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FILM AND DIGITAL TIMES

VENICE Special Report

An In-Depth Look at Sony's Full Frame, Full Height, CineAlta Camera



sony.com/venice

Cover photos from *Venice: La Serenissima*,
a large format production for IMAX and
giant screens by Peter Chang

Sony VENICE



Sony VENICE



Sony VENICE Launch in September



Sony Picture, Culver City. September 6, 2017.

Sony introduces VENICE.

It is Sony's new 6K Full Frame and S35 cine camera. This is the Full Frame 36×24 camera that Sony whispered last June. In a very quick whisper-to-product launch, VENICE was presented to the world on September 6 at Sony Pictures Studios in Culver City, not far from Venice Beach. The European premiere was in London at Pinewood on Sept 7.

VENICE comes with a PL mount. Remove 6 screws and a lever-lock E-mount lurks underneath. The big news is the big picture, dual internal ND filter wheels with 0 to 8 stops of ND, and an interchangeable sensor assembly. The newly designed 36×24 mm sensor has 15 stops of dynamic range and supports almost every format from Full Frame 3:2 to Super35 4K full 18mm height 4:3, Anamorphic and Spherical, and everything in between.

We are not sure which Venice it is named after: Venice Beach, California or Venice, Italy.

Sony Pictures in Culver City.



Peter Crithary was the Master of Ceremonies of the VENICE launch at Sony Pictures in Culver City.





VENICE comes with a Full Frame PL mount.



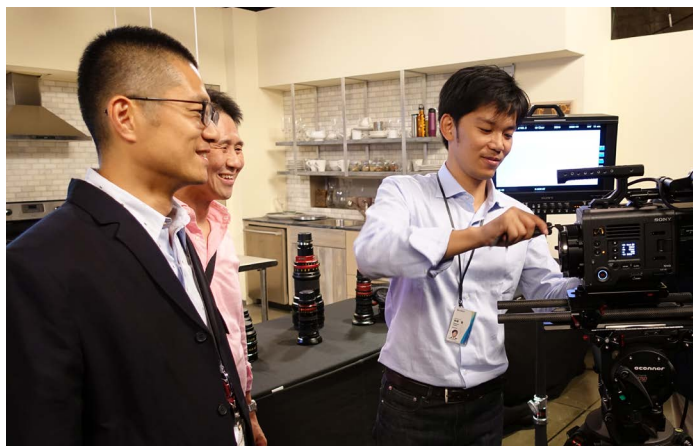
There's a lever-lock E-mount underneath the PL mount. E-mount functionality is not available until firmware update V2.0.



VENICE's native E-mount with PL mount removed, seen from rear side.



Leica M 0.8 21mm f/1.4 with E-mount to M adapter. Not functional yet.



Yutaka Okahashi (right) checking the lens mount.



Brian Linhoff with Sigma 35mm T1.5 Full Frame E-mount lens.

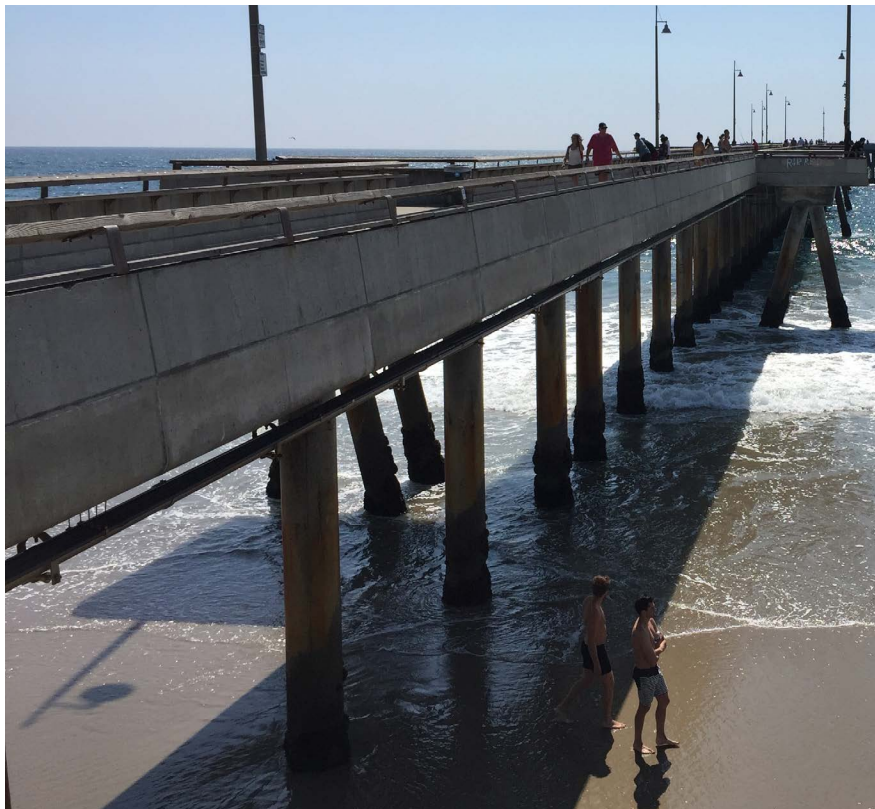


VENICE with ARRI/ZEISS MAster Anamorphic 40mm



Sony FE 85 mm F1.4 GM G Master Full Frame E-mount lens.

Which Venice is Sony VENICE named after? Venice Beach?



Venice Ramen at 515 W. Washington Blvd in Marina Del Rey



Charcoal is the carnivorous cousin of Josiah Citrin's Melisse in Santa Monica.

Venice, Italy



The Light of Venice

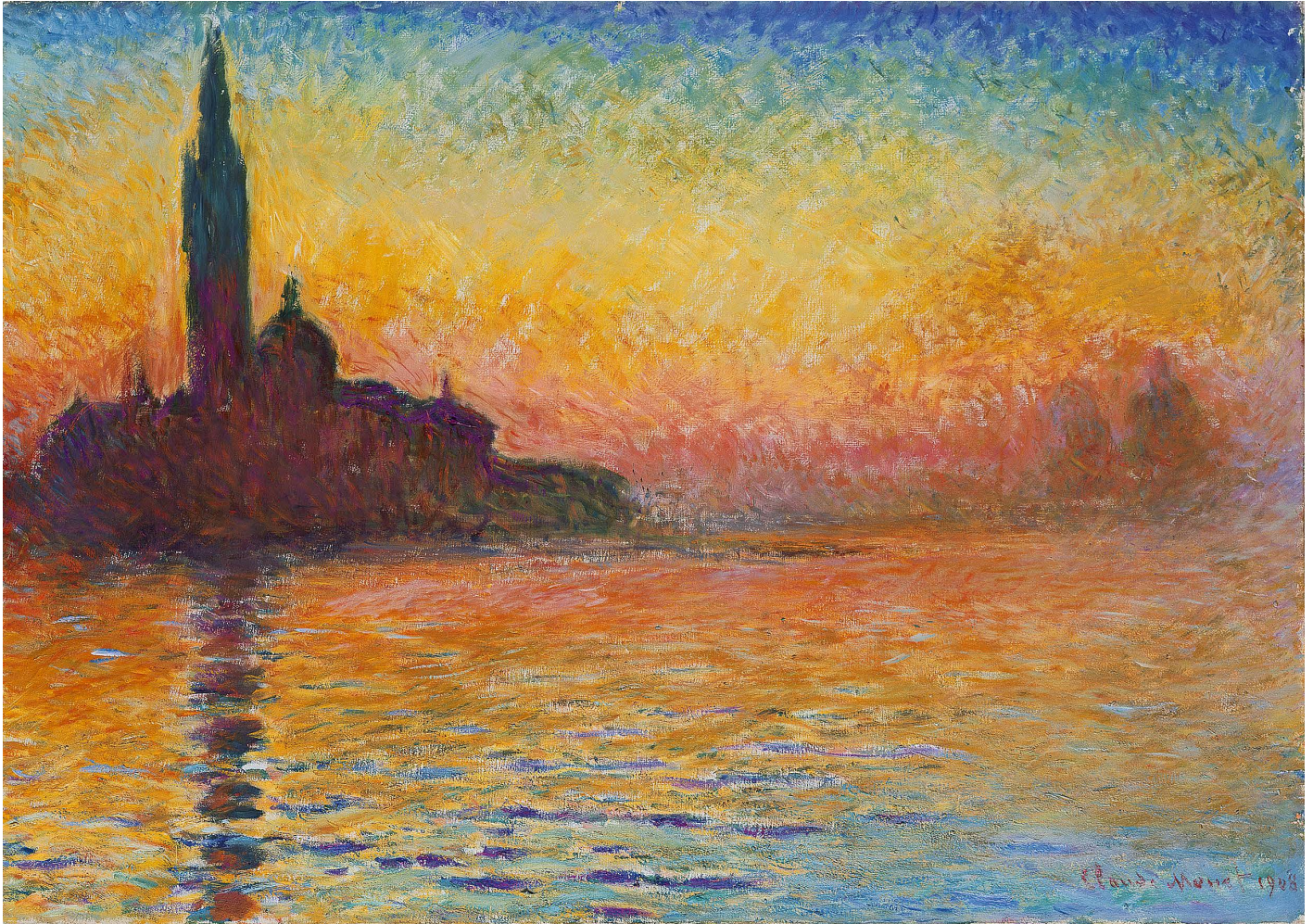


Giovanni Antonio Canal ↑
("Canaletto")
Entrance to the Grand Canal
Venice c. 1730
Oil on canvas
49.6 cm × 73.6 cm
(19.5 in × 29.0 in)
Museum of Fine Arts, Houston

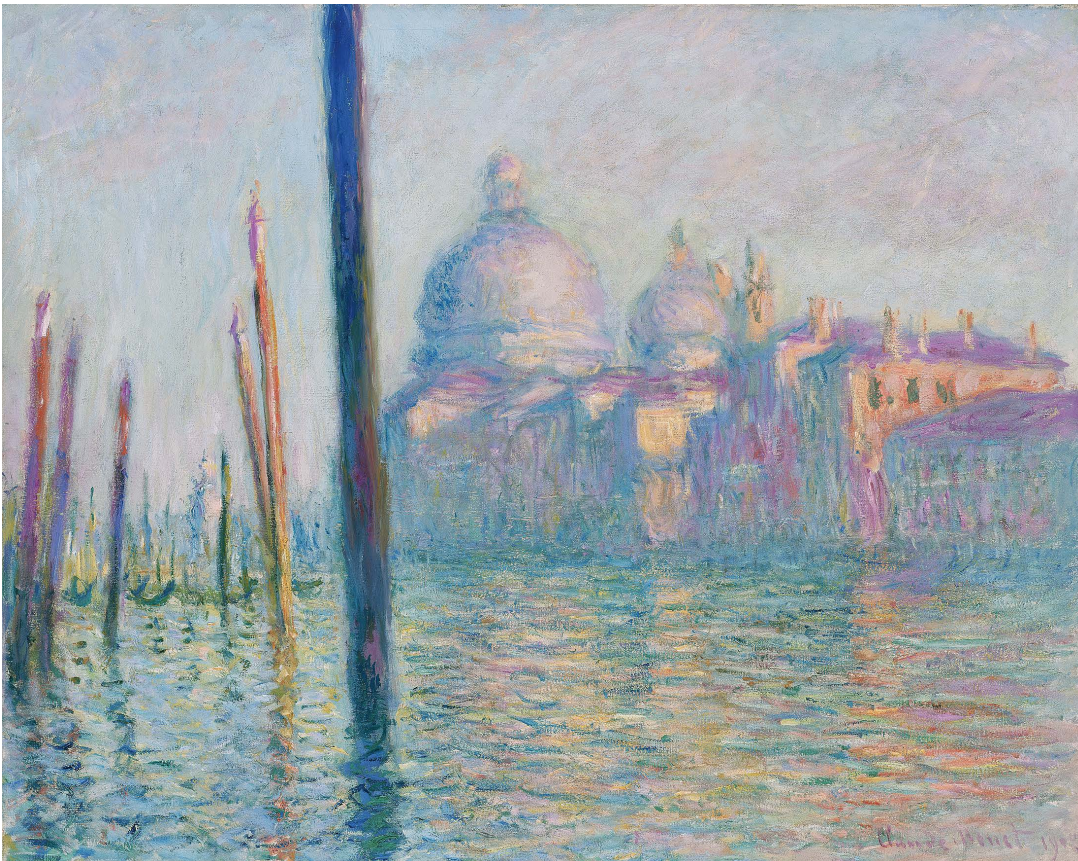
J. M. W. Turner →
San Giorgio Maggiore at Dawn
1819
Watercolor
224 × 287 mm
(8.82 × 11.3 in).
Tate Britain



The Light of Venice



↑ Claude Monet
San Giorgio Maggiore by Twilight
1908
Oil on canvas
65.2 × 92.4 cm (25.7 × 36.4 in)
National Museum Cardiff



← Claude Monet
The Grand Canal
1908
Oil on canvas
73.7 × 92.4 cm (29 × 36.4 in)
Museum of Fine Arts,

Venice in Amsterdam



Sebastian Leske, Sony, VENICE, FDTimes.



"Captain" of the Sony VENICE Team: Yasuo Ueda



Wolfgang Baumler and Peter Martin from Vantage with Hawk on VENICE.



Hugo Gaggioni, Sony VENICE, Scorpio FFA

It was fitting that Sony introduced a working Full Frame prototype of VENICE the camera in Amsterdam the city at IBC. After all, Amsterdam famous for larger than life, large format painting: members of militias posing on a staircase and Rembrandt's 1642 large format *Militia Company of District II under the Command of Captain Frans Banninck Cocq*, better known as the *Night Watch*.

But we digress. Two weeks earlier, on September 6, Sony showed a Super35 version of VENICE in LA. Grumbling was surely heard in Tokyo and in the short intervening time, a Full Frame 36x24mm model serendipitously appeared at IBC.

Sony announced that VENICE would ship in February 2018 with S35 format only. At the time, Full Frame and E-mount functionality were not expected until mid-year 2018. At IBC in September, Sony announced Full Frame capability on delivery.

A short walk to the Rijksmuseum is all it takes to reveal the appeal of large format: Rembrandt's *The Night Watch* (1642), Bartholomeus van der Helst's *Officers and Members of the Militia of District VIII in Amsterdam*, and Carlevarijs' *Entry of the French Ambassador* (1706-08).

What does this mean for us? Full Frame cine will loosen aspect ratios from their traditional roles, widescreen will go wider than 2.39:1, and the sizes of images on screen will be determined by story, emotion and style — and not by committees or conventions, studios or TV networks.





Above: Luca Carlevarijs
The Entry of the French Ambassador into Venice in 1706
1706 - 1708. oil on canvas, h 130cm × w 260cm (51 x 102 in).
Univisium aspect ratio! Rijksmuseum, Amsterdam

Below: Rembrandt van Rijn.
Militia Company... (The Night Watch). 1642. Oil on canvas. Height:
379.5 cm × Width: 453.5 cm.
Rijksmuseum Amsterdam.



Opposite:
Govert Flinck
*The Company of Captain Albert
Bas and Lieutenant Lucas Conijn*.
Oil on canvas. 1645.
Dimensions:
Height: 347 cm (136.6 in).
Width: 244 cm (96.1 in).
Rijksmuseum, Amsterdam.

A Camera called VENICE



“When I went to Venice, I discovered that my dream had become incredibly, but quite simply, my address,” Marcel Proust uncharacteristically succinct, described the city.

“VENICE is the first camera I want to own,” Claudio Miranda ASC, uncharacteristically loquacious in his enthusiasm, described VENICE, Sony’s new Full Frame camera, after shooting its product launch demo. “I can light tabletop pop tarts or a giant night exterior. I can easily work with VENICE on any job.”

This is the Full Frame 36×24 camera that Sony signaled in June. The big news was the big picture. Few details were revealed then.

The camera is named VENICE. In one of the fastest whispers-to-product launches we’ve ever seen, the camera was presented to the world on September 6. It was shown with PL mount, S35 format, with Full Frame, E-mount and updates coming soon.

No more number names. Not F246. VENICE is a high-end, 6K, Full Frame camera with an entirely new Sony designed 36×24mm sensor that has 15 stops of dynamic range and an artistic look. VENICE supports every format from Full Frame 3:2 to Super35 4K full 18mm height 4:3, Anamorphic and Spherical, and everything in between.

Sony Manager Peter Crithary explained, “We really went back to the drawing board for this one. It is the next generation camera system, a ground-up development initiative encompassing a completely new image sensor. We carefully considered key aspects such as form factor, ergonomics, build quality, ease of use, a refined picture and painterly look—with a simple, established workflow. We worked in close collaboration with film industry professionals. We also considered the longer term strategy by designing a user interchangeable sensor that is as quick and simple to swap as removing four screws, and can accommodate different shooting scenarios as the need arises.”

