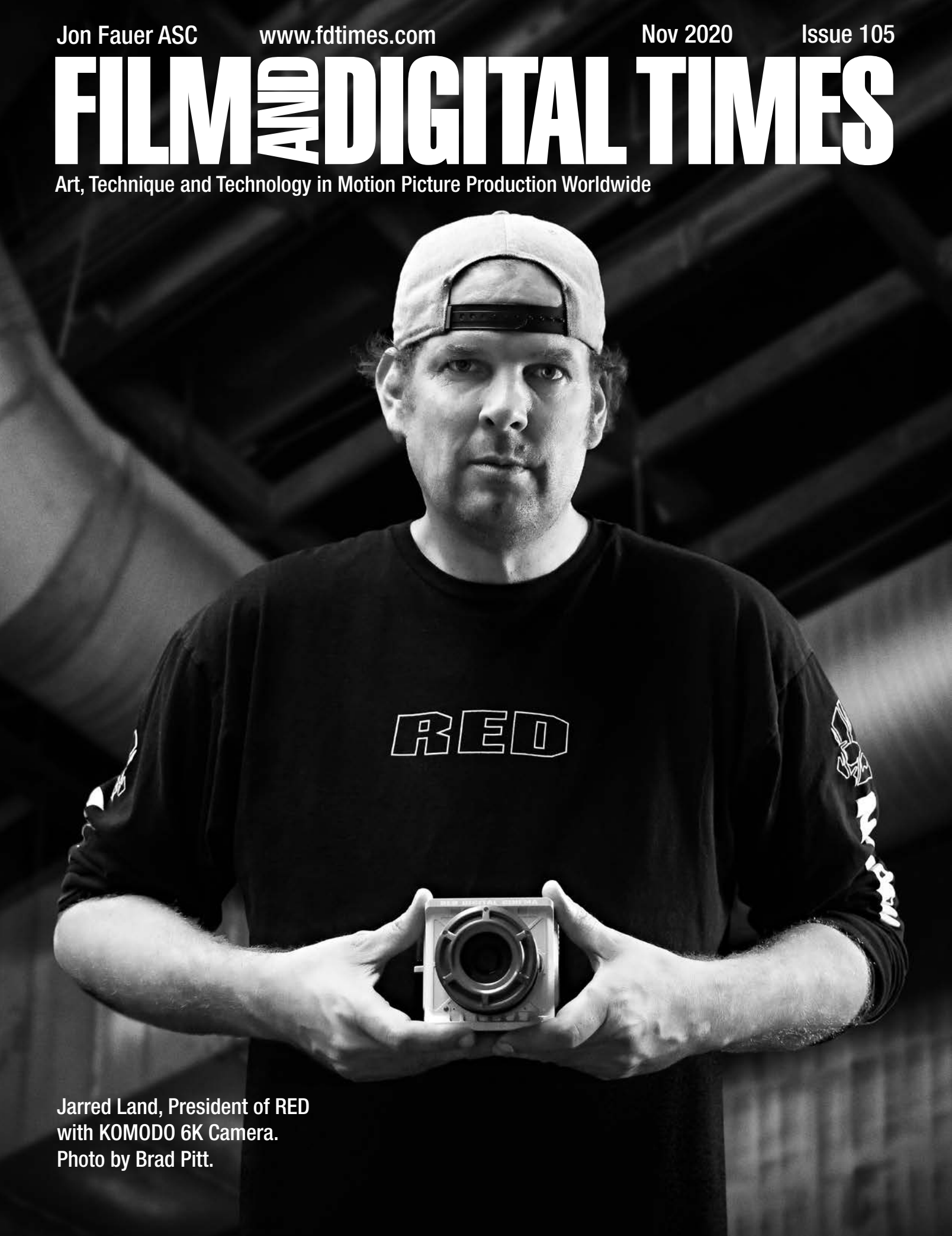
Jon Fauer ASC www.fdtimes.com Nov 2020 Issue 105

# FILM AND DIGITAL TIMES

Art, Technique and Technology in Motion Picture Production Worldwide




Jarred Land, President of RED
with KOMODO 6K Camera.
Photo by Brad Pitt.

# 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.



## subscribe

## www.fdtimes.com

**Subscribe online, call, mail or fax:**

**Direct Phone:** 1-570-567-1224
**Toll-Free (USA):** 1-800-796-7431
**Fax:** 1-724-510-0172

## Film and Digital Times
## On Paper, Online, and On iPad

### Print + Digital Subscriptions

Film and Digital Times Print + Digital subscriptions continue to include digital (PDF) access to current and all back issues online.

### iPad and iPhone

Get Film and Digital Times for iPad and iPhone on the Apple Newsstand. Download our free app in the iTunes Store (search: Film and Digital Times). Get individual issues, back issues, or an annual subscription.

### Digital (PDF) subscriptions

Digital (PDF) subscriptions include unlimited access to the current and all back issues. www.fdtimes.com/issues

### FDTimes Customer Service

For subscription or account questions, please contact us by phone Monday–Friday, 9 am–5:30 pm EST.

Phone: 1-570-567-1224
Toll-Free (USA): 1-800-796-7431
Fax: 1-724-510-0172
Email via website: fdtimes.com/contact
Mailing address: Film and Digital Times Subscriptions
PO Box 922
Williamsport, PA 17703 USA

Editorial offices in New York City

## www.fdtimes.com

## On Paper, Online, and now on iPad

# Subscribe
## Online:

## www.fdtimes.com/subscribe

## Call, Mail or Fax:

**Direct Phone:** 1-570-567-1224
**Toll-Free (USA):** 1-800-796-7431
**Fax:** 1-724-510-0172

Film and Digital Times Subscriptions
PO Box 922
Williamsport, PA 17703
USA

| | | | |
|---|---|---|---|
| ☐ | 1 Year Print and Digital, USA | 6 issues | $ 49.95 |
| ☐ | 1 Year Print and Digital, Canada | 6 issues | $ 59.95 |
| ☐ | 1 Year Print and Digital, Worldwide | 6 issues | $ 69.95 |
| ☐ | 1 Year Digital (PDF) | | $ 29.95 |
| ☐ | 1 year iPad/iPhone App upgrade (normally 29.99) *Get FDTimes on Apple Newsstand with iPad App when you order a Print or Digital Subscription (above)* | | + $ 9.99 |

Total $ _____

Payment Method (please check one):

☐ VISA ☐ Mastercard ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code _____

Expiration Date _____

Signature _____

Name _____

Company _____

Title _____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code _____

Phone _____

Fax _____

Email _____

# Contents: Nov 2020 Issue 105


About the Cover ..... 3
RED KOMODO 6K ..... 4
Jarred Land on KOMODO ..... 5-15
KOMODO Released: Specs ..... 16
SIGMA 105 mm F2.8 DG DN Macro | Art ..... 17
Canon EOS R5 and EOS R6 Compared ..... 18
Canon EOS R5 - 8K RAW Camera ..... 19
Canon EOS R5 ..... 19
Canon EOS R6 ..... 19
Canon EOS R5, cont'd ..... 20-21
Some Canon R5 Video Menu Settings ..... 22
Canon EOS C70 4K Super35 Cine Camera ..... 23-26
Canon EOS C70 Specs ..... 27
Canon EOS C70 and EOS R5 Compared ..... 28-29
ARRI Signature Zooms ..... 30-32
ARRI Signature System: Primes & Zooms ..... 33
Thorsten Meywald on Signature Zooms ..... 34-38
Crafting Signature Zooms ..... 39-41
Grading *Ford v Ferrari* with Skip Kimball ..... 42-44
Grade School with Skip Kimball ..... 45
*Ford v Ferrari* Frames ..... 46-51
The Business of the Business: CVP ..... 52
The Business of the Business: CVP, cont'd ..... 53-59
FUJINON Premista 19-45 mm joins 28-100 & 80-250 ..... 60
FUJINON Premista 19-45 mm T2.9 ..... 61-62
Using Prêt À Tourner Test Charts ..... 63
Panasonic LUMIX DC-S5 ..... 64
Panasonic LUMIX S1H and S5 Compared ..... 65
Panasonic LUMIX S5 ..... 66-69
Chrosziel TP7 Large Format Lens Test Projector ..... 70-71
FX6 and Sony Cinema Line ..... 72
Sony a7S III ..... 73-75
Sony a7S III Menus ..... 76
Sony a7S III Slow & Quick ..... 77
Sony a7S III Regular Internal Recording Modes ..... 78
Sony a7S III Slow & Quick Internal Recording Modes ..... 79
Sony a7S III, cont'd ..... 80-81
Cinematography Electronics /i Lens Display ..... 82
Easyrig EASYLOCK ..... 83
Teradek Bolt 4K LT ..... 84-85
SmallHD Indie 7 Monitor ..... 86-87
Wooden Camera AKS for RED KOMODO ..... 88-89
TILTA Kits for KOMODO ..... 90-91
Vocas Accessories for KOMODO ..... 92
Tokina 25-75 mm T2.9 Zoom ..... 93
Tokina 135 mm T1.5 Vista One ..... 93


## About the Cover

Jarred Land, President of RED, with new RED KOMODO 6K Super35 Camera held like an inspirational Hasselblad or Mamiya. Fitted with a GDU pancake lens (Canon optics) and RF to EF mount adapter.

Photo by Brad Pitt.


## About the Cover Photo

Following our interview on the RED KOMODO 6K, published here, Jarred Land and I discussed the developing article. The story was interesting. It foreshadowed important things for the industry. I proposed the idea of a cover, and gave Jarred some guidelines for that shot.

In his interview, Jarred he went into detail on the similarities that Medium Format cameras had to the KOMODO. Obviously these designs had a lot of influence on him and the KOMODO camera, so I sent him a few photos for reference of people holding Medium Format cameras. One of those photos was the 2013 Esquire portrait of Brad Pitt cradling his Hasselblad on set.

Unbeknownst to me, Jarred was actually sitting with Brad Pitt when I sent those reference photos over, and since they were the closest of friends, Jarred asked him to quickly grab a camera and take the cover shot.

Jarred emailed the photo shortly after simply stating, "How's this? I'm no Brad Pitt…but Brad Pitt kindly shot this photo."

Imagine my delight at how these two stars turned the tables.

# RED KOMODO 6K

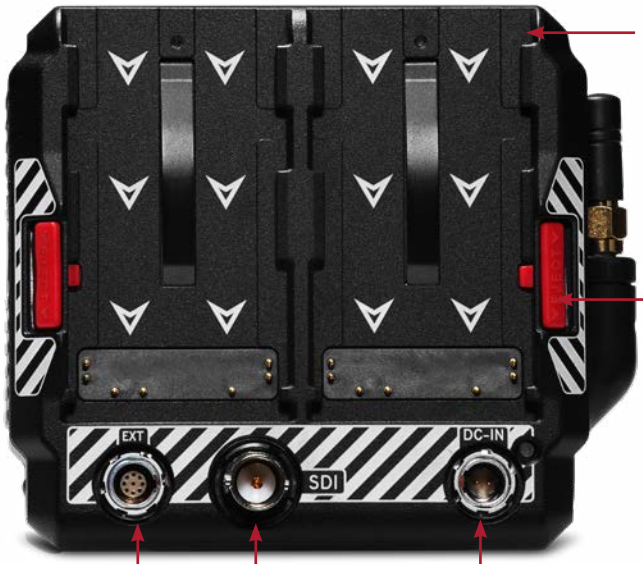
## Front


Tally light turns red when recording

Super35 Sensor (6144 x 3240)
27.03 x 14.25 mm
30.56 Ø
Global Shutter
6K to 40 fps

RF Lens Mount
54 mm diameter
20 mm flange focal depth

## Rear




2 slots for 7.4 V BP batteries (Canon style)

Battery Release

9-pin Extension Port
5V 500 mA Aux Power,
RS, Genlock,
Timecode In/Out,
RS-232, General
Purpose Output, etc.

12G SDI 4K Output

12 V DC Input (external power)

## Left

CFast 2 Media Door


## Right

Power ON / OFF

Antenna

Image Plane


RECORD start/stop.

Preliminary approximate specs. Size 4" x 4" (10.16 x 10.16 cm).
Weight 2 lb (900g).

# Jarred Land on KOMODO


Photo of Jarred Land by Brad Pitt

*Jarred Land joins Vittorio Storaro as an interviewee with boundless enthusiasm. You just have to ask a question and he can go on with a fascinating dissertation of almost unlimited length. I have cut this interview down ever so slightly to fit into this month's edition of FDTimes :)*

*We are talking with Jarred Land, president and co-owner of RED Digital Cinema, about the interesting new KOMODO camera.*

**Jon Fauer: It's the beginning of October 2020, the camera hasn't been officially released, and thousands of people already know about it.**

Jarred Land: Yes, it hard to believe that the KOMODO isn't actually official nor commercially for sale yet in production form. It is vacant from RED.com and we are just ramping up to get ready for traditional manufacturing. And yet it is a camera that everyone seems to be already shooting.

That's mostly due to the fact that we started a private but open beta program, which I have done before, with these white-painted hand-built preproduction cameras. We do this beta run to get it out to customers and give them unfettered access. This helps get those final real-world edge cases tested as we finish up the final touches before hitting the release build of the camera and the software.

Traditionally the white camera beta program, nicknamed "Stormtrooper," has been limited to close friends and family. But with the COVID-19 situation that we are in now, the program stretched out from a handful of cameras to hundreds and hundreds of beta customers which has been a bit insane and absolutely incredible. We actually have more KOMODOs in beta form out in customers' hands right now than some models of production cameras that we have released in the past. The response has been pretty overwhelming.

It may seem like an odd decision to release that many "development incomplete" cameras out in the wild, especially considering how much more it costs us to build cameras like this. But, having that many pre-production cameras out shooting in real environments has accelerated our engineering process tenfold. This has allowed us to have an incredibly stable camera build at launch, more stable than any camera that has come before, and this is even before we wrap up an actual golden release build.

This progress is purely the result of having a massive array of customers banging on the beta hardware and software on cameras that they actually own. That "own" part is important. These cameras are cameras that they actually bought and own, that they can do anything they want with, which creates a more authentic test environment and use case.

The feedback is very honest and transparent because when something goes wrong with their camera—the camera that they paid for—they will send feedback to us without any sugar coating. Even though they know it is a beta program when they bought in, they have very high expectations that when something goes wrong, we will fix it and fix it fast. As you know, this is unlike what most companies do with loaners and test units. When you just send a free loaner camera out to somebody to test,

Screenshots are from Zoom meeting.

especially existing customers, you don't always get the most critical evaluation because of the perception of favors involved, the pleasantries that may follow, and most importantly, people not pushing too hard because they don't want to get kicked off that special list.

**For the only two people on the planet who do not know what a KOMODO is, please explain.**

KOMODO is our small 6K Super35 utility camera, its a 4 inch, 2 pound cube. I'll give Phil Holland credit for the "utility" word as I used to just call it the "BABY DRAGON" crash camera. When we started the development a number of years ago, Netflix approached us and said, "The small action cameras being used now are good for only about 20 frames before the audience gets taken out of the picture (jostled by the difference in quality). So why can't you build a smaller RED?"

Remember, this was just around the time when we came out with the DSMC2, which is already a very small camera, all things considered. Heck, even the DSMC1, and even the RED ONE, for its time, were all incredibly small cameras. But it was a valid request to have something even smaller, and it was something that Jim and I thought about many times over the years because we both are really into shooting by ourselves without a big crew, and we both use our cameras in some pretty insane, harsh environments. And at that same time, I was heavily into building and flying drones, and no matter how small a DSMC2 was, even in Raven form, you still would need to get a very big drone to lift a DSMC2.

That request really pushed us to start thinking about how to make a smaller camera to check enough boxes. Image quality was the most important. It had to have enough resolution for most people, and more importantly, enough dynamic range, and image quality good enough to intercut with its other brothers and sisters. The dynamic range of KOMODO is 15, 16, 17 stops, depending on whom you ask and how you test it. By our own tests, we are happy to peg it at 16 stops, which is a really a breakthrough for a global shutter camera.

**Global shutter?**

Traditionally, a global shutter wasn't something you would want to use in a cinema camera—there were just too many sacrifices. Most significantly, a global shutter sensor would cost you a 3 to 5 stop loss of dynamic range, compared to the same sensor with a rolling shutter. Losing that many stops made it difficult to match the exposure ranges of proper cameras to intercut footage, and you end up back to only being able to use short bursts.

That was the challenge set forth for our sensor engineers: a global shutter sensor with high dynamic range, and remarkably they figured out how to solve it. In fact, the single most important requirement for KOMODO to be worth going forward was the global shutter, and it took us a few attempts to get there. KOMODO started and stopped a few times along the way.

Anyway, the benefits of global shutter are when you're shooting inside or outside of a car, on a motorbike, helicopter, or gimbal, the global shutter prevents vertical objects that are moving fast through frame from bending.

Also, post-stabilization is so much better with a global shutter because the actual pixel geometry stays relatively the same. You still have motion blur, but you don't have distortion on fast-moving objects. This is quite difficult to fix in post and make it look good, especially handheld shots. Sometimes you don't always have the opportunity to use a gyro or remote head stabilizer, for example inside cars or tight corridors. Global shutter makes image stabilization that much better.

Also, global shutter has the benefit of capturing explosions and flashes in their entirety through the frame since the capture is the entire frame at the same time. On a rolling shutter, the capture "rolls" through the frame and can result in split frames that are again really hard to fix in post.

So, that was the direction for this camera. That was the target. It was a hard one to make and a bit of a gamble. But, I think even today before we actually officially release it, I would mark the KOMODO already a success even if we never sold another camera.

Many filmmakers—Soderbergh, Michael Bay, the Wachowskis shooting *Matrix 4*, Thurber on *Red Notice*, and a ton of other directors and their cinematographers—have been using the camera as it was originally designed, as a crash camera and utility camera for high octane action sequences. Of course, the camera turned out to be a bit better than just that original concept—and KOMODO is also finding its way into many "A" camera positions.

**Did the design change from the original concept?**

Over the years of development, we just kept adding capability, making it smaller and kept making the image better and better. The sensor design improved. The color science led by the great Graeme Natress became so good it is easily our best. We added things we didn't think we could do, things we definitely couldn't do when we started designing the camera. For example, we added built-in wireless monitoring of the video feed with incredibly low latency, again something hard to do with a compressed signal out to a cellphone, that the mighty Mikael Lubtchansky of Fool Control quickly designed an app around.

Something else also happened along the way. It was not from a utility perspective, but from a mechanical / emotional perspective. You hold the KOMODO a bit differently because of the form factor being a little cube. Personally, I am 12 feet tall so I shoot from the hip a lot. KOMODO has a beautiful, high resolution top screen. It's small, but with the autofocus and focus confirmation you can actually use just this top monitor to view the image and frame your shot in a super compact setup without an external monitor. It's just like you do when you shoot a Medium Format camera, cradling the camera in a very specific way.

The Mamiya RZ67 is my favorite camera of all time. You can see that camera has been referenced into many of the things that we've done before, but never as much as the KOMODO. Just the way you hold the KOMODO, even if you do use a handle, has a certain intimacy that I always loved about shooting with Medium Format cameras, and the KOMODO shares that. This is probably why there are a few people working on Hasselblad-like top prism finders and waist level, fold-out focusing hood attachments for the KOMODO. I just love the connection you have holding the camera like that—there's just something about it that really excites me.

**How did you come up with the name?**

The name KOMODO was actually the engineering code name that came to be almost from the start. When I started talking with my team about this new camera, I just called it the "BABY DRAGON" since around that time, we were already shipping the BIG DRAGON, the DRAGON VV. Whenever we make a new sensor, we come up with a fancy name on the marketing side but the engineers also have their own undercover code name so they can talk about it internally freely without giving anything away. The test images they sent me started coming back marked as KOMODO and I was just like, "Wow. That's the name." It made a lot of sense, and it stuck. So I told them they needed to change their code name to something else and I stole the name KOMODO :)

**Please talk about the sensor development and explain the global shutter a little more.**

I guess it's probably easier to begin by describing a rolling shutter. When you capture motion, a rolling shutter means that the image is "scanned" by the sensor, usually from top to bottom, row by row. So it's "rolling." When it reaches the bottom of the sensor, it then refreshes, goes to the top, and this is your rolling shutter. Which is great. We've used rolling shutter and everybody else uses rolling shutter because it's so good at what it does.

The problem with a rolling shutter is when you have something moving in the frame. Between the time when the shutter captures the top row to the bottom row, you start to get a bending of objects. If you have a bunch of fence posts and you drive by them, they'll appear to be bending. You'll see it with helicopter blades or wheels. Anything that moves faster than your shutter speed will end up with this distortion. It is also mixed in with motion blur.

If you think about an explosion, car crash, a fight or stunt sequence, all them have fast moving action in front of the camera. As I mentioned earlier, flashes and strobes are another problem with rolling shutter, because by the time the shutter has rolled down halfway, or maybe a third of the way, the flash is already gone. So, it's lit up only a slice of the frame, and you get a weird split frame over exposure effect. That's one of the biggest reasons why the fashion industry finally got behind continuous lighting: strobes just wouldn't work. They screwed up almost every motion picture camera on set that had a rolling shutter and the demand for motion finally became worth it.

The global shutter has been used in the military and scientific communities a lot because they want an accurate frame. A global shutter captures the entire, global image frame by frame. So you can capture flashes. When you're driving down a street, all the fences and utility poles stay straight. Global shutter is literally ex-







3/8-16 and ¼-20 mounting threads

posing the entire sensor all at once. Global shutter is one of the older shutter technologies, but you have a reduction in exposure sensitivity and latitude because you're exposing everything at the same time.

Our sensor engineers, who I think are some of the best on the planet, addressed that problem. We have a restriction on frame rates, which actually ended up being more about heat and power than with the actual global shutter. But the sensor team figured out early on that we still had about a two stop gap, which was okay, but not good enough. When we compared it to our other cameras at the time, we realized we had to get the look closer to them.

Remember, KOMODO was intended as a "B," "C," "D," "E," F" camera. It had to mix with its big brothers. You're not going to want to rate it differently. If you're limited in dynamic range, the image is going to look dead. That defeats the whole purpose of it. So when we got to the point of being a stop to a half stop different, that's when it was okay.

Also around that same time, Jim came out of his retirement to begin the HYDROGEN smartphone program as a separate company. Jim was excited about the phone and its screen and laid out a plan for an additional camera module, which we on the camera side eventually looked at to assist with. Even though the phone went away, it naturally gave us a few ideas about how to expand on the top pins to interact with cell phones and other devices. Traditionally on a RED camera, the top pins were just for video and power to attach your monitor directly without cables. The top pogo pins on KOMODO do a lot more. Also, we've reduced the lag time that you usually get with wireless video from camera to iPhone. And it's not just iPhone—you can run KOMODO from your laptop, and we are working on an Android version as well. There are a lot of cool technologies inside that we learned from the long (for us) five-year development process and that got us up to today where we're now entering beta and lots of people are seeing and getting to use the camera. The feedback has been pretty phenomenal.

**Could you give us a virtual 360-degree walk around the camera?**

Sure! On the front, you see an RF lens mount, and I'm sure we'll talk about that a little later. Below the mount, you have a little tally LED. There's a small, built-in forehead and chin at the front for protection and stance.


There are two small internal microphones for capturing scratch audio. With the lens off, you can see the Super35 sensor.

On the camera right side, you have an antenna for Wi-Fi and video transmission of the actual live-view image.


At the rear, there are two Canon BP series battery mounts. BP batteries are little and will run the camera for about an hour and half each, which is another crazy thing for such a small camera. With two of them, you have three hours of run time.



In addition to the hot swappable, dual battery slots, you also have a 12-volt DC input, which also charges the attached batteries if they are attached to the camera while the camera is off. Next to that, you have an SDI connector that outputs 4K. There's an EXT port and we have a little module that sits underneath to give you genlock, sync and timecode.


On the camera left side, we have a CFAST 2.0 slot. CFAST 2.0 is the next generation of Compact Flash cards. It's pretty fast, low cost and durable. (Write speeds up to 490 MB/s and read speeds up to 550 MB/s, capacity from 32 GB to 1TB.)

Because of everything about this camera, we wanted to make sure that if it fell off your helicopter, fell into the water, got hit by a car or got blown up, you might still keep your data and have the shot. I can't say who did it, but I woke up this morning to some photos of a KOMODO that was burned to the ground. If you had a $100,000 camera, plus the lens that usually goes on it, when those go down, you have a really bad day. When a KOMODO goes down—and don't get me wrong, I still appreciate it's still an expensive camera from a consumer standpoint—but when you have a $6,000 camera go down, and you still got the shot, it may have been worth it. And that $6000 is actually cheaper than a lot of crash housings cost to buy. That's what KOMODO was designed to do and it seems to be doing that very well.

I love when customers send me photos. On *Matrix 4* in San Francisco, they had an intense explosion and fire one night that actually melted some signs and lamps on the street. We had some KOMODOs shooting it, and the screen melted as the camera was still rolling, and they got the shot. They felt so bad because those were super alpha, pre-beta cameras, very expensive to make. I remember Gareth Daley, who is our guy on the ground there,

beeped me and said, "Hey, check out what happened to our poor camera. … Oh, and we need more cameras." I almost did a back flip because the camera survived exactly what it was intended for.

Back to our little camera tour. On top, there is a high-res, touch screen LCD.


Of course, it displays the menus. You also get a live view image there. When we were designing KOMODO, I thought there's no way that a 3-inch screen was going to be usable for viewing images while actually shooting. But once you combine that screen with the phase detect autofocus that we now have for the first time with this sensor, that monitor really becomes more of a finder for framing. You get focus confirmation with the autofocus as well. It is rudimentary at this point, but it works. You know you're in focus and when you are not.


The top finder is powerful and makes the camera much more compact without an external monitor that you'd normally bolt on to the top of this thing. It really is a tiny shooting package. Once you hold this camera and put a lens on it, the weight and size are really incredible, as are the images you get out of it. There are a lot of very excited cinematographers and filmmakers from all levels using it. Even the really, really big guys who pick up the KOMODO don't want to go back. You might ask us, as a camera company that sells other camera models, "What are you guys doing? You're jeopardizing all your other sales." But that's not what this company's about.

If I woke up tomorrow and KOMODO was the only camera we had, I'd be fine with that. Well maybe the KOMODO and the RANGER :)

**You've been showing me cameras with different colors.**

These are all the special-order beta versions. They cost us a ton extra to make but it has been worth it. Blue is one of my favorites. There's a yellow one, an orange one, a grey one and a Bayhem green for Michael Bay. This one I have here has a KipperTie Revolva on it. KipperTie made an ND wheel for the KOMODO and you can put different NDs in it and change between them. It gives you a PL mount too. That's another great opportunity for having the RF mount to begin with.

I have been painting our cameras custom colors since the RED ONE, so its pretty normal for me to do. I just don't usually sell them. Here is the orange one. And a multi colored one. That was the second custom color after Bay that I did for Lana Wachowski, director of *Matrix 4*. Her hair was seven different colors. We coordinated with her assistant and made every side of the camera a different color to match. That's the camera she's using now in Berlin. Before the COVID lockdown, that was the last set I visited when they were still in San Francisco and I actually presented her with her own custom color KOMODO camera, and she absolutely loved it.

Here is another. Can you tell how much I love doing these custom colors? And because we were locked down, our factory was closed, everybody was at home, so it seemed like a great opportunity to do again. When the COVID lockdown first started in California, it was pretty hardcore. We couldn't do much of anything. When I wasn't shooting, I was in my garage at home tinkering and started powder coating raw KOMODO bodies as a bit of an experiment. Powder coating is pretty awesome. It is super durable and comes in a powder form so it's not that messy. You spray it on, it electrostatically bonds to the metal, and then you have to put it in an oven. It's a process, but it's super fun. I figured I would do a few custom colors of these cameras before the white ones and see if anybody wanted to buy them as fun little alpha cameras. Each color had a story; each color I made had a specific someone in mind and I ended up naming the color after them. People really responded to that, and instead of just a couple, I think we made about six or seven colors before we were far enough out of lockdown to begin the Stormtroopers where we are today. Once we build up and get past the white cameras in the next few weeks, then the factories will switch over to making normal black production cameras and the KOMODO will finally become official.

**The beta versions are the white ones?**

Yes. We call them Stormtroopers or "ST" for short or just "White." Nothing new. I've done it with the last three or four cameras. It's just that this time, since we're still in lockdown and couldn't go into production yet, this has been the biggest run of white cameras we have ever done. Stormtroopers always have been more expensive to make because they are a limited production, so they are a thousand dollars more than the regular cameras. But we're making more and more of them as we wait for the COVID numbers to be going down. When we first started making them, it was hard to get them out since we were still closed in Irvine. So, I did a little drive-through KOMODO curbside pickup at the studio with Clark McClanathan and Brian Henderson on a Saturday so customers could drive into our stage, pick up their cameras and drive off all safe and sound. It was pretty cool seeing some old friends and a lot of new.

**But aren't you considered an essential industry?**

Yes, technically. But Orange County was shut down completely by the health department. We had full lockdown at the factory. Everybody was sent home. Man, that seems like it was ages ago; I can't even remember now how long ago that actually was.

A few businesses eventually were allowed to open, just a little bit at a time. And yes, we could have pulled the "essential card" and kept working all the way through, but the reality was that the safety was uncertain, and frankly it didn't seem like anybody really knew what was going on at the start of it all. So much opposing information. So we played it safe.

RED Studios is in Hollywood, a different county with different rules. Somewhere in the middle of it all, when it was looking really bad here in California, I called the mayor and donated our stages to the city for triage if they needed it like a lot of businesses were doing in NY. This was when they were bringing in Navy hospital ships because the regular hospitals were running out of beds. They never ended up needing our stages, thankfully. But anyway, the result was that we did not need to officially bend the rules because we've just been following the safest play, rather than the "what can we get away with" play.

**Good for you.**

Luckily things have gotten better with the response of most people acting smart. Our studio in Hollywood has opened and we have a good situation here with an incredibly safe environment. It is very busy. The husband of one of our staff has a health testing company. He comes to the studio every week and we pay for everybody to get tested at the studio. We installed thermal testers in the stages. They have a computer screen with a thermal camera and a normal camera. It'll take your picture, it'll take your temperature to see if you have a fever, and then give you a pass or no pass. We've retrofitted the HVAC ducts with UV blasters that cycle and sanitize the entire volume of air many times per hour. You can smell the cleaning in the air. It's all pretty simple though. You have to be as safe as you can and play within the boundaries. Every production that comes to the studios follows the rules and so far every show that has rented our stages also have their own COVID task forces. I know people hate hearing "this is the new normal," but all the new protocols are so drilled into everyone every minute of every day it really is starting to feel normal.

