Camera 6K with PL mount modification

Lawrence Sher, ASC on *Joker*

Lawrence Sher, ASC
on *Joker* with ALEXA 65

Photo by Niko Tavernise

Jon Fauer: How many ALEXA 65 cameras did you have on "Joker?"

Lawrence Sher, ASC: Just two bodies, A and B camera. We had an ALEXA LF that we sometimes put on the Steadicam, and some ALEXA Minis that we used infrequently, inside four faux shells of studio cameras that were on the Murray Franklin set that were actually shooting the show in real time. So 95% of the movie was done with ALEXA 65 bodies.

Who supplied them?

They came out of ARRI Rental in New York.

What lenses did you have?

It was a bit of a Frankenstein list of lenses. ARRI Rental was very helpful in supplying lenses that fit certain criteria. I needed some lenses that were fast. I needed others that were close focus. It was a hodgepodge of a set.

Did you tune or detune the lenses?

We tried to make them all feel as vintage as possible even though a lot of them weren't really vintage lenses. We basically worked on matching them to each other, without a crazy amount of detuning.

How did you manage handholding with ALEXA 65 cameras?

I was operating B camera and I would just cradle it like a child. There were a lot of low angles. Geoffrey Haley, our A-Camera and Steadicam operator had a [Walter Klassen] Slingshot Rig.

Tell me about focus with ALEXA 65 and your fast lenses. I assume you were wide open a fair amount.

I actually revisited that question. I reviewed all the old camera reports and set up an Excel spreadsheet to figure out which lenses were used and at what T-stop. I was surprised to find that I was less wide open than I thought I would have been. It turned out we were at T2.8 most of the time.

Well, that's still pretty fast for your focus puller.

Yes. Particularly since we were shooting with the 135mm quite often. Greg Irwin is an amazing focus puller. We've worked together since *The Hangover* through *Godzilla* and now *Joker*. Tim Metivier, focus pulling on B-camera, was also terrific. With those two guys, the actors never had marks and we never had rehearsals. One of the real reasons we chose to shoot ALEXA 65 instead of 65mm film was because we knew it gave them a fighting chance at focus, because they could pull focus off a monitor.

Because they would rather watch a high resolution live video feed than a flickering, groundglass grain, beamsplit video assist image from the analog film camera 765?

That's something I try to explain when we discuss film or digital and what kind of camera to use. You do not want a technical detail like that influence the entire decision, but it does matter. As a result, we did not have to be anxious about focus. Particularly the way we were operating, cradling the camera, it was difficult to always look through the eyepiece. So it was reassuring to have the confidence that technically we would not lose any takes because of buzzed focus.

You were operating off a mini monitor?

I would often have the camera on my knee or cradled under my arm and I would be operating off a monitor. Sometimes I would operate with a Talon Remote Head and that let me watch both my B-camera and the A-camera at the same time on a monitor. I have an HME wireless intercom so I can communicate quietly with Geoff.

How did you decide to shoot with ALEXA 65 in the first place?

We initially wanted to shoot 65mm film. But the studio was reluctant. So then we were going to shoot 35mm. It was only very late in the game of testing that [Director] Todd Phillips realized that his desire for fluidity precluded being burdened by anything technical. He didn't want to risk losing even one take of a one-of-a kind Joaquin Phoenix dramatic moment and then the next day having a horrible conversation like, "Oh no, it's just a little bit out

of focus and not really something you want to put in a movie."

I then suggested that if we try ALEXA 65, we would be able to satisfy our original desire of shooting large format if he was willing to consider digital. And then we tested it. I worked very hard with Jill Bogdanowicz at Company 3 to create a simple LUT. There was just one LUT on the movie. It was meant to mimic 5293 film. I think Todd knew that we could be slightly more courageous and daring in digital. If we shot film, the movie still would have been really good, but there would have been little ways that we would have adjusted to everyday.

For example, if I'm cradling the camera and moving fluidly through the space, I would be saying to myself, I need to see through the eyepiece so I can actually see focus and be able to adjust it with my hand if it's out of focus. All these technical things help you when you're shooting digitally. They give you a little bit more piece of mind. It just makes you a little more free. I think that was ultimately the thing that kicked it over, and I was able to convince Todd to go shoot digital.

How did you get started in the business?

I went to Wesleyan, probably thought I was going to be a doctor. My dad's a doctor and my twin brother became a doctor. And then, I was interested in still photography. You know how a lot of doctors have hobbies? My dad was a really good amateur photographer. I was into art and drawing when I was young. I was an economics major at Wesleyan. But I knew I didn't want to go to Wall Street and I took a film survey class at Wesleyan called The Language of Film, taught by Joe Reed.

We were taught to look at film not just as entertainment but as art. It revived a dormant part of my creative brain. I graduated as a film major, and tried to learn about filmmaking and cinematography as much as possible. I helped friends shoot their short films. Then I drove to LA and tried to work my way up through the ranks, beginning as a camera assistant. Whenever I had a little extra money, I would just get a camera and film something. I got in the commercial music video world in the early 90s. My first job was driving film back and forth from the desert on an Antoine Fuqua music video. And here we are now.

Lens List

ARRI DNA 28mm T2.8
ARRI Prime 65S 35mm T2.5
Leica R 50mm T1.4
ARRI DNA 60mm T2
Canon CN-E 85mm T1.3
Leica R 90mm T2
ZEISS CP.2 135mm T2.1
ARRI Prime 65S 150mm T2.8
Leica R 280mm T2.8
Canon 35mm T1.5
Canon 50mm T1.3
Nikkor 58mm T1.2
ARRI DNA 80mm T1.9
ZEISS CP.2 85mm T2.1
Leica R 100mm T2.8
Canon CN-E 135mm T2.2
Nikkor 200mm T2
ARRI Vintage 765 (Hasselblad/ZEISS) 350mm T4.2
ZEISS 70-200mm T2.9 Zoom
Canon 150-600mm f/5.6

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