Sony VENICE

Full Frame Sensor 36×24 mm

Painterly Look

6K Full Frame 6048 x 4032 maximum resolution

4K Super35 window

Full Frame, full 6048 photosite width of the sensor
Widescreen spherical 2.39:1 or Large Format 'Scope

Super35 full height 2.0x squeeze Anamorphic

8-Step, 8-Stop Internal NDs

PL and Ruggedized E-mount

Spherical FF & S35

Anamorphic FF & S35

15+ Stops of Exposure Latitude

ISO 500 and Hi ISO 2,500

Retains highlights and color detail 6 stops overexposed and 9 stops into the shadows

Power: both 12 VDC and 24 VDC

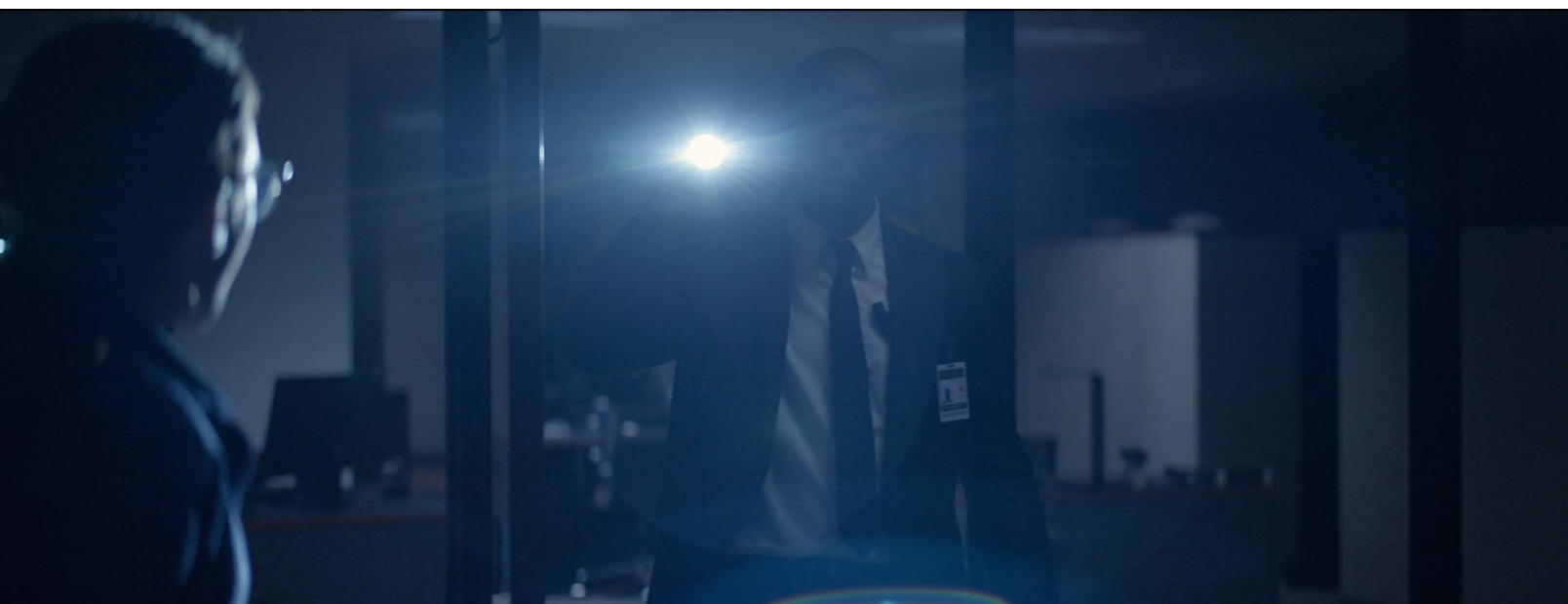
Ergonomics

VENICE is compact and comfortable. Sony answered the wish lists and complaints of cinematographers, crews and rental houses. Controls are where you expect them to be. There are LED panels with menus and buttons on both camera left and right sides—ready for operator, assistant or DIT. Menus are streamlined, logical and intuitive.



L-R: Director Joe Kosinski, Cinematographer Claudio Miranda ASC, Focus-Puller Dan Ming—shooting VENICE espionage thriller demo film “The Dig.” Starring Lily Collins and Taylor Kitsch. Production stills by Jeff Berlin.

4K Framegrabs from “The Dig”



VENICE Production Stills from “The Dig”

Production stills by Jeff Berlin





Shown with Leica Thalia
35mm Large Format

Why is VENICE's big picture such a big deal?

- Full Frame is a familiar format — a worldwide standard of still photography for 100 years.
- A Full Frame image has a more natural perspective and magnification than its Super 35mm counterpart.
- Fewer distortions at wide angle.
- Natural depth of field. Shallower if desired.
- A 50mm FF at T2.8 has same field of view and depth of field as a 35mm S35 at T1.4. Equivalent of 2 stops difference.
- Full Frame shares many characteristics of the 65mm format, but the lenses are smaller.
- VENICE Full Frame is backwardly compatible and can work with all Super35 lenses—windowing the S35 image in the 36×24mm sensor area.
- Full Frame sensors offer more flexibility for the designer — sensitivity, dynamic range, resolution, etc.

Aspect Ratio Agnostic

VENICE is aspect ratio agnostic. Sony's new Full Frame sensor can conjure up almost any conceivable aspect ratio permutation within Full Frame and S35: widescreen spherical, widescreen anamorphic (1.3x, 1.5 and 2x squeeze), 2.39:1, 1.85:1, 1.66:1, 1.33:1, 17:9, Univisium, and the list goes on.

Studio to Steadicam

VENICE will be welcome on almost any production setup: Studio to Steadicam, stabilizers, gimbals, drones, remote heads, and handheld. The modular and open design has an abundance of mounting points to attach on-board monitors, wireless video, audio and focus systems and other accessories.

VENICE Image Areas

- 36×24mm Full-Frame 6K Sensor
- Full Frame 36×24 up to a maximum resolution of 6048 x 4032 (firmware update)
- S35 Window mode, Super35 18.66 x 24.89 mm, 4096 x 3024 (4-perf film equivalent)
- S35 Window mode 14 x 24.89 mm, 4096 x 2160 resolution, similar height as previous Sony CineAltas (3-perf equivalent)

In other words, VENICE's new Full Frame sensor can capture a plethora of permutations, including Full Frame 24mm high anamorphic, S35 18mm high anamorphic, S35+ 20mm high anamorphic, FF spherical, S35 spherical, S35 14mm high (as in F65, F55), etc. That translates into being able to use almost any cine or still photography lens the world has ever seen.

Look

Sony designed and manufactured VENICE's new sensor with a fresh approach to color science and image processing. High dynamic range captures shadow detail in the darkest areas and retains highlight colors and textures. Skin tones are natural, smooth and silky.

Claudio Miranda described the look of VENICE: "It has a very cinematic look. Colors are really beautiful. It is a sort of softer, cosmetic, tonally well rounded look, with skin tones that are gorgeous. It doesn't feel video-like. It's not harsh. This is a leap forward. Color rendition is really nice. Tonal values hold true in the lower toe of exposure. It holds highlight detail and color information. It doesn't go red in the shadows. I would say there's more dynamic range than the F65"

Travel Guide to VENICE



Shown with Angenieux Optimo S35 Anamorphic 30-72 A2S

Build

During development, Claudio was invited by Sony to talk with the engineers. “I wanted them to make a camera that I would use. If it was good enough for me, hopefully it would be good for others. So I went to Japan to talk about menus, look and feel. The camera should be something you could take anywhere: to the North Pole or the Sahara. It should be rugged enough to be dropped off a table.”

I’m sure the Sony engineers were cringing at that thought. Don’t even think about subjecting VENICE to a drop test. Nevertheless, VENICE is extremely rugged and has a very solid feel.

The silent fan in VENICE can easily be cleaned or replaced on set. The airflow is totally isolated from electronic components to keep hostile environments away from delicate parts.

8 Steps, 8-Stops of Optical ND Filters Inside

Among many suggestions, Claudio told the engineers to build the 8 ND dual turret with the same familiar steps that most DPs use in their mattebox filters, and Sony did.

VENICE has two servo-controlled, mechanized optical ND filter wheels to reduce exposure up to 8 stops in 8 steps. It goes from clear to ND0.3 ($1/2 = 1$ stop) to ND2.4 ($1/256 = 8$ stops). So: ND.3, ND.6, ND.9, ND1.2, ND1.5, ND1.8, ND2.1, ND2.4.

Claudio got excited here: “Rather than settling for just a few internal NDs, the built-in ND filter selection is one of the best things. As the sun goes down, you don’t have to scramble with a massive number of mattebox filters.” The NDs can be controlled remotely for drone, crane and remote shots.

Control Panels on Both Sides

VENICE has menu displays on both sides of the camera. The main display is on the camera-right side for easy access by the camera assistant or DIT. The camera operator gets a smaller display on the “smart side”—camera left. This display shows helpful status reports as to frame rate fps, shutter angle, ISO, ND, and White Balance. The menus are intuitive, refreshingly logical and highly customizable.

EVF

The DVF-EL200 electronic viewfinder has a 1920x1080 OLED display that is sharp enough to see whether the shot is in focus. You can attach and adjust the EVF quickly, without tools. Plug it in with a standard LEMO connector. A dial lets you adjust brightness (it is 2x brighter than DVF-EL100), contrast and peaking.

Recording

VENICE supports in-camera XAVC or ProRes recording onto SxS cards. Attach an AXS-R7 recorder with 4 screws and it lets you record visually lossless RAW or X-OCN onto AXS cards.

RAW

With the AXS-R7, you can record 16-bit linear RAW in 4K.

X-OCN

Also with an AXS-R7, record 6K (future upgrade) 16-bit with significantly smaller files.

XAVC

XAVC is H.264/AVC intra-frame—for cost-efficient recording in 4K 10-bit and HD high-frame-rates.

VENICE PL and E-mount

Lens Mount

The lens mount is delightful, ingenious, and much better than what I expected. I assumed it would be an E-mount with traditional lens adapters.

But Shigeki Ishizuka, President of Sony's Digital Imaging Group, Kimio Maki, Senior General Manager, and the VENICE design group have come up with a native Sony E-mount over which a PL mount, and conceivably almost any other mount, can be screwed onto the front of the camera.

Therefore, VENICE works with your entire inventory of existing PL lenses, will accept Panavision mounts and is future-proof for almost any mount that comes along in S35, FF or Large formats.

VENICE's lens mount system works as follows. It is a solid E-mount with a breech-lock (rotate counter-clockwise to lock). The entire mount and front end were beefed up to support heavy cine lenses. VENICE will open up a whole world of high-end cine E-

mount lenses with Firmware Update 2.0. Many E-mount lenses are very compact, lightweight and great on drones, rigs, gimbals and stabilizers. The E-mount is fitted with 10 standard Sony metadata and power contacts at 6 o'clock.

An additional set 14 of "pass-through" lens metadata and power contacts sit below the E-mount contacts, ready to communicate with additional lens mounts.

The installation of a PL mount on VENICE is very clever. It is not a traditional lens mount adapter that inserts into the existing E-mount. It is much more solid and secure. Attach the PL mount with 6 solid screws directly in front of the existing E-mount. There's plenty of space because the E-mount flange depth is 18mm and the PL is 52mm.

The PL mount comes with industry-standard lens metadata contacts for Cooke/i at 12 o'clock.



Push safety button up and then rotate E-mount breech clockwise to unlock

tab will stop from opening clockwise at the "T" position of System, and clicks into place at T when locking clockwise



Quick and Easy Sensor swap:
Remove the front-end sensor block module by unscrewing 4 large silver-colored hex screws.

VENICE: Modular and User-Swappable Sensor Block



Interchangeable Sensor Block Assembly with Full Frame Sensor and E-mount.

This module can be quickly and easily swapped by the user. 4x 3mm hex in front and 2x 3mm hex at bottom.

Opportunities abound. You will be able to upgrade the sensor and keep the camera.

Could it be that various sensor blocks, with different ISO ratings and looks might be "loaded" into the camera the way film stocks are loaded in magazines?

Or maybe there could be a sensor for super slow motion or high frame rate.



Swappable Sensor Block

VENICE has a user-swappable Sensor Block with the Native E-mount attached.



Dual Recording

VENICE can record two streams simultaneously onto two separate media cards. For example: RAW or X-OCN on the AXS-R7 as a digital negative and XAVC or ProRes onto internal SxS cards for editing. VENICE will also, with a firmware update, record RAW or X-OCN on the AXS-R7 and XAVC 4K internally at the same time. When not using the AXS-R7, VENICE can record both XAVC 4K and ProRes simultaneously. If you're using one SxS card, it would be ProRes 422 Proxy.

Production to Post

With 15 stops of latitude and a wide color gamut, VENICE follows familiar Sony workflows of the F65 and F55. VENICE can work in the same color space as the F65 and F55 and Rec. 2020. Your images will flow seamlessly from camera to cart, dailies to grading, and ultimately to theaters, screens, tablets and displays.

Browse and View

Catalyst Browse and the RAW Viewer are free Sony software downloads for grading and transcoding.

Catalyst Browse lets you browse files, see and edit metadata, view video, apply color correction and establish looks. Use Catalyst Browse to transcode and copy files to connected hard drives, network storage or Sony's Media Cloud.

RAW Viewer is an application that provides highest quality debayering of RAW files, enables QC of recorded files, does color grading and supports a number of control panels.

Future Proof

VENICE has a modular design. The sensor block can be exchanged and swapped. When the next Sony sensors arrive, you'll be able to upgrade without having to buy a new camera.

Q&A with Sony VENICE Team



FDTIMES: Where are the VENICE cameras and sensors made?

Sony VENICE TEAM: VENICE cameras are built at the Sony Global Manufacturing Facility southwest of Tokyo. VENICE sensors are designed by our engineers and come from our Sony Semiconductor Manufacturing Corporation in Kumamoto, on the island of Kyushu, Japan.

How did you come up with the name VENICE?

We considered several names, but decided upon Venice for several unique reasons. The light and ambiance of Venice, Italy has attracted artists, poets and filmmakers for centuries. Many famous movies were filmed in Venice, and the Venice film festival which celebrates the art and craft of filmmaking. And then, of course, there is Venice, California—which is close to Hollywood and the worldwide center of filmmaking.

What was the main concept in developing the camera?

We carefully considered what the next generation camera needed to be, and how we could make it future proof. We intended this camera to be a reliable partner for creative professional filmmakers. Our goal was to have an intuitive design and refined func-

tionality that would make it a pleasure to work with. The newly developed 36x24mm Full Frame sensor and Full Frame ready lens mounts offer access to a great variety of lenses—spherical, anamorphic, S35 or FF. VENICE is intended to help cinematographers express themselves artistically, for directors to realize their dreams without compromises, and for producers to revel in the versatility of the camera.

What was the design concept?

“Simple and Robust” was the design concept. After conducting a series of interviews and prototyping possible designs with creators, we decided on placing the operation panels on both sides of the camera. These panels are optimized for simple operation in harsh conditions, and special attention was paid to the placement, feel and number of buttons.

What were the challenges in terms of design?

To clearly, and logically lay out the interface and connectors without compromising usability was a challenge. In terms of the UI and user interaction, we wanted to not only meet the industry

Q&A with Sony VENICE Team

standards for usability, but also to create a camera so effortless that crews will focus on their artistry and not on operating the camera.

What were the engineering challenges during development?

We wanted to design a very solid, durable camera body. Unconventional methods had to be employed for the internal thermal design. The new image sensor has high sensitivity. So, we designed the circuitry very carefully to be able to make use of the maximum performance of the image sensor. The mechanical 8 x ND as huge challenge, as was the internal cooling system. We are proud to say we accomplished what we set out to do.

What research was done and how is it reflected in the design?

We spent a significant amount of time with filmmakers around the world. They represented a wide range of backgrounds, from working on big budget feature films to independent documentaries. They were given a chance to use mock-ups of the interface and we asked them to perform different tasks that they might typically do before, during and after shooting. Based upon the results we closely observed, and as a result the designs were revised and we conducted a second round of closed tests with interactive prototypes. The results of these tests dictated all areas of the design, from the user interface to the number, size and placement of the buttons.

You position VENICE as Sony's flagship model. Why then does VENICE have a 6K sensor while the F65 has an 8K sensor?

VENICE has a lot of advantages compared to the F65. VENICE has a Full Frame sensor and its Latitude, Signal-to-Noise Ratio and Dynamic Range are a higher specification than F65. That's why we place VENICE as the flagship model. Picture quality of a camera should be determined not only by sensor resolution but also by sensor size, number of photosites, dynamic range, image processing, and much more. Considering the current market situation and desired picture quality, look, and color reproduction, we decided to choose a 6K large format sensor.

Is the Full Frame sensor developed by Sony?

Yes, it is. This is Sony's first Full Frame sensor newly developed for a high-end digital motion picture camera. We introduced the prosumer HandyCam NEX-VG900 in 2012 featuring an earlier developed Full Frame sensor. But that was a different camera for a different audience.

Is the VENICE sensor the same as the α series still cameras?

No, the VENICE sensor was designed and manufactured from the ground up specifically for this high-end cinema camera, for the highly demanding requirements of filmmaking. Without getting into all the details, the color filters are different, and the cinema camera sensor can capture High Dynamic Range exceeding Rec. 2020, which is a much wider color space than P3.