**Our industry seems to be adapting and adjusting to the pandemic and the challenges of working within it.**

Yes, it really has been interesting to watch, and of course to live. The film industry is hard to keep down, and I think it's really important for the entertainment industry to entertain during times like this. There are a lot of people in the world who turn to cinema as an escape from all the despair around us. It's been like that pretty much forever. Which means we have a bit of a responsibility, in the safest way possible, to get up and get out (or stay in) and just keep creating, no matter how bad things seem.

Mentally and emotionally, all the horrible things that COVID brought has taken its toll on myself and almost everyone I know. But all the horrific things aside, I have been able to shoot more in the last 6 months than I probably have in the last 6 years combined, which has been a bit of a wake up call for me. I probably would have gone completely insane if it hadn't for that. And, I am going to do my best to change things a bit so I can do more of that. Shooting more and launching the KOMODO in the middle of it all really was a great distraction for myself and a lot of people who followed along.

Something new to think about, something new to shoot, something new to test, and just generally something new to look forward to in really crappy times, KOMODO in a weird way brought our community together even tighter. I talked directly to every customer who wanted to get in the white KOMODO beta program. The stories and background and being able to talk to hundreds and hundreds of people and hear how they have dealt with this pandemic really has been something special.

From a business perspective, it's been hard. Our company has been forced to find new efficiencies, working from home and with fewer people as we dealt with the government on personnel reductions. On top of that, we had to contend with a global supply chain that quickly went sideways when the pandemic began and as factories all over the world, that we relied on in the past, including our own in California, suddenly shut down. Aaron Jones, who is our Head of Manufacturing, against all odds, pivoted like a rock-star and found some new partners, including a pretty incredible company in Mexico with whom, as the weeks go by, we keep expanding our relationship to help on assembly and manufacturing of parts for this new camera.

**Who will be the users for this new camera?**

It's funny because that answer has changed a little along the way.

I originally designed this camera to simply be an extra camera or crash cam to augment our bigger cameras. Tuck it away inside or outside cars, mount it to helicopters, fly it on drones and quite frankly, just beat the heck out of it. So, that was and still is the primary user group.

That's the group using it now. But because the image from the camera ended up being so good, and just so fun to shoot, there's also another much wider group adopting it.

The KOMODO obviously is smaller, but it feels very different from a DSMC2. Even just the feeling of holding is different. So yes, there is a second group, a much bigger group than I never thought there would be, myself included, who are shooting with KOMODO as an "A" camera. Not just independent and low budget stuff, but bigger stuff where the director is also the camera operator and/or DP. That crosses so many different use-cases and the numbers push that far outside being just an edge case.

The one-man/woman band that goes out and shoots for long durations to document the world needs the long battery run time and integrated everything. Many times they can't have seven cases of stuff and another 2 cases of lenses. As a travel camera, it's phenomenal. For action sports, surfing, skiing, this camera is near perfect. For underwater, a bit of a dream. Lots of companies are already making splash housings and underwater housings for it. Gates has the DEEP KOMODO finished now.

***(As Jarred's webcam goes out of focus)* Could you have your focus puller go a little deeper? What kind of shallow focus webcam are you using?**

Sorry, I keep moving. This actually is a MONSTRO with a Sigma HS Cine Prime on it.

**You need a Preston LR2 Light Ranger focus unit.**

Yeah, exactly. I should be using a KOMODO with an autofocus lens. That's exactly what I should be using because clearly I suck at pulling focus :)

**Let's talk about that. Tell us about the RF mount. I guess it will only do autofocus with RF lenses?**


No. It's actually the opposite right now. It has an RF mount, but autofocus at the moment is for EF lenses using an EF to RF adapter.

You and I have had conversations so many times over the years about lens mounts. We agree there hasn't really been a perfect mount. Especially in cinema applications. We need something with a big enough inside diameter and a short flange depth. But then Canon came out with their RF mount. It has a lot of power, a lot of communication. It has a short flange depth of 20 mm and a 54 mm ID, so you can adapt it to everything else. That's what got me really excited.

RED cameras always had Canon EF mounts. I've always been a Canon guy and shot Canon glass forever with Canon cameras. I bought the original R (with RF mount) and it was a beautiful camera. I love how much more they've done with the R5. The RF mount seemed like the perfect mount to use on this camera. Canon makes beautiful RF to EF adapters. One version has a control ring that you can program to do different things. Another adapter lets you put an ND filter inside.

If I made KOMODO with an EF mount, that would have added an inch to it because they're made with the DSLR mirror in mind, with a 44 mm Flange Focal Depth. So, the RF mount made the camera smaller. You can adapt RF to PL, you can adapt to EF, and you can adapt to Leica M. And, the RF mount accepts Super35 or Full Frame and Vista Vision lenses.

**Is the RF mount secure enough for cine lenses?**

It's a little wobbly, and that was my only concern. When we did the EF mount, it had a lock ring that would tighten the lens up so it wouldn't wobble. The RF mount doesn't have a lock ring.

**Do you think you'll do a lock ring for the mount eventually?**

I was hoping that the third parties would step up and, at least for the adapters, figure it out, which they have. I think KipperTie was the first one, but now you see a bunch of different companies making mounts for KOMODO that keep the lens and the adapter from rotating. Especially for PL glass, because you usually have


motors on them that have high torque, so you don't want the lens moving while you're focusing.

Canon makes some amazing RF mount lenses. Their 28-70 mm f/2 zoom is a phenomenal lens. I just buy everything that Canon makes. It's weird for me to be a cheerleader for Canon. I just think that they deserve a lot of credit because they do good stuff. Sony also did a fantastic job with the a7 and the a9 series. With the R cameras and RF lenses, Canon came back fierce and I love them.

**Are there four screws on the front of the camera to attach various mounts directly, as with DSMC2?**

No. KOMODO is so small, for us to have added a removable mount would have made the external dimensions bigger. So it's just RF mount, but then you put on RF mount adapters.

**Tell us about autofocus.**

Autofocus on all our other cameras has always been contrast based. Phase detect autofocus uses the pixels on the actual sensor and we have it on this camera for the first time. It is now working with the EF protocol but not yet the RF protocol. When we were developing KOMODO, most people had EF lenses and that's what we were working on first. If you have an EF lens with motors inside, tracking, continuous or spot autofocus will work with those lenses.

We have been working on this phase detect autofocus a little more than a year. Canon, Sony and everybody else have been working on it for maybe 10 years. Ours is not rock star autofocus. I don't want anybody to buy this camera thinking it's an autofocus consumer camera, because it's not. The way it focuses is a lot slower because our customers are cinema customers and filmmakers. They don't want the crazy fast focus shifts. Its capabilities are incredible. It's just premature to endorse the autofocus, even though lots of people are. It's so much better than autofocus on RED cameras in the past, which were relatively unusable.

But the potential is there. Having the PDAF (Phase Detect Auto Focus) on the sensor makes it many times more accurate. We're really excited about that, not just for traditional autofocus, but you can do some really cool cinematic stuff. Especially with Fool Control. And, when you have lenses with motors inside, you can use a wireless controller to focus the lens and get confirmation. Focus confirmation is really the most important thing to me. The process of moving the lens and the autofocus is just the gravy. You don't want the camera to make focus decisions for you. That's the angle we take: it is just make sure we know we're in focus. As you saw, in this interview you've stopped me three times to get me back in focus.

We ship the Stormtroopers with an RF to EF adapter. You can put on any EF lens, and it'll communicate.

**Will KOMODO do autofocus with native RF lenses eventually?**

Not until that protocol is turned on. That's the irony of it. It does EF lenses first. But that'll come. I'm sure the RF lenses will take over the Canon world.

**Now we get to the philosophical, difficult questions. You and I have been longtime advocates of Full Frame, and yet here you are going full circle back to Super35.**

**What were you thinking and where does this ultimately take us? Are more people going to shoot Super35 now because of KOMODO. What happens next?**

That's a great question, especially coming from you because we've talked so much about this. Am I in focus?

**Yes.**

It was purely physics and power restrictions to keep KOMODO this size. The body had to be four inches. And remember, we build Super35 cameras. I don't want to make Super35 sound like it's horrible because we still make the HELIUM DSMC2, which is a remarkable camera. The future definitely, in my eyes, continues to be Full Frame. I congratulate all the other camera manufacturers going to Full Frame because I really think that it is a powerful imaging format, no matter how some people might say that it all looks the same, depending on the homework you do. It's such an important separation, not just for resolution opportunities but also in image quality.

Cell phones are getting pretty great images. Probably most DPs on the planet and a lot of photographers shoot more pictures on their phones than their actual pro cameras, if you count all the actual clicks. And they're pretty good, so we have to push forward on the image quality. We have to do things like global shutter, for example. I'm a big believer in the concept that a larger image is better, and a bigger sensor is better. Certainly, you start to have lens limitations. You don't want to get into a whole new world of custom lenses. But that's why the Vista Vision format, our 40 x 20 mm format, is so great because it still fits inside that Full Frame.

So KOMODO has to be this size. For it to get a Full Frame sensor, and it's not impossible, we would have used more power. But KOMODO, with a Full Frame sensor, would be some years in the future. I would have to assume that because our next DSMC3 camera will likely follow in the Vista Vision format.

**There are hundreds of thousands of Super35 lenses out there, so rental houses and owners who have them will be very happy with KOMODO. Also, the physical size of the lenses can often be smaller.**

Absolutely. Especially some of the pancake lenses out there. The lens thing is really what's keeping S35. We sell a lot of S35 HELIUMs to customers who own hundreds of thousands, if not millions, of dollars' worth of S35 glass. There's a heavy investment in S35 glass.

**Speaking of things that you add on to a camera, many accessory manufacturers are already at work on things for KOMODO.**


We started talking about KOMODO for a while, and I've been teasing it, probably a little bit too much, because I'm so excited about it. Early on, which is unusual for us, I let out the mechanical drawings and information for the accessory manufacturers so they could start designing stuff for the KOMODO, because I knew they could do it better than us.

We learned that over the years. For example, the Fool Control app comes from Mikael in France. The guy's a rock star. So is KipperTie. Our whole third-party program proved that these guys can do a great job, so let's help them instead of making it difficult.

I put all the mechanical drawings, information and pin-outs in the manual. We're here to support the accessory companies. I started GDU with Matt Tremblay, our designer, because we liked making little things for our camera, and every once a while, we're like, "Let's make a bunch of them and sell them to our friends." I am humbled but blown away that so many people are making KOMODO stuff, and it seems like every day there's a new accessory maker finding some way to make this camera fit for all these edge cases that KOMODO lives in.

When a KOMODO camera comes along as a utility or additional camera, it's going to be doing a lot of different things than shooting with a regular camera. Depending on the job, sometimes it'll be mounted to the roof. Sometimes it'll be buried in the ground or rigged on an arm. There are so many opportunities for accessories because someone will say, "I need to put it sideways, at a 45-degree Dutch angle on a roll bar. Who makes that bracket?" So many people have jumped on, and they're making some great products. I can't wait to see your roundup of those things. In the end, the customer wins, and that's what should be most important.

**Speaking of customers, did you get a lot of feedback in the design process? Take us through the design process again from the very beginning. You originally thought of it as a crash camera, and maybe at some point this self-contained camera evolved?**

Actually, the original concept was more modular. Jim and I worked with Matt on the modularity. That was way before the phone. By the way, Jim and I talk every day. So, every time you make something modular, you have to add connectors and two faces, and then it turns into two millimeters on each side, and it just grows. The first major shift was to stop the modularity and just integrate it along with easy-to-find media.

Here's an interesting back story. I use Windows laptops from Razer, a great company. I complained about their proprietary charging cable for years. "Just use a USB-C cable," I said. Finally, one of their guys replied, "Why don't you just use normal media in RED cameras? Why don't you have normal batteries on your camera? Same thing." That got me thinking: I fly to New York for something and bring my camera in the bag, and I forgot my RED mags, or I forgot my special power adapter. I can't go to B&H because it's after-hours, too late or whatever.

Whereas now, I can go almost anywhere and get the pieces for this camera. Those became the next design concepts: more universal components, normal camera mount, normal batteries, and normal media. That was the basis, with it all integrated. No modular monitors and modular connectors and all this other stuff because as great as that is when you have a Pelican case full of modules, and you have a crew to help you, you just want it all-in-one at some point.

The other half of the design concept had to do with G-forces. With crashes that this camera would endure, you don't want things flying off of it. The first conceptual prototype had magnets to hold the batteries on. As a crash camera, things flying off become lethal projectiles, so we did not use magnets.

The Mamiya RZ67 and Hasselblad 503 were examples that our engineers had to shrink in size to a four-inch envelope. That size was very important dimensionally for fitting and rigging. So that was the first mechanical concept.

**It's almost like a mini, mini RED RANGER in terms of the design concept?**

Absolutely. Filmmakers appreciate the RANGER because of its self-contained design. I mostly ask Matt Tremblay, whom I design our cameras with, "Okay, if we have to stop everything and only make two cameras, which cameras would we make?" The KOMODO and the RANGER are now unquestionably the answer we both agree on, because the RANGER mops up a lot of stuff that we missed over the years from an integration standpoint. And the KOMODO takes that integration to a minimal extreme. The Ranger is bigger and has a lot more horsepower, especially in its MONSTRO form. And you now have the KOMODO beside it to fill in gaps. Those two cameras together are probably the lineup that most people would be happy with if those are the only 2 cameras we made, not just from a mechanical design perspective but also from a sensor standpoint. With both, they check all the boxes and almost every use-case.

**Before you started building the camera, you had to make sure**

**you could get the sensor to perform as well as you wanted it to?**

To test the KOMODO sensor, we put the KOMODO sensor inside a DSMC2 body, and kept comparing it against all the sensors that came before it, the HELIUM, the DRAGON, then the MONSTRO and the GEMINI. That was our own benchmark and it really was about getting a high enough dynamic range and an image good enough to seamlessly intercut with the others. That took a bit longer than we wanted it to, but we eventually got to a place much, much better than we thought we could.

**What is the native ISO recommended now that you have shot a lot of tests?**

That answer is the same as our other cameras but also a little different. We changed the REDCODE in KOMODO away from ratios like 3:1, 6:1, 7:1, 8:1 to three condensed options: MQ, HQ and LQ. When we used numbers, it was one of our highest number of support questions, what those ratios meant in terms of quality and which ones should people use.

We continue to change the algorithms and the bit-rates of each one with more and more testing. So it is a bit hard to guess where it will end up. Back to your question, that compression ratio does have an effect on ISO in an indirect way, the "native" or "suggested" default ISO right now, I would say, is 800. This has been the standard ISO for most of our sensors. But that suggestion may change depending on the compression level because we updated our codec a little and the lower compression reacts differently to low detail, and that does have an effect on ISO.

On LQ setting, a high ISO setting in very underexposed situations with tons of detail, the noise is a bit more pronounced. The same situation with an HQ setting would result in some noise that is noticeably better than normal. So, you can get the best of both worlds if you give it the bandwidth.

Sorry, back to answering your question. I'm going to reserve judgment on that, but I've been shooting this camera at 800 ISO forever, and I've had no issues with it at that rating—so we can just sit on that number for now.

**What about nighttime or really dark interiors?**

Again, it's a subjective question. Nighttime or dark interior? It's not a GEMINI. It's not going to see in the dark. It's very similar to how you would shoot a HELIUM but maybe a bit better. I like to think of the KOMODO as this beautiful mashup between HELIUM and our DRAGON sensors but with a much better color science.

**Another philosophical question. Is this the beginning of a new trend for shallow flange focal depth cine cameras and cine lenses?**

I'm actually shocked it took this long because the days where a camera needed a long flange depth are long gone. Most of us don't use cameras with a mirror anymore.

Medium format still cameras are even coming around to short flange depth. I have the new Hasselblad 907X (medium format front end for the CFV II 50C digital back that accepts the new Hasselblad XCD lenses with an 18.3mm FFD.) And I absolutely love it. I couldn't imagine going backwards, even to my beloved RZ67.

I think that the only reason now to have a PL lens mount with a 52 mm Flange Focal Depth mount is because of existing lenses, not the cameras. Pretty much every camera now made by everyone has a mount that is completely changeable, or has a short flange depth to use adapters to transform the camera to be able to use almost any piece of glass. It's much easier to go forward than backward in distance away from the sensor. If you start with a short flange distance, you can just add an adapter to get out to that 52 mm PL mount flange focal distance.

As soon as there are dedicated cinema lenses with shallow flange depth, which we all know are coming, then I think it'll eventually be the default for everybody and PL will eventually go away. Since the DSMC2 cameras we sell have the option of either choosing a PL mount or a shorter mount, we know that ratio—and the ratio today compared to 10 years ago may surprise or may not surprise you :)

**Your Canon 28-70mm f/2 zoom is a good example how optical designers are able to take advantage of the shallow FFD to make lenses that they haven't done before.**

Absolutely. Canon did this. And Sony did a similar thing with their GM (G Master) series. Lenses that once were f/2.8 are now f/2 and they're the same size or smaller, often with better optical quality. Of course, then you look at Leica, and their M lenses, which have been around for a while, and they are tiny. A lot of them are really fast (f/1.4).

Even though a lot of these lenses are not truly telecentric, many can accept a little breathing to avoid big, massive lenses. Just like there is an acceptance now that smaller cameras can be just as good, if not better than bigger cameras, the same is true with glass. When we (RED) made our first lenses, we artificially made them bigger than they needed to be, way bigger. I still have a set of our first lenses with just the lens cells and they are incredibly small, almost 1/3 the size, and I use them like that from time to time and they are fantastic. As cameras get smaller, so do flange distances and the physical size of lenses.

**Well, congratulations on a great camera that I expect will be very successful and thanks for a really interesting talk.**

I love this little camera; so excited to talk about it, thank you for letting me go on and on and on about it :)

# KOMODO Released: Specs

| | |
|---|---|
| Sensor: | 19.9 Megapixel Global Shutter CMOS Global Shutter |
| Effective Pixels: | 6144 x 3240 |
| Sensor Size | 27.03 x 14.26 mm (Diagonal: 30.56 mm) — Super35 |
| Dynamic Range | 16+ Stops |
| Lens Mount | RF Mount. 20 mm flange focal depth. 54 mm diameter. |
| Lens Communication: | Canon EF protocol via Canon RF Mount Adapters. Phase Detect Autofocus with EF autofocus lenses. (RF Lens Electronic Control Not Supported at this Time) |
| Max Data Rates: | Up To 280 MB/s Using Red Pro CFast or other Qualified CFast 2.0 Media Cards |
| Monitor: | Integrated 2.9"1440 x 1440 Touchscreen LCD With Preview And Camera Control |
| REDCODE RAW Max Frame Rates: | 40 fps at 6K 17:9 (6144 x 3240)<br>50 fps at 5K 17:9 (5120 x 2700)<br>60 fps at 4K 17:9 (4096 x 2160)<br>120 fps at 2K 17:9 (2048 x 1080) |
| Playback Frame Rates (Project Time Base): | 23.98, 24, 25, 29.97, 30, 50, 59.94, 60 fps—all Resolutions |
| Best Available REDCODE Settings: | REDCODE HQ, MQ and LQ at 6K 17:9 (6144 X 3240) up to 40 fps<br>REDCODE HQ, MQ and LQ at 4K 17:9 (4096 X 2160) at to 60 Fps<br>REDCODE HQ, MQ and LQ at 2K 17:9 (2048 X 1080) at to 120 Fps |
| REDCODE RAW Acquisition Formats: | 6K 17:9 (6144 X 3240), 2.4:1 And 16:9<br>5K 17:9 (5120 X 2700)<br>4K 17:9 (4096 X 2160)<br>2K 17:9 (2048 X 1080) |
| Apple ProRes: | 4K (4096 × 2160) at ProRes 422 HQ and ProRes 422 up to 60 fps<br>2K (2048 × 1080) at ProRes 422 HQ and ProRes 422 up to 120 fps |
| Color Management: | Image Processing Pipeline 2 (IPP2)<br>Supports 33×33×33 3D LUTs<br>Supports Import of CDLs |
| Audio: | Internal Dual Channel Digital Mono Microphones, Uncompressed, 24-bit 48 KHz<br>Additional Dual Channel via 3.5mm Audio Connector, Uncompressed, 24-bit 48 KHz |
| Body: | Aluminum Alloy |
| Size: | approximately 4" x 4" (10.16 x 10.16 cm). |
| Weight: | 2.10 lb / 0.95 kg (without Body Cap And CFast Card) |
| Onboard Power: | Two Slots For BP-9 Series Batteries (7.4 V DC) |

## Connections

| | |
|---|---|
| DC Power Input: | +7 To +17 V DC via 2-Pin Connector |
| 9-Pin EXT Connector: | Genlock, Timecode-In, GPIO (remote trigger), CTRL (RS232), 5 V DC 500 mA Accessory power |
| Wired Control: | Camera Control and Live MJPEG Preview Video Feed via Komodo Link Adaptor using USB-C or Gigabit Ethernet (Compatible USB-C To Ethernet Adapter Required) |
| SDI OUT: | Monitor Outputs: 12G-SDI with 6G-SDI, 3G-SDI and 1.5G-SDI Modes<br>12G-SDI: up to 4096 x 2160 4:2:2 for 60p<br>6G-SDI: up to 4096 x 2160 4:2:2 for 30p<br>3G-SDI: up to 2048 x 1080 4:2:2 for 60p<br>1.5G-SDI: up to 2048 x 1080 4:2:2 for 30p, 24p<br>SMPTE Timecode, HANC Metadata, 24-bit 48 KHz Audio |
| AUDIO IN: | 3.5 mm Ø MIC IN |
| AUDIO OUT: | 3.5 mm Ø headphone OUT |
| Remote Control: | WiFi For Camera Control via Interchangeable Antenna With SMA Connection |
| Wireless Video: | Wireless Live Preview Video Feed via 2.4 GHz / 5 GHz Wifi for Framing |
| RED Control: | Fool Control and Live Preview From iOS or Android (coming soon)<br>Available from the Apple App Store And Google Play Store.<br>RED Control works Wirelessly Or Wired via The Komodo Link Adaptor (sold separately) |
| MSRP: | US $ 5,995.00 go to: *red.com/komodo-6k*<br>+ $399.99 for Canon RF-EF Mount Adapter with Drop-In Variable ND Filter (yes, you want this) |

# SIGMA 105 mm F2.8 DG DN Macro | Art


SIGMA DG DN Art lenses for mirrorless cameras currently come in L-Mount (20 mm Flange Focal Depth) and E-mount (18 mm FFD). The ever-growing DG DN Art series so far includes 14-24 mm F2.8, 24-70 mm F2.8, 35 mm F1.2, and 85 mm F1.4 lenses.

On September 30, the new 105 mm F2.8 DG DN MACRO | Art prime was introduced. It is SIGMA's first macro lens for mirrorless cameras in the Art line for mirrorless cameras.

There are three categories of SIGMA lenses: Sport, Contemporary and Art. Art lenses prioritize optical performance in their design. The 105 mm F2.8 DG DN MACRO | Art displays outstanding performance from the center of the frame all the way to the edges of frame.

This lens will be used not only for macro but also for portraits.

The optical design promises exceptional sharpness at all shooting distances — from extreme close-up to infinity.

CEO Kazuto Yamaki explained, at the product launch, that SIGMA set out to achieve the best ever optical performance, beautiful front and rear bokeh, a robust focusing mechanism, and precise focus control using cam groups. The optical design produces clear images with both delicate rendering and free of color bleeding. The designers paid special attention to create smooth and attractively shaped bokeh.

- 17 optical elements in 12 groups, with 1 SLD lens
- Compatible with high-speed autofocus
- Dust-and splash-proof
- Auto and manual aperture.
- Aperture ring with click/de-click switch,
- Maximum magnification ratio: 1:1
- 133.6mm / 5.3" x 74 mm Ø
- 62 mm Ø front filter
- Weight: 715 g / 25.2 oz


SIGMA fp L-Mount camera
with
SIGMA 105mm F2.8 DG DN
MACRO | Art


Sony α series E-mount camera
with
SIGMA 105mm F2.8 DG DN
MACRO | Art

# Canon EOS R5 and EOS R6 Compared

## EOS R5


RF Lens Mount on both R5 and R6
54 mm diameter
20 mm flange flocal depth


LCD panel

A distinguishing feature of the R5 is the MODE button and LCD MODE display panel on top.


R5 has a 5.76M dot OLED EVF

3.15" 2.1M dot LCD touchscreen monitor

## EOS R6


12-pin connection for high-speed lens data transmission between camera and lens, on both R5 and R6


R6 has an analog MODE dial on top


R6 has a 3.69M dot OLED EVF

3" 1.62M dot LCD touchscreen monitor

# Canon EOS R5 - 8K RAW Camera

## EOS R System

Canon launched the EOS R System and RF Mount in Hawaii on Sept 5, 2018 with the Full-Frame Mirrorless EOS R camera and RF lenses. It was made clear that there would be more to come.

The more affordable EOS RP was released in March 2019.

For the third act in the EOS R series, Canon introduced the R5 and R6 cameras on July 9, 2020.

R5 and R6 cameras are weather, dust and spray resistant. A favorite feature, carried over from the original EOS R, is the mechanical shutter that completely covers and protects the sensor from dust when changing lenses (when the camera is turned off). All cine and mirrorless still cameras should have this.

# Canon EOS R5

Canon's new EOS R5 is a 45 Megapixel Full-Frame RF-mount mirrorless hybrid still/video camera that shoots and records uncropped 8K DCI 12-bit RAW at 2600 Mbps to an internal CFexpress card. The RAW is Canon RAW.

Like residents of Long Island, you may not wear socks from Memorial Day to Labor Day, but if you do, the R5 specs might just knock your socks off.

Here are a few of the sockless sartorial details:

- 45 megapixel Full Frame (36 x24 mm approx) CMOS sensor.
- 8192 x 5464 photosites. (Estimated 4.40 µm pixel pitch).
- 8K RAW 12-bit internal video recording up to 29.97 fps, DCI 8192 x 4320.
- 8K DCI (8192 x 4320) or UHD 8K (7680 x 4320) 10-bit 4:2:2 Canon Log H.265 or HDR PQ H.265 internal recording to 29.97 fps. 4K 10-bit 4:2:2
- Canon Log H.265 or HDR PQ H.265 internal recording to 119.88 fps in DCI 4K (4096 x 2160) or UHD 4K (3840 x 2160).
- Full-width (no crop) 8K RAW and 8K/4K sensor modes.
- Dual Pixel CMOS AF (Autofocus) available in all 8K and 4K recording modes.
- 5-axis In-Body Image Stabilization—a first for Canon. It works in conjunction with Optical IS (Image Stabilization) inside many RF and EF lenses. The In-Body Image Stabilizer provides the equivalent of up to 8 stops of Shake Correction.
- Dual-card slots: 1x CFexpress Type B and 1x SD UHS-II.
- ISO range of 100-51,200; Expandable to 102,400.
- Rear joystick for focus area selection and menu navigation.
- 0.5" 5.76 million dot OLED EVF, 119.88 fps refresh rate.
- 3.15" 2.1 million dot vari-angle LCD monitor/touch screen.
- Weight: 1.62 lb. Size: 5.43" x 3.84" x 3.46".

### Price

The EOS R5 camera is available at an estimated retail price of $3,899.00 for the body only and $4,999.00 for the R5 with RF 24-105 mm F4 L IS USM lens kit.

### Canon RAW and other details

The Canon R5 captures RAW up to 8K and records it internally onto a CFexpress card. Canon RAW format is familiar to users of the EOS-1D X Mark III. The viewfinder is a 0.5-inch 5.76 million dot OLED EVF with a 120 fps (119.88 fps) refresh rate.

### Autofocus and Subject Detection

The EOS R5 uses Canon's Dual Pixel CMOS AF Technology to make extremely fast Autofocus calculations. Subject detection adopted from the Live View AF tracking system in the EOS-1D X Mark III camera provides face, head and eye tracking when selected. Autofocus of animals is also possible for the first time in a Canon camera, following focus by tracking the whole body, face, or eye of cats, dogs or birds.

### New Sensor

Canon's EOS R5 has a newly developed CMOS sensor. Its In-Body Image Stabilization (IBIS), when used in conjunction with the ever-popular in-lens stabilization (IS), lets you handhold the camera and lens in incredibly low light levels. It's especially effective in video mode, with an almost gimbal-like quality when shooting from a bumpy dolly, on a rough road or racing up stairs.

### EOS 5D Mark II then; EOS R5 now

This reminds me of an earlier paradigm-disrupting product launch. Canon's EOS 5D Mark II changed the game for DSLR Video. The new EOS R5 will push the envelope of what filmmakers can do with Mirrorless cameras. I expect it foreshadows a migration to more cine and hybrid mirrorless cameras—and dedicated lenses— with shallow flange focal depth mounts.

# Canon EOS R6

Canon also introduced the EOS R6, described as "geared towards advanced amateurs." It has a 20.1 megapixel Full Frame sensor based on the EOS-1D X Mark III.

- 20.1-megapixel Full Frame CMOS sensor.
- 5472 x 3648 photosites.
- ISO range of 100-102,400 expandable to 204,800.
- UHD 4K 10-bit 4:2:2 Canon Log H.265 or HDR PQ H.265 internal video recording to 59.94 fps.
- Full HD 1080p 10-bit 4:2:2 Canon Log H.265 or HDR PQ H.265 internal video recording to 119.88 fps.
- Almost full-width sensor modes (about 1.07x crop).
- Dual UHS-II SD card slots
- 0.5" 3.69 million dot OLED EVF, 119.88 fps refresh rate
- 3" 1.62 million dot vari-angle LCD monitor/touch screen.
- Weight: 1.5 lb Size: 5.43" x 3.84" x 3.48"

### Price

The EOS R6 is available now, at a US retail price of
$2,499.00 for the body only,
$2,899.00 for the R6 with RF 24-105 F4-7.1 IS STM lens kit,
or $3,599.00 for the R6 and RF 24-105mm F4 L IS USM lens kit.

# Canon EOS R5, cont'd

EOS R5 camera left and right profile views, with Canon RF 85mm F1.2L USM lens. Minimum focus 2.79 ft / 0.85 m. 82mm Ø front filter.


R5 with RF Mount. Shutter closed (protects sensor when changing lens).


R5 with Wooden Camera RF to PL mount adapter.

Side view of R5 with Wooden Camera RF to PL mount adapter.

R5 with Canon RF 24-105 mm F4 L IS USM.