Why is the sensor rated at 500 ISO?

Considering the optimal balance of dynamic range, we set it to 500. A dynamic range equivalent to F65 is achieved, but with lower noise. In addition, the sensitivity is changeable from 125 to 4,000. So we'll see how cinematographers will decide to rate VENICE.

Furthermore, we have now implemented a Hi ISO rating of 2500 and you can select from Dual Base ISO 500 or 2500 modes in the

menu. Once selected, you can then refine the setting.

What is the benefit of VENICE's interchangeable sensor block?

Customers can change the sensor block assembly themselves without sending the camera to a service facility. For example; a rental house might want to change the CMOS sensor or the ND mechanical turret. In addition, the customer can change the cooling fan assembly easily, even on location. The strategy here is to offer a future proof camera system where the sensor is concerned, so when new sensors are developed with improved or different features, for example Ultra High Frame Rate, then the new block can be used for different projects, or for different scenes within a project, then go back to the primary sensor block for the film without having to switch to a different camera.

How does Fast Image Scan work to minimize Jello-Effect?

As Sony's image sensor technology improves, so does the ability to greatly minimize effects such as "jello". Electronic circuit stacking and internal memory on the CMOS enable Fast image scan

Why is VENICE not FZ mount like the F55 and F5?

The flange focal length of the FZ mount is 19mm while the E-mount is 18mm. At this time, we prioritize the advantage of compatibility with E-mount, which enables adaptability of a larger variety of lenses: smaller, lighter, wider and different.

Which E-mount lenses can be used with VENICE?

We will announce in due course. Version 2 firmware upgrade onwards will enable use of E-mount lenses.

The F55 and F65 have anamorphic shooting mode. What is the difference on VENICE?

The anamorphic mode on the current models are framed in a 13x24 mm image area, and squeezed by 2x. VENICE can frame the industry-standard (4-perf equivalent) 18x24 mm area.

Does VENICE have the same Ultra-Wide color gamut as F55 and F65?

Yes. VENICE has the same S-Gamut3 and S-Gamut3.Cine for image capture. That's why VENICE can utilize the same workflow. However, the color science development for VENICE has surpassed that of the F55, and F65, again as a result working closely with filmmakers with respect to skin tone rendition and other aspects of the image of critical importance. **Q: You said that VENICE was aspect ratio agnostic. What if I want to shoot in an aspect ratio that's not an Imager Mode?**

A: You might create your own frame lines from the menu. Be sure to shoot a framing chart so the post production people know where to crop (which is an easy task in, for example, DaVinci Resolve.)

Q: What is the 4K S35+ Anamorphic Mode?

A: To achieve 4K in S35, it has a taller image height. See charts.

Q: What's the difference between an Imager Mode and an Aspect Ratio?

A: Imager Mode is the active area of the sensor. You can choose different Imager Modes from the menu. They are the same as the most popular aspect ratios. The camera displays the appropriate frame line. It also "crops" ("windows") the active area during recording, so you don't have to crop the black "out of frame" areas during post. (see next page).

Built-in Optical ND Filters

This is one of the most clever engineering feats in VENICE. Two Optical ND Filter wheels are somehow stuffed in the claustrophobic gap between the rear of the native E-mount and the cover glass of the sensor (less than 18mm airspace.) The filter wheels are controlled by servos that are engaged from the Main Menu on the camera right side or the Mini Display on the operator's (left) side.

There's a clear optical glass in each wheel and two NDs. That provides 8 stops of ND exposure control in 9 steps (2^3), 2 wheels with 3 choices in each. See chart below.

As Claudio Miranda, ASC said, "The built-in ND filter selection is one of the best things. As the sun goes down, you don't have to scramble with a massive number of mattebox filters."

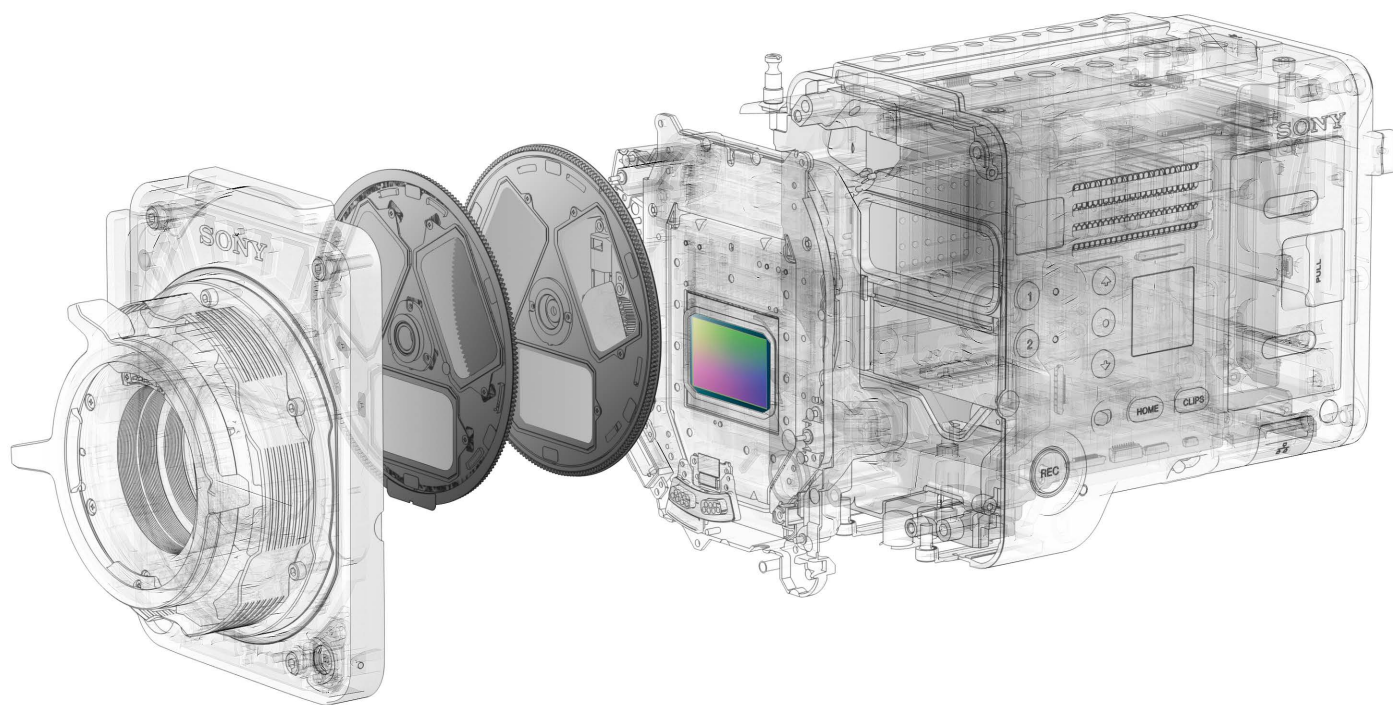
The NDs can be controlled remotely when the camera is on a crane, remote head or drone.

There are two good reasons to use the ND filter wheels: because you have to or because you want to. Technical or creative.

You "have to" control the sun for a manageable exposure.

Or you "want to" add NDs and be able to shoot wide open.

8 steps of ND in 1 stop increments



| | | ND Filter Wheel A | | |
|-------------------|---------------------|---------------------|---------------------|---------------------|
| | | Clear | ND .3 (1 stop) | ND .6 (2 stops) |
| ND Filter Wheel B | Clear | Clear | ND .3 (1 stop) | ND .6 (2 stops) |
| | ND .9 (3 stops) | ND .9 (3 stops) | ND 1.2 (4 stops) | ND 1.5 (5 stops) |
| | ND 1.8 (6 stops) | ND 1.8 (6 stops) | ND 2.1 (7 stops) | ND 2.4 (8 stops) |

Two turrets hold three high quality optical ND filters in each.

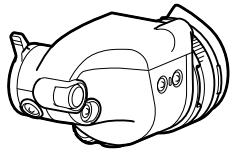
The first wheel holds a Clear, ND.3 and ND.6 filter.

The second wheel has Clear, ND.9 and ND1.8.

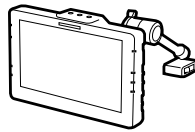
These permutations deliver 0 to 8 stops of ND.

Filters can be dialed in quickly, controlled remotely or directly on the camera.

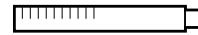
The Sony VENICE System



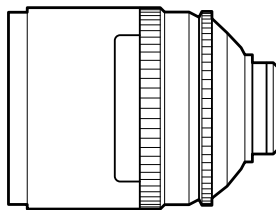
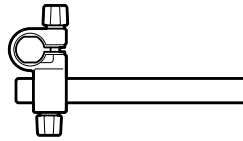
DVF-EL200
Viewfinder



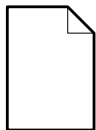
DVF-L700
Viewfinder
(VF cable (A-2201-632-A or
A-2201-633-A) is required)



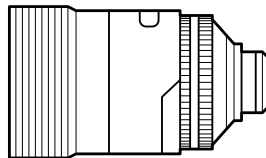
ECM-680S, ECM-678, ECM-674
Microphone
(EC-0.5X3F5M is required)



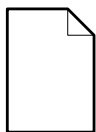
SCL-PK6,
SCL-P11X15
S35 PL Lens



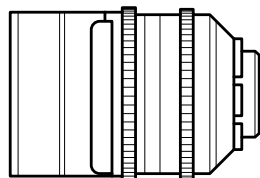
CBKZ-3610A,
CBKZ-3610AM,
CBKZ-3610AW
Anamorphic License



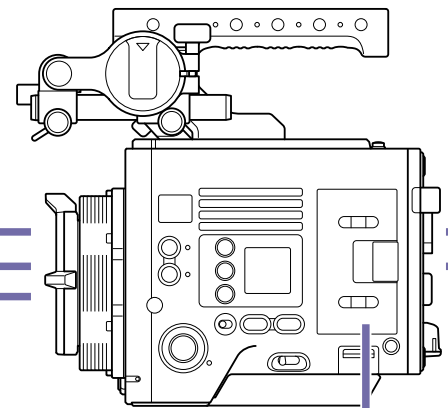
Anamorphic Lens



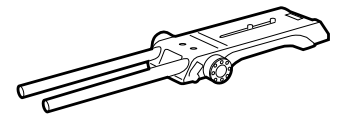
CBKZ-3610F,
CBKZ-3610FM,
CBKZ-3610FW
Full Frame License



Full Frame Lens

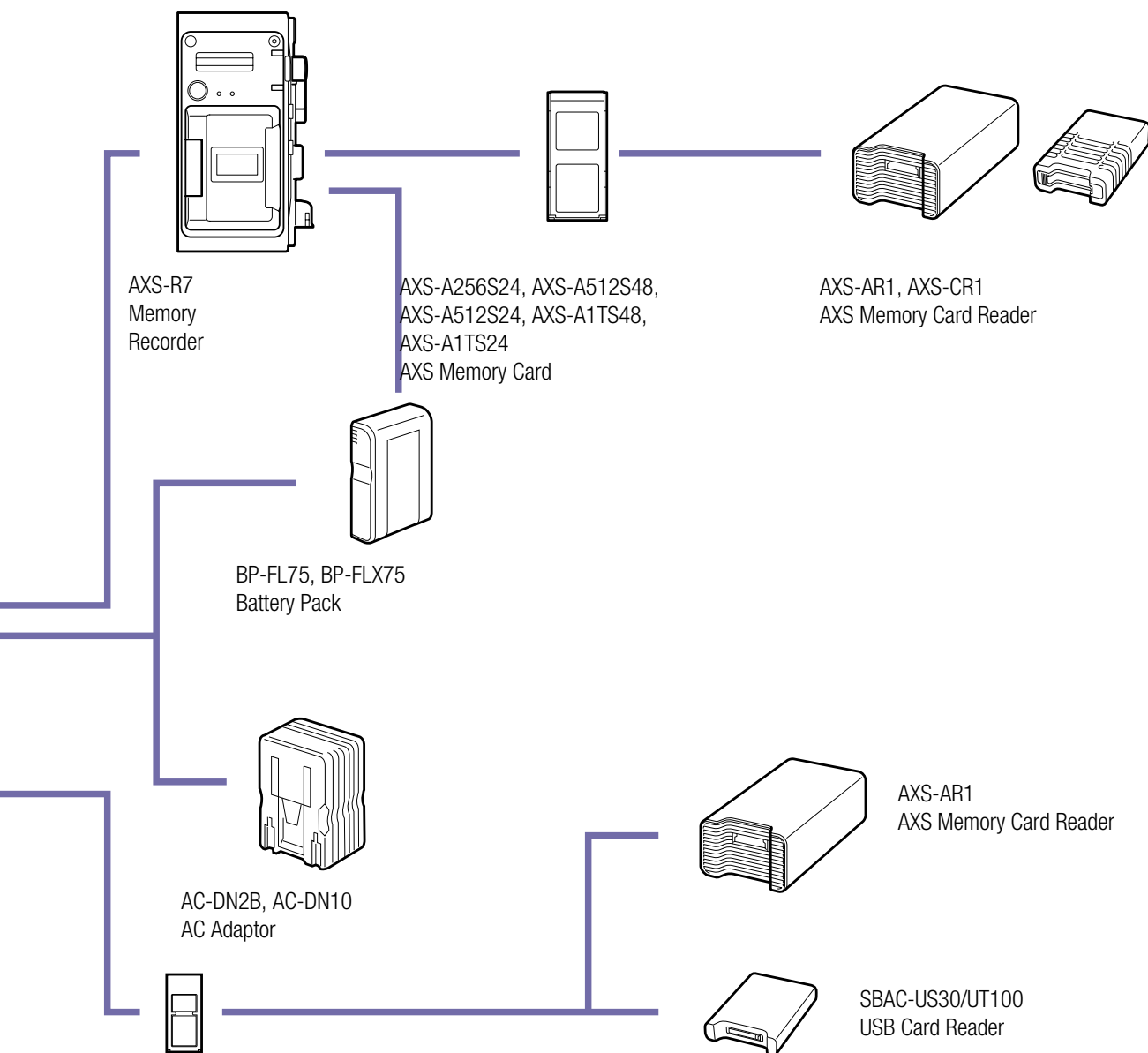
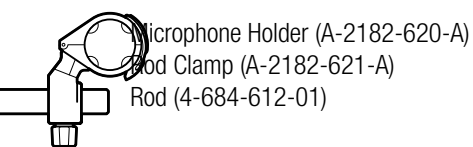


MPC-3610



VCT-FSA5
Shoulder Adaptor

The Sony VENICE System



BP-256D, SBP-128B/C/D, SBP-64A/B/C/D, SBP-32,
BS-64G1A/B, SBS-32G1A/B
XS Memory Card

D-S64E, QD-S32E, QD-N64, QD-M128A, QD-M64A, QD-M32A,
D-G128A/E, QD-G64A/E, QD-G32A/E
QD Memory Card
(QDA-EX1 XQD ExpressCard Adaptor is required)

Sony VENICE, cont'd



PL Mount

Shown with Leica Thalia
35mm Large Format

Why would you work with an E-mount on VENICE?

There are superb E-mount lenses from Sony, ZEISS and others. Many are small and lightweight—helpful for shooting on drones, gimbals, rigs or handheld.

FE designates Full Frame E-mount.

GM stands for Sony G-Master. These stellar lenses are top of the line, with gorgeous bokeh and breathtaking looks.

E-mount lenses open up new vistas for Sony VENICE.

Here are some examples.

- FE 12-24 F4 G
- FE 16-35 F2.8 GM
- FE 100mm F2.8 STF GM OSS
- FE 70-200 mm F2.8 GM OSS
- FE 24-70 mm F2.8 GM
- FE 85 mm F1.4 GM FE PZ
- 28-135mm F4 G OSS FF Cine
- FE 35 mm F1.4 ZA
- FE 50mm F1.4 ZA
- FE 16-35 mm F4
- FE 24-70 mm F4
- FE 70-300mm F4.5-5.6 G OSS
- FE 90 mm F2.8 Macro G OSS

E-mount



Shown with
Sony G-Master
FE 16-35mm
F2.8 GM Full
Frame E-mount
wide zoom

Sony VENICE, cont'd



RAW and Internal Recording

The AXS-R7 Recorder (above) attaches with 4 screws to record 16-bit linear RAW in 4K onto AXS cards in a future firmware update.

For the smallest size and weight, VENICE records XAVC or ProRes in-camera onto SxS cards (below),



Sony VENICE, cont'd

Sony DVF-EL200 Viewfinder is shown in handheld position towards front of camera.

Adjustable top handle is attached facing the rear.

Shown with Cooke S35 Anamorphic /i 32mm



Sony DVF-EL200 EVF attaches to many mounting points on the camera. Here it is at the rear—helpful for operating on a geared or studio fluid head.

Also, note how the top handle is also adjustable forward and back, and also faces front or rear.



Sony VENICE Specs

| | | | |
|--|---|--------------|----------|
| Power | 12V DC 11-17.0V and 24V DC 22 - 32.0V | | |
| Weight (body only, no AXS-R7) | Approx. 3.9 kg (8 lb, 10 oz) without lens, handle, EVF, bottom plate or accessories | | |
| Approx weights | With AXS-R7, EVF, top handle, onboard Sony BP-FL74 battery: 17 lb. / Add FF lens as well: 21 lb. | | |
| Dimensions | 235 mm long x 236 mm high x 147 mm wide (9 3/8" long x 9 3/8" high x 5 7/8" wide) | | |
| Sensor | Full-Frame CMOS 24.7 Megapixels total, 24.4 Megapixels effective, 6048 x 4032 | | |
| Sensor Dimensions | 24.1 x 36.2 mm, 43.5 mm Diagonal. Photosite size ~ 6 microns | | |
| 8 Steps, 8 Stops Built-In NDs | Clear, ND 0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, 2.4 — 8 stops of control in 1-stop increments. (1/2 - 1/256) | | |
| ISO | ISO 500 and Hi ISO 2,500 | | |
| Lens Mount | Native breech lock E-mount, 18mm flange focal depth PL Mount attaches over E-mount with 6 screws, 52 mm flange focal depth | | |
| Latitude | 15+ Stops | | |
| Resolution, Aspect Ratios and Frame Rates* | Res. | Aspect Ratio | FPS |
| | 3.8K | 16:9 | 1-60 fps |
| | 4K | 17:9 | 1-60 fps |
| | 4K | 4:3 | 1-48 fps |
| | 4K | 6:5 | 1-30 fps |
| | 5.7K | 16:9 | 1-30 fps |
| | 6K | 17:9 | 1-30 fps |
| | 6K | 1.85:1 | 1-30 fps |
| | 6K | 2.39:1 | 1-30 fps |
| 6K | 3:2 | 1-24 fps | |
| White Balance | 2000~15,000 Kelvin with Green/Magenta adjustment, AWB | | |
| Gamma Curve | S-Log3 | | |

| | |
|---|---|
| Image Recording Formats XAVC and ProRes | XAVC 4K Class480: 23.98p, 24p, 25p, 29.97p XAVC 4K Class300: 23.98p, 24p, 25p, 29.97p*, 50p, 59.94p XAVC QFHD Class480: 23.98p, 24p, 25p, 29.97p XAVC QFHD Class300: 23.98p, 24p, 25p, 29.97p, 50p, 59.94p MPEG HD422(1920x1080): 23.98p, 24p, 25p, 29.97p, 50i, 59.94i HD ProRes 422HQ: 23.98p, 24p, 25p, 29.97p, 50p, 59.94p, 50i, 59.94i HD ProRes 422: 23.98p, 24p, 25p, 29.97p, 50p, 59.94p, 50i, 59.94i HD ProRes 422 Proxy: 23.98p, 24p, 25p, 29.97p, 50p, 59.94p, 50i, 59.94i |
| Image Recording Formats RAW / X-OCN AXS-R7 Required | RAW SQ 4K 17:9 (4096 x 2160): 23.98p, 24p, 25p, 29.97p, 50p, 59.94p 3.8K 16:9 (3840 x 2160): 23.98p, 24p, 25p, 29.97p, 50p, 59.94p X-OCN ST/LT: 6K 3:2(6048 x 4032)*: 23.98p, 24p, 6K 2.39:1 (6048 x 2530)*: 23.98p, 24p, 25p, 29.97p 6K 1.85:1 (6048 x 3270)*: 23.98p, 24p, 25p, 29.97p 6K 17:9 (6048 x 3190)*: 23.98p, 24p, 25p, 29.97p 5.7K 16:9 (5672 x 3190): 23.98p, 25p, 29.97p 4K 6:5 (4096x3428)*: 23.98p, 24p, 25p*, 29.97p* 4K 4:3 (4096x3024): 23.98p, 24p, 25p, 29.97p 4K 17:9 (4096 x 2160): 23.98p, 24p, 25p, 29.97p, 50p, 59.94p 3.8K 16:9 (3840 x 2160): 23.98p, 24p, 25p, 29.97p, 50p, 59.94p |
| Audio Recording Format | LPCM 4ch , 24-bit 48-kHz |

* indicates implementation after firmware update

VENICE Roadmap as of April 2018

| | V1.0 | V2.0 (July 2018) | V3.0 (Winter 2018) |
|--|--|--|---|
| Imager modes | 4K 17:9 4K 16:9 4K 4:3 Anamorphic 6K 3:2 Full-Frame recording (without in-camera playback) When VENICE is set to 6K Full-Frame, SxS recording is not available | 4K 6:5 Anamorphic 6K 1.85:1 6K 17:9 6K 3:2 (In-camera playback) When VENICE is set to 6K Full-Frame, SxS recording modes are supported | 5.7K 16:9 6K 2.39:1 |
| Lens mount support | PL lens mount Cooke® /i™ technology | E-Mount | – |
| Recording formats | 16-bit RAW with AXS-R7 16-bit X-OCN with AXS-R7 XAVC® 4K/QFHD* MPEG50* *When camera is set to 4K mode | Apple ProRes | – |
| Simultaneous Recording combinations | RAW/X-OCN & MPEG50* XAVC 4K/QFHD & MPEG50* *When camera is set to 4K mode | RAW & Apple ProRes | XAVC 4K/QFHD & Apple ProRes (Proxy only) RAW/X-OCN & XAVC 4K/QFHD |
| Shooting functions | Variable White Balance (100K increment) Tint color correction control Relay rec. (SxS) | Select FPS (Off Speed) Dual Base ISO mode High Base ISO 2500 | Cache Rec. (AXS, SxS) |
| Monitor Out functions | OSD on Black MLUT on Playback Independent MLUT ON/OFF (one Preset) Double speed VF Two OSDs and two Markers selection 4K-SDI output in RAW/X-OCN recording | Independent MLUT select (several presets) MLUT in Off-speed shooting User 3DLUT | ASC-CDL control 6G/12G-SDI (for 4K 50/60p) |
| Shooting Assist functions | Digital Magnification in viewfinder Highlight Clip Indicator | Look Around (Surround View) Dot by Dot Magnification Auto White Balance High-Lo Key False Color | – |
| Hardware | Visit www.sony.com/VENICE | Inside Clips Button | S700 Protocol 12-pin lens remote |
| Network functions | – | Wired LAN control (limited functionality) | Wireless LAN control (CBK-WA02) Wired LAN control (full functionality) |



For more information visit: sony.com/VENICE

This roadmap, features and timing may change. New functions may pop up at any time. Roadmap courtesy of Sony

VENICE Online Simulator

The Sony VENICE Camera Simulator is an online “flight” simulator. You can try out VENICE’s menus and settings.

tiny.cc/VENICE-simulator

Supported browsers: Google Chrome 63 and above, Safari 10 and above.

Note: REC button, User Menu, Full Menu and Setting detail menu in Project, TC/Media, Monitoring and Audio are not simulated.

Sony says, “Simulator is designed for evaluation purposes only

and we cannot guarantee its accuracy in all possible scenarios. Please use at your own risk.”

Optional Full Frame and Anamorphic licenses (CBKZ-3610A and CBKZ-3610F) are installed in the Simulator.

Optional AXS-R7 Portable Memory Recorder is mounted in the Simulator.

The Simulator was produced for VENICE 1.0 software. Subsequent updates may change the operation of the simulator’s menu systems.



Good Things to Know about VENICE’s Real Menus

The main menu is on the camera right side, presumably where the DIT can access it easily without bothering the Camera Operator. There’s a basic menu on the Camera Operator’s die (Camera Left) for basic things an Operator should or would like to know: fsp, shutter angle, ISO. You can work both camera left and right side menus at same time.

To go from normal Base ISO to High ISO:

- Push the Main Menu MENU button for 3 seconds .
- Project > Basic Setting.

To Format Memory Card:

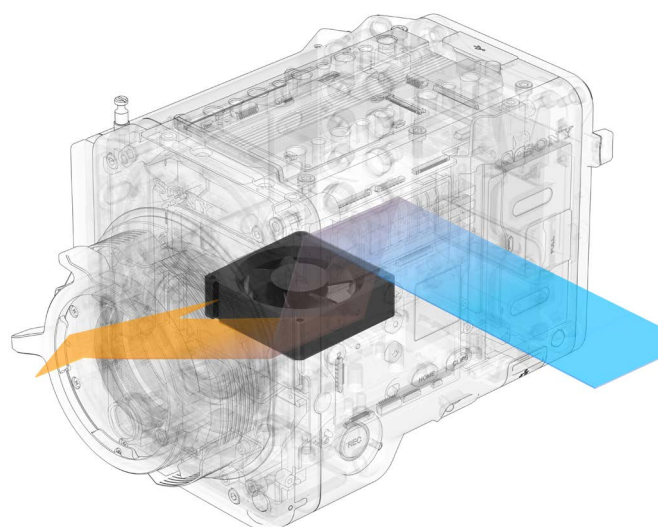
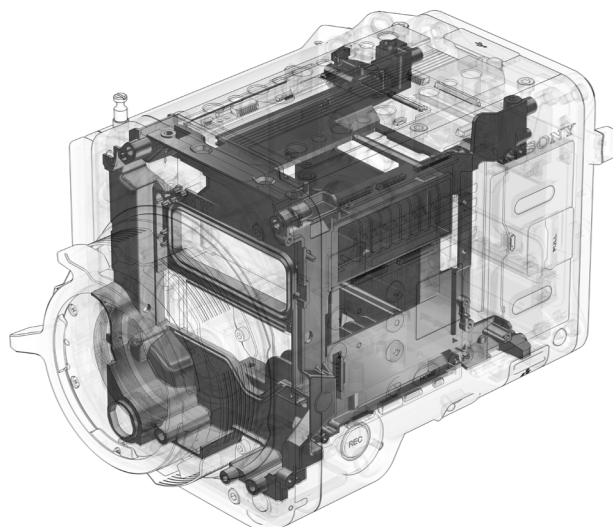
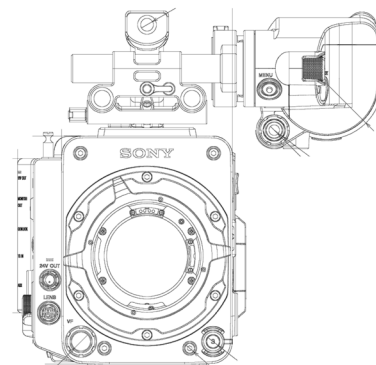
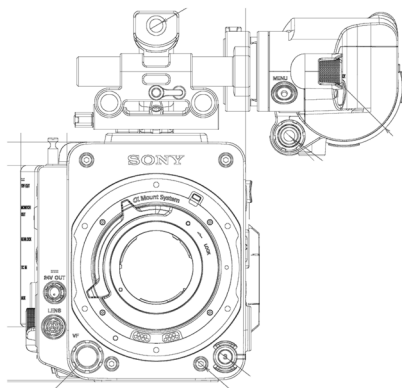
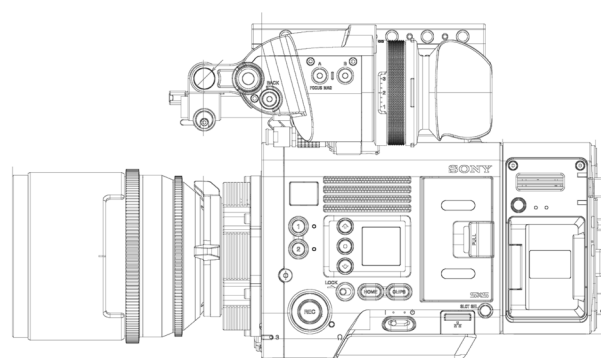
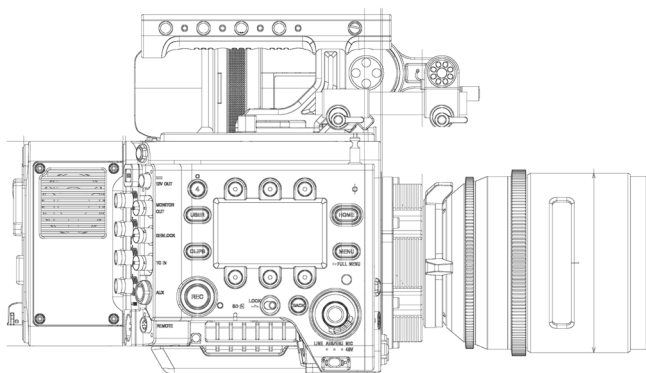
- Hold down the Main MENU button for 3 seconds.
- TC/Media>Format Media>choose AXS or SxS slot>Execute>Execute>OK>then push HOME or MENU button to exit or BACK button to stay in Deep Menu.

Sony VENICE Specs

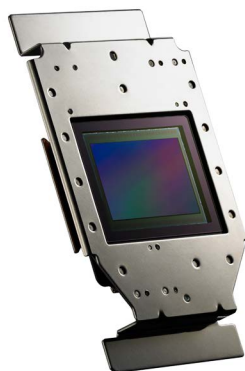
Inputs/Outputs

| | |
|------------------|--|
| DC Input | XLR 4-pin (male) |
| Battery DC Input | Square-shaped 5-pin connector |
| DC Output | 12V: 4-pin ×1 24V: Fischer 3-pin ×2 |
| SDI Output | BNC×4, (12G, 3G, 1.5G-SDI) |
| HD MONI Output | BNC×1 (1.5G-SDI) |
| HDMI Output | Type A ×1 |
| EVF | LEMO 26pin |
| Audio Input | XLR-type 5pin (female) ×1 (LINE/ AES/EBU / MIC / MIC+48V selectable) |
| Timecode Input | BNC ×1 |

| | |
|------------------------|--|
| Genlock Input | BNC ×1 |
| AUX | LEMO 5-pin (female) ×1 (Timecode Output) |
| Remote | 8-pin ×1 (with firmware update) |
| Lens | 12-pin ×1 (with firmware update) |
| Lens Metadata Contacts | 4-contacts ×2, conforming to Cooke /i Protocol |
| Network | RJ-45 type ×1, 10BASE-T, 100BASE-TX |
| USB | USB host, type-A ×1 |
| Headphone Output | Stereo mini jack ×1 |
| Speaker Output | Monaural |
| Media | ExpressCard/34 slot×2 SD card slot ×1 |



Sony VENICE Imager Modes



VENICE's 36x24 mm Full-Frame image sensor

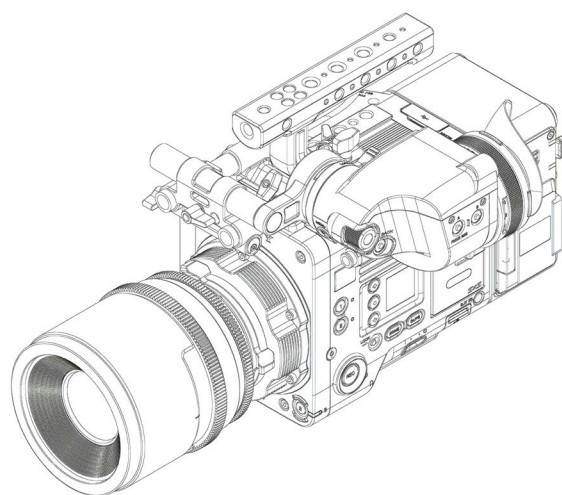
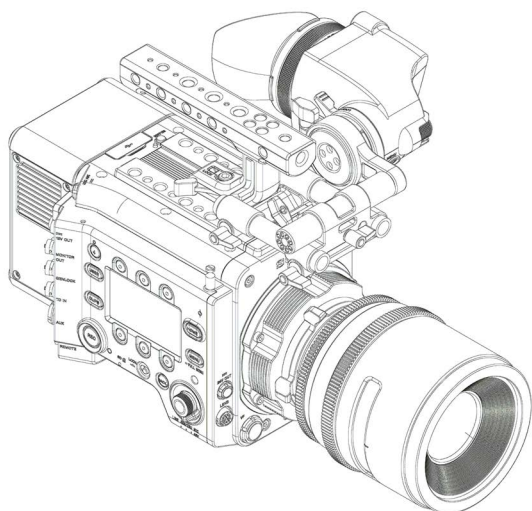
| Software License | Imager Mode | Resolution | W x H (mm) | Supported Project FPS | Select FPS |
|--------------------|-------------|-------------|-------------|------------------------|------------|
| - | 3.8K 16:9 | 3840 x 2160 | 22.8 x 12.8 | 23, 25, 29, 50, 59 | 1-60* |
| | 4K 17:9 | 4096 x 2160 | 24.3 x 12.8 | 23, 24, 25, 29, 50, 59 | 1-60* |
| Anamorphic License | 4K 4:3 | 4096 x 3024 | 24.3 x 18.3 | 23, 24, 25, 29 | 1-48* |
| | 4K 6:5* | 4096 x 3432 | 24.3 x 20.4 | 23, 24, 25, 29 | 1-30* |
| Full Frame License | 5.7K 16:9* | 5670 x 3190 | 33.7 x 18.9 | 23, 25, 29 | 1-30* |
| | 6K 17:9* | 6048 x 3190 | 35.9 x 18.9 | 23, 24, 25, 29 | 1-30* |
| | 6K 1.85:1* | 6048 x 3270 | 35.9 x 19.4 | 23, 24, 25, 29 | 1-30* |
| | 6K 2.39:1* | 6048 x 2534 | 35.9 x 15.0 | 23, 24, 25, 29 | 1-30* |
| | 6K 3:2* | 6048 x 4032 | 35.9 x 24.0 | 23, 24 | 1-24* |