R5 has one slot for CFexpress card and another slot for an SD UHS-II.

The R6 has two SD UHS-II card slots.

# Canon R5, cont'd

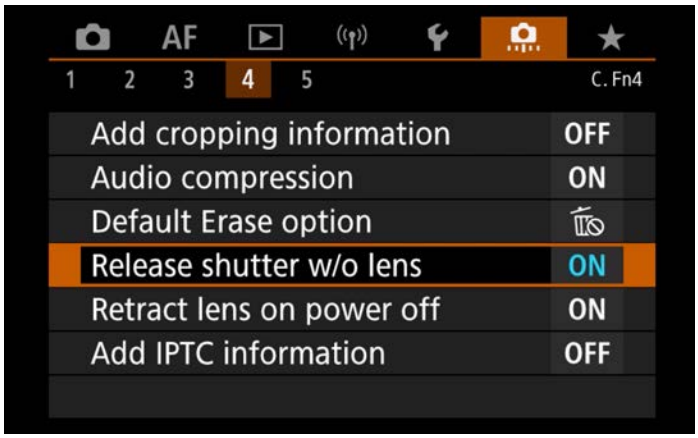

To toggle between Still and Movie Modes, press the MODE button and then the INFO button. This is not intuitive but it works nicely.

## Shooting R5 with a PL or other Mount

If you're using an RF mount adapter like a PL to RF, then this is a very important menu setting. Otherwise, the camera will not shoot or record.

Go to Custom Menu Setting C. Fn page 4.

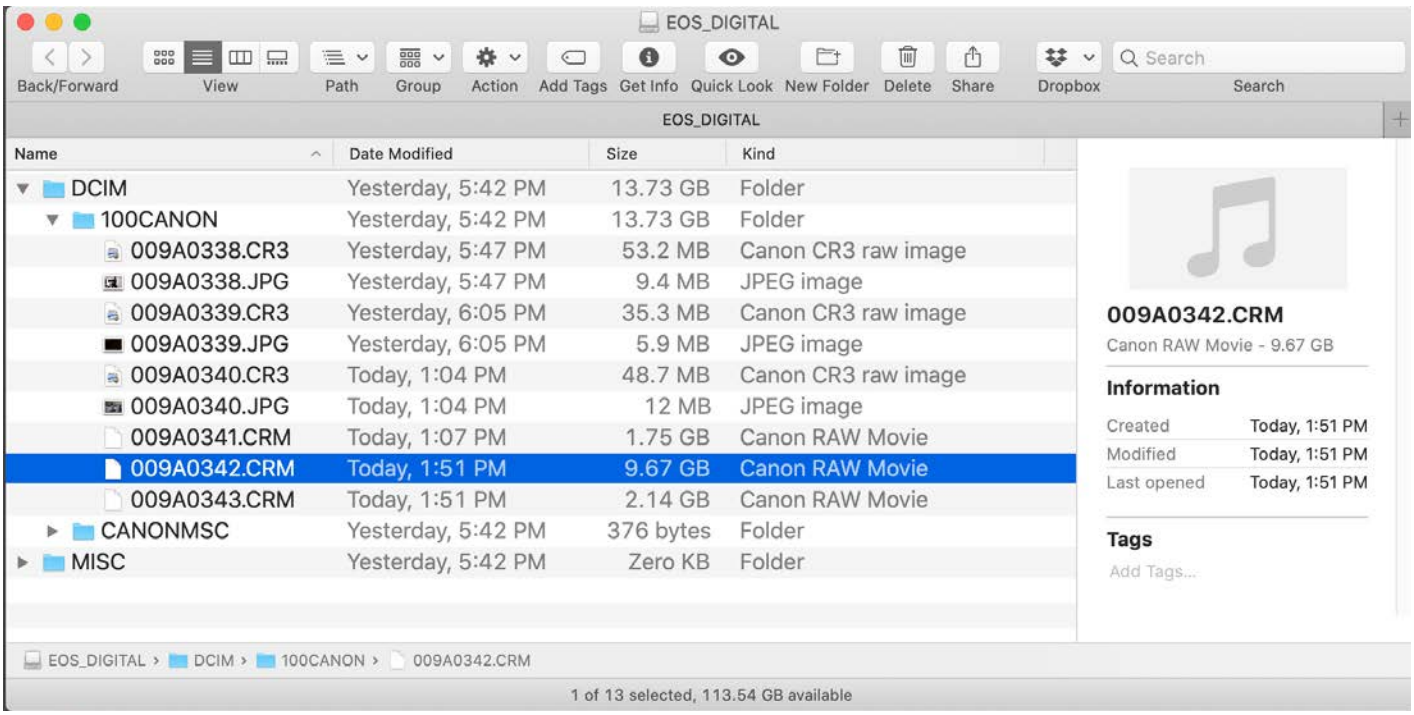
"Release Shutter without Lens" must be turned ON.



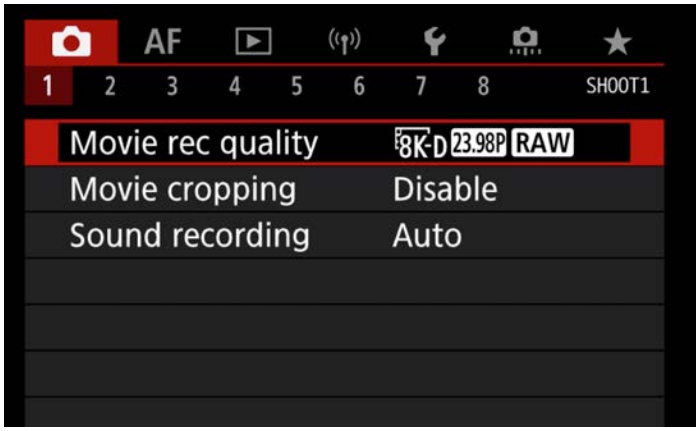

## .CRM RAW Video Files

Video files are found in the default-named 100CANON folder.

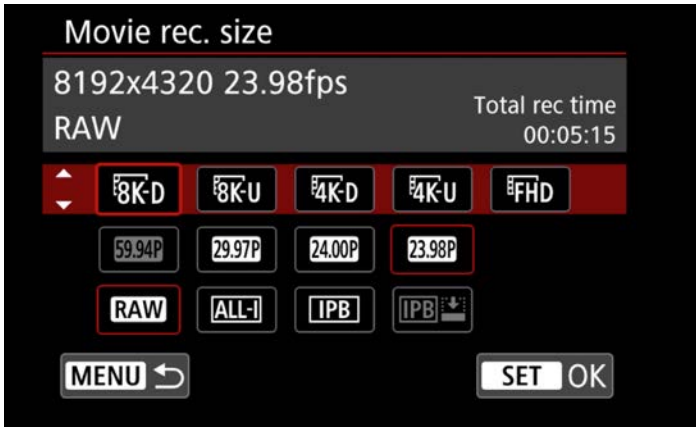
Raw 8K files have a .CRM file extension with an associated .XML file. (RAW still files have a .CR3 file extension.)



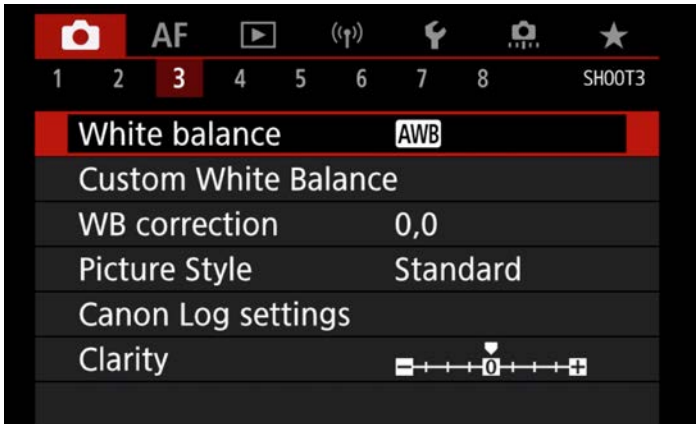
# Some Canon R5 Video Menu Settings



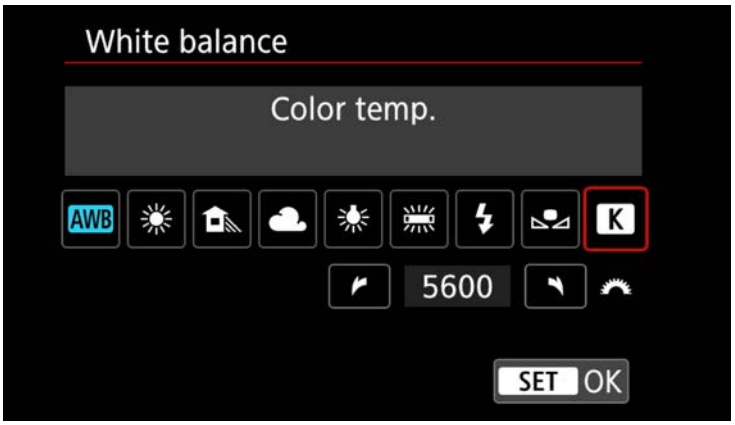

Press Menu. Shoot page 3 lets you set MOVIE REC QUALITY.



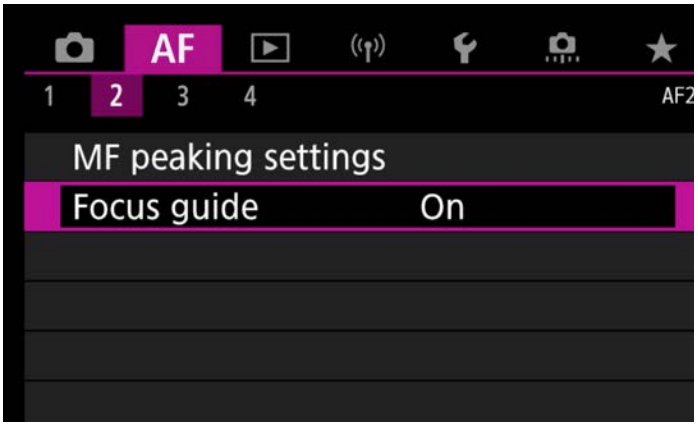

Of course, we want to shoot 8K 23.98 fps RAW




White Balance is found on Shoot page 3.




Of course, we want to set our own color temperature, here 5600° K.





Autofocus AF page 2: A g=helpful focus function: Focus Guide. Turn it ON. When you're in focus, the focus box and guide arrows turn green.


If you're front focused, two arrows point up, far, away.


If you're back focused, two arrows point down, near, closer.

# Canon EOS C70 4K Super35 Cine Camera


This is the first Canon Cinema EOS Camera with an RF Mount. It has a Super 35mm Sensor.

If you're familiar with the C300 Mark III, you'll be at home with many of the C70 capabilities.

Why would you want a C70 then? Because it is smaller than the C300 Mark III, is half the cost, has a versatile RF mount and can record H.265 video.

**September 24, 2020. Canon's press release reads:**

"Canon is excited to announce the company's first-ever RF mount Cinema EOS camera, the EOS C70 4K Digital Cinema Camera. When the Canon RF mount was first introduced, imaging professionals began to dream about the possibilities that this revolutionary mount system might provide them. One request that Canon consistently heard was to put an RF mount on a Cinema EOS camera so that future lens performance could capitalize on the short flange depth. Just two short years later, those wishes have come true with the new C70 camera."

Hurray! One of those people who dreamed of RF mounts was me. Jarred Land RED was another. (See KOMODO article.) The RF mount's shallow, 20 mm flange focal depth accommodates not only innovative Canon RF lenses, but also—by means of adapters—almost any other cine or photo lens on earth. This includes EF, M, PL, LPL, PV, SP70, R, GX, F, S, BNCR, and more.

The new Canon C70 and RED KOMODO have RF mounts.

The other 20 mm flange focal depth (FFD) mount is the L-Mount, created by Leica and shared by SIGMA and Panasonic.

Sony cameras are equipped with an E-mount (18 mm FFD).

Fujinon's X-series is 17.7 mm FFD and GFX is 26.7 mm FFD. Nikon Z mount is 16 mm FFD.

I expect the new Canon EOS C70 will blaze the path for an entire line of new RF mount cine cameras from Canon in both Super35 and Full Frame.

The C70 sensor is the same as the Canon EOS C300 Mark III but the recording capabilities are different. While the C300 Mark III, introduced in April this year, can record up to 4K RAW Light 12-bit (to 30 fps) onto CFexpress cards at data rates of 1 Gbps, the new EOS C70 doesn't trample those toes. Instead, it records XF-AVC or MP4 to SD cards at half the data rate.

The C70 camera came so suddenly that, in the absence of an in-depth interview with the designers thus far, please indulge the locked-down mind, neither delirious nor inebriated nor dexamethasoned, and let's take an imaginary journey to meet with the planners and designers at Canon in Tokyo.

The cast of characters in the room includes the intrepid investigator from FDT, engineers and planners from Canon, and a fantasy assortment of industry luminaries invited to comment. There's Rusty Gates, Camera Assistant to the stars, flying in from



Hollywood. Award-winning DP Itsy Bitzer, ABC, ADD, landed from London. The goddess of handheld, Lucy Lumiere, happens to be scouting in Kyoto and arrived by Shinkansen.

Surely, Canon planners had watched in amusement, or was it horror, as so many Canon mirrorless cameras seemed to sprout wings and sport lollipops on top with assorted appendages, cages, and on-board recorders to view and capture higher quality video.

"What if you make the mirrorless camera thicker," Itsy suggests. "You could incorporate the recorder and monitor in back."

"It should have the familiar handgrip of a mirrorless camera," Lucy advises.

"The camera should autofocus with RF lenses," Rusty suggests, ever eager to avoid having to pull focus if he can.

Anyway, enough speculation—let's dive in and look at the C70.

## Canon EOS C70 4K Digital Cinema Camera

The EOS C70 camera is like a bridge between the Photography EOS and Cinema EOS families. It is small and lightweight—2.6 lb—and a breeze to handhold.

The C70 has a thin, motorized ND filter unit that is only 6 mm thick. This is fitted in the less-than 20 mm gap between the RF mount and the sensor. ND buttons are in the familiar Cinema EOS location: on the camera left side.

13 custom buttons let you select from more than 80 functions.

Tatsuro Kano, Executive Vice President and General Manager of Canon U.S.A.'s Imaging Technologies & Communications Group said, "The EOS C70 will provide a familiar form and feature set to our entire spectrum of imaging customers. We are eager to see how creatives use this tool and the projects that come from it."

The camera has a Canon Super 35mm Dual Gain Output (DGO) sensor that reads out each photodiode at two different degrees of gain, like two different exposures for each frame. One "exposure" protects details in highlight areas and the other emphasizes shadow detail. The result is an image that Canon measures up to 16+ stops of dynamic range.

The C70 can record 4K DCI or UHD up to 120 fps and 2K DCI or HD up to 180 fps.

The camera records in XF-AVC format (variable bit-rate) – both Intra and Long GOP with an MXF file "wrapper"—in 4K at 4:2:2 10-bit. Another choice is Long GOP 10-bit 4:2:2/4:2:0 MP4/HEVC with an MP4 file container — a first in the Cinema EOS line.

The C70 has an active fan cooling system. Air intake is on the camera left side. The exhaust vent is on the camera right side, above the integrated handgrip. This cooling system is isolated from the sensor and electronics to protect them from water, sand, and dust and allows uninterrupted recording for extended periods of time.


## Canon EOS C70 Details

- Sensor: Super35 CMOS Dual Gain Output sensor with Dual Pixel Autofocus. Super16 crop available.
- Total Pixels: 9.6 Megapixels (4206 x 2280)
- Effective Pixels: 8.85 Megapixels (4096 x 2160): 4K/2K DCI
- 8.29 Megapixels (3840 x 2160): UHD/FHD
- High Framerates:4K 120p and 2K CROP 180p
- Image Processor: DIGIC DV 7
- Lens Mount: RF Mount
- Dynamic Range: 16+ stops
- ISO: 100*–160–25600–102400* (* = expanded)
- Internal ND: 2, 4, 6, 8**, 10** stops (** = two filters)
- Focus Guide: Canon's famous up or down green triangles converge on the monitor when subject is sharp.
- LCD Monitor: 3.5-inch (8.8 cm diagonal) LCD with 16:9 aspect ratio, approx. 2.76 million dots, (1280 x RGB x 720)
- Direct Touch Menu System
- No EVF (use the built-in, swing away LCD Monitor).

**Video Formats**

- XF-AVC: MPEG-4 AVC / H.264
- MP4 (HEVC): H.265 / HEVC
- MP4 (AVC): H.264 / AVC
- Color Space: Cinema Gamut, BT.709, BT.2020
- Gamma: BT.709, Wide DR, Canon Log 2, Canon Log 3, PQ, HLG
- White Balance: 2000K - 15000K with -20CC to +20CC green/magenta correction; AWB, Daylight, Tungsten, Set A, Set B
- SD Cards: 2 slots. SD/SDHC/SDXC supported
- Electronic Image Stabilization
- Time Code: Count-up Non Drop Frame; Drop Frame (only in 59.94 Hz mode); Regen, Record Run, Free Run, External Source.
- Audio: (1) Linear PCM (16 bit – 48kHz; 4-channel recording), (2) AAC (16-bit – 48kHz; 2-channel recording)
- Audio Input: 2 channels Mini-XLR; MIC jack (3.5mm), INPUT REMOTE LANC/RC-V100.
- Output: HDMI, 3.5mm stereo headphone mini-jack
- Input/Output: Time Code, USB-C
- DC IN: 24 V DC
- Battery: 14.4 V DC
- Dimensions, body only: (W x H x D) approx. 6.3 x 5.1 x 4.6 in. /160 x 130 x 117 mm
- Weight, body only: approx. 2.6 lb. /1179.3 g
- Custom picture processing via import of 3D LUTs and recording to Look Files


## Canon Mount Adapter EF-EOS R 0.71x

Canon has sold more than a hundred million Full Frame EF still lenses. So it's no surprise that they encourage you to use these lenses on the Super35 C70 with their dedicated Canon Mount Adapter EF-EOS R 0.71x. It's not a mechanical-only adapter. There are optics and electronics inside. So, this adapter does several important things.

1. It lets you attach EF lenses in the RF mount.
2. It keeps the original Full Frame lens's angle of view in Super35.
3. A Full Frame lens will gain 1 T-Stop with the adapter in S35 format.
4. The adapter preserves full electronic communication between the lens and camera, enabling optical lens corrections and lens metadata transfer between the C70 camera and certain Canon EF lenses.

As of September 24, 2020, compatible EF lenses currently are:

- EF16-35mm
- F2.8L III USM,
- EF24-70mm F2.8L II USM
- EF24-105mm F4L IS II USM

Firmware update is provided free of charge.

Compatibility will be added for additional EF lenses in the future.

Even if you do not update the firmware, you can use the EF lens, but it is recommended to use the firmware update in order to effectively take advantage of as many functions in connection with the camera as possible.

Canon Mount Adapter EF-EOS R 0.71x

## Price & Availability

The Canon EOS C70 4K Digital Cinema Camera is scheduled to be available in November 2020 for an estimated retail price of $5499.00.

The Canon Mount Adapter EF-EOS R 0.71x is scheduled for December 2020 at an estimated retail price of $599.99. For more information: *cinemaeos.usa.canon.com*

Specifications, availability and prices are subject to change without notice. Actual prices are set by individual dealers and may vary.

# Canon EOS C70 Specs

| | |
|---|---|
| Sensor: | Super35 CMOS Dual Gain Output sensor with Dual Pixel Autofocus. |
| | Super16 crop available. |
| Total Pixels: | 9.6 Megapixels (4206 x 2280) |
| Effective Pixels: | 8.85 Megapixels (4096 x 2160): 4K/2K DCI<br>8.29 Megapixels (3840 x 2160): UHD/FHD |
| Image Processor: | DIGIC DV 7 |
| High Framerates: | 4K 120p and 2K CROP 180p |
| Lens Mount: | RF Mount<br>(EF lenses, including EF-S and EF cinema, attach with an RF to EF Mount Adapter) |
| Exposure Modes: | (1) Manual exposure based on shutter setting, iris setting, ISO/gain setting and ND filter setting<br>(2) Push-auto iris control, auto iris control<br>(3) Auto ISO |
| Shutter: | Speed, Angle, Clear Scan, Slow or Fast in 1/3 or 1/4 stop increments |
| Dynamic Range: | 16+ stops |
| Iris: | 1/2-stop, 1/3-stop or Fine increments. |
| ISO: | 1-stop, 1/3-stop increments:<br>100*–160–25600–102400* (* = expanded) |
| Internal ND: | 2, 4, 6, 8**, 10** stops (** = 2 filter layers) |
| Focus: | Dual Pixel AF (DPAF), Manual Focus, One-Shot AF, Continuous AF, AF-Boosted MF, Face Detection AF. (Only lenses that support AF functions can be used in these modes) |
| Focus Guide: | Canon's famous up or down triangles converge and turn green on the monitor when subject is sharp. |
| LCD Monitor: | 3.5-inch (8.8 cm diagonal) 16:9 aspect ratio LCD, approx. 2.76 million dots, (1280 x RGB x 720) |
| White Balance: | 2000K to 15000K with -20CC to +20CC green/ magenta correction; AWB, Daylight, Tungsten, Preset A, Preset B. |
| SD Cards: | 2 slots. SD/SDHC/SDXC supported. |
| Frame Rates: | See chart below |
| Video Formats: | (1) XF-AVC: MPEG-4 AV C/ H.264<br>(2) MP4 (HEVC): H.265 / HEVC<br>(3) MP4 (AVC): H.264 / AVC |
| Color Space: | Cinema Gamut, BT.709, BT.2020 |
| Gamma: | BT.709, Wide DR, Canon Log 2, Canon Log 3, PQ, HLG |
| Time Code: | Count-up Non Drop Frame; Drop Frame (only 59.94 Hz); Regen; Record Run; Free Run; Ext Source |
| Audio Input: | 2 channels Mini-XLR; MIC jack (3.5mm) |
| Audio: | (1) Linear PCM 16 bit - 48kHz; 4-channel<br>(2) AAC 16-bit - 48kHz; 2-channel |
| Remote Input: | LANC/RC-V100. |
| Video Output: | HDMI |
| Audio Output: | 3.5mm stereo headphone mini-jack |
| Input/Output: | Time Code, USB-C |
| Power: | DC IN: 24 V DC. Battery: 14.4 V DC |
| Dims, body only: | 6.3 x 5.1 x 4.6 in. /160 x 130 x 117 mm (W x H x D) approx. |
| Weight, body only: | approx. 2.6 lb. / 1179.3 g |

## A few of the many Recording Formats

| Format | Codec | Sampling | Data Rate | Resolution | Maximum fps | Comments |
|---|---|---|---|---|---|---|
| XF-AVC | H.264 Intra | 4:2:2 10-bit | 410 Mbps | 4096 x 2160<br>3840 x 2160 | 29.97 fps | best quality |
| | | | 310 Mbps<br>160 Mbps | 2048 x 1080<br>1920 x 1080 | 59.94 fps | |
| XF-AVC | H.264 Long GOP | 4:2:2 10-bit | 260 Mbps<br>160 Mbps | 4096 x 2160<br>3840 x 2160 | 59.94 fps | |
| XF-AVC HFR (Special Mode) | H.264 Long GOP | 4:2:2 10-bit | Variable Bitrate | 4096 x 2160<br>3840 x 2160 | 120 fps | highest frame rate in 4K |
| | | | | 2048 x 1080<br>1920 x 1080 | 180 fps | highest frame rate in 2K |
| XF-AVC Proxy | H.264 Long GOP | 4:2:0 8-bit | 35 Mbps<br>24 Mbps | 2048 x 1080<br>1920 x 1080 | 59.94 fps | |
| MP4 | H.265 Long GOP | 4:2:2 10-bit | 225 Mbps | 4096 x 2160<br>3840 x 2160 | 59.94 fps | |
| MP4 | H.265 Long GOP | 4:2:0 10-bit | 170 Mbps | 4096 x 2160<br>3840 x 2160 | 59.94 fps | |
| | | | Variable Bitrate | 4096 x 2160<br>3840 x 2160 | 120 fps | |

# Canon EOS C70 and EOS R5 Compared

## Canon EOS C70


RF Lens Mount. 54 mm diameter, 20 mm flange flocal depth.
Super35 Sensor.



## Canon EOS R5


RF Lens Mount. 54 mm diameter, 20 mm flange flocal depth.
Full Frame Sensor.


# Canon EOS C70 and EOS R5 Specs Compared

| | C70 | R5 |
|---|---|---|
| Sensor | 20.2 megapixel APS-C /S35 CMOS sensor<br>4K DCI: 26.2 x 13.8 (29.6 mm diagonal)<br>UHD: 4K: 24.6 x 13.8 (28.2 mm diagonal)<br><br>same sensor as C300 Mark III | 45 megapixel Full Frame CMOS sensor<br>(36 x 24 mm approx, 43.27 mm Ø) . |
| Total Pixels | 4206 x 2280; Approx. 9.6 megapixels | Approx. 47.1 megapixels |
| Effective Pixels: | 8.85 Megapixels (4096 x 2160): 4K/2K DCI | Approx. 45.0 megapixels<br>8192 x 5464 photosites. |
| Pixel Pitch (distance from center to center) | ≈ 6.4 µm | ≈ 4.40 µm |
| In Body Image Stabilization | Electronic, as C300 Mark III and C500 Mark II | IBIS |
| Best quality video available | 4K 4:2:2 10-bit XF-AVC All-I to 30 fps, 410 Mbps, with a .MXF file extension.<br>4K 4:2:2 10-bit XF-AVC Long GOP to 60 fps, 260 Mbps, with a .MXF file extension.<br>4K 4:2:2 10-bit XF-AVC Long GOP to 120 fps at reduced data rate.<br>4:2:2 10-bit H.265/HEVC 10-bit 4:2:2 to 60 fps, 225 Mbps, HDR video compression, with a .MP4 file extension.<br>4:2:2 10-bit H.265/HEVC 10-bit 4:2:2 to 120 fps at reduced data rate, with .MP4 extension. | 8K DCI RAW 12-bit internal video recording up to 30 fps at 2600 Mbps<br>4K DCI All-I up to 120 fps at 1880 Mbps<br>DCI 8192 x 4320. |
| Maximum frame rate at 4K | 4K 4:2:2 10-bit to 120 fps | 4K 4K DCI All-I up to 120 fps |
| Sensor Modes | Super35, Super16 (cropped/windowed) | Full Frame, Super35 (APS-C) |
| ISO | 100-102,400 | 100-51,200 |
| Internal ND: | 2, 4, 6, 8*, 10* stops (* = Canon calls it "Extended ND." To get 8 and 10 stops of ND, not 1 but 2 ND filters are engaged.<br>This alters the Flange Focal Distance of the lens, which doesn't matter if you're using an autofocus lens. If you're manually focusing by distance marks, then you should check by eye-focus. | No internal ND |
| Media | Dual SD slots | CFexpress slots, single SD |
| Mount | RF | RF |
| Anamorphic Desqueeze | Yes | No Anamorphic Desqueeze |
| Video Recording Time | Almost unlimited | Limited |
| Approx. US Price | $ 5499 (half price of C300 III), RF mount, | $3,899 |

# ARRI Signature Zooms

September 23, 2020. ARRI introduces four Signature Zoom lenses:

- 16-32 mm T2.8
- 24-75 mm T2.8
- 45-135 mm T2.8
- 65-300 mm T2.8
  (110.5-510 mm T4.95 with dedicated 1.7x extender)

They cover Large Format / Full Frame and have LPL mounts (44 mm flange focal depth, 62 mm inside diameter.)

So, now there is a Signature lens system consisting of four Signature Zooms and sixteen Signature Primes. The roadmap was more like a speedway. Signature Primes were unveiled concurrently with ALEXA LF at BSC Expo in February 2018. First customer deliveries began in May 2018 with the 35, 47, 75 and 125 mm primes. Then, during every following month in 2018, at least one or two additional focal lengths shipped. By the end of 2018, I think delivered sets already consisted of thirteen lenses. Three more Signature Primes arrived in 2019; they were unique: 12, 15, and 280 mm. I cannot recall an introduction of so many cine lenses in such a short time.

Pre-production 45-135 and 65-300 Signature Zooms have landed. Logan Schneider and Jimmy Matlosz are already shooting shorts and demos. Logan commented, "Signature Zooms felt like looking through a window. If things look good in front of the lens, they will look good. They see everything and they are also really nice with skin tones. The resolution gives you all the detail and the smooth skin tones. Inherently it's a mellow image, with a mixture of nice contrast, rich blacks and highlights, so you can use the full tonal range."

When they wrap, I look forward to trying these zooms at FDTimes NYC.

Deliveries of the two longer Signature Zooms are expected in Q2 of 2021, and the others by Q4 of 2021.





65-300 T2.8 with 1.7x Extender makes it a 110.5-510 mm T4.95. Shown with detachable carrying handle and zoom stick.


The 1.7x Extender is intended for the 65-300 mm Signature Zoom and 280 mm Signature Prime only.


16-32 mm T2.8 with detachable zoom stick.