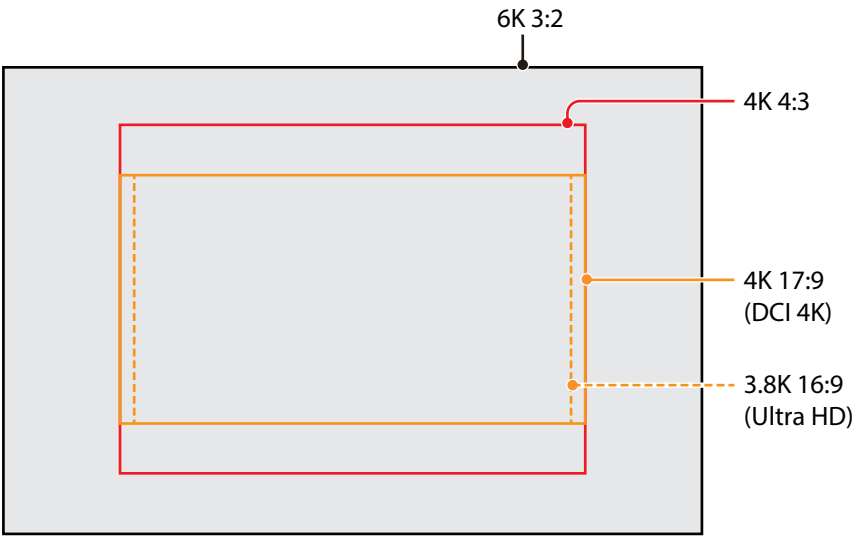
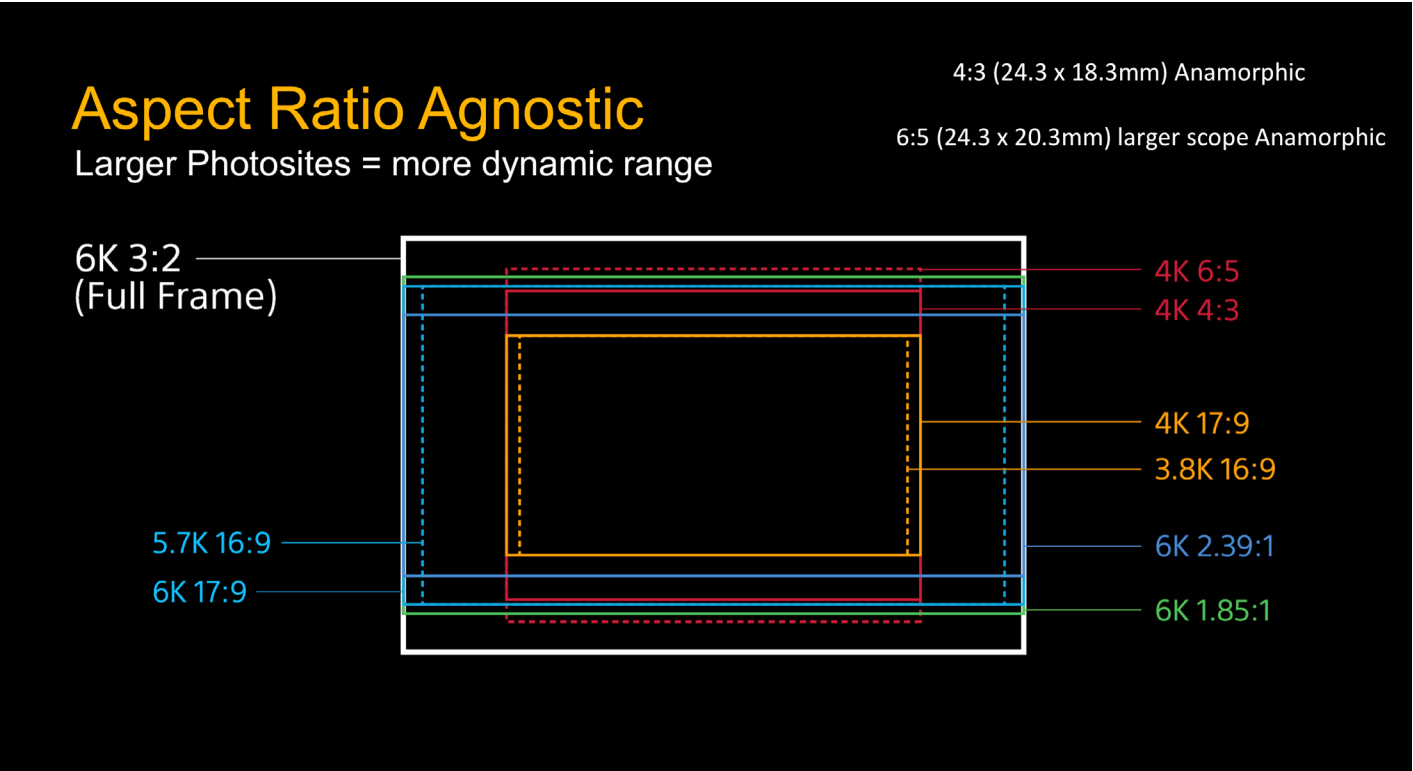
VENICE Recording Formats

| Format | Profile | 23.98 | 24.0 | 25.0 | 29.97 | 50 | 59.94 |
|-----------|------------------|-------|------|------|-------|----|-------|
| RAW | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| X-OCN ST | X-OCN ST | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | X-OCN LT | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| XAVC 4K | Class480 | ✓ | ✓ | ✓ | ✓ | | |
| | Class300 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| XAVC QFHD | Class480 | ✓ | | ✓ | ✓ | | |
| | Class300 | ✓ | | ✓ | ✓ | ✓ | ✓ |
| MPEG HD | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| HD ProRes | ProRes422HQ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | ProRes422 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | ProRes 422 Proxy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

VENICE Built-in filters

| | | ND Filter Wheel A | | |
|-------------------|------------------|-------------------|------------------|------------------|
| | | Clear | ND .3 (1 stop) | ND .6 (2 stops) |
| ND Filter Wheel B | Clear | Clear | ND .3 (1 stop) | ND .6 (2 stops) |
| | ND .9 (3 stops) | ND .9 (3 stops) | ND 1.2 (4 stops) | ND 1.5 (5 stops) |
| | ND 1.8 (6 stops) | ND 1.8 (6 stops) | ND 2.1 (7 stops) | ND 2.4 (8 stops) |



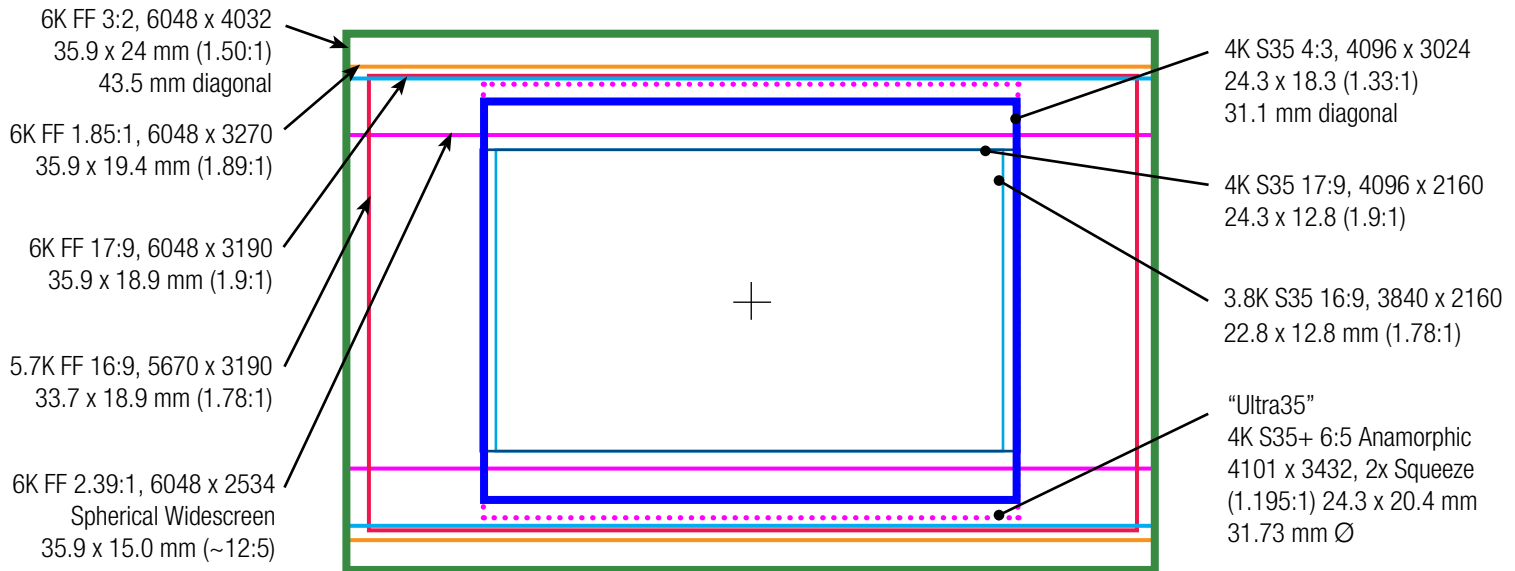


Software Licenses

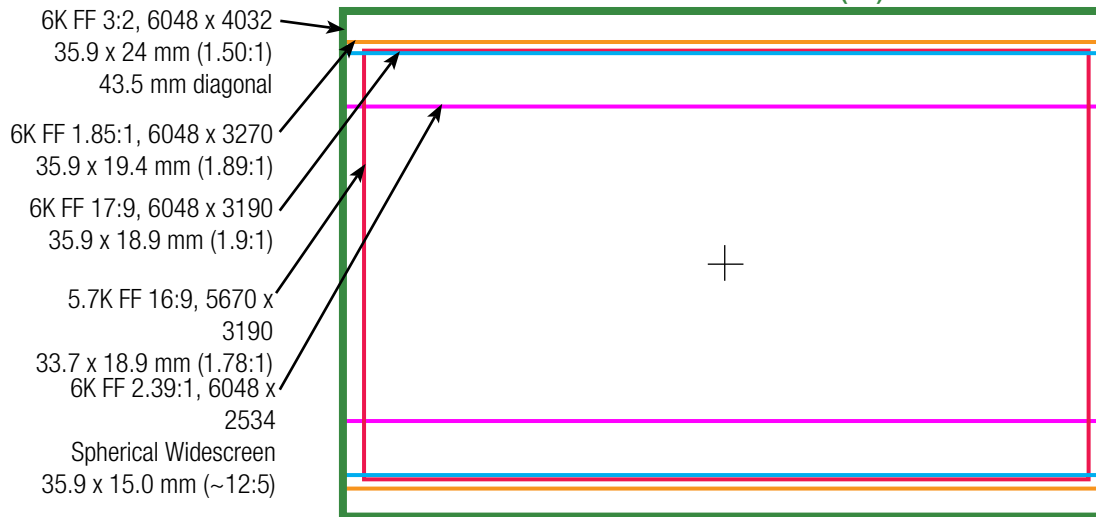
Software licenses are installed from the main menu: Maintenance > License Option.

| Software license | Imager mode | Effective number of pixels | W × H (mm) | Project frame rate |
|--|-------------|----------------------------|-------------|------------------------|
| License not required | 3.8K 16:9 | 3840 × 2160 | 22.8 × 12.8 | 23, 24, 25, 29, 50, 59 |
| | 4K 17:9 | 4096 × 2160 | 24.3 × 12.8 | 23, 24, 25, 29, 50, 59 |
| Note: Recording in 6K 3:2 is supported, but in-camera playback is not yet. | | | | |
| Anamorphic License | 4K 4:3 | 4096 × 3024 | 24.3 × 18.3 | 23, 24 |
| Full Frame License | 6K 3:2 | 6048 × 4032 | 35.9 × 24.0 | 23, 24 |
| Note: Recording in 6K 3:2 is supported, but in-camera playback is not yet. | | | | |

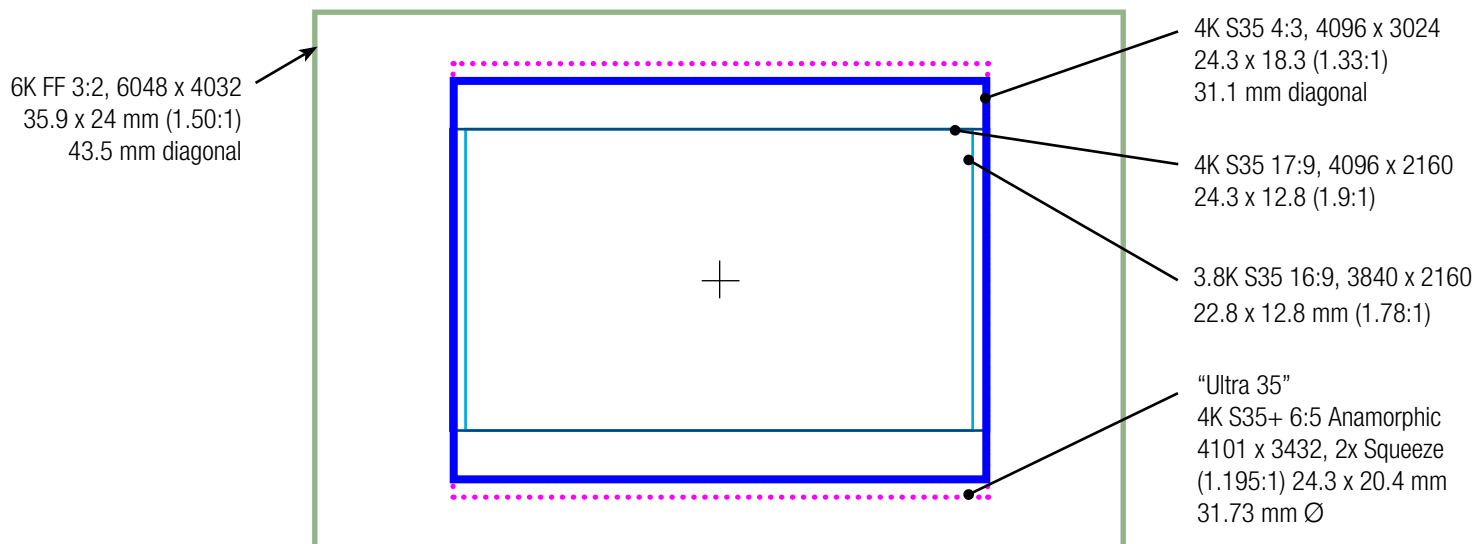
VENICE 6K Full Frame (FF) and 4K Super35 Modes



VENICE 6K Full Frame (FF)



VENICE 4K Super35 and "Ultra35"



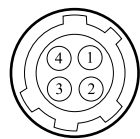
Note: some imager modes will be available later this year in version 2 and version 3 software updates. Various license options available. The Cinema Pack includes all license options and is the most desirable way to go. Advanced functions like False color in VF and Wired LAN control will be in software version 2.

Menu simulator for VENICE is now available: sony.net/Products/Cinematography/Venice

Sony VENICE Electrical Connectors

12V OUT Connector (DC OUT 12V, Hirose 4-pin)

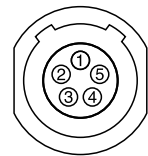
Supplies 12 V DC power to an accessory when the power switch is set to ON. You can output a REC Tally signal and input a REC Trigger signal through the 12V OUT connector.



| No. | Signal | I/O | Specification |
|-----|-----------------|-----|---|
| 1 | UNREG GND | – | GND for UNREG |
| 2 | REC TALLY | OUT | Open-collector output (Max. 50 mA) Low: REC |
| 3 | REC TRIGGER | IN | Open or +5 V DC: Normal GND: Active (REC) |
| 4 | UNREG +12 V OUT | OUT | +11 V to 17 V DC output 11 V to 17 V input Output voltage: Same as the input voltage Maximum output current: 1.0 A 22 V to 32 V input Output voltage : 15 V Maximum output current: 0.8 A |

AUX Connector (LEMO 5-pin)

Outputs the timecode signal.

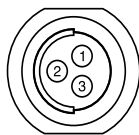


| No. | Signal |
|-----|-------------|
| 1 | Factory Use |
| 2 | NC |
| 3 | – |
| 4 | TC OUT |
| 5 | GND |

Diagrams courtesy of Sony

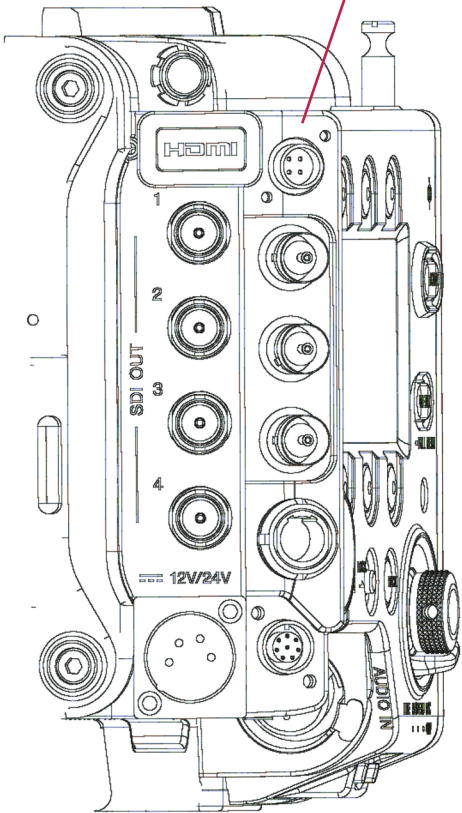
24V OUT Connector (DC OUT 24 V, Fischer 3-pin aka 3-pin RS connector)

Supplies 24 V DC power to an accessory when the power switch is ON. You can start/stop the camera via pin 3 (standard R/S configuration.)



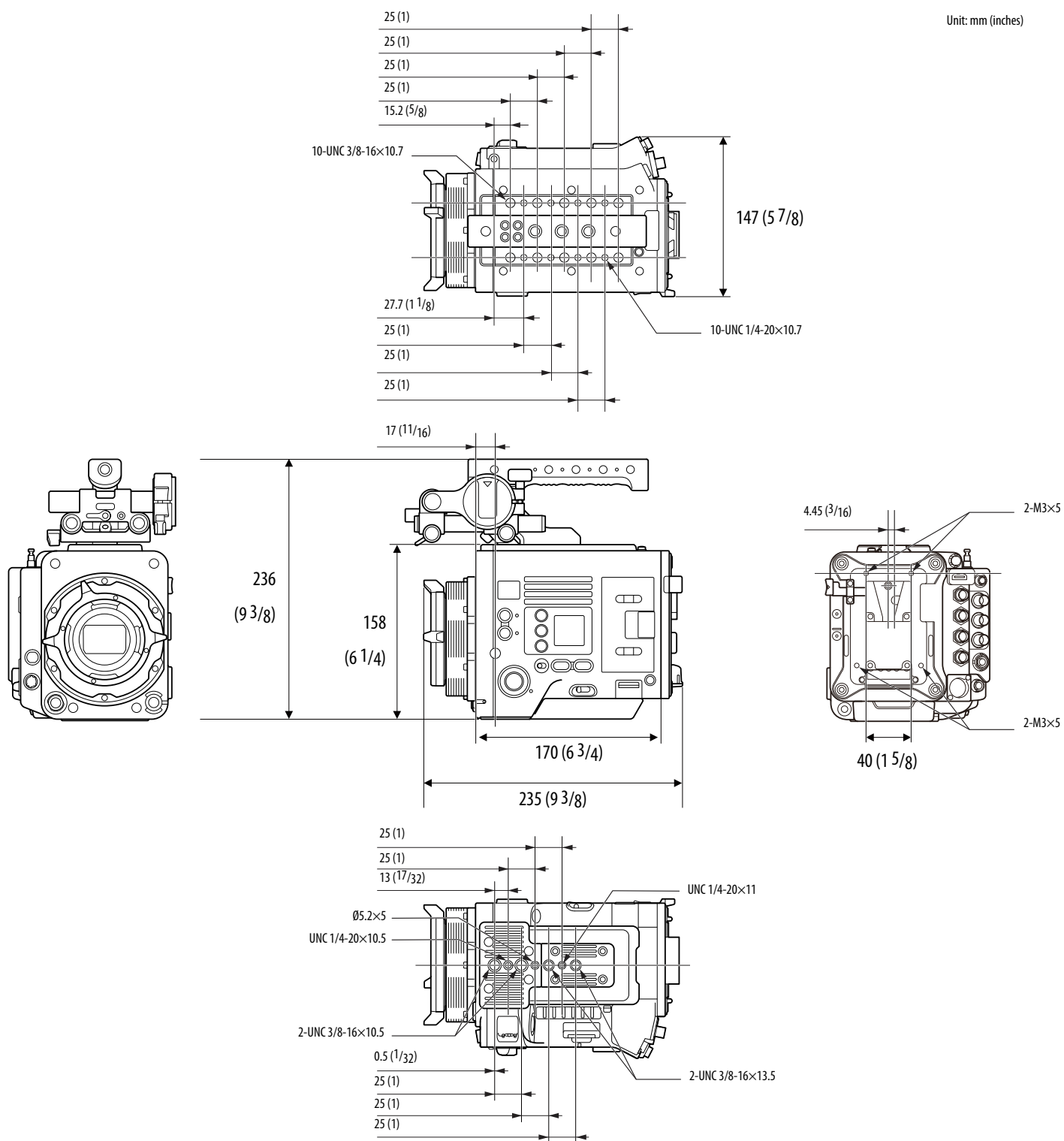
| No. | Signal | Specification |
|-----|---------|--|
| 1 | GND | |
| 2 | 24V-AUX | 11 V to 17 V input Output voltage : 24 V Maximum output current: 1.0 A 22 V to 32 V input Output voltage: Same as the input voltage Maximum output current: 2.0 A |
| 3 | R/S | |

Hirose 4-pin 12 V DC Out.
A short Hirose 4-pin to Lemo 2-pin adapter is a good cable to have on hand for many accessories with 2-pin standard configurations

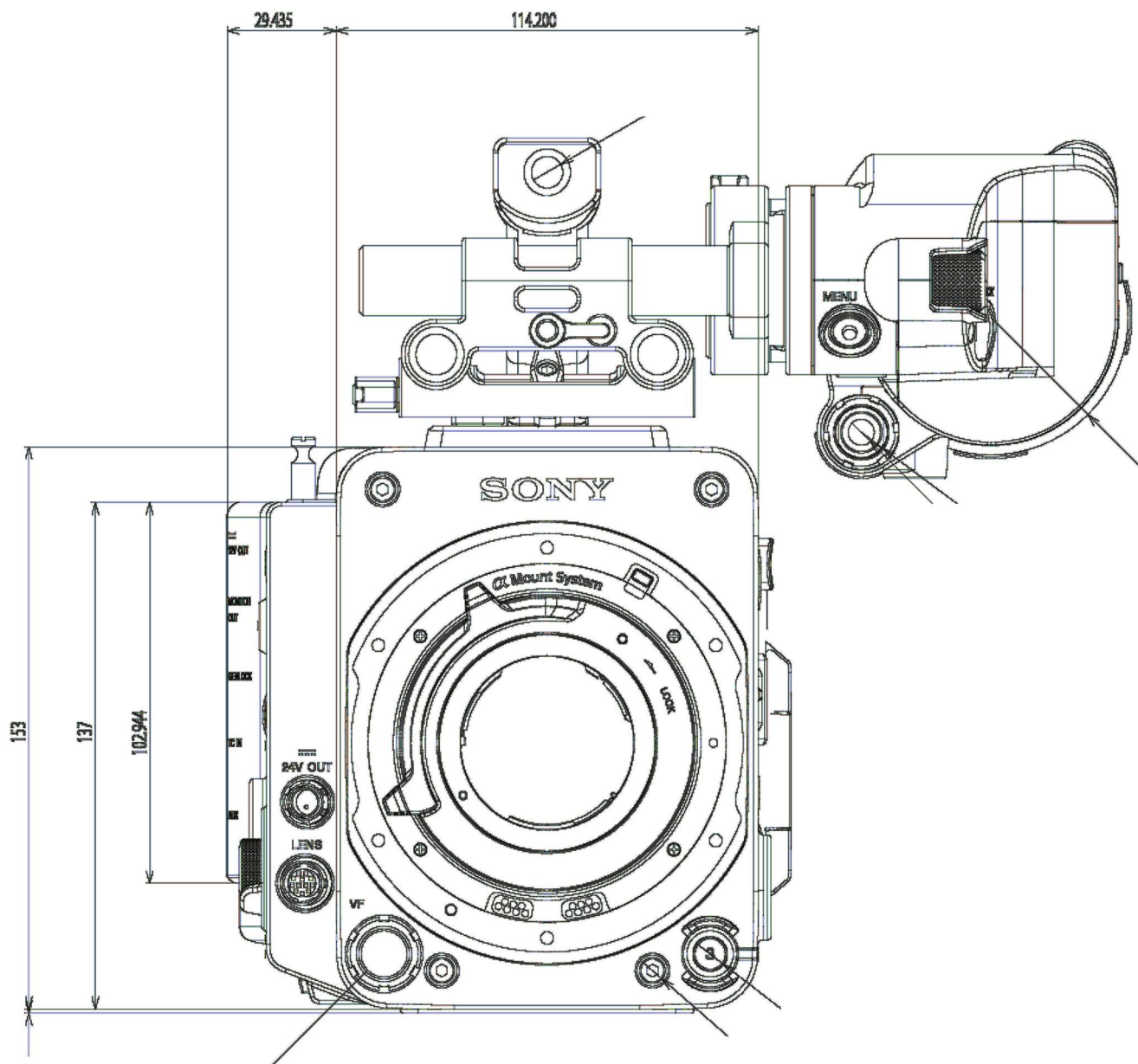


Sony VENICE Dimensions

Unit: mm (inches)



Sony VENICE E-Mount

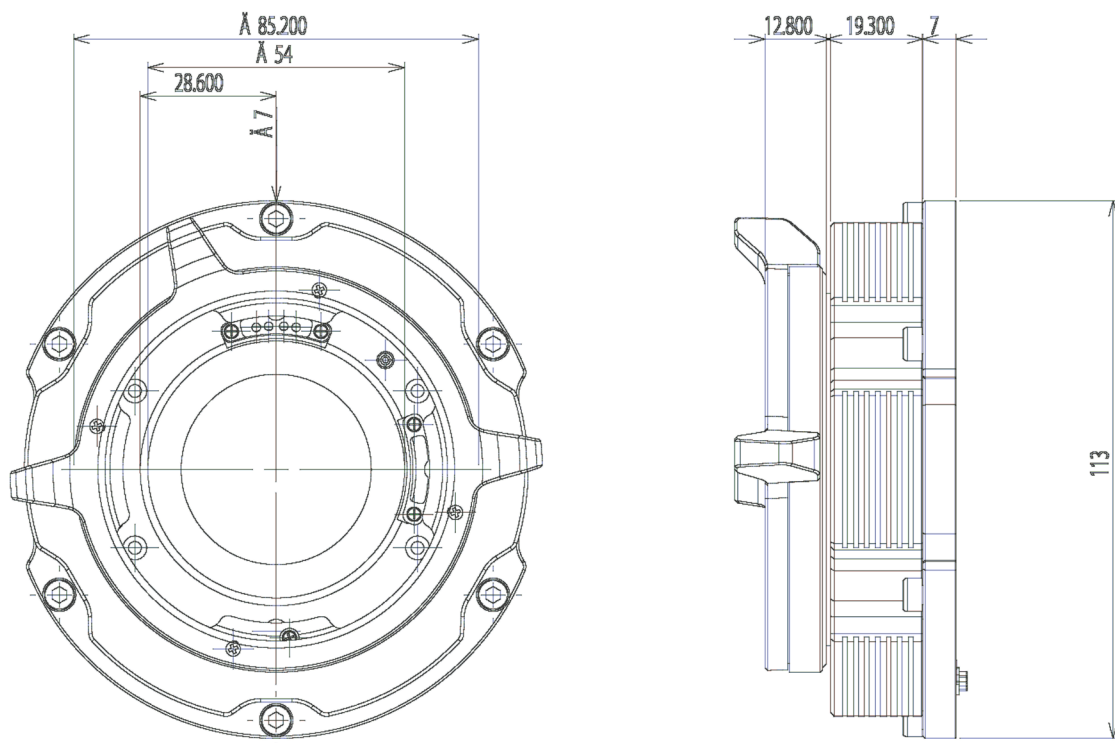


Sony VENICE essentially has two mounts. The native mount is a lever-lock E-mount (18mm Flange Focal Depth).

What makes the E-mount so interesting is that it opens up an enormous world of Full Frame lenses by using all kinds of E-mount adapters.

This is an incredibly smart design and suggests possibilities for Panavision PV and SP 70 mounts, ARRI LPL mount, Leica M and R, mount, Canon EF, Nikon F and so on.

Sony VENICE PL Mount



The drawing above shows the Sony VENICE PL mount. It attaches over the native E-mount with 6 screws.

It's a very clever design. This is the intellectual property of Sony. Anyone contemplating manufacturing their own mounts for VENICE should contact Sony.

Mounting Questions (and Answers)

What Spherical Full Frame Cine lenses are here now?

Many. See the list in this book, from A to Z: Angenieux, ARRI, Canon, Cooke, CW Sonderoptic, IB/E Optics, Leica, Panavision, Servicevision Scorio, Sigma, Tokina, Vantage HAWK, Whitepoint, ZEISS and more. And the list is growing.

What about still photography lenses?

More than 300 million Full Frame still photography lenses are out there, waiting to be outfitted with a lens mount adapter.

What about Sony E-mount still and cine lenses?

Absolutely, including Sony G-Master lenses. Companies are busy modifying G-Masters and other E-mount still lenses with 0.8M gear rings. Also, remember the FE PZ 28-135mm f/4 G OSS Zoom Lens. It's E-mount, Full Frame, with optical image stabilization that will be very helpful for aials and bouncy vehicles.

We'll get to mounts in a minute. Meanwhile, rest assured, VENICE's E-mount is very rugged. VENICE accepts not only E-mount but also PL mount lenses.

If I'm a rental house, what about my enormous inventory of existing PL-mount lenses?

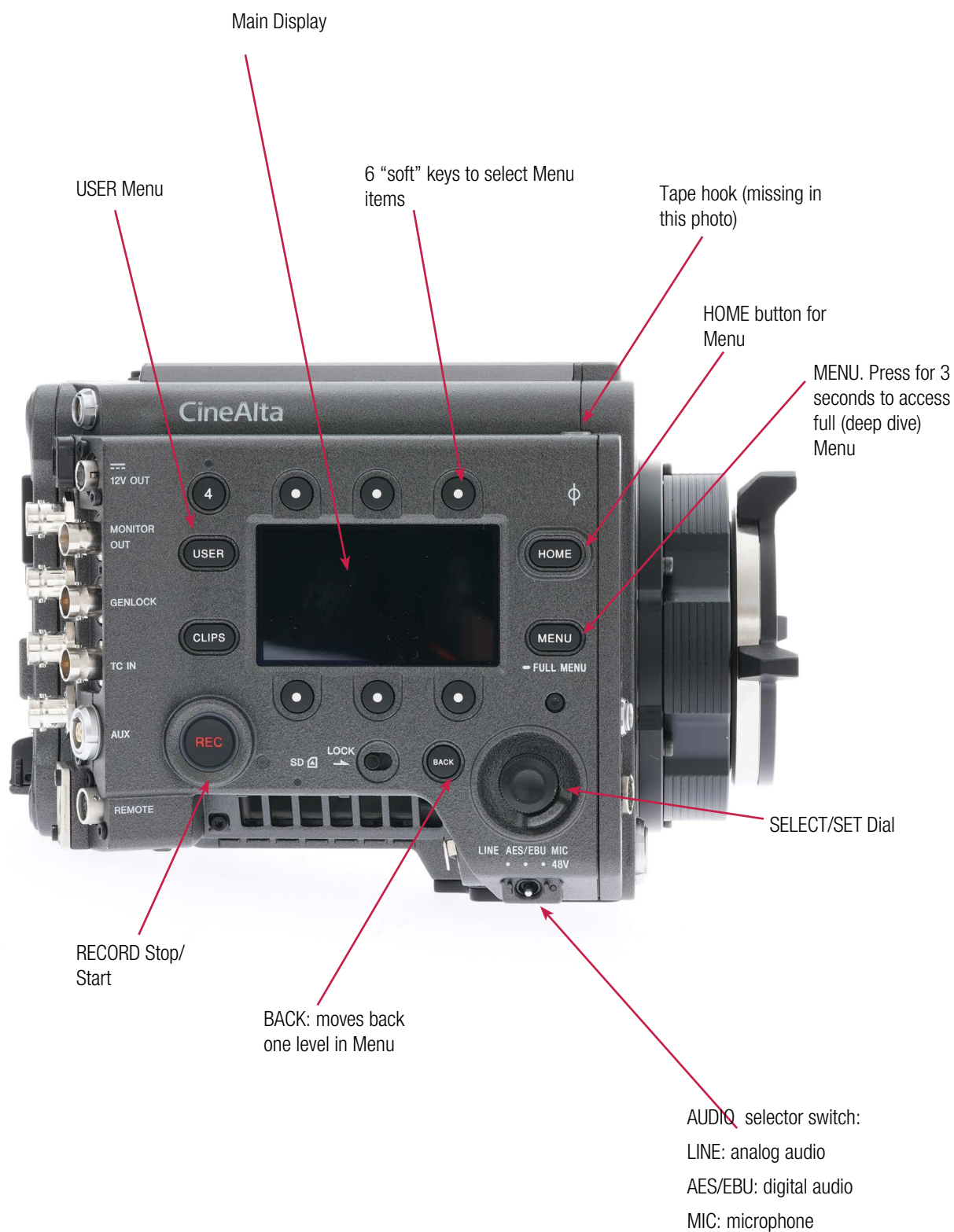
Not to worry. VENICE will accept any PL-mount Super35mm lens and format—anamorphic or spherical. VENICE's Full Frame sensor offers a significantly larger image canvas within which existing Super35 (and maybe 16mm and B4) formats can be used.