# ARRI Signature Zooms, cont'd

| ARRI Signature Zoom | 16-32 T2.8 | 24-75 T2.8 | 45-135 T2.8 | 65-300 T2.8 | 65-300 with 1.7x Extender |
|---|---|---|---|---|---|
| Focal Lengths | 16-32 mm | 24-75 mm | 45-135 mm | 65-300 mm | 110.5-510 mm |
| Zoom Range | 2x | 3.1x | 3x | 4.6x | 4.6x |
| Aperture | T2.8-22 | T2.8-22 | T2.8-22 | T2.8-22 | T4.95-39.62 [5] |
| Illumination Circle Ø | >46 mm | >46 mm | >46 mm | >46 mm | >46 mm |
| MMOD [1] | 0.45 m / 1'6" | 0.7 m / 2'6" | 1 m / 3'4" | 1.8 m / 6' | 1.84 m / 6'1.56" |
| MODF [2] | 0.194 m / 7.64" | 0.412 m / 16.22" | 0.656 m / 25.83" | 1.337 m / 52.52" | 1.337 m / 52.52" |
| Lens Mount [3] | LPL | LPL | LPL | LPL | LPL |
| Lens Metadata | LDS-2 (/i) [4] | LDS-2 (/i) [4] | LDS-2 (/i) [4] | LDS-2 (/i) [4] | LDS-2 (/i) [4] |
| Focus Barrel Rotation | 312° | 312° | 300° | 300° | 300° |
| Zoom Barrel Rotation | 120° | 100° | 110° | 140° | 140° |
| Iris Barrel Rotation | 40.76° | 48° | 48° | 54° | 54° |
| Iris Blades | 11 (rounded) | 11 (rounded) | 11 (rounded) | 11 (rounded) | 11 (rounded) |
| Front Diameter | 156 mm | 114 mm | 114 mm | 156 mm | 156 mm |
| Length from flange | 212 mm / 8.35" | 244 mm / 9.61" | 300 mm / 11.81" | 420 mm / 16.54" | 456.8 mm / 18'' |
| Weight [6] | 3.50 kg / 7 lb 11.5 oz | 4.1 kg / 9 lb 1 oz | 3.64 kg / 8 lb .3 oz | 8.1 kg / 17 lb 13.7 oz | 8.7 kg / 19 lb 2.9 oz |
| Approx List Price | 55,900 € | 39,900 € | 39,900 € | 59, 900 € | Extender included w/ 65-300 |

1. MMOD (Minimum Marked Object Distance) from sensor plane
2. MODF (Minimum Object Distance from Front) Minimum focus from front of lens
3. Flange Focal Depth = 44 mm
4. /i only on non-ARRI cameras. /i cannot provide corrected metadata with extender
5. With the extender, T2.8 becomes T4.95, which is T4 + 6/10. T22 becomes T39.62, which is T32 + 6/10.
6. Preliminary Specs

# ARRI Signature System: Primes & Zooms

| ARRI Signature Lens | Focal Length | T-Stop | MMOD fr sensor plane | Front diameter | Length from flange | Weight |
|---|---|---|---|---|---|---|
| Signature Prime 12 [1] | 12 mm | T1.8-22 | 0.35 m / 14" | 134 mm | 239 mm / 9.41" | 2.8 kg / 6.2 lb |
| Signature Prime 15 | 15 mm | T1.8-22 | 0.35 m / 14" | 156 mm | 197 mm / 7.75" | 2.8 kg / 6.2 lb |
| Signature Prime 18 | 18 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 2.0 kg / 4.4 lb |
| Signature Prime 21 | 21 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 1.9 kg / 4.2 lb |
| Signature Prime 25 | 25 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 1.9 kg / 4.2 lb |
| Signature Prime 29 | 29 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 1.8 kg / 4.0 lb |
| Signature Prime 35 | 35 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 1.7 kg / 3.7 lb |
| Signature Prime 40 | 40 mm | T1.8-22 | 0.35 m / 14" | 114 mm | 178 mm / 7.01" | 1.8 kg / 4.0 lb |
| Signature Prime 47 | 47 mm | T1.8-22 | 0.45 m / 18" | 114 mm | 178 mm / 7.01" | 1.8 kg / 4.0 lb |
| Signature Prime 58 | 58 mm | T1.8-22 | 0.45 m / 18" | 114 mm | 178 mm / 7.01" | 2.0 kg / 4.4 lb |
| Signature Prime 75 | 75 mm | T1.8-22 | 0.65 m / 26" | 114 mm | 178 mm / 7.01" | 1.9 kg / 4.2 lb |
| Signature Prime 95 | 95 mm | T1.8-22 | 0.85 m / 3' 1" | 114 mm | 178 mm / 7.01" | 1.9 kg / 4.2 lb |
| Signature Prime 125 | 125 mm | T1.8-22 | 1 m / 3' 4" | 114 mm | 178 mm / 7.01" | 2.3 kg / 5.1 lb |
| Signature Prime 150 | 150 mm | T1.8-22 | 1.5 m / 6' | 114 mm | 208 mm / 8.19" | 3.25 kg / 7.3 lb |
| Signature Prime 200 | 200 mm | T2.5-22 | 1.8 m / 6' | 114 mm | 218 mm / 8.58" | 3.1 kg / 6.1 lb |
| Signature Prime 280 | 280 mm | T2.8-22 | 2.5 m / 8' 3" | 134 mm | 278 mm / 10.93" | 4.3 kg / 9.5 lb |
| SP 280 + 1.7x Extender | 476 mm | 4.95-39.62 | 2.54 m / 8'4.58" | 134 mm | 314.8mm / 12'' | 4.9 kg / 10 lb 13 oz |
| Signature Zoom 16-32 | 16-32 mm | T2.8-22 | 0.45 m / 1'6" | 156 mm | 212 mm / 8.35" | 3.50 kg / 7 lb 11.5 oz [2] |
| Signature Zoom 24-75 | 24-75 mm | T2.8-22 | 0.7 m / 2'6" | 114 mm | 244 mm / 9.61" | 4.1 kg / 9 lb 1 oz [2] |
| Signature Zoom 45-135 | 45-135 mm | T2.8-22 | 1 m / 3'4" | 114 mm | 300 mm / 11.81" | 3.64 kg / 8 lb .3 oz |
| Signature Zoom 65-300 | 65-300 mm | T2.8-22 | 1.8 m / 6' | 156 mm | 420 mm / 16.54" | 8.1 kg / 17 lb 13.7 oz |
| SZ 65-300 + 1.7x Extdr | 110.5-510 mm | T4.95-39.62 | 1.84 m / 6'6'1.56" | 156 mm | 456.8 mm / 18'' | 8.7 kg / 19 lb 2.9 oz |

1. Image is upside down
2. Preliminary Specs

# Thorsten Meywald on Signature Zooms

Thorsten Meywald, ARRI Product Manager Optical Systems, taken in February 2018 with an ARRI Signature Prime 47mm at T1.8.

**JON FAUER: Please tell us about the new ARRI lenses. What are they called? What focal lengths and details?**

THORSTEN MEYWALD: Our new Signature Zoom lenses may not be a big surprise. When we introduced the Signature Primes in 2018 our customers asked, "Are there going to be zooms?" We said, “Yes, they are on the roadmap and planned.” We have been working on zooms for the past two years. Both the primes and the zooms are part of a system.

I think the expectation was that we would create one zoom lens, and that's it. This, however, would not meet our goals. First, as an alternative to primes, a cinematographer should be able to shoot an entire feature, commercial, or TV show with these zoom lenses without any compromise in quality. Second, these zooms must match the look of our Signature Primes in order for our lens system to truly succeed.

**Do the Signature Zooms have the same signature logo as the primes?**


The Signature Zooms have the same handwritten logo as the Signature Primes. They are a family of lenses that look similar on the outside as well as on the inside. The mechanical housings are all magnesium.

**Tell us about the details and focal lengths.**

There are four zoom lenses and also an extender. All of them cover Large Format.

The Signature Zoom system starts with a very wide 16-32mm. The mid-range zoom is a 24-75mm. Next, there's a longer 45-135mm zoom. Finally, there's an extremely long 65-300mm zoom. They have a consistent maximum aperture of T2.8 with no exposure ramping. The T-stop remains the same from 16 mm to 300 mm.

The illumination circle diagonal exceeds 46 mm and covers ALEXA LF and Mini LF sensors, as well as cameras from RED, Canon, Panavision and Sony.

**What about the image circle?**

Image circle and illumination circle are often used interchangeably, which gets confusing. Within the image circle you have well defined performance data for MTF, color aberrations, distortion, breathing, etc. The illumination circle defines the level of illumination at the corner of the image, while at the same time allowing for relaxation of the optical performance. The image circle of the Signature Zooms covers ARRI Alexa LF and Mini LF sensors. The illumination circle amply covers RED MONSTRO 8K VV sensors.

**And the Extender?**

To complement the 65-300 mm zoom, we have created a 1.7x extender. It ships with the zoom as a matched set at no extra charge. Many photographic extenders are “universal” in that they can be used with many different lenses. However, that can result in optical compromises. To retain the highest optical performance, we designed this extender specifically for use with this lens. It transforms the 65-300 mm T2.8 zoom into a 110-510 mm T4.9 zoom.

This 1.7x extender works with one additional lens: our 280 mm T2.8 Signature Prime, which is the longest focal length in our prime lens set. It turns that prime into a 476 mm T4.9.



Another reason for designing a dedicated extender is that we saw no reason to extend a lens to a focal length that we already offer. An extender should enhance a product line, not duplicate it.

For example, you wouldn't use the extender with the 75mm T1.8 Signature Prime because we offer a 125 mm T1.8. Nor would you use the extender with the 45-135 mm T2.8 zoom because we offer a 65-300 mm T2.8. This philosophy enabled us to focus on making the best extender possible for a single purpose, rather than a lower quality extender for many purposes.

**Hypothetically, would it work on the other zooms and primes?**

Mechanically it won't work because there will be a collision between the rear element of the base lens and the front element of the extender. That's the reason we engrave a warning on the extender that you should only use it on the 65-300 mm Signature Zoom and on the 280 mm Signature Prime.

Many extenders in the industry have four or six elements inside. Our extender has 10 elements, which is necessary to maintain our high optical standards.

**Does the extender change the Minimum Marked Object Distance (M.M.O.D.)?**

The close focus of the 65-300 zoom, from the sensor to the object, is 1.8 meters. With the extender, your Minimum Object Distance is increased 4 cm, so your 510 mm focal length will have a minimum close-up distance of 1.84 meters.

**Are these zooms handholdable?**

The first three zooms can be used handheld. The 45-135 mm weighs about 3.7 kg. It's short and has a front diameter of 114 mm, which is the same as our Signature Primes. Close focus is one meter.

The 65-300 mm will likely not be used for handheld work, although if you try, you will find it is relatively easy to use. It weighs about 8.1 kg, which is still very lightweight for such a range and maximum aperture. It's about 420 mm long from the flange to front. It has a 156 mm front diameter.

By comparison, the Signature Prime 280 mm weighs 4.5 kg, with a 134 mm front diameter. Minimum Marked Object Distance is 2.5 meters from the sensor.

The 16-32 mm T2.8 wide zoom is extremely short. It is just 211 mm from the front to the flange. Close focus is 450 mm from the sensor, or 195 mm from the front of the lens. If you're shooting wide-angle with an ALEXA Mini LF in a very small room, or you're sitting in a car with limited space, you can move around easily with this very short zoom. The weight is expected to be 3.8 kg. This lens is excellent on a drone as the balance is very good. The lens and the Mini LF are approximately the same length.

**When you first set out on this project, how did you decide on the focal lengths?**

It began with the concept of having a system of zooms that could work on their own for almost every situation. It you wanted to shoot a show only with zooms, we could provide a range of focal lengths from 16 to 300 mm, or up to 510 mm with the extender. The other idea was to have a range of focal lengths appropriate not only for large format but also for Super35. As a wide-angle lens 16mm is very popular in S35, and in large format, it's ultra- wide.

**How did you decide on the focal length range and overlaps for each zoom? That must have been difficult.**

It was very difficult. As you can imagine, there were a lot of discussions. It was a balance of requests from the market and what was practical. We went through several different iterations before we came up with these focal lengths.

The design philosophy followed what we have done with Signature Primes. The 12, 15 and 18mm Signature Primes have incredibly high resolution. Why? Because you often shoot wide scenic vistas and landscapes with lenses in that range and want to see many small details. The resolution of the 16-32 mm Signature Zoom is also incredible. The 45-135 mm Signature Zoom will probably be used more for portraits, and therefore this lens is slightly smoother, gentler and softer because you're shooting faces with it. The balance of the Signature Zooms follows the balance of the Signature Primes.

**Interesting. I was not aware of this balance. Is the 75 mm Signature Prime slightly softer than, for example, the 18 mm?**

Yes. Keep in mind that we are talking about very high levels of resolution, and curiously this results in an image that feels extremely natural. There are subtle and intentional aesthetic differences between the wide and long lenses.

Most likely, we will see 8K or higher as a future standard. That is when you'll see a dramatic difference in images captured right now with Signature Zooms and Primes. Moving images will only



become more immersive as display resolution and dynamic range increase. The Signature Look captures high resolution images that are natural, flattering, and timeless. These lenses are designed to be an excellent long-term investment, both technically and aesthetically.

**Typically I have avoided describing lenses as being 2K, 4K, or 8K lenses. What's your opinion on that?**

I don't like to follow the "K race". On the camera side, we now see 12K. Most likely, sensor development will never end. But when you tell an optical designer you want to have an 8K lens, what does that really mean?

You discuss the resolution of a sensor in "K." But, you'll describe a lens in line-pairs per millimeter as you see it on a lens test projector, or you will quantify a lens in MTF which is resolution and contrast. When we talk about high-resolution lenses, we look for high-resolution and contrast in not only the low frequencies but also the higher frequencies as well.

The lower frequencies provide the overall contrast of the image. Older or vintage lenses very often have higher contrast in the lower frequencies, but not in the higher frequencies. This was not required in the past because film has been very forgiving. In the film days, making a lens with a resolution of 80, 100 or more line pairs was nice, but the film process (camera original, gate steadiness and release printing) often reduced resolution significantly. Now, with digital sensors, and especially with HDR, we can record very high resolution and we can show it. And high resolution lenses produce very natural images when matched with a high resolution HDR display.

**What is the resolution in line pairs per millimeter of the Signature Zooms?**

We have tested the prototypes on projectors in manufacturing and together with customers. We have seen 200 line-pairs in the center at wide-open aperture, T2.8. Stopped down to T5.6, we have also seen 200 line-pairs in the corners. And when we say 200 line-pairs, this was the limit of our test chart. This follows common wisdom about fall off: when you stop down, your field gets flatter, and you get better resolution in the corners.

**So, in terms of image quality, the Signature Zooms are as good as primes?**

I am asked this question very often. I have heard some other companies say that their zooms are as good as primes. That's a difficult statement—because how are you comparing? If you compare the Signature Zooms with the Signature Primes, you'll see a subtle difference. At a technical level, the prime will still be better.

This is physics. Can you make a zoom that has exactly the same performance as a prime? Theoretically you can, but then you end up with a massive lens that no one can afford. We think that the quality of Signature Zooms will stand out by comparison to other zooms and primes.

Most importantly, their look matches our own primes. I know of no other primes and zooms that match so closely in digital. Film smoothed over many differences, but digital is not as forgiving.

**Can you say that the Signature Zooms match Signature Primes?**

Yes. The matching is about the look, the bokeh, the very smooth and subtle separation of the main subject from the background. The bokeh is not distracting. When I refer to bokeh, I'm speaking not only about the out of focus highlights but the entire out-of-focus image. This quality is consistent across all Signature primes and zooms.

**Please tell us about skin tones.**

The skin tones also match. They are very natural and slightly warm. Skin texture is natural without feeling harsh. We capture fine detail without unnatural harshness.

As with Signature Primes, the Signature Zooms have very little distortion. Breathing is minimal. Chromatic aberration is very well corrected, both laterally and longitudinally. This was standard homework we had to do.

**What is the style, the quality, the look, in less technical, but maybe more painterly, artistic or culinary terms?**

You and I have discussed Signature Primes in oenological terms and I find this quite appropriate. Imagine we are tasting a wine from Tuscany. They make very good wine there. Some are quite expensive, for example the Super Tuscans like Tignanello or Sassicaia. They have a distinct complexity. When you lean back, close your eyes and taste such a wine, you will experience something different each time.

Other growths from Tuscany may be less complex and less expensive. The basics are similar: it can be the same soil, the same grapes, the same sun and maybe even the same winery. They are the second and third growths. They are less complex. When you taste one of these more affordable wines, they can be almost as good, but somehow the experience is the same every time you try them.

The look of the Signature lenses is consistent but, at the same time, very complex. This look is predictable in quality, yet it produces images of unexpected complexity and sophistication.



**If you are in a restaurant — I look forward to that when this crisis ends —and the food is not so good, sometimes you're influenced by that and say, "This wine is not as good as what I remember from last time." Reluctantly returning from wine-tasting to look, I assume the Signature Zooms have the same micro contrast finesse for skin tones and details that you have in the Primes.**

Yes, they have the same kind of smoothness that you know from the Signature Primes, which is not a lack of resolution. The resolution is still very high. This is why skin tones look so smooth: the transitions across fine details are rendered in a higher number of tonal steps, for greater complexity.

**Do the Zooms have a magnetic rear filter holder?**

They do. It's the same interface, so you can use the same rear filters on both the Signature Primes and Signature Zooms. You can even use the rear filter with the extender.

**And LDS-2 metadata?**

The zooms and extender are LDS-2 capable. When you use the extender, the camera will automatically record metadata that references precise changes in your focal length, T-stop and also minimum marked object distance as the lens itself becomes a couple of centimeters longer due to the length of the extender.

LDS-2 is exceptionally helpful for VFX as it dynamically records the entrance pupil position, which somewhat simplifies tracking and compositing.

And LDS-2 will be also expanded in the near future to capture distortion and chromatic aberration correction information. We design our lenses to eliminate the need for this kind of information under normal circumstances, but for critical use we plan to provide it.

**Would you like to tell us about manufacturing?**

Signature Zooms are made in the same facility as Signature Primes and designed by the same optical and mechanical designers. Zoom lenses are much more complicated than prime lenses. When I describe the Signature Look I often say it is a balanced approach to harmonizing aberrations and resolution. We took the same approach in manufacturing in that we harmonized mechanical stability and optical performance.

We take customer service very seriously. The lenses can be serviced at our ARRI service stations in Munich, Beijing, Hong Kong, and Burbank. These facilities have dedicated MTF measurement devices, clean rooms and tools to service both our prime and zoom lenses. The first customer shipments will begin in the second quarter of 2021, with all the zooms available by early fourth quarter of 2021, and by then our service stations will be ready for them.

**What were some of the specific challenges in making zooms?**

One of the challenges is the thermal stability of the zoom, which is even harder to fulfill than a prime. You can imagine having the same optical performance with a prime at minus 20 degrees and plus 50 degrees. The bearings still must rotate and not get too stiff or too loose. This is much more critical in zoom lenses because you have many more moving groups. We have spent quite some effort to thermally stabilize these zoom lenses and we believe they are on the same level as the primes.

**Do you have the approximate prices of these lenses?**

Here are the European prices. I don't have the exact American prices yet. For the 65-300mm including the extender, the list price is 59,900 Euros. For the 24-75mm and 45-135mm, each is 39,900 Euros. And the wide-angle lens, the 16-32mm, which I sometimes call an optical beast, is 55,900 Euros.

**Why do you call it a beast?**

It's because of the optical quality. The resolution is higher than the other lenses, which is very difficult to do in a wide angle zoom lens. This is done on purpose to capture fine detail in wide shots and vistas. The breathing of this lens, even at 16 mm where it really counts, is zero-point-something percent. It's almost zero. Our goal with Signature lenses is that they should only enhance images. They should never distract.

**It's not an upside-down image, is it?**

No, it's not upside down. It's not the unique design we used for our 12 mm Signature Prime or the 9.5-18 mm Ultra Wide Zoom and 19-36 mm Anamorphic Ultra Wide Zoom made for Super35 format.

**When did you finalize the optical design and start building the prototypes?**

We already have working prototypes for the two longest zooms that have now been field-tested on several productions. We are beginning serial production. The prototypes for the two wider zooms are coming by end of this year.

**When was this project green lit? When did you say, "Okay, let's go and build them?"**

It was at the end of 2018.

**Do you see trends in different areas of the world preferring different focal lengths of zooms or primes?**





Currently the Asian market in particular has been asking for extremely wide-angle lenses, which surprises me. There's a large demand for the 12, and 15, and 18 mm — and especially for the 12 mm which is comparable in angle of view to an 8 mm in Super35 format. France, Spain and India have been open to more extreme focal lengths as well. The US—especially Hollywood—and the UK are staying with more familiar focal lengths.

When we brought out the 200 mm and 280 mm Signature Primes, some customers initially thought they were rehoused DSLR lenses. Perhaps they came to this idea because many very long lenses in our market are in fact rehoused Nikon, Canon or other brands of camera lenses that are rehoused and equipped with a PL mount. The Signature 200 mm and 280 mm Primes are completely original designs made specifically for use in motion pictures.

This year we have seen more demand for very long lenses. I think this is a result of social distancing. Maybe 20 years from now, we can say, "That's the 2020 style with lots of depth compression."

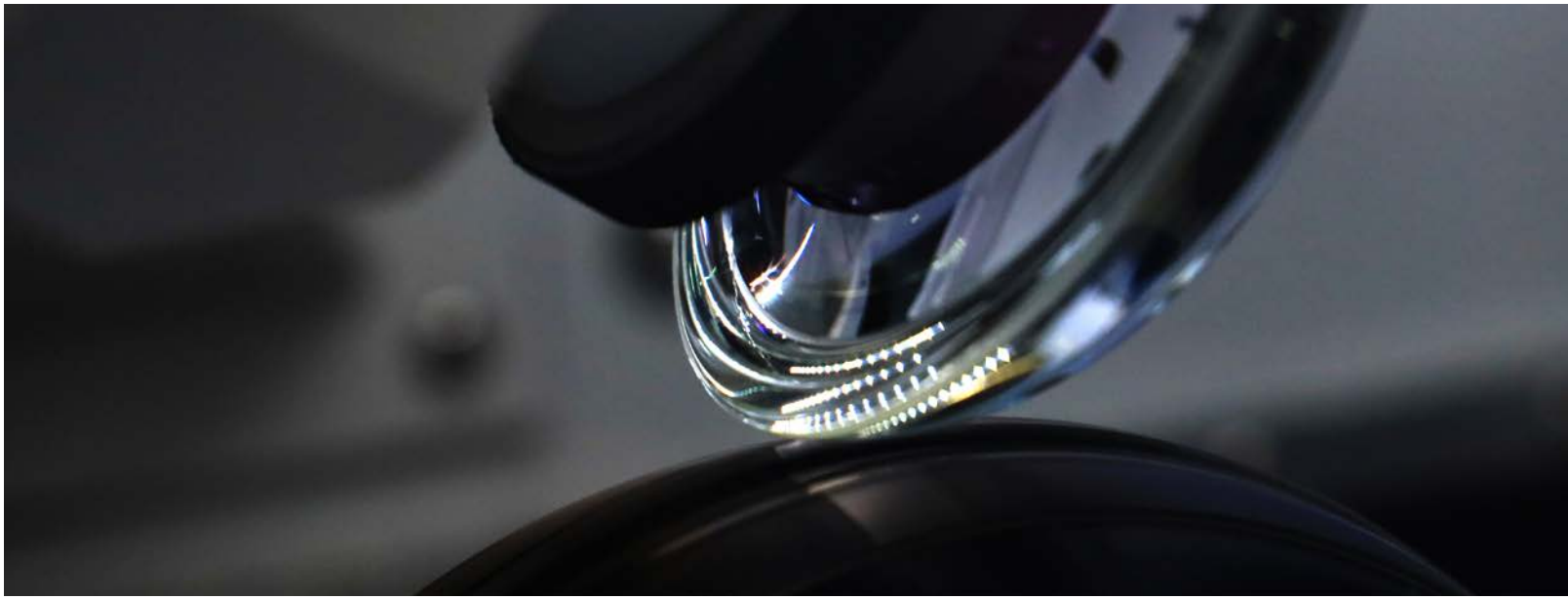
**That reminds me of the original Angenieux 25-250 arriving on the scene and on locations in 1962. It was a lens that helped spark the Nouvelle Vague, the New Wave. It was used on Claude Lelouch's "A Man and a Woman," and "Easy Rider," on most of Rossellini's films in the 1960s, Haskell Wexler's "Medium Cool" and many commercials from that era. So how would you summarize what you're doing with these lenses?**

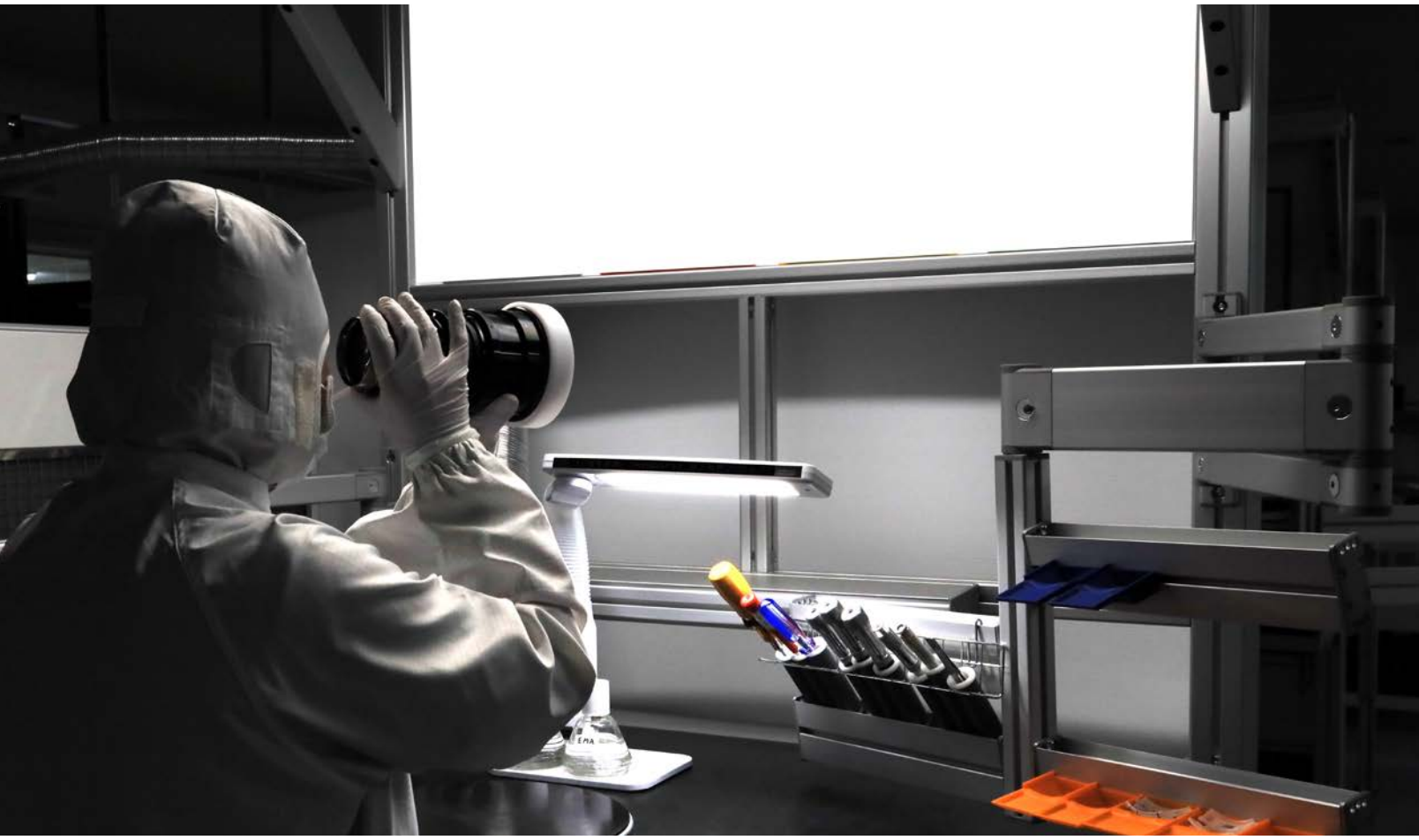
What we are doing with the Signature Zooms is similar to what we have done with the Signature Primes. For us, it's a new chapter in lens design. These lenses are not an updated version of previous lens design or philosophy, which would have been much easier. We said, "Let's do something completely new." This was important because, in the past, most of our lenses were designed for film. Digital possesses a new kind of beauty, and we felt that required a new optical approach. Our roots are in film, so we worked to find a way to retain that aesthetic in a new medium. We've done that in our cameras, and we've tried to bring that richness and complexity (the Super Tuscan style!) to our lenses.

It was a risk, but cinematographers really like the Signature lenses. That has been borne out by the fact that our lens business has remained stable despite the crisis. That surprised me. I wasn't expecting that. This is not an easy time in our industry and yet people are buying expensive lenses. As you know, Signatures are not cheap. They are made to last.

**Are these customers mostly rental houses or individuals?**

Both. They are rental houses and individuals. I have the feeling that in a crisis, when you make an investment, you need to make sure that your investment is safe. Also, you want to be certain that if you have a problem with the product, you will still be able to have it serviced in five, ten or twenty years from now. It becomes a matter of trust in the brand. I think it's the same behavior that we all resort to as individuals in a crisis. We gravitate toward safe havens. I believe that Signature Zooms and Signature Primes provide this kind of reassurance.






TRIOPTICS


ARRI
MAP-2A
ARRI
K2.0023839
ARRI
ARRI
MSB-3

# Grading *Ford v Ferrari* with Skip Kimball

Company 3 Senior Colorist Skip Kimball driving his DaVinci Resolve Studio in Deluxe's flagship theater, Stage One.

In last month's FDTimes, Nicol Verheem (Founder & CEO of Teradek and CEO of Creative Solutions) said, "One of my recent favorite memories was watching *Ford v Ferrari* with my 12-year-old son. I can remember walking out and he said, 'First off, that was a really good movie. And second, when can we come back and see it again?'"

I saw it again as well and was delighted to get in touch with Company 3's Senior Colorist Skip Kimball about the film's impressive grading.

*Ford v Ferrari* was directed by James Mangold. Cinematography was by Phedon Papamichael ASC, GSC. It's based on the true story of Carroll Shelby (Matt Damon) and Ken Miles (Christian Bale) as they work to win the 24 hour race at Le Mans in 1966.

Although *Ford v Ferrari* takes place in 1966, the filmmakers resisted an initial "vintage" look. "We developed the show LUT during camera testing," Kimball said. "It was important that the film evoked a period feeling without appearing like an old movie." Some historical notes: John Frankenheimer's *Grand Prix* was released in 1966, shot in Super Panavision 70 format and a young Austrian named Otto Nemenz was the show's camera technician.

Cut to 2018. During prep, Papamichael researched films like *Grand Prix*. He commented, "It was very important to us to convey that these little machines were just a bunch of nuts and bolts holding together this gigantic engine, with the danger and the intensity of what it's like in a race car."

DaVinci Resolve Studio was used not only to grade and conform the film but also for quick reviews and visual effects updates.

Shot in at least seven different camera formats, Resolve's resolution independence let Kimball work with all footage in their native RAW formats and 15 different sizing procedures. Resolve's Camera Shake tool was used frequently to help match energy between shots, sometimes adding to what VFX was already doing.

The final race at Le Mans was done at five different locations. Kimball had to match the various locations, light, sky and time of day. "The scene is so intense and exciting and, like Ken Miles, all anyone should be focused on is the race."

Emails with Skip Kimball followed.

**Jon Fauer:** Please tell us more about the look of *Ford v Ferrari*.

Skip Kimball: While it is a period piece, we didn't want it to look like a 60s film with the usual nostalgic tropes to evoke an "old film" look. It was important to simultaneously suggest the era of the 1960s while keeping the colors bright and vivid. We wanted it to feel like it would if you were really there, not like a faded memory of the time. Much of the story takes place in Los Angeles, where I grew up, so I tried to make the film look like how I remember the city looking then.