Or, you can use an expander to enlarge the image circle of S35 to FF.

VENICE Guide — Camera Right Side



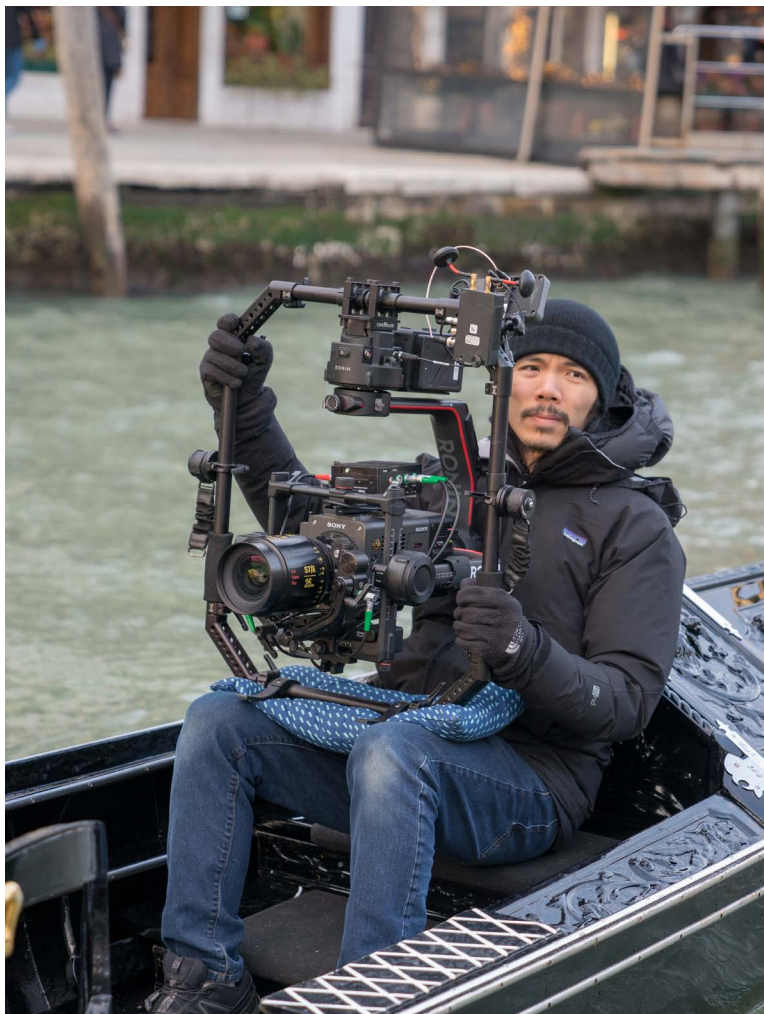
VENICE Guide — Camera Left Side



VENICE in Venice



VENICE in Venice with Peter Chang for IMAX



Peter Chang (above) is a Director, Producer and Cinematographer with impressive credits on giant screen productions. He is a founder of Golden Gate 3D, a production company of immersive content. He won the Best Large Format Cinematography Award for Jerusalem (2014) and National Parks Adventure (2016). Peter just wrapped in Venice (the city), with VENICE (the camera), where he produced the large format production for IMAX and giant screens, "Venice: La Serenissima."

Photos in this article courtesy of Peter Chang. Large format production for IMAX and giant screens by Peter Chang. gg3d.com

JON FAUER: How did your VENICE in Venice project begin?

PETER CHANG: I had been tracking the development of the VENICE and attended the launch event in L.A. I wanted to test the camera specifically for giant screen IMAX projects. For that purpose we needed the 6K Full Frame option on the camera.

I had been planning to shoot the annual Carnival celebration in Venice, Italy. We brainstormed the concept with Sony and off we went. It was a no-brainer really, given that the camera's called VENICE. This production has the title, "Venice: La Serenissima."

What will be the ultimate release?

A short version should premiere at NAB. It's part of a much bigger project that is in progress. The Venice sequences provided a great opportunity for us to try out the VENICE Full Frame camera and

some Full Format lenses. Carnival is a visually spectacular celebration born out of Greek and Roman festival traditions. It is one of the highlights of the year for Venice, with three million visitors. The canals and streets are filled with color, masks, costumes, acrobats, street artists and musicians.

What was the style of the film?

It is very much documentary style, capturing the event, the carnival celebration, festivities and costumes. We captured the city from the water, using boats. We also got scenes of local culture, mask making, gondola building, glass blowing and slices of life during our time in Venice.

What lenses did you have?

This served as a camera and lens test for us. I think it's important to test the camera with different lenses on an actual shoot to see how it behaves. From a filmmaking standpoint, I wanted to see how these Full Frame lenses performed. We had Cooke S7/i, Leica Thalia, Sigma FF Cine Primes and a Focus Optics Ruby Zoom.

The Focus Optics Ruby 14-24mm T2.8 has been a favorite of ours on giant screen projects. It's a rehoused Nikon. For the giant screen, we tend to favor wider angle shots. The widest available Cooke S7/i was 25mm T2, the Leica was a 30mm T2.9, and we had Sigma FF Cine 14mm T2 and 20mm T1.5 primes. We did mix it up with some longer lenses.

The Sony E-mount wasn't functional yet but Sony's 12-24mm



f/4 G, 16-35 f/2.8 GM and 24-70 f/2.8 GM are super sharp and have interesting bokeh. Sigma has a 12-24 f/4 Art lens and recently announced E-mount primes. Maybe they'll do more Cine versions. For giant screen, I'm looking forward to the Cooke s7/i 18mm and the Leica Thalia 16mm and 24mm.

With VENICE's E-mount, you don't have to wait for somebody to rehouse and cinematize a good still lens. Especially at ultra wide angles, you probably aren't pulling focus that much.

We used cine glass in PL mounts on this particular shoot. But the E-mount opens up possibilities with just about any lens out there. I think there are a lot of very interesting wide angle still lenses that you can use once the VENICE E-mount is operational and that opens up a world of adapters as well.

How did you frame and crop?

The IMAX aspect ratio is 1.43:1. That is pretty close to the VENICE native Full Frame aspect ratio of 1.5:1. For giant screen IMAX productions, that means cropping a lot less on the sides. It's a taller aspect, which is great, so we lose less resolution for the format. We just crop in post, using Resolve, Premiere or other software.

Describe the look and logistics of large format cinematography.

The look has a lot to do with framing and camera movement. We're often shooting wide shots so there's a lot of information. The challenge is to get clean frames. For example, during Carnival, when you have people dressed up in period costumes and masks in the Piazza San Marco, there are massive crowds. It's shoulder to shoulder. We did our best with that. Of course, there's a lot of sky when framing for the dome, and if you don't have an interesting sky, it can be tough. With Large Format on an IMAX screen, the effect is considerable when you have a much wider frame and a wider field of view. There's just much more to see. It's more immersive and we're always striving for a wider image. Another challenge is to find a way to frame it properly. The horizon and visual center of frame is lower. Camera moves tend to be slower and forward-moving in order to spare the audience a dizzying and potentially nauseating experience on the giant screen.

On the VENICE camera, what was your ISO and frame rate?

We rated it at 500 ISO and shot at 24 fps, 6K Full Frame and re-

coded X-OCN ST files on VENICE's AXS-R7 onboard recorder. (X-OCN is a visually lossless, streamlined and efficient codec.) We were able to manage the X-OCN data and play it back nicely with DaVinci Resolve on our laptops. We transcoded and graded everything to ProRes with Resolve for our dailies. The footage is very impressive. Mick Pacifici, our First AC, was also our DIT on set and he was managing the dailies.

What were your impressions of the Sony VENICE camera?

I think it's an astonishing camera. The internal ND system was one of our favorite things, and it really enabled us to move quickly in constantly changing lighting conditions. It saved a lot of time. We put the camera through its paces in some physically tough conditions. We were filming primarily in freezing temperatures with a lot of humidity, on boats, in the rain. Lighting conditions were often harsh, with bright, blinding winter light that would reflect off the white stucco and marble building walls and the water. There was lots of contrast going through dark tunnels and emerging into bright sunlight. The dynamic range of the camera held everything and then, with the internal NDs, we could really fine tune things, which was phenomenal. I wish every camera had that.

And then, of course, once you look at the image itself, it's just, "Wow." VENICE has a beautiful and impressive image in terms of color. Its dynamic range is some of the most we've ever seen. Highlight range and shadow detail are incredible. The amount we've been able to pull from the files has been impressive. VENICE is a lovely camera. Of course, the lenses help with that as well.

How did you get started and wind up in IMAX and giant screen and large format?

I started out in feature films and then moved into documentaries, initially television, and then, from there, got into 3D and giant screen IMAX projects. I've been doing that now for seven years. Initially I worked as a cinematographer and then, about three years ago, embarked on directing and producing my own giant screen film, "Cuba." It is scheduled for release later this year and we've been in production over the last three years on that.

That's a long time.

These films take an average of five years to make. Sometimes longer. And Cuba's a very challenging place to work, but the upside is that it allowed us to use a variety of cameras and lenses as they've come out during that time. For example, "Cuba" is a film that's being supported by the top giant screen IMAX dome theaters and they have extremely high standards when it comes to capture. We are always on a hunt for what is the best you can get at any given moment in terms of camera and lenses.

I'd love to see more wide angle glass for these larger sensors. I'd love to see 4:3 aspect ratio, 100 megapixel and larger sensors in a motion picture camera. As part of this pursuit in resolution, we've been exploring stitched arrays of cameras. But, ideally we would just have a single sensor that could carry the resolution that we need.

Is this new wave of large format cameras one of the greatest changes in the business since films went from silent to talkies?

I'm biased, but, yes, I agree. For a long time, at least in the large format documentary world, it was just 15/70mm IMAX film and it was an incredible barrier to entry with insanely high costs. Then in the last five years, it started to shift into a hybrid film and digital



combination, like “Jerusalem.”

Now it's gone all digital and the cameras have finally caught up. I think we're finally there and it's really going to open up new styles of production. There are new subjects, stories and new filmmakers entering the space and working on this incredible canvas. When we talk about giant screen IMAX, it's really two formats. You have flat screen 3D, which most people are familiar with in their local multiplex, but also the 2D dome experience, which used to be called Omnimax. The dome provides a unique experience. Some might even call it more immersive than 3D. Traditionally, it was mostly IMAX film (70mm IMAX Format: 70 x 48.5mm, 15-perf, running horizontally).

The domes are transitioning into digital now, in terms of projection, but it's also the most unforgiving in terms of resolution. When you think about a digital Super 35 image, and you crop it to 1.43:1, that's really not going to hold up as well on the dome as higher resolution, larger sensor images.

I think it's revolutionary, and it's akin to what you were saying, especially with regard to large format, giant screen, and IMAX, and certainly these large format cameras will have a huge impact. We're all very excited.

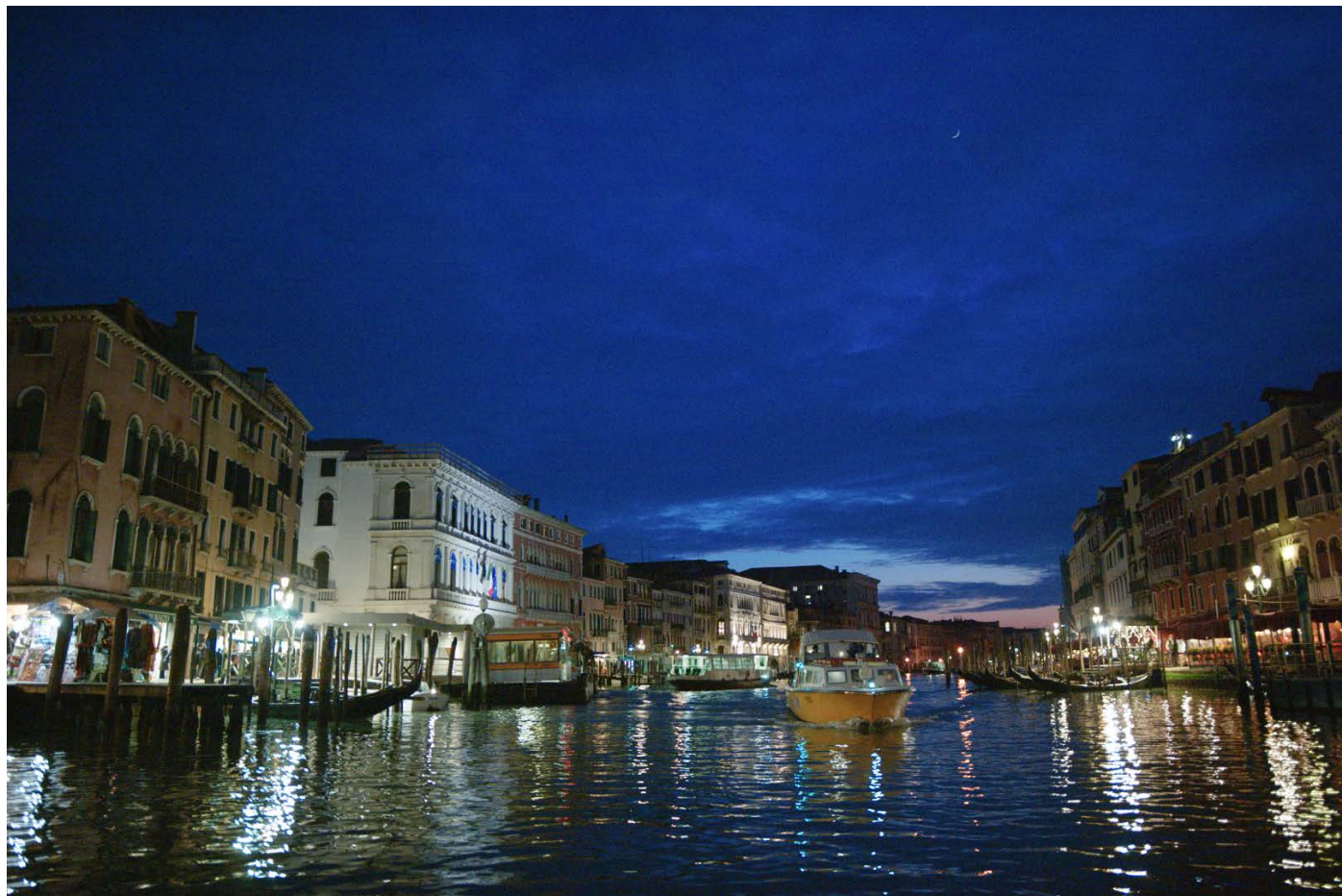
Above: Peter Chang operating DJI Ronin 2 on the Grand Canal.
At right, from left to right: Michel “Mick” Pacifici, first AC & DIT.
Peter Chang, Director, Producer, Cinematographer.
Pedro Guimaraes, SOC, Camera and Ronin Operator.
Following two pages: 6K framegrabs from *Venice in Venice*.



Venice: La Serenissima Framegrabs









Logistics of VENICE in Venice



From left: Michel “Mick” Pacifici, First AC & DIT. Peter Chang. Violet Angell and David Battistella, Producers. Pedro Guimaraes, SOC, Camera and Ronin Operator. Here, Ronin is being operated as a remote head.

By David Battistella, Producer of “Venice: La Serenissima.”

Logistics

Venice is an icon. Filming in the city presents specific challenges. It is like no other place in the world. While there is a possibility of walking to locations, there are many literal hurdles. The city has over 1500 bridges. For a crew on the move, that can be complicated. When you are chasing light, as we were on this shoot, that means boats are needed to move around. Filming in Venice, you can get about 1/3rd of the shots you might plan for on a “normal” shoot day in a city with a mini van. Boats can also mess with people’s stomachs, as the motion on the water can be a factor. Then there is shooting in Italy, which presents another set of logistical challenges.

This production was a welcome challenge because it was at short notice and also during one of the busiest times of year, Venice’s winter *Carnevale*. There are a tremendous number of people and events. The days are shorter so needed to be even more organized when it came to getting those magic hour shots that show the city in its very best light. The best way to describe it logistically is by offering a comparison. You have to shoot in Times Square on New Year’s Eve and the city is flooded and you have to get everywhere by boat. That was the situation we went into. Fortunately, we found some talented local people with a lot of experience and this was an enormous help.

Aesthetics

I’m super excited about large format sensors in cameras right now and I am very happy we are moving in this direction. I like to look at these things in terms of language. The Super35 format has its own language. The image has a well determined aesthetic and it is one that we have been raised on for motion pictures and television for more than a century. The crop factor is something we know.

Cinematographers inherently understand that the new larger formats are a new language, a new way to tell a story. It is opening up a field of view that, when combined with these higher resolutions, absolutely change the narrative and open creative expression. In this larger format digital age, we are beginning to understand why so many iconic films that were shot in large format have stuck with us. It’s because there is just that much more to perceive and receive from the large format image.