Jim Mangold is all about realism. He never wants to go over the top or make it feel like there is a "look". He'd rather it feel like you were just standing there. I'm much the same way. An inexperienced filmmaker can easily go overboard with camera filtration or post-processing, but an experienced filmmaker lives in the subtle details and the nuances of photorealism.

The early scenes of the Ferrari factory have a dreamy quality compared to the more steely and industrial feel of the Ford factory. This complements the different philosophies the manufacturers had. Shelby's garage is a blend between the two. And *The Godfather* was a big inspiration for Lee Iacocca's negotiation with Enzo Ferrari.

We developed the show LUT during camera testing. It was important that the film evokes a period feel without feeling like an old movie. We wanted it to feel like you were actually there in the 60s. There's a subtle degree of film emulation while retaining rich shadows and bright white highlights.

**Tell us more about cameras, RAW, grading logistics, probably large ARRIRAW files. Stored locally or LAN? Hardware, OS, Monitors, Panels, Final Conform?**

*Ford v Ferrari* was shot on ARRI ALEXA LF and a variety of other cameras. For any camera-original material, we worked natively from the camera RAW files, which did require quite a bit of storage and throughput. Production shot over 240 hours of material that were processed by Deluxe's EC3 dailies.

We used DaVinci Resolve 16 Studio on Linux. We're rocking multiple SuperMicro SuperServer systems with 4-5x RTX 2080 Ti or RTX Titans. Dual-monitor desktop GUI using Eizo displays. DaVinci Resolve Advanced Panels. Our DaVinci Resolve Studios all work off a shared fiber-channel SAN so multiple artists and technicians can access the projects and material.

Grading was performed on a Barco DP4K-P for traditional digital cinema, and on the Christie / Dolby Eclipse projector for Dolby Cinema. Home video was mastered in SDR and HDR on Sony BVM-X300 monitors.

I like to work with the camera RAW media for maximum creative flexibility, so we always conform natively in DaVinci Resolve Studio. My editor, Tashi Trieu, built a fast pipeline to keep up with continuous visual effects updates. Because it was conformed natively in DaVinci Resolve Studio, we could offer our clients complete creative flexibility in the DI theater. When James Mangold, the director, and editors Mike McCusker and Andrew Buckland, wanted to experiment with the timing of a particular VFX sequence, we auditioned the edits right there in the theater. That way we could test the changes there, on the big screen, with the surround sound mix. Then Mike took those timings back to editorial so we were all in sync.

**How did you begin grading in DaVinci Resolve? With an over-**

**all LUT or a default Resolve LUT that you modified?**

During pre-production, while we were building the LUT and setting up the look in dailies, I often referred to my father's old car magazines from the period. This gave me a great sense of the look of the time that the car manufacturers, marketing people, and photographers had designed.

The LUT was based in part on film looks I had built for film-outs years ago, with some modifications to better handle the wider gamut of the ALEXA capture. Using a single overall LUT simplifies the visual effects pipeline, which includes the work of many artists around the world, as well as deliverables and archival.

I use DaVinci Resolve Studio's Group function to apply the show LUT across any original camera media and VFX shots while leaving titles and graphics to be graded separately.

**Phedon said that a big challenge was matching all the varying lighting conditions from different times and places: California, Georgia, etc. This must have been especially interesting for the 24-hour LeMans sequence.**

James Mangold had a very specific direction throughout the film, even down to the amber color of the Ferrari headlights. That whole sequence is a product of our combined inspirations and experimenting with different looks together. The climax of Ford v Ferrari is a confluence of practical effects, digital visual effects, and a lot of footage shot over multiple days in uncontrollable conditions. It's certainly a challenge, but ultimately a very rewarding one.

**Did you add film grain in the DI via a Resolve plug-in?**

There are a lot of options when it comes to grain these days. But I've found that it's often simpler and more flexible to use scans of real film grain and perform the composite myself. I have a library of grain that I've had scanned over the years and it's always served me well.

For the Dolby Cinema version, we chose to tone the grain down a little bit. The added contrast on a giant screen really pronounced the grain more than we felt was appropriate for the film.

**Different grading for different releases? Theatrical, Dolby, standard DCP, online, etc?**

We graded and mastered in traditional SDR digital cinema (14fL P3D65), Dolby Cinema (108nit P3D65), SDR home video (100nit Rec.709), and both HDR10 and Dolby Vision for 4K HDR home video.

**Thanks!**

*On the next pages, let's go back to Grade School—Grading School—as Skip Kimball takes us through the grading and looks of* Ford v Ferrari.

## Grade School with Skip Kimball, cont'd

Skip Kimball comments on the following selected DaVinci Resolve graded frames from *Ford v Ferrari.*

1. The 1959 24 Hours of Le Mans flashback is shown with muted, earthy colors.

2. Los Angeles is characterized with sun, warmth, and saturated colors. Even though the movie takes place in the 60s, the intention was to present it as if we were currently there, rather than as a faded memory. James Mangold referenced photographs taken in the 60s, particularly marketing photographs that were featured in car magazines. The hyper-real and oversaturated colors informed the look of many scenes throughout the film.

3. The Ford factory is cool, desaturated, and meant to feel mechanical and automated, in contrast with the warmth and "handmade" feel of Ferrari's boutique factory in Italy. This is meant to reflect the industrial, mass-produced philosophy of Ford and Henry Ford II's character.

4. Coppola's T*he Godfather* was an inspiration for Enzo Ferrari's office. Warm pools of light illuminate the cool and calculating man who defends his empire against Ford's Lee Iacocca (Jon Bernthal).


5. Shelby's hanger at LAX (Los Angeles Airport), Night Exterior.

6. This is one of our favorite shots in the movie. As a plane crosses in front of the hanger, it casts foreboding shadows across the scene. It's an emotional moment when Ken Miles (Christian Bale) listens as the Ford team, without him, loses Le Mans.

6. The interior of Shelby's hanger at LAX is a blend between the cool blues of Ford and the warmth of Ferrari, representing a blend of the two philosophies as he marries Ford's industrial might with a handmade approach.


7. The introduction to the 24 Hours of Daytona race is at night with stadium floodlights serving as a key lights for the scene.

8. Ken describes the Le Mans race course to his son Peter.

9. The start of the 24 Hours of Le Mans is hopeful and optimistic.


10. Ken refuels during his break shift mid-way through the 24 Hours of Le Mans.


11. Ken prepares to get back in the race.

12. The bittersweet conclusion of the race is less saturated to reflect Miles' realization that despite being in the lead, falling into formation with the rest of the Ford team dropped him out of first place.


13. Stunning realization. Less saturated.


CVP Creative Space on Charlotte Street, London.

*Fitzrovia, London. January 28, 2020. Jon Fry, Darren Simpson, Yevgeny Subbotin, Aaron George and I met in the nicely appointed club at CVP Creative Space on Charlotte Street. As often happens in our world of moveable feasts, we soon adjourned to continue the discussion at Berners Tavern.*

*In a large elegant room festooned floor to ceiling with paintings, the menu included traditional British pork pie prepared tableside with showmanship, chargrilled Buccleuch Estate Scottish beef with triple cooked chips, battered Cornish haddock with crushed peas. As anyone familiar with this CVP cast of characters, the drinks and wine flowed copiously.*

*BSC Expo began a couple of days later, and then the world shut down. Although indoor dining is not on my list of recommended activities, we have updated this interview as things evolved. Production is busy in many places to meet the insatiable demand for films to stream.*

*Because there are two speakers with the same initials—Jon Fauer and Jon Fry, Jon in this interview refers to Jon Fry.*

**Jon Fauer: Would someone please tell us about the origins and history of CVP?**

Jon Fry: I can start. CVP is probably 35 years old now. It began as Creative Video Productions, founded back then by Phil and Alison Baxter. Phil was an owner/operator, a jobbing cameraman on TV-am, a daytime news show in the UK. In addition to working as a news cameraman, he owned his own gear. But, at TV-am, he was not always shooting with his own gear. So Alison, his wife, rented out the kit that he owned when he wasn't using it.

**Smart lady.**

Jon: I think they made as much money, perhaps more, by renting his gear than by his working as a cameraman. That evolved with Phil buying even more new equipment, renting it out, and then selling the used equipment. Eventually, they thought, "Why are we doing all this work through renting and working? We might as well buy new equipment and sell it."

**Where were they located?**

Darren Simpson: Birmingham, in the Midlands. And I'm sure Phil had a production company as well.

**Isn't Birmingham the scary *Peaky Blinders* area?**

Jon: I would hate to say that they were associated in any way. The company evolved into a reseller that did very well because they were quite quick to catch on to the trend of buying through the internet. They were largely the first proper transactional website in our industry in the UK.

Darren: Most definitely. That was around the mid 90s.

Jon: They took over the march from everyone else and were a good few years ahead of everyone else. They mainly dealt at the lower end and not the pro end of the market. They weren't dealing with the BBC, ITV, the big rental companies or high-end produc-

Jon Fry, Darren Simpson, Yevgeni Subbotin, Aaron George (L-R).

tion companies. And then, in 2008, Creative Video Productions (CVP) bought a company called Mitcorp. Mitcorp was a very different company. It was very account managed, with face-to-face customer relationships and dealt with many of the higher end parts of the industry. Phil wanted to have those relationships. He couldn't steal them. He couldn't win them off Mitcorp.

**So Phil bought Mitcorp?**

Darren Simpson: CVP traded a lot with Mitcorp. All the dealers did that: they'd buy and sell from each other to help their own customers. It was a very different industry back then. Phil always wanted an in to what's considered the broadcast market. He was mostly dealing with videographers who, to be fair, were the types of people buying stuff online anyway. But looking back, even a Sony Z1 Camcorder wasn't the sort of thing you'd buy online. People hadn't wrapped their heads around spending that much money on a camera and doing the transaction online. Back then, Mitcorp was the company with all the relationships with all the broadcasters and rental companies.

Jon: Then what happened was Creative Video Productions, which was a much smaller company, bought Mitcorp, which was the much larger company in terms of turnover. This was quite a surprise to the industry, but it was almost a match made in heaven. Normally, when you combine two companies, you add two 10s and it totals only 15 before it goes anywhere further. But because of the presence of Creative Video Productions online, together with the relationships of Mitcorp, the combination now meant that you put two 10s together and made 25, almost overnight, because of the complementary nature of the two companies.

Mark Forth was running Mitcorp as the sales director. He became the managing director of the combined companies. We all worked together from that point on. The company had circa 25 million turnover at that time. We've progressed from there to the position we're in today, with an average of 110 million turnover. In the process, we've done nothing more than focus on selling gear, being better at what we do, and how we take that message to market.

**Nice. Why don't we talk about how each of you started. Shall we begin with Yevgeny? And where was Mitcorp located by the way?**

Yevgeny: Mitcorp was where our headquarters are today, Brentford, West London, in the same offices. Darren was already working there. I joined Mitcorp in 2006, after being interviewed. I was one three people employed that day. I'm the only one left. The other two were fired within two months.

Aaron George: We tried firing him, but…

Yevgeny: They tried to fire me, and they couldn't. I've always been in sales. Darren and I worked together at Mitcorp, under Mark, doing sales. and Jon Fry used to be our account manager at Sony.

**I didn't know that.**

Yevgeny: Jon was the bright star at Sony within Europe. Jon joined Mitcorp in 2008.

Berners Tavern. 10 Berners St, London.

**Yev, where were you before Mitcorp?**

Yevgeny: I was working for another company 100 meters away, selling computers. I can't remember how, but somebody from Mitcorp came to buy a computer from me. They liked me and then they sent a secret shopper to barrage me with difficult questions.

**They sent a what?**

Yevgeny: A secret shopper.

Aaron: To test him out.

Yevgeny: Apparently, I handled myself okay and so they employed me.

**Secret agent. Interesting. That's a good story.**

Yevgeny: I don't know if it's true or not. I've been told that.

**How did you learn about the motion picture business?**

Yevgeny: It was on the job training, totally. When I started, I didn't know the difference between a BNC cable and an XLR. Actually, Darren was the one who taught me the most.

Darren Simpson: I told him to make sure he sells an XLR cable with each of his microphones, basically. Make sure it's complete and it works. Make sure people don't come back saying something is missing.

**Darren, can you tell us how you started?**

Darren: Well I came over from Australia in 2003. I'm from Melbourne originally where I worked in the industry. My dad owned a company in Melbourne that was a Sony, Panasonic and AVID reseller. I arrived in London basically looking for a job. I stayed in a hostel with other backpackers and spoke to many resellers who didn't employ me. Three months later, Miller, the Australian brand of tripods and heads, recommended me to Mitcorp. They hired me to do showroom sales and things like that. I was more what we would call a technical consultant in sales to start with, but I was nowhere near technical, that's for sure. It was mainly to look after freelancers. There were only three of us salespeople at the time, and that was it.

In the beginning, they wouldn't let me sell Digibeta or high-end products. I was maybe allowed to sell DVCAM. We were traditionally a broadcast reseller. Ultimately, our big entry into the cinema business was probably thanks to RED releasing the RED ONE. All of a sudden, RED brought out the RED ONE and many people were buying them online for $20,000. The cameras would be delivered to them at home where they quickly realized they needed lenses, baseplates, matteboxes, tripods and everything else to make the camera work.

**They didn't know those things in advance?**

Darren: No. They'd open the box and say, "Expletive deleted, I need to buy some more stuff." To be fair, that's how our relationship started with ARRI. I worked a lot with Alan Piper, when he was at ARRI, before he ran RED in the UK. Lovely guy. I learnt so much from Alan over the years. He taught me loads about lenses

and matteboxes, which were often even more complicated than they are today.

I would sell Ultra Primes to customers and then, I then would enjoy explaining matteboxes to them. That's where our relationship with ARRI started. We sold loads of Ultra Primes because not many sales companies like ours sold 35mm lenses back then. The rental houses had them and vintage lenses weren't so trendy in those days.

**What about Cooke lenses?**

Darren: It took us years to get a relationship with Cooke. They came afterwards, but at that stage, ARRI/ZEISS Ultra Primes were probably the most popular lenses we were selling.

**Why did you leave Australia?**

Darren: Lots of reasons. I was lucky that my sister lived just down the road from here. She managed a pub and had a room rent free. So I lived in Piccadilly Circus for the first 12 months that I lived here, rent free in a pub.

**What more could you want?**

Darren: I stayed. I love London. I originally intended to stay for only two years for the duration of my holiday working visa.

Aaron: It's about time you went home.

**Ha. Then why don't we talk to the other Australian in the room and why he didn't go home. Aaron, how did you get started at CVP?**

Aaron: I joined two and a half years ago. I've been with CVP quite a short time relative to everybody else here. But I've known them for more than 10 years. When I was at ARRI we had a close relationship with CVP and we became quite good friends over the period.

At ARRI, I was Head of Service looking after cameras, lenses and accessories as well as lasers and scanners for most of Europe.

**I remember you at ARRI. Why are you not Head of Service at CVP? Why are you now in customer service and sales?**

Aaron: That's a good question, Jon. I think it's a test in time thing about service because you mostly hear issues and problems that people have. It's rewarding to solve them, but after 12 years of dealing with that, I was looking for a bit of a change, a new scene, and these guys had always been chasing me for years to offer me a job.

Darren: He's one of the people we'd see every year at every trade show and we always joked around about when he would be coming to work for us, because he's a likable guy, isn't he? And we like to employ people we like. It's just the way that we work, we just joked about it for years.

**Jon: I seem to remember we told ARRI we didn't court him.**

Darren: No, we only joked around about it, didn't we?

Aaron: It just happened. It was 12 years and I was like, "No, never, never." But then one year, personal circumstances changed. My wife got pregnant and I wanted to be a little closer to home than the hour and a half each way that I was driving. And then we were at IBC and they did their usual joking, hitting me up, "Come and work for us." But this time I said yes, and they were like, "What?"

Darren: No, you turned around to me and said, "Mate, I'll do whatever you want, but I'm not having anything to do with engineering," and we said, "Oh, you do sales then." You were like, "Oh yeah, OK." Anyway, we all joked around about it at the time because it was quite late at night and we had quite a bit to drink by that stage. Then we all came back and spoke about it. It seemed like a pissed idea at the time, but actually it all stacked up.

Aaron: I had worked in every part of the business: on the creative side, rentals, and service. The only thing I hadn't really done was sales. I was confident with the kit and the industry and it made sense maybe to try my hand at it, and do something different.

Darren: Let's face it, what we do isn't really sales per se. It's more account management. It's relationships and solving problems and building camera kits. Aaron is one of those personalities who is likable and very knowledgeable and everything else that goes with it. It made sense, really.

Jon: I did not attend IBC in Amsterdam that year because my wife was having a baby. So, I came into work after IBC to be informed by Mark, Darren and Yev that we'd employed Aaron. I said, "Oh, that's cool. What's he going to be doing?" They said, "Working for you in sales." I was like, "Great. Do we really know whether or not he wants to do this," and they said, "Well, we don't know. You'd better give him a call." So we did and it worked.

Aaron: I remember getting that call from Jon Fry about a week later. He asked, "Were you serious? Are you sure you want to do this?" I said, "Actually, yes. Shall we meet?"

**And I'm forever grateful to you, Aaron, because you were the one who introduced me to CVP. So thank you.**

Aaron: Pleasure. For me, it's been great so far. Setting up the ARRI Creative Space at CVP here with the guys has been amazing and the job's been extremely rewarding. I do more than just the sales. We organize and host a lot of events and workshops and it's been pretty diverse.

**Jon Fry, how did you get started? I didn't know about Sony.**

Jon: There are a number of stories. But we'll go with the real one. My background is actually as an engineer.

**For real?**

Jon: Everybody has the same reaction. And most people don't believe me. They believe I was a dolphin trainer or a biscuit designer. But nobody believes that I was an engineer. Seriously, I did a five-year apprenticeship with the UK government as an electronic engineer. I then got a job with Sony after leaving the Defense Research Agency to fix gear on the bench in Basingstoke, at Jays Close and other places. It worked out after three or four years that I was better at explaining to people why I hadn't fixed their gear properly than I was at actually fixing their gear.

**You can't make this stuff up.**

Jon: It made sense that perhaps I should be more customer facing than actually engineering. I did a little spell in systems integration at Sony—solution architecture and project management. It was good, but my attention to detail, if I'm completely honest, was not built for that, and eventually, I fell into sales. I worked at Sony for a number of years. Then I had a two-year sabbatical, for want of a better word, where I went and worked at Visual Impact, who at

the time were the biggest UK resellers. In the late 90s and early 2000s, they were almost comparable to what CVP is today.

I worked there for a couple of years and then went back to Sony in sales looking after the channel, as it's called. This entailed looking after resellers. I was the Sony sales and account manager for Mitcorp and CVP. So I developed a relationship with not only the Mitcorp guys but also the Creative Video Productions guys. When the two companies merged, it came as quite a shock to me because I always thought it might be Mitcorp buying Creative Video Productions and not the other way around. Then 10 years ago, in December 2009, I gave in much in the same way as Aaron and Yevgeny did and joined the dark side.

**Were you recruited by CVP?**

Jon: I was recruited, yes. I'd always had a very good relationship with the guys. I liked my career at Sony, but there's always a ceiling to what you're ever going to achieve within a certain company. I think I'd probably reached that point within Sony. Therefore, it was a natural progression to move into CVP. I was fortunate enough to join as Sales Director. It was a fairly stiff learning curve coming from a large corporation like Sony and then moving into a very quick, flexible, nimble company like CVP where you make a decision, it's done, and then you move on to the next thing. It was challenging but very exciting and quite fulfilling. So that was the career for me.

**At that time, CVP was still owned by Phil and Alison Baxter? And from what I understand, some of you bought the company?**

Jon: We worked under Phil. The hierarchy, if you like, was Phil as the CEO, Mark as the managing director, myself as the sales director, and then a very flat structure with sales and engineering and everything all rolling up to either myself or Mark, but with Darren and Yevgeny at the time very much taking the sales lead.

When I joined the company there were 10 sales people. (There are 20 today.) In 2013, Phil Baxter passed away suddenly, unexpectedly. That left Alison as 100% owner of a company without necessarily wanting to own the company. I think they were probably considering an exit just before he passed away, and she did a very good job of holding the company together. We took the lead to make sure that the company pushed forward. I think we did a good job in the period from 2014 to 2017. Eventually, Alison thought she'd done what she needed to do and wanted to move on. We were offered the opportunity to complete an MBO, a management buyout.

We got together as a group of five individuals. Mansukh Kerai, our financial director, Mark Forth the managing director, Darren and Yevgeny as directors, and me as sales director. We put together a business plan, presented it to a number of banks and got funding and support from HSBC to buy the company in December 2017.

While the company was big, we felt there was a need to bring back the personality. I think we've achieved that. We're more accessible. We understand our customers and the market better today than we did even two years ago.

If you consider our Newman Street location, the facility is good and it is well stocked with the latest kit. But more than that, it's a place to enable clever people to demonstrate their talents because you can't do it without the people. We've worked hard in building a very capable network of people like Aaron, Ivailo, Sam Measure and everybody else. If you're in production in the UK, you probably have worked with them.

**Your staff is like a who's who of the British industry.**

Jon: A bit. Newman Street, the Creative Space with ARRI, and the other locations are nothing more than a tool set to enable us to put those people in front of our customers.

**In an MBO, is the bank involved in your day-to-day business? How do they protect their loan?**

Jon: The MBO enabled us to purchase the company. The bank leaves the management of CVP to us. Fundamentally they protect themselves by having faith in the business. It's not an asset finance. It is faith in your ability to run a company and pay back a loan.

**But the bank has certain guarantees?**

Jon: Whenever you borrow money there are personal guarantees attached. But those personal guarantees would never cover the value attached to the loan for the business because probably no individual would be able to afford it. However, what they did have was faith in the company for which they were funding the buyout. They considered the business plan being presented, the people on board, our customer database, our supplier network and everything that sits around that. Fundamentally, I suppose the validity attached to how good the business is or was and could be, moving forward as a forecasted projection, is what the bank invested in.

**The reason I asked is because many companies in our business are individual or family owned, and this is one of the few that had a management buyout. Other companies we know were funded by private equity firms.**

Jon: You find, in this industry, a lot of companies introduce private equity or venture capitalist investment in the company, which, to be honest, is something we could have done. However, the downside is that you no longer necessarily control your own business. We wanted to have flexibility to do what we wanted to do. We didn't want to change our identity in any way, shape or form. In fact, what we actually wanted to do was invest more in the business because we recognized there were opportunities that weren't being fulfilled by others.

**For example?**

Jon: Now, being supported by the bank and having demonstrated that we are able to facilitate the loan that they've given us means that they're quite happy to let us invest more into the business. Examples are the buildings in Charlotte Street and Newman Street, as well as investments in additional members of staff.

Yevgeny: When we bought the company, we had just over 100 staff. Now we are 148.

Jon: It's a continued investment. I think it's going to continue moving forward as we get more and more people on board to facilitate, fundamentally, the demands of the industry and the customers whom we listen to. None of this was necessarily our brainchild. It's all about getting closer to our customers.

Darren: And moving the market, really. Finding out what the challenges are and trying to put together facilities to address them. It's not more complicated than that.


CVP Newman Street, London.

**Would you like to go through a day in the life of how the sales is done at CVP? How is your approach different or unique?**

Darren: We've been quite lucky to have relationships with all the manufacturers. The difference is we slowly expanded our portfolio. We were traditionally a Sony reseller. All these other brands seemed to happen off the back of that. We developed strong relationships with all the lens manufacturers, including Angénieux, Cooke, Leitz and ZEISS. It was similar with cameras: ARRI, Blackmagic, Canon, Panasonic, RED, and the others all evolved over these years. One of the unique things about CVP is that we can give good, unbiased opinion on almost anything.

We have a chat, consult and talk to them about what they're shooting and what their application is. Then we create the recommended package for them. We won't be forcing VENICE or ARRI on them. It's all about the best tool for them, but let them make the decision on what they want to use and give them the pros and cons of each, and with lens choices. There are so many lens choices. And then there are all the bits of metal, rigs and accessories to go around it. We're quite unique in that we also have put a lot of investment into accessories over the years to be able to support the camera and lens systems. Where we've been quite strong is that we hold stock.

**I remember Jon Fry explaining the concept of "just in time" to me. Our industry often buys equipment just in time as the production actually begins.**

Darren: Yes. And I can't think of many other companies who really keep stock—inventory—the way CVP does. Phil always used to say that he wanted to have stock ready to ship from his website. It's like when you buy a pair of shoes online, you might be less concerned what price is if you know if it's in stock, and you'll buy it. Sure, there's an element of price as well. But our industry has gotten more and more complicated as the years have gone on. The camera's the camera, and then you've got so many additions to that camera—power, cables, lenses, tripods, recording media—all the things that go around it. To have everything in stock, with different options, and to have all that in stock to be able to deliver next day or within a couple of days, is very difficult to do.

**It's even difficult for many manufacturers to do that.**

Darren: We try to think ahead and get behind the right technology at the time. If we think it is going to be popular, we'll put it in stock.

Yevgeny: We're not always right though. It can be risky business.

Darren: We do get it wrong sometimes, no doubt about it. But we're lucky enough nowadays that we've got enough volume here

to be able to always find a home for something eventually.

It would be difficult to replicate what we've created today anywhere else because it's already volume driven in the first place, and as Jon mentioned, our industry is so last minute. As we know, whether it's producers, production companies or rental houses, the amount of lead time after a job is awarded can be as short as two days before the crew starts testing. It happens all the time. I'm sure it happens in the US as well.

It's all about having these tools to be able to deliver the order because at the end of the day, if you can't deliver, you lose a sale.

Jon: The other key to this is we do offer customers total peace of mind. While we have all the gear in stock, on the run up to the start of a film, during the six months that they're thinking about the project, we've been involved with them. We've been working with them to make sure that they understand what the kit is. Then there is often, literally, the last minute drop because they've given us two days notice even though they've been talking about it for six months.

At the back end of all this, we have full-time engineers in Brentford to support and repair the equipment. After we've delivered the gear, in the unlikely event they have a problem, we can also fix it. We also have a very large fleet of demonstration equipment where, if push comes to shove, and we try to avoid it if we can because it's not really our business, we can bail people out if there's a problem. Again, this is where I think we've created a business that is very different. We're not just about selling boxes. We're about making sure that throughout the customer journey they're looked after. We hold their hands.

Darren: Customers are buying a manufacturer's product, as far as we're concerned. Because we represent that manufacturer, we feel responsible. We supplied the equipment in the first place. We've created the obligation to be able to follow through. Whether it's pre or post sales, we are able to support the customer all the way through.

**Yev, if some new gear comes along, are you proactive and call your customers and tell them that you have something new that might be of interest, or do you wait for them to call you?**

Yevgeny: We never wait. We always talk to our customers daily and they appreciate our reaching out. We inform and educate. I would also like to add that CVP is well known for being able to source hard to find things. Often, these are products that a lot of people have heard about, but not many have seen. Like vintage lenses or film equipment that is in demand at this particular moment. We can do it, and we are pretty well known for it.

**Tell us about the buildings at Newman Street and Charlotte Street and how they came about.**

Jon: It was largely driven by us recognizing, through relationships with our customers, the need for change in the market. As Darren said, when things are as complicated as they are in our industry, it's very difficult to make an entire decision on a purchase, or everything that you might need within that purchase for a particular project, online. You need to come and try things out. It's a bit like your analogy of a bespoke tailor on Savile Row. If you represent 1000 brands like we do, and god knows how many products are on the website, you need to go to one place to be able to try all of the pieces together. The only place that we know of in the UK that's anywhere near that is our Newman Street facility.

Charlotte Street came about mainly because we wanted to offer a place in central London that was more than just a showroom. It is where people can come to as a destination. It enables us to get closer to our customers. Whether it's a networking event, a popup restaurant or a product demonstration, it is something that was dreamt up out of the fact that we were doing high-end ARRI demonstration days. It could have been a hands-on event or a training event, and it would run for one day. If you hire a facility in central London for one day, it's very expensive. Then you get fairly low turnout because most of the people who wanted to come along to the ARRI demonstration were busy working. Charlotte Street is a permanent exhibition space, and often some of the events run for a week.

People will drop in when they've got time rather than saying, " I can't make February the 22nd, therefore, I'm going to miss out, but I might be able to do the 25th." So come along on the 25th. That really was the driver for doing this, and it's evolved from that into a club with membership and everything else that goes with it. The facility's used continually.

Darren: To be fair, last year we created our own festival, basically. It is called Kitfest, and we're doing it again next year. It uses our two premises and another place next door to Newman Street. We had all the manufacturers here to display their new kit. It was a way to give back to the manufacturers as well, and the level of professionalism of the attendees was amazing. It wasn't just a normal trade show. We had probably 500 or 600 people—rental companies, DPs, Directors and crew.

Jon: And we don't charge for stand space.

**What about the future?**

Jon: I think there is still an opportunity for progression and for us to become better at what we do. One of the things that we've learned through creating a very strong group of people that sit either within CVP or are friends of CVP, is that we're probably moving on from being what is largely considered as product experts to becoming technology experts. That is quite a broad brush, but I think we've demonstrated that to some degree.

Consider the Lens Coverage and Camera Comparison Tool, a phenomenal online tool that is the result of a huge amount of work by Sam Measure. It is not a product demonstration. While it shows a lot of cameras and lenses, it demonstrates the technology. I think we have the knowledge and expertise in-house now to push forward in 2021 and develop additional tools that are useful for our industry.

If we want to drive our industry forward, we've got to give people the knowledge and tools to become better at what they do. One of the things that we're doing is to give the industry tools so that they can make decisions easier and the lens tool is an example of that.

**What about training?**

Jon: I'd love to think that we can do all of that. If we can develop training courses or opportunities and it's something that can be included as part of a CV, that would be great for people who are trying to get their first job or as they're trying to move up the ladder. They're trying to progress with their careers. I think there's

Jon Fry, Darren Simpson, Yevgeni Subbotin, Aaron George (L-R).

an opportunity. People have spent fortunes attending training courses, and at the end of it, there's often nothing to really certify them ever having done that. I think, again, we've got an initiative to try and make that happen.

**You mentioned the website. Do most people order through the website or direct, person to person?**

Jon: Our business is between 15% and 20% online. The rest is account managed face-to-face. We're a different model from what most people expect. In a perfect world, I would love everybody who finds out about CVP, whether through social media, via our website or at a trade show, to end up walking through our doors. They would develop a relationship with a sales person, meet one of our technical consultants and end up having a conversation with one of our engineers. If any customer has that experience, we at CVP, have a much better opportunity of retaining that customer. Anybody who buys online will do that for a couple of reasons. Mainly because we've got it in stock…

Aaron: Or it's late at night or a weekend….

Jon: We're competitive in terms of pricing. But the next time they want to buy something, they'll probably still go through a search engine and find us again, but that's not good enough. We've put a lot of time, effort, and energy in creating what I believe is a very valuable sales process, and I'd love everybody to end up talking to us on the phone because that way they will get an appreciation of just what we have available to them to make their purchase easier.

Darren: It's better when you pick the phone up and they remember you, isn't it? It might go like this: "I need to buy a monitor." I'll offer a suggestion. "Oh great. Send me a quote." Bang, and they order it and job done. They want to speak to someone. It's an advantage to know someone within a company rather than just being another number.

Jon: It's opposite to the way the majority of sales or retail happens today. Everybody wants to move away from the high street. Everybody wants to push everything through an online portal because it's a cheaper route to market. But by separating yourself, how on earth are you supposed to understand the true wants and needs of a customer? They don't tell you about their job requirements online, and that's the challenge. When an industry like ours is so much in need of understanding technology and has a definite requirement to get hands on, up close and personal, to gather an opinion that is credible, that's where we add value. We're credible because we're brand agnostic. That's what it's got to be about for me.

Darren: It's taking everything back to the old school again, as well. That's what Newman and Charlotte Street are about. You can come and touch and feel it.

**Thank you very much. I look forward to this discussion being continued. And to getting together again in a nice restaurant like Berner's Tavern.**

# FUJINON Premista 19-45 mm T2.9 joins 28-100 & 80-250


And now there are three.

FUJIFILM announced the third lens in their FUJINON Premista line of lightweight Full Frame zooms.

The new 19-45 mm T2.9 addresses the demand for a wide zoom for documentary handheld shooting, Steadicam, aerials, underwater, on gimbals, remote heads and drones.

The 19-45 is 10% shorter and 14% lighter than its siblings, the Premista 28-100 mm T2.9 and Premista 80-250 mm T2.9-3.5. This is quite a feat for a short, wide zoom. The 19-45 has Cooke /i and ZEISS eXTended Data.

These are preliminary specs for the 19-45 and could be updated. The 19-45 is scheduled to ship in early 2021.

| Fujinon Zoom | Premista 19-45 mm T2.9 | Premista 28-100 mm T2.9 | Premista 80-250 mm T2.9-3.5 |
|---|---|---|---|
| Range | 19-45 mm | 28-100 mm | 80-250mm |
| Aperture | T2.9 - T22 | T2.9 - T22 | T2.9 - T22 (80-200) and T3.5 - T22 (200-250) |
| Lens Mount | PL Mount | PL Mount | PL Mount |
| Image Circle Ø | 46.3 mm | 46.3 mm | 46.3 mm |
| Close Focus | 0.6 m / 24" | 0.8 m / 2' 7" | 1.5 m / 4' 11" |
| Focus Barrel Rotation | 280° | 280° | 280° |
| Zoom Barrel Rotation | 120° | 120° | 120° |
| Iris Barrel Rotation | 48° | 48° | 48° |
| Iris Blades | 13 | 13 | 13 |
| Front Diameter | 114 mm | 114 mm | 114 mm |
| Length (approx.) | 230 mm / 9 in | 255 mm / 10 in | 255 mm / 10 in |
| Weight (approx.) | 3.3 kg / 7.3 lb | 3.8 kg / 8.4 lb | 3.8 kg / 8.4 lb |

# FUJINON Premista 19-45 mm T2.9





Rear, PL mount, /i contacts and /i 4-pin Lemo

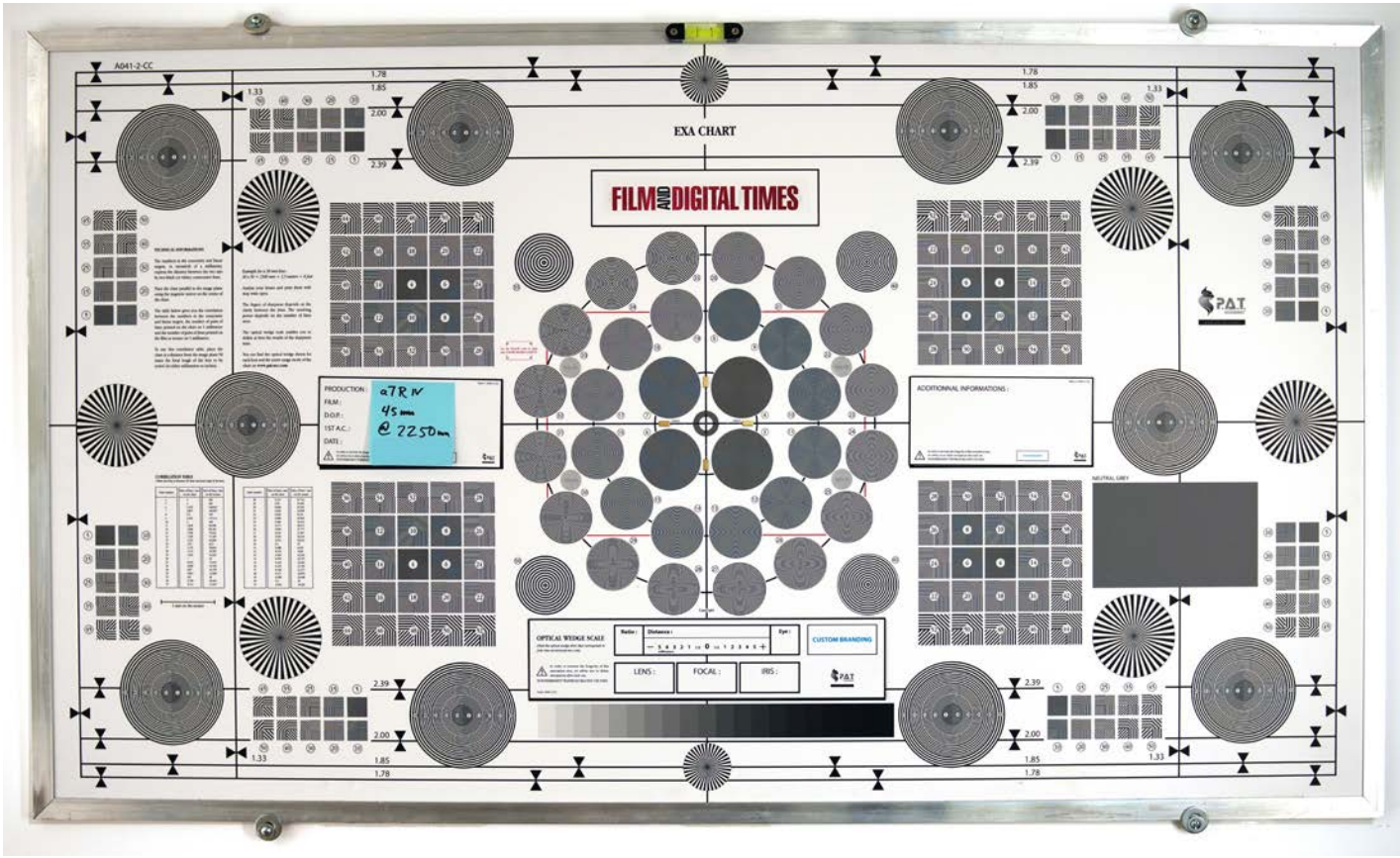
Front with lens support


Top View


Bottom View

# FUJINON Premista 19-45 mm T2.9, cont'd


# Using Prêt À Tourner Test Charts




Prêt À Tourner lens charts are used in major rental houses worldwide and they are essential for camera and lens checkouts. What makes the PAT-ACC charts unique is the high resolution laser process with which they are printed, accurate to 250 lp/mm. While a lens projector offers a detailed look at the lens itself, the PAT-ACC chart lets you analyze the entire "food chain"—lens, camera, sensor, OLPF, sensor cover glass and monitor together.

Here is episode 1, lesson 1 on how to use PAT-ACC charts.

Set up your camera and lens at a distance from the chart of 50x the focal length of the lens. For example, a 45 mm lens should be 45 x 50 = 2250 mm from the chart to the image plane of the camera. 2250 mm is 2.25 meters or 225 cm or 88.58 inches. Don't worry if the chart does not fully fill the frame.

Level the camera. Attach the Prêt À Tourner round mirror to the center of the chart. The mirror attaches with 4 magnets.

Look through the viewfinder to center your camera and lens horizontally and vertically to the chart. When you're dead center, you'll see the lens directly in the middle.

I shot these tests with a 61 megapixel Sony a7R IV to analyze in Photoshop. During a rental house checkout, you can see your results immediately with the camera intended for the job and a high resolution monitor. By the way, any moiré patterns you see are a result of the sensor, monitor or printing process—not the chart.

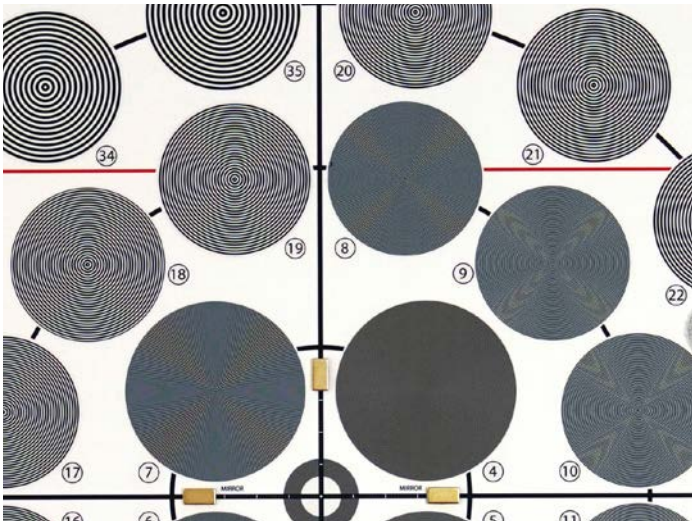
Now, look for the target on the chart with the lowest number (indicated in the circles). The lower the number, the higher the lens resolution. Our example at right shows target 9 as the lowest number with clearly defined rings.

The degree of sharpness depends on the clarity between the lines.

The resolving power depends on the number of lines seen. You can also see geometric and chromatic aberrations.

To calculate resolution (when filming the target at a distance of 50 times the focal length), divide 20 by the target number and multiply by 50. In our example, 20 ÷ 9 = 2.22. And then 2.22 x 50 = 111. So, 111 lines pairs/mm is the approximate resolution of this lens in combination with the sensor of the camera. It's only a guideline, because your monitor's resolution adds additional variables to the math.

Speaking of math, why did we divide 20 by the target number? Because, the targets are measured in actual size under a magnifier by how many lines there are in 1 mm at 1/20th increments. And then we multiply by 50 because that's the multiplier of the focal length for the distance from which we're viewing. *pat-acc.com*



# Panasonic LUMIX DC-S5



The S5's 20 mm flange focal depth L-Mount shares L-Mount lenses with SIGMA and Leica as part of the L-Mount alliance.

The new LUMIX DC-S5 joins Panasonic's growing line of Full Frame L-Mount hybrid mirrorless cameras that shoot stills and video.

A quick review. The LUMIX DC-S1H is still the flagship for hybrid video, with a crisp 5.76 million dot OLED EVF and numerous video choices that include C4K Full Frame 4096x2160 All-I 4:2:2 10-bit 400 Mbps MOV H.265 files internal recording up to 30 fps.

The LUMIX S1H has a 24.2 MP sensor. LUMIX DC-S1R has a high resolution 47.3 MP sensor. Both have 5.76 million dot finders.

Now, if you want a lighter, smaller, cheaper companion to the S1H, the new LUMIX S5 beckons. It uses the same 24.2 Megapixel Full Frame sensor as the S1H.

For internal video recording onto its SD card, the S5 tops out at Full Frame UHD 3840x2160 29.97p 4:2:2 10-bit LongGOP 150 Mbps with a 30-minute limit.

You can record 4:2:0 8-bit MOV or MP4 LongGOP 29.97p at 100 Mbps with no time limit. There are about 24 permutations of recording formats for Full Frame, APS-C / Super35, UHD and FHD. For anamorphic Super35, the S5 manages most of the popular desqueeze ratios and framelines.

The sensor has in-body stabilizing. Add that to Optically Image Stabilized L-mount lenses, and you gain 5 to 7 stops of steadiness. Boost I.S. in Video Mode lets you shoot handheld with the steadiness almost as if you were a human tripod. Autofocus speed has been improved from earlier S-series LUMIX cameras.

## LUMIX S5 Specifications

- 24.2 Megapixel Full Frame sensor, like the S1H. But the S5 does not have an OLPF. (The S1H has a low pass filter.)
- Sensor Size: 5.6 x 23.8 mm
- Image Stabilization: 5-Axis In-Body
- 2,360,000 dot OLED viewfinder.
- 1,840,000 dot tilt and swiveling monitor.
- ISO: 100-51,200 that extends to 50-204,800.
- Dual native ISO familiar from other Panasonic cameras.
- 96 Megapixel High Resolution stitched JPEGs—good for background plate still photography.
- Live View Composite (e.g. light painting, star trails, car tail light smeared timelapse.)
- Time lapse, slow and fast motion (Slow & Quick).
- Dual SD card slots.
- Anamorphic desqueeze in Super35 format. 1.3x, 1.33x, 1.5x, 1.8x and 2x squeeze ratios are displayed.
- Frame lines available: 2.39:1, 2.35:1, 2:1, 1.85:1, 16:9, 4:3, 5:4, 1:1, 4:5, 9:16.
- 14+ stops of dynamic range with V-Log / V-Gamut
- Larger sensor (Full Frame) and yet the body is smaller than LUMIX GH series cameras.
- Autofocus has been improved: more accurate and faster.
- Audio mic input and headphone output jacks are on the camera left side.
- Dimensions: 132.6 mm wide x 97.1 mm high x 81.9 mm deep.
- Weight: 714 grams
- 10-bit HDMI external 4K recording in 4:2:2 10-bit will be supported. The S5 is available body only, or with a compact 20-60 mm F3.5-5.6 zoom lens.

# Panasonic LUMIX S1H and S5 Compared

Panasonic S1H


Panasonic S5


Panasonic S1H w/ PL adapter


Panasonic S5 w/ PL adapter

## LUMIX S5 Firmware v1.2 Update

V1.2 Firmware coming later this year is expected to provide:

- Support for RAW Video Output via HDMI to Atomos Ninja V
- 5.9K 5888 x 3312 at 29.97 /25 / maybe 23.98 fps
- 4K 4128 x 2176 up to 59.94 / 50 fps
- Anamorphic 3.5K 3536 x 2656 up to 50 fps
- C4K video recording
- Video Tools: Vector Scope, Master Pedestal Adjustment, SS/ Gain Operation (Sec/ISO, Angle/ISO, Sec/dB)
- New Photo styles: L. MonochromeS, L. ClassicNeo

## LUMIX S1H Firmware Update

- The S1H will get improved autofocus performance, similar to S5.

## LUMIX S1R Firmware Update

- The S1R will get 5K video recording capability
- and improved autofocus performance, similar to the S5.

Panasonic LUMIX S5 at ISO 800, 1/5000 second with L-Mount SIGMA 85 mm F1.4 DG DN | Art lens at f/1.4.

## Video Recording Modes

**H.264 / MOV 4:2:2 10-Bit**
UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p
[150 Mb/s]
Full HD (1920 x 1080) at 23.976p / 25p / 29.97p / 50p / 59.94p
[100 Mb/s]
4K Anamorphic (3328 x 2496) at 23.976p / 25p / 29.97p
[150 Mb/s]

**H.264 / MOV 4:2:0 8-Bit**
UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p / 50p / 59.94p
[100 to 150 Mb/s]
Full HD (1920 x 1080) at 23.976p / 25p / 29.97p / 50p / 59.94p
[100 Mb/s]
4K Anamorphic (3328 x 2496) at 23.976p / 25p / 29.97p / 50p
[100 to 150 Mb/s]

**H.265 / MOV 4:2:0 10-Bit**
UHD 4K (3840 x 2160) at 50p / 59.94p
[200 Mb/s]
4K Anamorphic (3328 x 2496) at 50p
[200 Mb/s]

**H.265 / MP4 4:2:0 10-Bit**
UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p / 50p / 59.94p
[72 to 100 Mb/s]

**H.264 / MP4 4:2:0 8-Bit**
UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p
[100 Mb/s]
Full HD (1920 x 1080) at 23.976p / 25p / 29.97p / 50p / 59.94p / 100p / 119.88p / 180p
[20 to 28 Mb/s]

## Recording Limits

Up to 30 Minutes for UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p (4:2:2 10-Bit)

Up to 30 Minutes for UHD 4K (3840 x 2160) at 50p / 59.94p(4:2:0 10-Bit)

Unlimited for UHD 4K (3840 x 2160) at 23.976p / 25p / 29.97p(4:2:0 8-Bit)

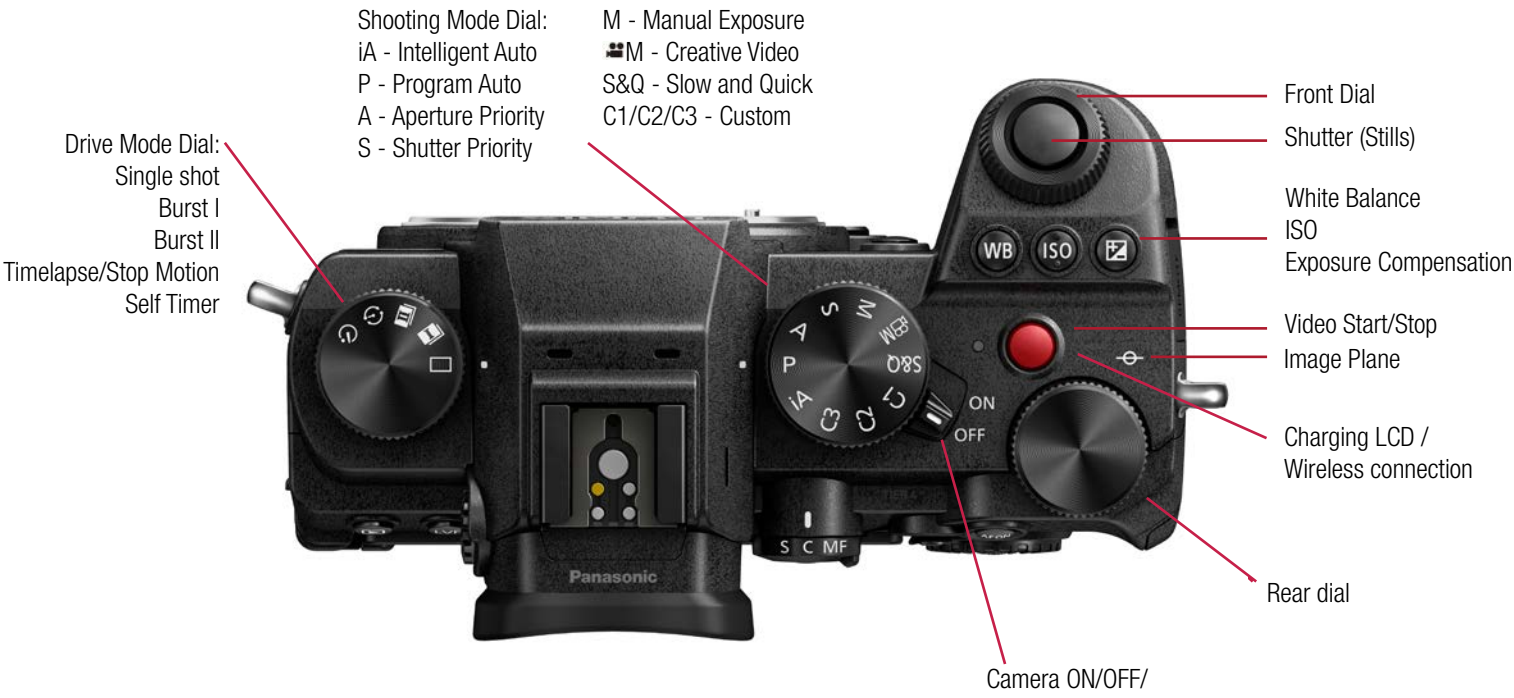
## External Video Recording Modes

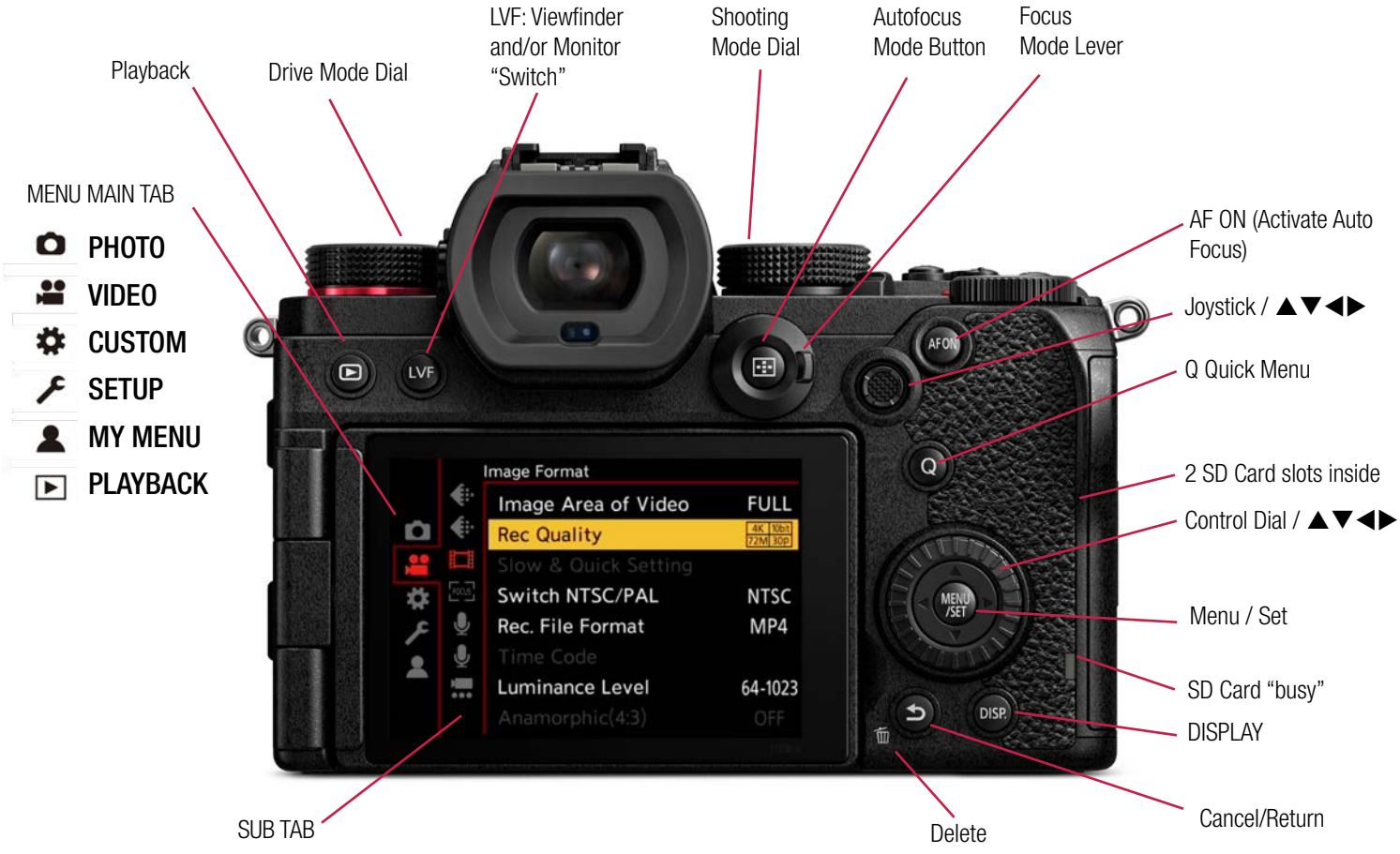
**4:2:2 10-Bit**
UHD 4K (3840 x 2160) up to 50p / 59.94p

Panasonic LUMIX S5 at ISO 800, 1/320 second with L-Mount LUMIX S 20-60 mm F3.5-5.6 lens at f/6.3.


Panasonic LUMIX S5 with L-Mount LUMIX S 20-60 mm F3.5-5.6 lens.

# Panasonic LUMIX S5, cont'd

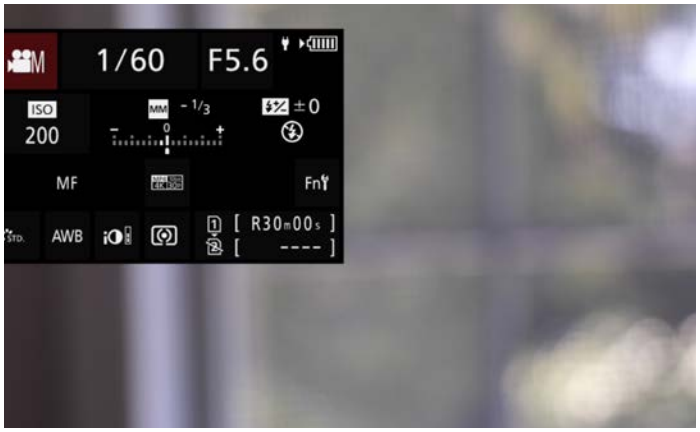


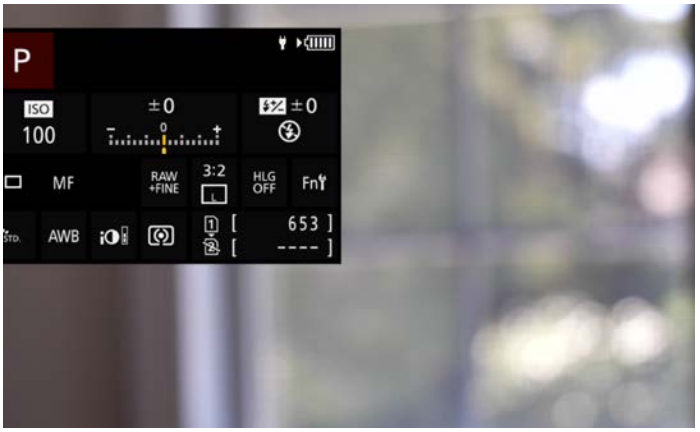
# Panasonic LUMIX S5, cont'd

## DISP Button Data on Rear Monitor

The DISP Button cycles the rear touch-screen monitor display between live image with data, live image without data, blank, main parameters (that can be changed by selecting them by touch, and blank screen. Note: HDMI output shows live view and a window with camera settings (the S1H showed a full screen of camera settings against a black background.)




Creative Video Mode

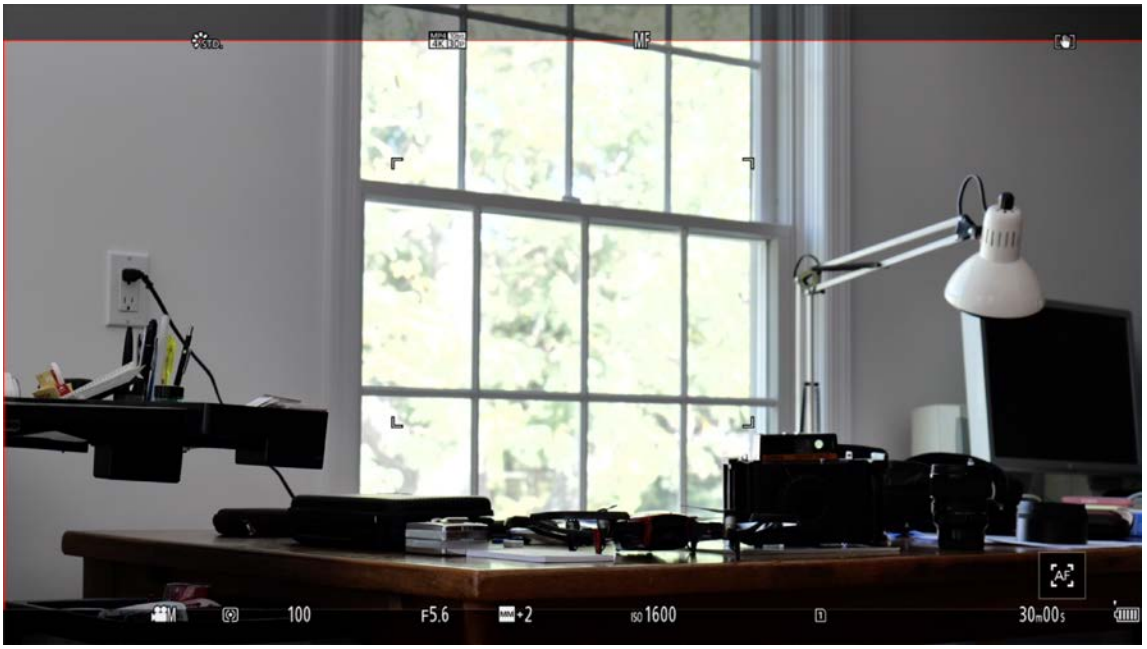



Program Exposure Still Mode

## Q Button Rear Touchscreen Monitor


In Creative Video Mode


In Program Still mode.




Your viewfinder might look like this when shooting video:

- 2:1 Aspect Ratio
- UHD 4K MO4 10-bit 30p
- Manual Focus
- Image Stabilization On
- Creative Video Mode
- Shutter 1/100 sec
- F5.6
- ISO 1600
- SD card in slot 1
- 30m 00s remaining
- Battery Full

# Chrosziel TP7 Large Format Lens Test Projector


It's good when you see the same lens test projector at a lens manufacturers' factories, at rental houses and repair facilities worldwide. That was ARRI's intention when they worked with Chrosziel on the development of a new, Large Format test projector for the Signature Prime and Signature Zoom lenses.

The results were two models, one with a fixed ARRI ALEXA Camera Plate mount and dedicated cover glass set.

The other model, TP7, has Chrosziel's familiar quick release base breech lock and swappable lens mounts, including LPL, PL, PV, EF, E, Leica M, L and more.

Think of a lens projector as being like a high-tech slide projector, a modern magic lantern. Taking the place of a slide-mounted photograph, there's a precisely, laser-etched reticle with targets that resolve to 200 lp/mm. And instead of a standard projection lens, you're shining the light through the lens you're testing.

In some ways, it's sort of the opposite process of looking at a lens chart with the camera and lens. The projector provides rapid and highly accurate evaluation of lens characteristics such as resolution, (sharpness), contrast (how rich the blacks are), geometry (distortion), chromatic aberrations (color shift when focusing), flange focus distance (back focus), breathing, zoom tracking, shading (vignetting), internal barrel flare and lots more.

The Chrosziel TP7's light source is a 5,000 K LED light engine. Using a Compound Parabolic Concentrator (CPC) mirror system, it evenly covers a 60 mm image circle without fall-off—large enough for ARRI ALEXA 65, LF, Mini LF; RED MONSTRO, Sony VENICE, etc.

Some rental house lens wizards were freaked out by the LED light source at first. After years of working with Quartz bulbed projectors, they grew familiar with how lenses looked on their particular test instruments, some of them even venerable Chrosziel models. And then things changed quickly. They noticed how the Chrosziel TP7 was cool and quiet. The illumination was more uniform.

Dan Lopez, Head of the Lens Service and Repair Department at Otto Nemenz International, said, "We received our P-TP7 Lens Test Projector and could not be happier. The user friendliness is a big plus; it made the set-up go by with ease. We were able to begin projection immediately and **the first thing you notice is how white the light is compared to the tungsten and halogen bulbs we are used to seeing."**

Dan continued, "The consistent light intensity across the entire field of view of the lens is fantastic. We originally were doing the lens projection in High Mode, but switched to Low Mode to give our eyes a break. I truly believe using an LED light is really allowing us to see how the lens performs without any influence from the light source. This is also going to be a great show-and-tell projector for customers. The simple lens mount, reticle, filter changeability and the ease of back focus adjustment makes this an excellent projector for repair and performance evaluation of any lens."

You'll typically see two ways of projecting lenses at rental houses. Some put the projector on a trolly, usually on tracks in the floor or rails from the ceiling, and use the wall as the projection screen. Others prefer to mount the projector in a fixed position and move the screen, usually suspended from the ceiling on rails.


Now, when we say that a PL mount lens has a flange focal depth (FFD) of 52 mm or an LPL mount lens is 44 mm, that is the distance from the flange, where the lens meets the camera, to the image plane (sensor).

When lens technicians set up a projector, they usually "zero it out" with a dedicated measurement calibration block whose integrity is known. Once they know the distance from the flange of the projector's mount to the reticle (acting like the image plane) is correct, testing begins.

Move the projector (or your moveable screen) to a distance you want to check on the lens. Let's say 8 feet, exactly.

Focus the lens until the target is sharpest in the center. Rack focus to see whether the corners are also sharp, or not (field curvature.)

What if your lens is sharpest in the center at 7'8" instead of 8'?

Let's check the flange focus distance (back focus) as shown with the round digital gauge in the photo above. The TP7 has a motorized mechanism that moves the reticle forward and back. There are two ways to adjust it. You can use a wired or wireless lens control system like the Chrosziel MagNum. Or you can adjust it manually.

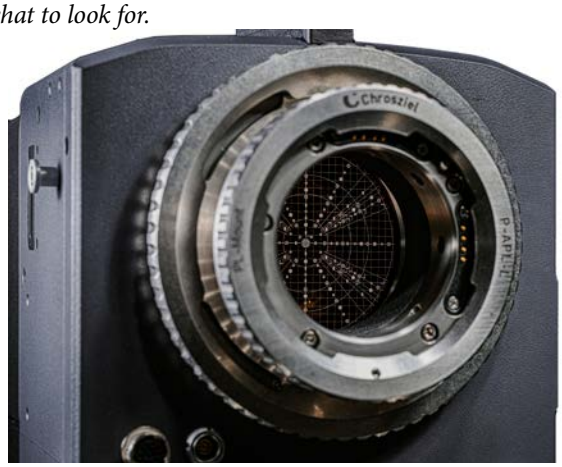
The optional LDM laser rangefinder (reading 1.985 meters in the photo above) lets you check the distance between the reticle (image plane) and the projection screen without having to use a tape measure. You can change between Imperial and Metric, continuous or single measurements. Of course, there's a tape hook on both sides of the projector as well.

Connectors on the projector let you check /i Technology and LDS lens data. This is helpful to ensure that, when the lens says 8', your /i or LDS monitor readout also says 8'. You can even reprogram the lens.

The projector is accurate to less than 5 microns. The TP7 is unique in that it includes two 3"x3" filter trays. One sits between the flange and the reticle to simulate the effects of the camera's cover glass or OLPF (up to 7mm thick). These vary between models and manufacturers. The other 3"x3" tray goes between the LED light source and the reticle to be used for color correction filters (up to 4.6 mm thick).

The Chrosziel TP7 is available now at US S19,135 or €16,950 plus shipping and tax. For more information: *chrosziel.com*

*Upcoming articles will go into greater detail on how to check a lens and what to look for.*



# FX6 and Sony Cinema Line

September for Sony seems like clockwork. Pre-prototype cameras inevitably show up at IBC in Amsterdam, often under unreachable glass.

Despite COVID and crisis, IBC and Cinec cancelled, the cycles of product planning began long ago. So it is no surprise that Sony revealed a new cinema camera on September 2, 2020.

The details were sparse. The following is based on discussions with Sony representatives mixed in with a generous dose of speculation.

FX6 is Sony's newest member of their newly-named Cinema Line. FX6 is the smallest member of the family, joining VENICE and FX9.

Every previous Cinema Line camera was introduced in the month of September: VENICE, the flagship Full Frame camera with PL mount lurking beneath a very usable E-mount, launched in September 2017. FX9, the affordable E-mount Full Frame camera was released a year ago at IBC: September 2019.

The FX6 is planned for release later this year. It is almost surely Full Frame. The "X" in FX9 is like eXtra or eXcellent and Full Frame. The "S" in FS7 or FS5 helps me remember that it is a Super35 camera.

## FX6 preliminary details

- E-mount
- 4K and almost surely Full Frame
- Two internal media card slots. Not sure what kind.
- Internal ND preset and variable filtration like the FX9.
- Controls and layout seems familiar to FX9 users.
- 2 audio controls on the camera left side instead of 4.

Here is edited text of Sony's announcement:

"Existing cameras that will form part of the Sony Cinema Line include VENICE and FX9. VENICE is for movie production and FX9 has a track record in documentary production. The next camera will appeal to a wider spectrum of visual creators. Sony will be releasing and shipping this next addition to the Cinema Line, FX6, by the end of 2020.

"Each of the Cinema Line cameras evolves with user feedback. The FX9 Version 3.0 firmware upgrade, available in 2021, will see a Center Scan mode for Super 16mm and B4 lenses with adaptors, the addition of the S700PTP to enable remote control, and other features. In parallel, in November 2020, VENICE will see additional updates in Version 6.0 firmware.

"The voice of our customer is critical to everything we do," said Neal Manowitz, Deputy President of Imaging Products and Solutions Americas at Sony Electronics Inc. "We have the deepest respect for filmmakers, cinematographers and storytellers, and will continue to evolve our product line to meet and exceed their demands. Just as our VENICE camera was designed to capture the emotion in every frame, our new Cinema Line expands that vision to allow a broader range of creators to push their boundaries further, and capture and create like they've never been able to before."

# Sony α7S III

Sony's new α7S III ( (ILCE-7SM3) is the latest in their alpha series of hybrid still/cine E-mount Full Frame cameras.

Think of "S" for "Sensitivity," "Speed" (as in high ISO) and "Sinema"—well, "Cinema." It's hard to believe that its predecessor, α7S II, arrived 5 years ago and the original groundbreaking α7S was at NAB 2014.

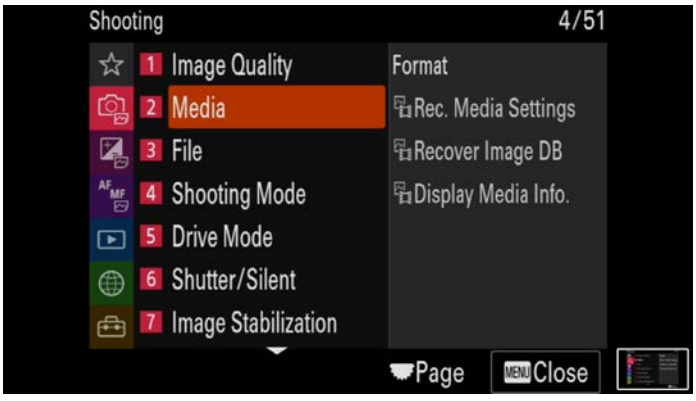
By the way, you can remember what "R" stands for in the alpha series: "Resolution," as in 61 megapixels within the α7R IV delivered last September.

The α7S III will record 4K QFHD Full Frame internally up to 120 fps.

The camera will output, to an external recorder, Full Frame 4264×2408 16-bit RAW 4K DCI up to 60 fps via its full-size HDMI type A connector.

In additional to the full-size HDMI connector, these are the things you may immediately like at first sight:


α7S III with Sony FE PZ 28-135 f/4 G OSS Zoom Lens.


1. Fully articulating monitor. Touch menu control. Menu revised with an intuitive 3 column layout. For example, Media > Format. Easy to access.


3. Safety latch on Media Card door.

4. The connectors have nicely hinged covers that don't flop around.

# Sony α7S III, cont'd

## α7S III (ILCE-7SM3) Specifications at a Glance

- 12 MP resolution, 4264 x 2814 3:2 (1.5:1) CMOS sensor.
- Full Frame (35.6 × 23.8 mm).
- ISO 80-102,400. (40-409,600 extended.)
- 15+ stop dynamic range in S-Log3.
- 10-bit 4:2:2 internal recording to high-speed CFexpress Type A Cards or SD Media Cards (UHS-I/UHS-II SDXC/SDHC).
- 16-bit external recording via full-size HDMI connector.
- 4K full pixel readout in all modes. No crop.

## EVF and Sensor

The Sony' α7S III (ILCE-7SM3) has an all-new, 12 Megapixel Exmor R CMOS sensor inside its dust and moisture-resistant, ventless and fanless camera body.

The new sensor provides phase detect autofocus, something new in the α7S series. It's similar to the autofocus phase detection of the α7R IV and α9. The result is very fast autofocus, real-time eye AF that locks onto the subject's eye, rack focus, subject tracking, touch tracking and smooth focus transitions.

So, you might ask, if the α7S III camera's sensor is a "mere" 12 Megapixels, why is that so interesting when you can count up to 61 MP on its α7R IV cousin?

The short answer is: 4K, Full Frame, full width video, 15+ stops dynamic range, crazy high ISO, low noise, minimized rolling shutter effect, faster readout and higher fps.

The long answer is in the math. The 12K sensor has a resolution of 4264 x 2814. That means its 4K full-width image can use all those big pixels without binning, cropping or scaling. Although Sony does not give out official photosite size, you can divide sensor width in mm (35.6 mm) by number of pixels (4264) and you get about 8.4 microns.

## Internal Recording

- No 29 min 50 sec limit. You can record up to 60 minutes in 4K at 60 fps according to Sony specs. I haven't tried yet, but it might be possible to record for several hours.
- Record 3 formats internally, up to 4K QFHD (3840 x 2160).
- XAVC-S Long-GOP (inter-frame) h.264 MPEG-4 3840 x 2140.
- XAVC-HS Long-GOP (inter-frame) h.265 HEVC.
- New XAVC-SI (all intra h.264) up to 600 Megabits/second, with frame rates up to 120 fps in 4K and 240 fps in Full HD.

## Also

Compared with the previous α7S II model, rolling shutter is minimized 3x, sensor readout speed is increased 2x and computing power of the new Bionz XR image signal processor is improved up to 8x. This means better sensitivity, greater signal-to-noise ratio and hence, less noise.

The OLED EVF has 0.90x magnification and a 41 degree field of view with a 25 mm high eye point. A menu setting lets you change the viewfinder field of view to about 35 degrees and approximately 35mm high eye point.

The α7S III has a QXGA 0.64-inch, 9.44 million dot OLED electronic viewfinder. That exceeds the detail and the ability to see critical focus of many optical groundglass finders.

The fully articulating monitor swings out on left side of the camera. It has touch menu control and an all-new menu layout. The menu has been revised with a more intuitive 3 column layout. Submenus on the right show 2 additional levels of choices.

Still or Video menus are "curated" by the dial on top. The resulting menu settings are unique to each mode and keep your choices uncluttered.

This is Sony's first camera to use CFexpress type A memory cards. These cards achieve 700 Mbps write / 800 read speeds. They come in 80 or 160 GB capacities. They are smaller than SDXC cards and CFexpress type B cards (as used in the Canon R5).

SD-XC UHSII v90 cards are said to handle most video recording formats except All Intra 4K 120 fp — which might require a CFexpress type A card. However, you'll enjoy faster transfer speeds with CFexpress.

There are two slots in the camera and each slot accepts both types of cards. CFexpress type A media cards will be released around the same time as this camera.

As with the other α7 and α9 cameras, this one also has an E-mount: 18mm Flange Focal Depth, 46.1 mm I.D. There are currently 57 E-mount lenses from Sony and many more from SIGMA, ZEISS and others. Furthermore, there are many E-mount to PL, LPL, M, PV, and adapters.

The α7S III has IBIS 5 axis In-Body Image Stabilization.

Dust and moisture resistance have been improved. There is no internal fan. The lack of vents means that moisture resistance is increased.

The α7S III is available now for about $3499.

More details: *alphauniverse.com*


α7S III with VG-C4EM Vertical Grip and battery pack.

# Sony α7S III, cont'd


12 MP resolution, 4264 x 2814 (1.5:1) 35.6 × 23.8 mm FF sensor.


9.44 million-dot EVF and 2.95" touchscreen monitor.

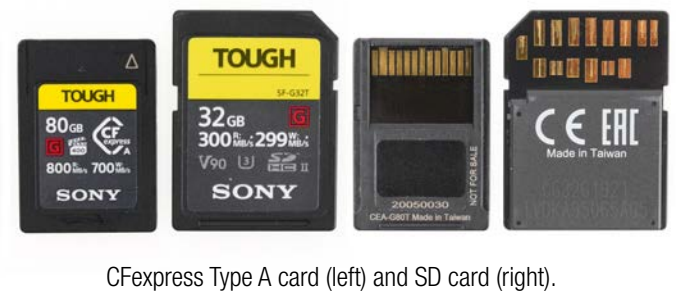

Top view: summon cine mode from the top dial.

Bottom view: NP-FZ100 battery inside - same as earlier models.

Connections: Full size HDMI Type-A and USB-C that also charges battery.

Touchscreen monitor flips out and rotates to the side.

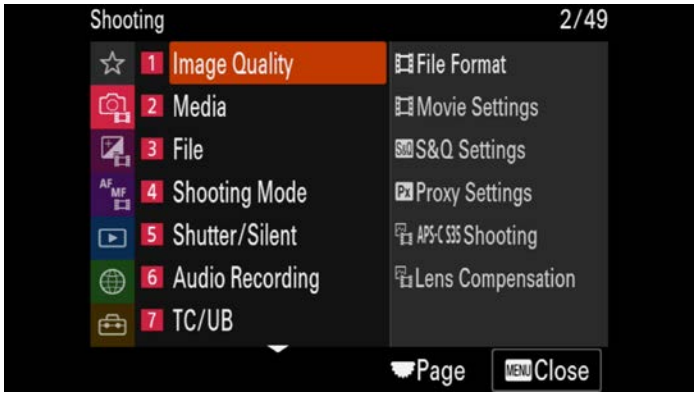
Dual slots accept new high-speed CFexpress Type A Cards or SD Media Cards (UHS-I/UHS-II SDXC/SDHC).



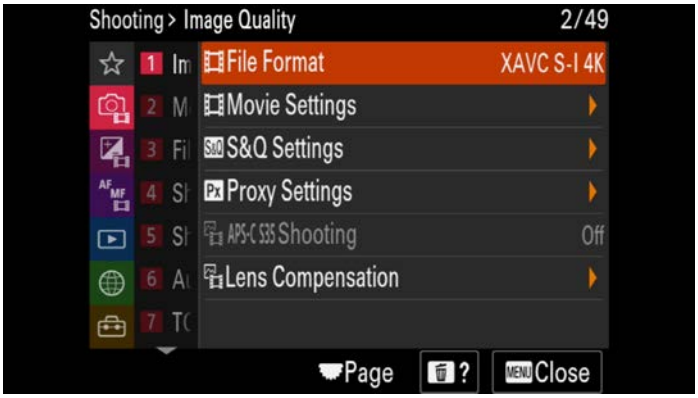

CFexpress Type A card (left) and SD card (right).

# Sony α7S III Menus

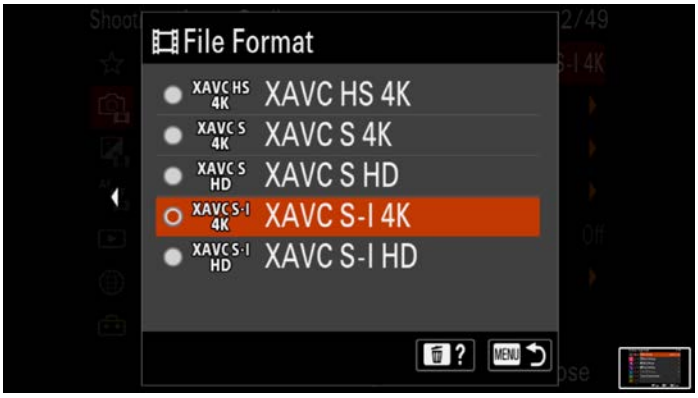

Top view: summon cine mode from the top dial.



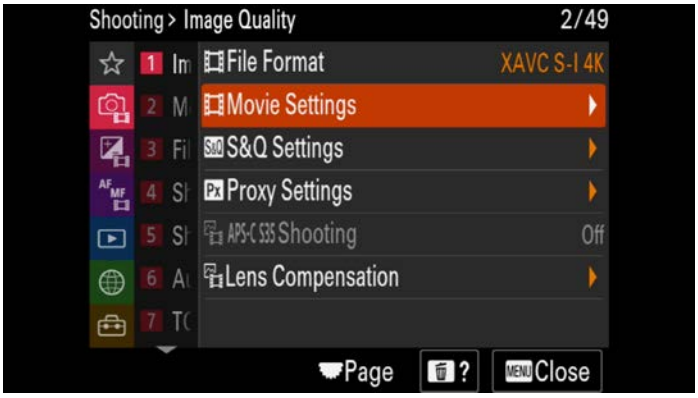

1. Easy to navigate, redesigned menus with 3 columns visible.



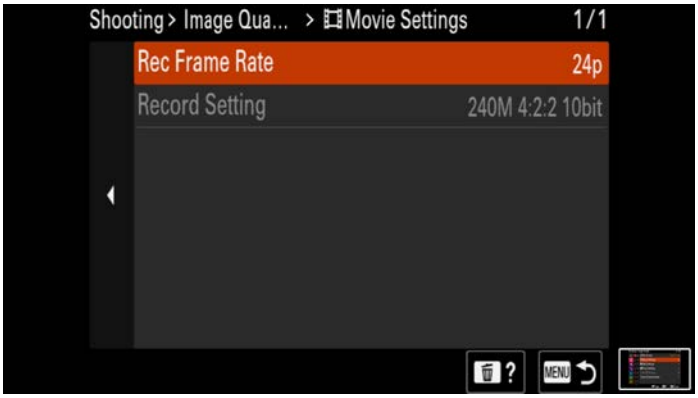

2. Go to Shooting > Image Quality > File Format > *select...*




3. Let's select XAVC S-I 4K Inter Frame.



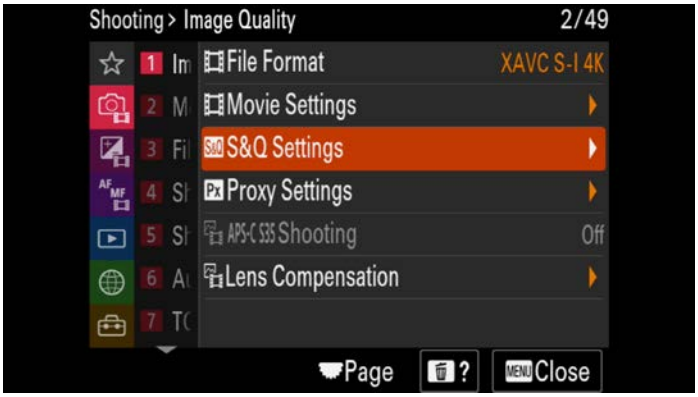

4. Go to Movie Settings to choose a frame rate.



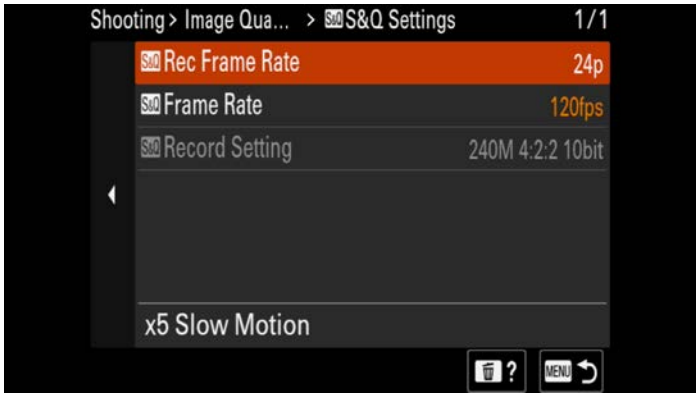

5. Select Record Frame Rate and let's choose 24p — 24 fps.


6. By the way 24p 4:2:2 10-bit has a 240 Mbps data rate.

# Sony α7S III Slow & Quick

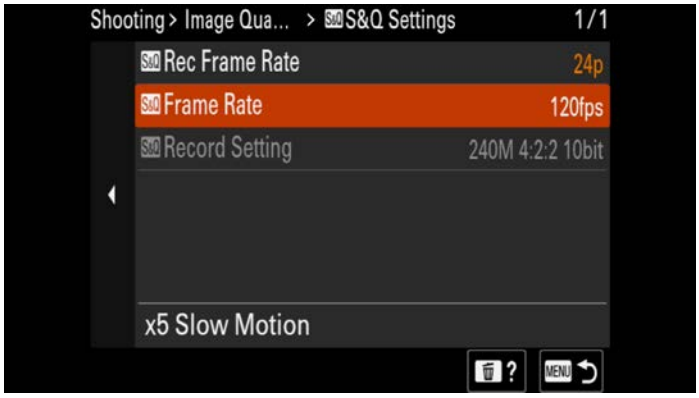




7. S&Q stands for Slow and Quick (under- and over-cranking).

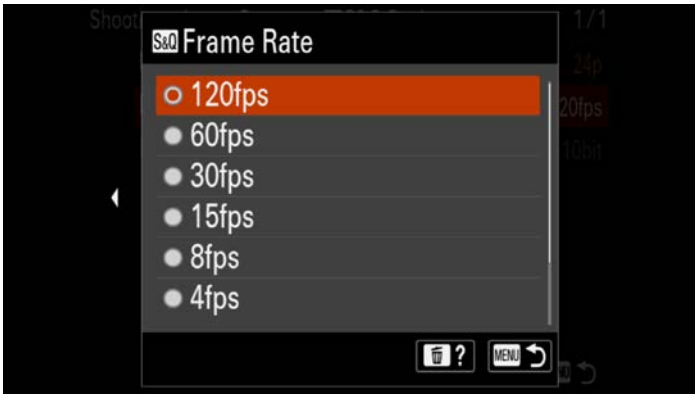



8. Select your base playback frame rate. They call it Record Frame Rate.

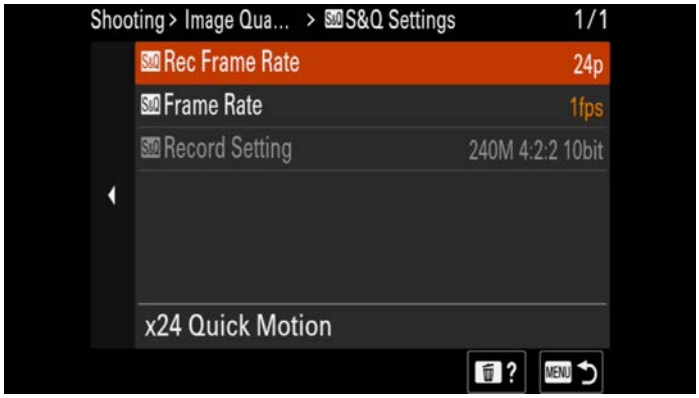

9. We'll pick 24 p / 24 fps.




10. Next, select Frame Rate. This is really your Capture fps.




11. Of course, we'll pick 120 fps.




12. If we want under-cranked scudding clouds, we'll pick 1 fps.

# Sony α7S III Regular Internal Recording Modes

| Format | Resolution | Compression | Frame Rate | Sampling / Bit Rate | Data Rate |
|---|---|---|---|---|---|
| XAVC S-I - H.264 AVC | 4K - 3840x2160 | All-Intra | 24p | 4:2:2 10-bit | 240 Mbps |
| | | | 30p | 4:2:2 10-bit | 300 Mbps |
| | | | 60p | 4:2:2 10-bit | 600 Mbps |
| XAVC S-I - H.264 AVC | HD - 1920x1080 | All-Intra | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | 30p | 4:2:2 10-bit | 111 Mbps |
| | | | 60p | 4:2:2 10-bit | 222 Mbps |
| XAVC S - H.264/AVC | HD - 1920x1080 | Long GOP | 24p | 4:2:0 8-bit | 50 Mbps |
| | | | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | 30p | 4:2:0 8-bit | 16 Mbps |
| | | | 30p | 4:2:0 8-bit | 50 Mbps |
| | | | 30p | 4:2:2 10-bit | 50 Mbps |
| | | | 60p | 4:2:0 8-bit | 25 Mbps |
| | | | 60p | 4:2:0 8-bit | 50 Mbps |
| | | | 60p | 4:2:2 10-bit | 50 Mbps |
| | | | 120p | 4:2:0 8-bit | 60 Mbps |
| | | | 120p | 4:2:0 8-bit | 100 Mbps |
| XAVC S - H.264/AVC | 4K - 3840x2160 | Long GOP | 24p | 4:2:0 8-bit | 60 Mbps |
| | | | 24p | 4:2:0 8-bit | 100 Mbps |
| | | | 24p | 4:2:2 10-bit | 100 Mbps |
| | | | 30p | 4:2:0 8-bit | 60 Mbps |
| | | | 30p | 4:2:0 8-bit | 100 Mbps |
| | | | 30p | 4:2:2 10-bit | 140 Mbps |
| | | | 60p | 4:2:0 8-bit | 150 Mbps |
| | | | 60p | 4:2:2 10-bit | 200 Mbps |
| | | | 120p | 4:2:0 8-bit | 200 Mbps |
| | | | 120p | 4:2:2 10-bit | 280 Mbps |
| XAVC HS - H.265 HEVC | 4K - 3840x2160 | Long GOP | 24p | 4:2:0 10-bit | 30 Mbps |
| | | | 24p | 4:2:0 10-bit | 50 Mbps |
| | | | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | 24p | 4:2:0 10-bit | 100 Mbps |
| | | | 24p | 4:2:2 10-bit | 100 Mbps |
| | | | 60p | 4:2:0 10-bit | 45 Mbps |
| | | | 60p | 4:2:0 10-bit | 75 Mbps |
| | | | 60p | 4:2:2 10-bit | 100 Mbps |
| | | | 60p | 4:2:0 10-bit | 150 Mbps |
| | | | 60p | 4:2:2 10-bit | 200 Mbps |
| | | | 120p | 4:2:0 8-bit | 200 Mbps |
| | | | 120p | 4:2:2 10-bit | 280 Mbps |




*Charts courtesy of Sony. Any errors are probably mine.*

*In the Slow and Quick Chart on the next page, I deleted a few of the redundant lower data rate rows so that it would fit on the page.*

# Sony α7S III Slow & Quick Internal Recording Modes

| Format | Resolution | Compression | Capture fps | Record fps (Base fps) | Sampling / Bit Rate | Data Rate |
|---|---|---|---|---|---|---|
| XAVC S-I - H.264 AVC | 4K - 3840x2160 | All-Intra | 1/2/4/8/15/30p | 24p | 4:2:2 10-bit | 240 Mbps |
| | | | | 30p | 4:2:2 10-bit | 300 Mbps |
| | | | | 60p | 4:2:2 10-bit | 600 Mbps |
| | | | 60p | 24p | 4:2:2 10-bit | 240 Mbps |
| | | | | 30p | 4:2:2 10-bit | 300 Mbps |
| | | | | 60p | 4:2:2 10-bit | 600 Mbps |
| | | | 120p | 24p | 4:2:2 10-bit | 240 Mbps |
| | | | | 30p | 4:2:2 10-bit | 300 Mbps |
| | | | | 60p | 4:2:2 10-bit | 600 Mbps |
| XAVC S-I - H.264 AVC | HD - 1920x1080 | All-Intra | 1/2/4/8/15/30/60/120p | 24p | 4:2:2 10-bit | 89 Mbps |
| | | | | 30p | 4:2:2 10-bit | 111 Mbps |
| | | | | 60p | 4:2:2 10-bit | 222 Mbps |
| | | | 240p | 24p | 4:2:2 10-bit | 89 Mbps |
| | | | | 30p | 4:2:2 10-bit | 111 Mbps |
| | | | | 60p | 4:2:2 10-bit | 222 Mbps |
| XAVC S - H.264/AVC | HD - 1920x1080 | Long GOP | 1/2/4/8/15/30/60 | 24p | 4:2:0 8-bit | 50 Mbps |
| | | | | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | | 30p | 4:2:2 10-bit | 50 Mbps |
| | | | | 60p | 4:2:0 8-bit | 50 Mbps |
| | | | | 60p | 4:2:2 10-bit | 50 Mbps |
| | | | | 120p | 4:2:0 8-bit | 60 Mbps |
| | | | | 120p | 4:2:0 8-bit | 100 Mbps |
| | | | 120p | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | | 30p | 4:2:2 10-bit | 50 Mbps |
| | | | | 60p | 4:2:2 10-bit | 50 Mbps |
| | | | | 120p | 4:2:0 8-bit | 60 Mbps |
| | | | | 120p | 4:2:0 8-bit | 100 Mbps |
| | | | 240p | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | | 30p | 4:2:2 10-bit | 50 Mbps |
| | | | | 60p | 4:2:0 8-bit | 50 Mbps |
| | | | | 60p | 4:2:2 10-bit | 50 Mbps |
| | | | | 120p | 4:2:0 8-bit | 60 Mbps |
| | | | | 120p | 4:2:0 8-bit | 100 Mbps |
| XAVC S - H.264/AVC | 4K - 3840x2160 | Long GOP | 1/2/4/8/15/30/60/120 | 24p | 4:2:0 8-bit | 60 Mbps |
| | | | | 24p | 4:2:2 10-bit | 100 Mbps |
| | | | | 30p | 4:2:2 10-bit | 140 Mbps |
| | | | | 60p | 4:2:0 8-bit | 150 Mbps |
| | | | | 60p | 4:2:2 10-bit | 200 Mbps |
| | | | | 120p | 4:2:0 8-bit | 200 Mbps |
| | | | | 120p | 4:2:2 10-bit | 280 Mbps |
| XAVC HS - H.265/ HEVC | 4K - 3840x2160 | Long GOP | 1/2/4/8/15/30/60/120 | 24p | 4:2:2 10-bit | 50 Mbps |
| | | | | 24p | 4:2:2 10-bit | 100 Mbps |
| | | | | 60p | 4:2:2 10-bit | 100 Mbps |
| | | | | 60p | 4:2:0 10-bit | 150 Mbps |
| | | | | 60p | 4:2:2 10-bit | 200 Mbps |
| | | | | 120p | 4:2:0 10-bit | 200 Mbps |
| | | | | 120p | 4:2:2 10-bit | 280 Mbps |

Sony α7S III at ISO 6,400 — 1/160 sec
with FE 12-24 mm F2.8 GM (G-Master) zoom at 12 mm f/2.8


Sony α7S III
with Sony G Master 12-24 F2.8 zoom.

Sony α7S III at ISO 12,800 — 1/160 sec
with Sony FE 100-400mm F4.5-5.6 GM OSS at 280 mm f/5.6.


Sony α7S III
with Sony FE 100-400mm F4.5-5.6 GM
OSS zoom.

# Cinematography Electronics /i Lens Display


Larry Barton, President of Cinematography Electronics, was on the other end of a Zoom chat in high resolution, with dramatic lighting and Full Frame worthy shallow depth of field. Although the discussion was supposed to be about the Cinematography Electronics /i Lens Display, I grilled Larry mercilessly on how he achieved images that could contend for a best cinematography award.

His secret was a Sony RX1R II Full Frame camera with a fixed ZEISS Sonnar 35 mm f/2 lens feeding HDMI to a USB converter and then to his computer. (Sony just released the latest version of Imaging Edge Webcam software, so now Larry can connect directly from camera to Mac or Windows computer.)

It was now time to learn about the Cinematography Electronics /i Lens Display. Larry said:

"What we've done with our /i Lens Display was to take the iris, focus, focal length and other metadata from the lens—combined with information from the CINETAPE 2—and make the information more user-friendly for focus pullers and lens technicians at rental houses. We also have two bar graphs that are easy to read and understand. They display the CineTape distance and the depth of field.

"Other information, such as Hyperfocal Distance, Field of View, Zoom, Entrance Pupil, and CineTape distance is selectable on a configurable top multifunction display window.

"The result is a quick and simple system that nicely demonstrates the many benefits, both on set and in post, that /i Technology can add to production.

"I think that the /i Lens Display will be especially helpful for lens technicians at rental companies and also for ACs doing their checkouts. It's a great tool to confirm that the /i metadata information matches the engraved scales on the lens."

The /i Lens Display is available from Cinematography Electronics and Cooke Optics for a list price of $7,000.

*cinematographyelectronics.com* *cookeoptics.com*


# Easyrig EASYLOCK

After months of keeping us in suspense about his latest secret project, Easyrig founder and inventor Johan Hellsten introduced EASYLOCK on September 14. That's Johan, thumb up, in the photo above, with the Easyrig crew at their headquarters in Umeå, Sweden. Chief engineer Robert Olofssson is holding an EASYLOCK belt.

Johan explained, during a caffeinated video chat, "We have been working on EASYLOCK for almost two years. It has been the most time consuming upgrade we've done in a long time to the Easyrig system. It's important because you really want to make sure the vest is tight when using a gimbal rig."

Think of EASYLOCK as a ratcheting belt buckle system. If you're a skier, the concept is similar to the way ski boot buckles tighten. Adjustment is simple and release is easy.

Pontus Jonsson, Easyrig Sales Manager North America & UK, explained, "This will be the new standard for Gimbalrig and Gimbal Flex vests beginning October 2020. It will not affect the price. We have a philosophy here at Easyrig that we should not earn money on upgrades." For more info: *easyrig.se*

EASYLOCK is durable and flexible. The buckle is made of glass fiber reinforced heat stabilized lubricated black polyamide resin.

With the new EASYLOCK system, the Gimbal vests have new sizes:

- Gimbalrig Standard – 85 cm (33") to 120 cm (47").
- Gimbalrig Large – 118 cm (46") to 138 cm (54").
- Gimbal Flex Small – 70 cm (27") to 90 cm (35").
- Gimbal Flex Standard – 85 cm (33") to 118 cm (46").

EASYLOCK ratchet to tighten.

Pull to release.

# Teradek Bolt 4K LT

L to R: Bolt 4K LT Transmitter (TX), 4K LT Receiver (RX)

I have been singing the praises of 4K and HDR wireless video on set and location. But there was a concurrent chorus of users who wanted a more affordable alternative.

Now Teradek adds their new Bolt 4K LT Transmitter and Receiver to their Bolt 4K line-up.

"Bolt 4K LT represents the culmination of a massive effort at Teradek," said Nicol Verheem, Creative Solutions CEO. "We've added considerable technology upgrades without raising the price to the end-user."

What's this? Same price as previous Bolt 2K models? Why would I want to upgrade? And at half the price of the current Bolt 4K systems, what's missing?

Yes, Bolt 4K LT is the same price as earlier 2K models.

You want to upgrade because the image quality and signal range is greatly improved compared to your older 2K Bolts. But you don't have to ditch them. For example, you can use them for B camera or second unit.

Bolt 4K LT uses the same 4K chipset as the more expensive 4K models. To simplify things, allow me to nickname those existing, more expensive models "4K ST." So, like Arricams: Bolt 4K LT and 4K ST. Of course, let's not forget Bolt 4K MAX with up to 5,000 foot range.

As far as I can dissect, the only things missing in the 4K LT is 12G-SDI 4K. You get HDMI 4K and 3G-SDI / HDMI 1080p video connections on the LT. Also, 4K ST achieves DCI 4K.

Things get even more interesting with the new Bolt 4K RX Monitor Module. It is actually another version of the 4K LT Receiver that is designed to attach directly to SmallHD 7-inch monitors (Cine 7, Indie 7 and 702 Touch). This turns it into an all-in-one monitor / receiver unit.

Greg Smokler, Creative Solutions VP of Product, explained, "Combined with our new 4K Production Monitors from SmallHD, we believe the 4K LT wireless line offers an affordable on-ramp to the world of 4K and HDR on-set monitoring. The ability to freely mix and match transmitters, receivers and monitor modules across any Bolt 4K model really opens up possibilities for users at all levels of production."

The Bolt 4K RX (Receiver) Module can be connected directly to SmallHD Cine 7, 702 and Indie 7 monitors with a few screws. It includes a specially designed HDMI connector that doesn't rely on a cable—it's a machined piece that fits securely. The big benefit is that it retains the 4K information since it is HDMI 2.0. This will allow users to do a 1:1 pixel zoom of the 4K on the HD SmallHD 7" monitors.

As Teradek says in a headline: Featherlight body weight with heavyweight strength. Zero delay. Entirely HDR. Total cross-compatibility with all Bolt 4K and Bolt 4K MAX devices.

A Teradek spokesperson added, "Another thing we really want to highlight is the compatibility and ecosystem that the 4K + HDR monitoring world now has with the powers of Bolt 4K systems and SmallHD 4K Monitors combined."

All Bolt 4K Series transmitters and receivers are interoperable. Models and ranges can be mixed-and-matched, so all Transmitter / Receiver combinations can be linked and share image signal up to their respective model distances. A single Transmitter can connect with up to 6 Receivers (LT, ST) for on-set viewing by many people: DP, Director, AC, Script Supervisor, Sound Mixer, AD, etc.

Bolt 4K LT prices are as follows:

- Bolt 4K LT 750: $2,490
- Bolt 4K LT 1500: $4,990
- Bolt 4K RX Monitor Module: $1,490
- Cine 7 Bolt 4K RX (Monitor+ Module Bundle): $2,990

# Teradek Bolt 4K LT, cont'd

Bolt 4K LT Transmitter (TX) attached to camera

## Teradek Bolt 4K LT Specifications

- Bolt 4K LT 750: 750 ft range
- Bolt 4K LT 1500: 1500 ft range
- Zero-Delay Wireless Video (<0.001 sec)
- Up to 6 Receivers can be use with 1 transmitter
- Fully Cross-Compatible with all Bolt 4K Series (LT, ST, MAX)
- HDR 10-bit 4:2:2 Color Gamut
- HDMI 2.0 up to 4Kp30
- 3G-SDI up to 1080p60
- 13x 40 MHz Frequencies
- Transmit Metadata, Timecode, and Record Flags
- Smartphone Management with Bolt 4K Manager App
- Increased image clarity with 50% boost in signal range
- Faster reconnection times
- Improved image quality at longer distances compared to 2K Bolt.


Bolt 4K LT Monitor Module Receiver

Bolt 4K LT Monitor Module attached to Cine 7 Monitor


Bolt 4K LT Receiver (RX)


Bolt 4K LT Transmitter (TX)


Indie 7 is a new SmallHD 7" touchscreen monitor, well, for independent filmmakers and many others. Some call it an entry level model, but perhaps that is a bit modest for something so packed with helpful features.

This is probably the affordable monitor you'll want to tame your new KOMODO. Optional software upgrades provide touchscreen camera control of RED KOMODO and DSMC2 cameras.

Dave Bredbury, Product Manager (Cine) at Creative Solutions, said, "The Cine 7 and 702 Touch monitors have proven widely popular, especially with operators who use Camera Control for RED. With the announcement of KOMODO and other compact professional cameras, we saw the necessity to add a model to the series for those working on a more independent budget. Indie 7 is that model."

As its name suggests, Indie 7 has a 7" 1080p touchscreen display. At 1000 Nits, it is visible in bright daylight. Indie 7 uses intuitive PageOS 4 software that provides many cinematography tools and customized menu opportunities. Camera Control for RED KOMODO and DSMC2 are offered as two individual software upgrades for seamless access to all internal camera functions and settings. An Indie 7 KOMODO Kit will also be available with an included Control Cable for full tethering and camera accessibility.

Indie 7 accepts the Teradek Bolt 4K RX (Receiver) Monitor Module (Gold Mount or V-Mount). As described in the Bolt 4K LT article on the previous page, the Monitor Module attaches directly to the Indie 7 without cables. Because Indie 7 inputs a full 4K image, you can check critical focus with 1:1 pixel mapping when punching in because the video signal is four times the resolution of the display.

Indie 7 is compatible with Teradek RT for pulling focus. Teradek RT overlays are also available for monitoring wireless FIZ control settings.

Dave Bredbury concluded, "We're continuing to develop additional hardware integrations and software upgrades for Indie 7, Cine 7 and 702 Touch to further expand access into new cameras and simplify monitoring for all creative professionals."

Indie 7 launched on October 15, 2020.

## Pricing

- Indie 7 Smart Monitor: $899
- Indie 7 RED KOMODO Kit: $1,399
  Introductory Price $1,149
- Indie 7 Bolt 4K RX (Monitor+ Module Bundle): $2,399

### Software License Upgrades for Cine 7, 702 Touch, Indie 7

Camera Control Kit for RED DSMC2 : $499

Camera Control Kit for RED KOMODO: $499
Introductory price $249

# SmallHD Indie, cont'd


Indie 7 front and bottom view

Indie 7 bottom view


Indie 7 bottom view with Bolt 4K Monitor Module attached

Indie 7 top view with Bolt 4K Monitor Module attached


Indie 7 front view


Indie 7 rear view

## Indie 7 Smart Monitor Specifications

| | |
|---|---|
| Display: | 7-inch IPS LCD touchscreen |
| Resolution: | 1920 x 1200 |
| Brightness: | 1000 Nits |
| Color: | 100% Rec 709 |
| Input: | 1x 3G-SDI, 1x 3G-SDI In/Out, |
| | 1x HDMI 2.0, 1x Micro USB |
| Output: | 1x 3G-SDI, 1x HDMI 2.0 |
| Audio: | ⅛" headphone jack |
| Power Input: | 2 mm barrel connector (DC 10-34v) |
| | Sony L-Series dual battery bracket |
| | Gold-Mount or V-Mount battery plates |
| Construction: | Anodized aluminum chassis |
| Software: | PageOS 4 |
| Camera Control: | RED DSMC2 and KOMODO, |
| Compatibility: | Teradek 4K RX Monitor Module, Teradek RT |

## SmallHD 7-inch Monitors Compared

| Features | Indie 7 | 702 Touch | Cine 7 |
|---|---|---|---|
| | Smart 7 | | |
| Starting Price | $899 | $1299 | $1799 |
| Brightness | 1000 Nits | 1500 Nits | 1800 Nits |
| Color Space | Rec.709 | DCI-P3 | DCI-P3 |
| Locking Power Connector | No | No | Yes |
| VENICE / ARRI Camera Control | No | No | Yes |
| RED Camera Control | Yes | Yes | Yes |
| Bolt 4K RX Module Compatible | Yes | Yes | Yes |
| 1 Camera Control Included | No | No | Yes |

Note: ARRI, VENICE, DSMC2, and KOMODO Camera Control licenses are all sold separately. However, the Cine7 includes 1x Camera-Control license as part of the $1799 base price.

# Wooden Camera AKS for RED KOMODO

RED KOMODO is a chameleon of camera, as Jarred Land said. It is as comfortable working alone, Medium Format still camera style, as it is accoutred with AKS.

AKS stands for All Kinds of Stuff or Accessories.

Wooden Camera is ready with RED approved accessories for KOMODO.

There are essentially 4 Accessory Kits to choose from: Base, Advanced, and Pro V-Mount and Pro Gold Mount.

Arca Swiss quick release mounts and sliding dovetail systems have been fixtures of the still photo world for around 30 years. Many of the Wooden Camera Accessory Kits for KOMODO use Arca Swiss style dovetails and plates. For example, the Complete Top Mount Kit includes three interchangeable Arca Swiss accessories: Top Handle, Monitor Hinge, and Top Plate.

The RF to PL Mount adapter is essential if you're using PL lenses because KOMODO's native mount is Canon style RF (20 mm Flange Focal Depth).

The B-Box is a breakout for the camera's EXT connector. It slides into the BP-9 battery slot for a slim profile.

The Battery Slide Pro V-Mount or Gold Mount attaches to the KOMODO's left BP-9 battery slot and powers the camera using a right angle LEMO compatible connector.

*woodencamera.com*

RED KOMODO fully outfitted with Wooden Camera and Creative Solutions Products


## Wooden Camera BASE Kit for KOMODO

Includes LW 15mm Baseplate and Top Handle Kit.

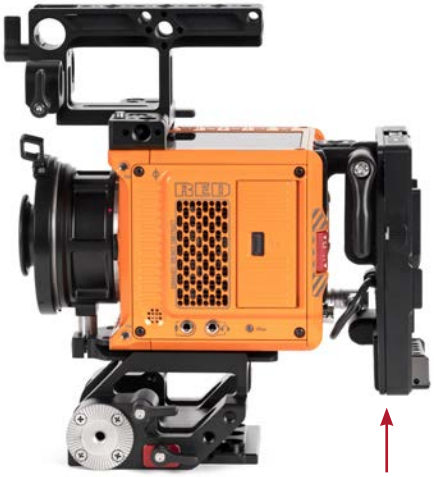

## Wooden Camera ADVANCED Kit for KOMODO

Includes LW 15mm Baseplate, Complete Top Mount Kit, and 2x 15mm Rods (12").

# Wooden Camera AKS for KOMODO , cont'd

## Wooden Camera Pro (V-Mount) Kit for KOMODO

includes LW 15mm Baseplate, Complete Top Mount Kit, Battery Slide Pro V-Mount, and 2x 15mm Rods (12").



Battery Slide Pro V-Mount

## Wooden Camera Pro (Gold Mount) Kit for KOMODO

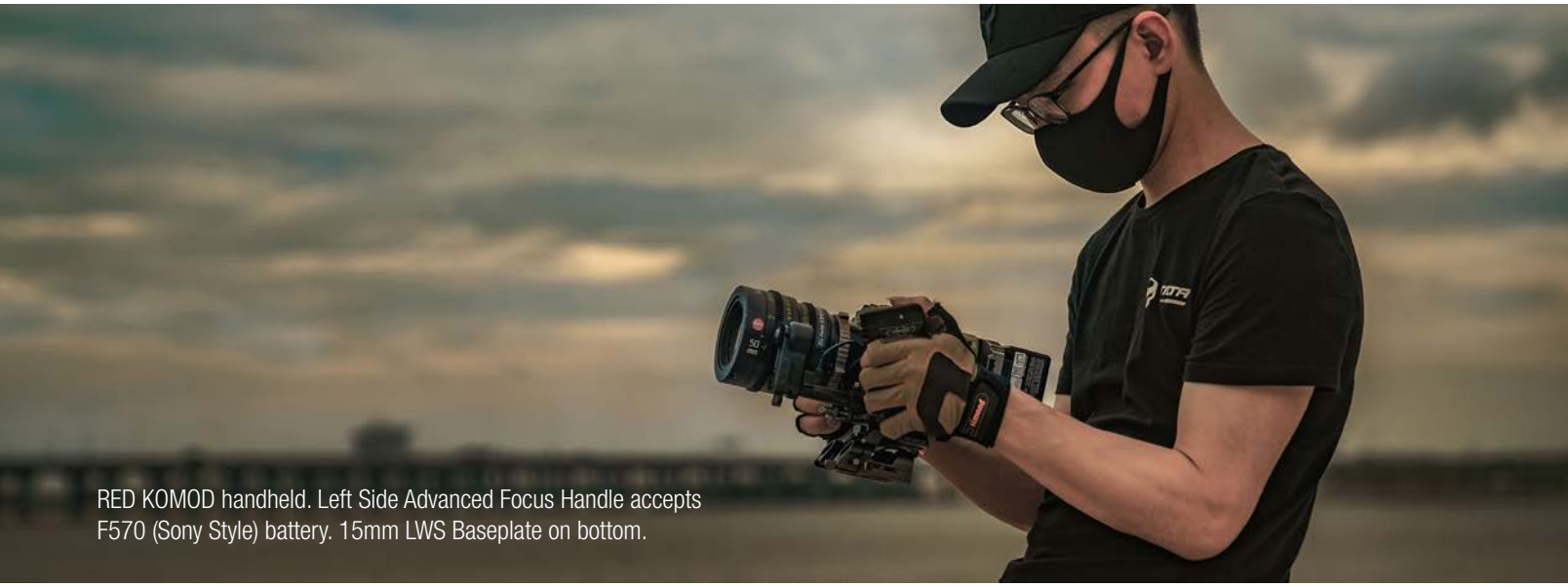
includes the LW 15mm Baseplate, Complete Top Mount Kit, Battery Slide Pro Gold Mount, and 2x 15mm Rods (12").

Battery Slide Pro Gold Mount

Wooden Camera RF to PL Mount Adapter

B-Box attaches to the camera-right BP-9 battery slot. It plugs into KOMODO's EXT connector and provides a breakout with 3-pin Lemo RS (Remote Start/Stop), 5-pin Lemo for Timecode, 4-pin CTRL, USB 5V and BNC for Genlock. Battery Slide Pro V-Mount or Gold Mount for RED KOMODO can be used simultaneously.

# TILTA Kits for KOMODO



RED KOMOD handheld. Left Side Advanced Focus Handle accepts F570 (Sony Style) battery. 15mm LWS Baseplate on bottom.


Tilta matching colors to KOMODO

Tiltaing Adjustable Quick Release Top Handle

# TILTA Kits for KOMODO, cont'd


The TILTA Full Camera Cage for RED KOMODO protects the camera and provides 1/4-20 and 3/8-16 mounting threads for accessories. Handgrips attach to industry-standard Hirth-Tooth Rosettes in front and at the back of each side. A cold shoe on top accepts carrying handles. There are numerous configurations.

The base of the cage has mounting threads to attach your camera to gimbals, drones and other places where balance is important.

Several baseplates attach to the bottom of the cage for lens rods, Arca Swiss and Manfrotto as well as other quick release plates, and underslung battery plates.

Complete your KOMODO customizing with a quick-release top handle or adjustable quick release top handle, assorted side handles (wood, powered or lens controlling), handgrip extension arms, NATO rail adapters, Arca Swiss and Manfrotto quick release plates, and lots more.

*tilta.com*


Tilta Right Side Wood Handle, Quick Release Handle, Cold Shoe Bracket


Right side view with PL to RF lens mount adapter


Dual Canon BP to V Mount Adapter Battery Plate - left side


Dual Canon BP to V Mount Adapter Battery Plate - right side

Top view showing Cold Shoe Top Plate

# Vocas Accessories for KOMODO


Based on the unique and compact design of the RED KOMODO, Vocas has made a range of equally compact and handy accessories for this camera.

Depending on your needs and job requirements, Vocas accessories can be combined or used independently.

With the side cage as the starting point, you can add components to build a complete cage with different top handles, handles, lens motors, microphone holder, additional 15 mm rods for mounting focus motors and shoulder supports.

The Vocas Canon R-mount to PL adapter, which has been available for quite some time, fits directly onto the KOMODO camera.

An optional, compact but sturdy mount support provides additional stability to the lens and lowers the stress of the lens weight on the camera.

If you are already a happy owner of Vocas accessories for previous cameras, your investment is safe. For example, you can use KOMODO with the popular Vocas USBP-15 MKII shoulder base plate by adding a Vocas KOMODO adapter plate.

*vocas.com*

## Tokina 25-75 mm T2.9 Zoom


Tokina Cinema's 25-75mm T2.9 zoom for Super35+ format is a small, light, dedicated cinema lens.

It is 6.9 inches / 174 mm long (PL mount)with a 95 mm front diameter and 86 mm front filter thread.

Focus, Iris and Zoom rings have industry standard 0.8 MOD cinema gears. there are 9 iris blades.

Minimum focus distance is 2.43 ft / 0.74 m. (1:7.89 magnification).

There are 15 optical groups and 18 elements inside.

The Tokina 25-75mm T2.9 covers greater than Super35 format—up to an image circle of 36 mm diameter—filling the sensors of RED Komodo, RED Helium 8K, RED Dragon 6K, RED Monstro in 6K, Alexa LF and Mini LF in 4K UHD, as well as popular cinema and mirrorless cameras from Canon, Blackmagic Design, and Panasonic in 4K DCI or 4K UHD.

When paired with the Tokina Cinema 1.6x Expander for PL or EF mount versions, the lens becomes a compact size 40-120 mm T4.2 that covers Full Frame and Vista Vision 6K and 8K size sensors.

The lens is designed to match the mechanical and optical properties of Tokina Cinema 50-135 mm T2.9 MKII and 11- 20 mm T2.9 zoom lenses.

The 25-75 mm retains optical design features familiar to the 11-20 mm T2.9 and 50-135 mm T2.9 MKII— including parfocal design to retain focus while zooming, limited focus breathing, and low distortion.

The addition of the 25-75 mm completes a 3-lens set of Tokina cinema zooms that cover from 11 mm super wide angle to 135 mm telephoto.

All lenses in the series feature an interchangeable mount between PL, EF, Sony E, MFT, and Nikon F mounts.

Suggested retail price for the 25-75 mm T2.9 is $5799 USD and will ship in Spring 2021.

For more information visit: *tokinacinemausa.com/2575mm-t29*

## Tokina 135 mm T1.5 Vista One


Tokina Cinema Vista One 135 mm T1.5 Prime lens is the latest addition to the existing 6 lens set of 18 mm T1.5, 25 mm T1.5, 35 mm T1.5, 50 mm T1.5, 85 mm T1.5 and 105 mm T1.5 primes. A magnificent seven lens set.

Vista One lenses are a limited release version of the Tokina Cinema Vista Prime lenses. The Vista Ones have a new single coated front element and new lens barrel design. The single coating allows for a reduction in contrast and increase in lens flare when off-axis lighting is used. When the lens is on-axis to the light source, the lens retains contrast and normal lens flare properties. The single coating technology of Vista One lenses presents an advantage over uncoated lenses that may provide too much reduction in contrast and less image control.

The Vista One lenses are distinguished by their premium grey color painted lens barrel with blue and white lens marking accents. Available from Tokina Cinema USA authorized retailers at a suggested retail price of $11,999 USD.

Vista One limited edition primes are now available for purchase as single lenses. Previously available only in complete sets, the Vista Ones are now available for separate purchase. Suggested retail price ranges from $8849 to $11,999 USD per lens, depending on the focal length.

For more information visit: tokinacinemausa.com/vista-one

Tokina Cinema also announces the Vista One Upgrade Program. Owners of Tokina Cinema Vista Primes can upgrade their existing lenses to the popular Vista One single-coated version. The cost of upgrade is $19,349 USD for a 6-lens set of 18mm, 25mm, 35mm, 50mm, 85mm, and 105mm lenses when customers send in existing Vista Prime lenses for conversion. The conversion is also available on a per lens basis at a cost of $3,409 USD per lens. The upgrade service includes exchange of lens elements to the proprietary single coated formulation and change of cosmetic parts to the premium grey color lens barrel finish with white and blue accents.

For more info: *tokinacinemausa.com/vista-upgrade-program*

# www.fdtimes.com

On Paper, Online, and now on iPad

# Subscribe Online:

www.fdtimes.com/subscribe

## Call, Mail or Fax:

Direct Phone: 1-570-567-1224
Toll-Free (USA): 1-800-796-7431
Fax: 1-724-510-0172

**Film and Digital Times Subscriptions**
**PO Box 922**
**Williamsport, PA 17703**
**USA**

| | | | |
|---|---|---|---|
| ☐ | 1 Year Print and Digital, USA | 6 issues | $ 49.95 |
| ☐ | 1 Year Print and Digital, Canada | 6 issues | $ 59.95 |
| ☐ | 1 Year Print and Digital, Worldwide | 6 issues | $ 69.95 |
| ☐ | 1 Year Digital (PDF) | | $ 29.95 |
| ☐ | 1 year iPad/iPhone App upgrade (normally 29.99) *Get FDTimes on Apple Newsstand with iPad App when you order a Print or Digital Subscription (above)* | | + $ 9.99 |

Total $ _____

Payment Method (please check one):

☐ VISA ☐ Mastercard ☐ American Express

☐ Check Enclosed (payable to Film and Digital Times)

Credit Card # _____

3 or 4 digit security code_____

Expiration Date_____

Signature _____

Name _____

Company _____

Title_____

Address _____

City _____

State or Province _____

Country _____

Zip or Postal Code_____

Phone _____

Fax_____

Email_____

# Sponsors and Educational Partners

### Titans of the Industry

arri.com
blackmagicdesign.com
canonusa.com
creativesolutions.io
sigma-global.com
sony.com/professional

### Moguls

abelcine.com
aja.com
Angénieux.com
bandpro.com
cookeoptics.com
cvp.com
fujifilm.com
leitz-cine.com
panasonic.com
prestoncinema.com
red.com
teradek.com
zeiss.com/cine
zgc.com

### Executive Producers

atomos.com
dji.com
emit.fr
leica.com
litepanels.com
ocon.com
servicevision.es
smallhd.com
tiffen.com
woodencamera.com

### Producers

antonbauer.com
cartoni.com
cinemaelec.com
ibe-optics.com
ottonemenz.com
photocineshop.com
C&L Studio: camarasyluces.com
transvideo.eu

### Co-Producers

aatondigital.com
BandH.com
chrosziel.com
manfrotto.us
mole.com
msegrip.com
orcabags.com
pstechnik.de
sachtler.com
steadicam.com

### Associate Producers

16x9inc.com
brighttangerine.com
chengseng.com
chrosziel.com
cinetech.it
cmotion.eu
dmglumiere.com
denz-deniz.com
easyfocus.at
easyrig.se
filmtools.com
hd-systems.biz
idxtek.com
inovativ.com
jlfisher.com
kinoflo.com
loumasystems.biz
mytworks.com
nanliteus.com
pat-acc.com
raid-japan.com
ronfordbaker.co.uk
rosco.com
sekonic.com
shapewlb.com
vocas.com
whitepointoptics.com

### Rental Houses

abelcine.com
arri-rental.com
bertonevisuals.com
camalot.com
camarasyluces.com
cinediving.com
www.hd-systems.biz
jpfcine.cl
keslowcamera.com
kofilmrental.com
koernercamera.com
lemac.com.au
lites.be
ljud-bildmedia.se
musitelli.com
nacinc.com
panalight.it
photocinerent.com
rawcamera.com
rvz.fr
sanwa-group.com
servicevision.es
storyline.no

### Media Partners

afcinema.com
airstar-light.us/film
bscexpo.com
camerimage.com
cinec.de
cinegearexpo.com
fsfsweden.se
ibc.org
icgmagazine.com
imago.org
inter-bee.com
nabshow.com
soc.org

# Sponsors and Educational Partners

## Associate Producers

## Rental Houses

## Media and Production Partners

## Titans of the Industry

SONY
Blackmagicdesign
ARRI
Canon
SIGMA
CREATIVE SOLUTIONS

## Moguls

Cooke
CVP
Leitz
ZEISS
RED
FUJINON
AJA VIDEO SYSTEMS
angénieux
TERADEK
FUJIFILM
Panasonic
PRESTON CINEMA SYSTEMS
AbelCine
Cooke AMERICAS
bandpro FILM & DIGITAL INC.

## Executive Producers

SERVICE VISION
ATOMOS
TIFFEN
WOODEN CAMERA
SMALLHD
DJI PRO
Litepanels
Emit
oconnor
Leica

## Producers

C&L RENTAL
CINEMATOGRAPHY electronics
Tokina VISTA BEYOND FULL FRAME
TILTA
PHOTO CINE SHOP.COM
ANTON BAUER
CARTONI PROFESSIONAL CAMERA SUPPORT
CAMERAS BY OTTO NEMENZ
transvideo
IB OPTICS

## Co-Producers

TERADEK RT
AATON DIGITAL
ORCA
P+S TECHNIK
THE STUDIO B&H
sachtler
Manfrotto Imagine More
STEADICAM
Mole-Richardson Co.
matthews studio equipment

Associate Producers, Rental Houses, Media and Production Partners on previous page