I like the fact that the larger formats are moving us in new directions. We can go toward deep focus or shallow focus. In recent years, the DSLR revolution moved us into a kind of wide-open shallow depth of field mode. The lens options in large format push us toward wanting to reveal the fullness of the quality of the lenses and the sensors and let other people see the experience a large format deep focus image creates.

That experience can be realistic, if the production requires it or somewhat surreal, if you want to play with the full capacity of the format because shallow DoF in larger format offers more than S35 in terms of total image feel and depth.

Seeing into the soul of things

If you look at medium or large format portrait photography, you can perceive a depth to the images. It’s like the larger format sees more into the soul of things. The result is, even subconsciously, deepening our experience with the content. A lot of emphasis is placed on resolution, but I feel that the field of view and the entire optical path to and after grading needs to be considered—including the combination of sensor, glass, format, color bit-depth and color gamut mapping. The balance between all of these factors helps shape the overall experience.

Workflow of this production

For *Venice* we were in what I call rapid deployment mode. We wanted to capture beyond the surface and have viewers experience more than what you might in a brief trip in the city. For this reason it was important to keep the crew small and tight, but have all of the gear needed to create images for presentation from your phone to the IMAX sized screen. Keeping shots steady was a major priority.

Logistics of VENICE in Venice, cont'd



Getting the right shots, at the right time of day, was important. We had to chase light, operate in a documentary way, but present a movie that is up to the standards and expectations of large format cinema. The other important note was weather, so most of our pre-production happened the night before. But, it was a flexible plan. Light and circumstances dictated where we needed to be and what was to be captured.

I actually love working in this way because a lot of magic can happen and you get into the rhythm of nature and the surroundings and go with it. Of course, you have to pile up all the information you can and make decisions as you go. Peter and the entire crew are filmmakers who understand this and are patient. There is also a tenacity we have to bring to these shoots with a desire and willingness to stick it out to get the shots that make it into the film.

VENICE the camera in Venice the city

A word about the light in Venice. The city of Venice presents a huge dynamic range dilemma. Specifically, there are narrow, dark canals with heavy top light. When filming in a narrow canal with wide angle lenses you will almost inevitably completely blow out the sky. It's one of the widest dynamic ranges imaginable. In a boat, in a canal, you are actually in an even darker spot, below street level. Normally, you have a choice to make: expose for the shadows and blow out the sky, or expose for the sky at the expense of detail and color in the canal. We wanted both.

Sony VENICE and our choices of lenses performed well. The High Dynamic Range of the camera held detail in the highlights with a soft roll-off and retained the texture of the brick or stone walls, the color of the water and the painted buildings in the less "lit" parts of the frame. This was the biggest test to me personally, because I have wanted to see a camera-lens combination perform well when pushed in these extremes. At the base exposure of 500 ISO we could really push the sensor pretty hard before clipping.

We went to Venice with new tools and plugged them into the way we work. The camera performed reliably in diverse conditions. The 16-bit color depth allowed us to pull out detail that might seem lost. I think colorists are going to be pleased at what can be recovered when they start to peer at pixels and push the image.

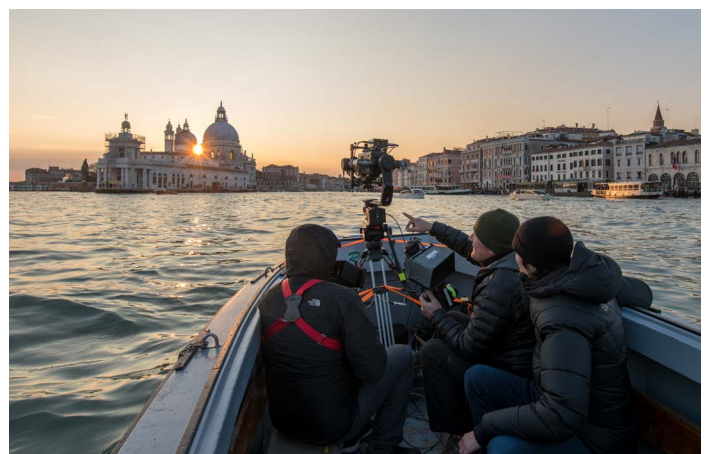
For a high-end, large format camera, Sony implemented a simple, easy system with VENICE, from acquisition to post.

The internal ND system was a plus. It was essential to the speed of our production. Sometimes, we found ourselves out on choppy water at 0 degrees Celsius, with the camera balanced on a DJI gimbal. If Peter wanted to make a creative choice to change a shot from deep focus to a narrower depth of field on a second take. We could do that in two seconds. (Could that have been done with mattebox filters? No.)

The optics of the internal ND filters are clean. You can point the camera at the sun and appreciate the natural flare from the lenses without worrying about artifacts from the filters or sensor. We dialed in the ND of the moment. If you shoot nature or magic hour, the internal ND filter system will be appreciated. Knowing that the NDs are matched (Clear-8 Stops of ND) to the colorimetry of the sensor is something any cinematographer can appreciate. This was helpful toward the way we worked on this shoot.

I also want to mention that VENICE had another advantage for our shooting situation. The camera turns on instantly and is ready to shoot. There's minimal boot-up time. This was critical for us during long days on the boat while we were discovering shots. We could turn the camera on and be ready to shoot in seconds.

David Battistella is an award winning director, writer, producer, editor and filmmaker who lives in Florence. davidbattistella.com





By Michel (Mick) Pacifici, First Camera Assistant, Focus Puller and DIT on “Venice.”

Pulling focus wide open in Full Format is no shocker to me. I have had the good fortune of working with Alexa LF, Alexa 65 and RED MONSTRO 8K VV. It is a great luxury when shooting on wider focal lengths, as Peter Chang typically likes to do on his giant screen productions. I’m a fan of the shallower depth of field because you can immediately see if you are in or out of focus.

I pull focus with a combination of traditional view by eye and fly by monitor techniques. With a Full Format sensor, you may think you are holding focus the way you were with a Super35 camera, but you may not be.

A cool tool for exposure is embedded in the assignable buttons: you can show where the scene is clipping in the highlights by turning it red. Red clipping is the equivalent of the thickest area of negative. Clipped areas go white in digital.

Outfitting the camera

I packed everything into 4 cases—camera, lenses, accessories—everything. We had to travel light and be as mobile as possible. We had an IDX V-mount battery on board to power the camera. I used a Preston Wireless Focus System: MDR 3 and Hand Unit 3. RS 3-pin connectors for power to the power port on the Preston. A Teradek Bolt 2000 provided wireless video transmission. For the gimbal rig scenes, Camera Operator Pedro Guimaraes, SOC used a DJI Ronin 2. The Ronin 2 also powered the camera and accessories.

You do not have to worry about exposure too much with VENICE. We liked the 1 stop increments of the ND filter wheel. By the way, when you change the ISO setting, DaVinci Resolve detects that and you don’t have to adjust it in post. The camera also has variable color temperature. In addition to standard 3200K and 5600K, you can set almost any color temperature you want. You can even do a

tint shift from Magenta to Green, and it is also automatically applied in DaVinci Resolve. That streamlines the process.

Lenses

Personally, I always liked the look of Cooke. The Full Frame Plus S7/i follow those expectations. They are very smooth and have good flare handling.

The Leica Thalias flare a little less, perhaps because the front element is a little more recessed in the lens barrel. Less direct sunlight would hit the front element. Thalias were the sharpest of the lenses we tested, in a good way. Overall, they were pretty and character also came from their pleasing bokeh.

We shot without matteboxes because Peter embraces the flares. He calls them highlights. He wanted to take what sun would give us, getting hit by the sun. The Cookes flared the most, which Peter liked. The Cookes are bigger and heavier—so on the Ronin gimbal rig, lighter was better—the Thalias are less massive.

DIT, Data Wrangling and Post

In addition to pulling focus, I was also the DIT. We were very familiar with the workflow of the Sony F65. The VENICE camera uses the same established workflow—but it is now much faster. The workflow is fairly seamless. We recorded X-OCN ST using Sony’s AXS-R7 recorder attached to the rear of VENICE. X-OCN is Sony’s visually lossless RAW format for smaller files. (X-OCN produces file sizes much smaller than camera RAW, resulting in longer record times, faster file transfers and more economical postproduction — while retaining the quality of 16-bit linear encoding.)

I brought a MacBook Pro laptop to manage our data. I used Pomfort Silverstack to manage, copy, and play back data. A Sony AXSM 1 TB Memory Card could be offloaded in 40 minutes with the USB 3.0 Reader. (The new Thunderbolt Card Reader would be even faster.) Data was copied at about 5–6 frame per second. I made 2 or

Depth in Venice, cont'd



3 copies to external, spinning hard drives: a primary and a backup.

Dailies were transcoded from the original X-OCN camera files to ProRes 422 1080 files with DaVinci Resolve 14. (DaVinci Resolve and Sony RAW Viewer will play X-OCN files.) DaVinci Resolve is a great tool and maintains frame accurate timecode and meta-data. As I mentioned earlier, the VENICE ISO exposure metadata is transferred automatically into DaVinci Resolve, which simplifies pulling shadow detail out of very dark areas.

All of these things that are automated in the transcoding process with DaVinci Resolve allow you to do more things on set. Working as both DIT and Focus Puller, it freed me up to focus on focus. I really was not playing as a DIT very much during the day except to check exposure. All those other things carry over into DaVinci Resolve.

Summary

I liked the latitude, color rendition, exposure, color temperature adjustments of Sony VENICE. It's reassuring to know that you can't format a Memory Card by accident.

The Sony VENICE menus are not intimidating. Sony took the good things from F55 and put them into VENICE: one-touch buttons, timecode, and audio. They refined the menus even more. Camera Assistants and operators don't have to even see the deep Sony menus. (Push the Menu button for 3 seconds to dive deeper).



From left: Peter Chang, Director, Producer, Cinematographer. Violet Angell, Producer. Pedro Guimaraes, SOC, Camera and Ronin Operator. Michel "Mick" Pacifici, First AC, Focus Puller & DIT.







Maher Maleh: VENICE in Berlin with Thalias



by Maher Maleh, Cinematographer

Sony VENICE and Leica Thalias

Sony and CW Sonderoptic both approached me to do this test, which is fun because I know both of them very well. I'm always happy to try new toys. We found a date. The first half of the first day was spent at the rental house learning about the camera and checking how do you outfit it and attach the accessories? How many power outlets do you have? What are the menu settings and all those things? I must say, I wasn't a big Sony fan before because the cameras were always too complicated, too big, and I didn't like the look.

However, I was very impressed when I saw the VENICE camera at Camerimage last year. Once I had first hands on the camera, I was even more impressed how lightweight and how small it is. The menu is pretty smart. Also the display. They did a great job on everything. So we went out and I called in a lot of favors from friends to just see what we could do. I did not want to do a staged thing. I really wanted to see what the camera is capable of in normal circumstances, with high contrast and fast movements. I wanted to find out how lightweight and if it was easy to handle.

Sony VENICE camera

The first day we just went with the camera as a rock-and-roll unit through Berlin and we had a few locations where we wanted to shoot. We have subways passing by just to see if there's any rolling shutter effect (there isn't) because the VENICE has a new system for their shutter which is pretty amazing. It feels a little bit like you have a 90-degree shutter, but it's not a technical, harsh shutter effect. It's hard to describe. You have to see it. It's very crisp, very clear when the object is passing fast or when you pan quickly on a long lens, but it's not a jittery shutter thing. It's something else, which was impressive.

On the second day, we had a Russian Arm and we simulated conditions on a car commercial to play with high contrast back light. We had a black car and full back-lit sun in dark alleys and full brightly light areas. It handled the contrast and the movement very well. The Russian Arm crew said that setting up the VENICE was among the fastest they ever did because the camera is very well balanced.

Next, we lit some interior scenes in a sports studio with high contrast backlight and haze to see the camera's handling of contrast and dynamic range. Having 8 stops of internal ND was really helpful. The controls and menu on the operator's side let you change internal ND filters very fast in increments of 1 stop to ND2.4, which is



so much faster than using external mattebox filters. While shooting, you can even change the internal ND filters quickly within the take, when the sun comes out or a cloud passes by.

Then we went onto a rooftop for a high contrast sunset scene. We saw the entire width of the city. There was a small snowstorm, which was impressive. When you see the film on a big screen, you see every single snowflake coming down.

Leica Thalia lenses

That was the camera side of the shoot. Now, let's talk about the lenses. I used a set of the Leica Thalias. They were impressive. I have a set of Leica Summicron-C cine lenses, which I love, and I have a set of Summilux-M for my M10 camera, but I never worked with the Thalias before. We had the 24, 30, 35, 45, 55, 70, 100, 120 and 180 mm.

I was a little bit scared, at first, about the T-stops. They are not all the same, ranging from T2.2, T2.6, T2.8 to T3.6 depending on the lens. But, I must say, it was never a problem. The big, sensitive sensor made it easy to compensate. I always like to shoot wide open to get a very shallow depth of field, which is even shallower in Full Format than S35 for the same field of view. We had scenes where the depth of field was very narrow. It's a look I love and something you can't get on S35 sensor cameras. They lent me three close-focus prototypes: 24, 55 and 120 mm. The widest, 24 mm, was a beautiful lens. There's no distortion. They have an amazing close focus.

There's one scene where I go really close to the eyes and the beard of a guy and it's not a macro attachment. That's the original, close-focus lens. It's just what they do. I told my focus puller to just go to minimum focus and I'll walk as close as I can until I get the focus, and suddenly I felt this bang and I hit the guy with the mattebox because we went so close. That was impressive. When you play with lights hitting the lens from the side, like a Pocket PAR, you get nice flares. But, even shooting straight into the sun and then tilting down, there's no haze, no milkiness. They are crisp and sharp but they have a very cinematic bokeh. It's not like a crisp, sharp, video-looking thing.

I must say, I really like the look. It's crisp—but right behind your plane of focus, they fall off very nicely with a great bokeh. I would say it's something like the Summicron-C but even more cinematic. I really want to get them again. They're very nice cine lenses: very sharp where the focus is but a nice fall off right behind, not technically crisp, more of a "shooting on film" feeling.

VENICE in Berlin, cont'd





Getting back to the camera, I used to think it was a Sony problem because I didn't like their look. They reminded me of the old Betacam days: super sharp, very well engineered, but nothing you would use as a cinematographer to make a nice look. But, now Sony has really made a camera that looks cinematic. The sensor is amazing. The colors and textures are beautiful. And the Thalias were perfect partners. They did well together.

Stills with Leica SL, PL mount, Thalia lenses

I actually took all the still photos with a Leica SL camera. It's a Full Frame—Leica Format—camera. I had a PL mount adapter and I used Thalia lenses for every shot. The PL mount is impressive. I would have liked to film with the SL (because it shoots both stills and video) at the same time, but we had too tight a schedule. We shot everything as 500 ASA. We never went above 500 ASA, even for the night scenes. I lit with a small LED, like a light saber. That was it. I was exposing at T2.8 or even T3.2 and the camera was very good in the blacks. I look forward to Sony's software update this summer with a second native ISO of 2,500.

Getting started

I live in Berlin. I was born there, in the western part. When I was three years old, we moved to the center of Germany near Frankfurt, and this is where I grew up. I never finished school because at one point they kicked me out. I wasn't really a school person. Then, I started in an advertising agency as a trainee and then moved my way up until I was a producer. I produced films for the German railway and other corporate projects, but I couldn't handle the blah, blah, blah. You know, when you're young and you have to tell the client how great this and that was. I couldn't do it, but I always loved to shoot. Fortunately, it was a small agency so we were involved all aspects: discussing concepts with the client, shooting, editing and doing online post production. I was able to learn the whole process.

But I liked camera the most. So I quit my job and joined Pille, a camera rental house in Wiesbaden, and worked there for six months as a trainee. Then I became a loader for two years and a focus puller for eight years. I did a lot of jobs in the States. I worked with Darius Khondji and all the other guys. It was an interesting time. Then I worked as a camera operator. On one of my jobs, a long commercial, the DP wasn't available after 7 days because they changed the schedule. The director said, "Maher, you take over." I said, "No, no, no. I'm not a DP." And he said, "But you have to. There's no other way for us to complete the film." The gaffer said, "Oh, come on, I'll help you."



It was so cool, so much fun, that I decided not to pull focus anymore and that was it. I never went to film school. I never shot any student films. I just went straight into the business. That was my kind of film school. I shot some commercials, music videos, an American TV series and two US features. Then I ended up doing commercials and I specialize in cars now. I almost never work in Germany. I fly around the world. Last year, I had 6 jobs in China 4 in Cape Town and many other cities around the world. Right now I'm Second Unit DP on "Homeland" in Budapest.

Full Frame

Not even the focus puller should be afraid of shooting Full Frame. It handles like an S35 sensor when you stop down a bit. No worries about exposure or handling: I used a waveform monitor on day one, but then exposed based on my monitor's look. And it was all there in the grading. That doesn't mean, "fix it in post and don't care while shooting". But it gives you another level of contrast handling and, because of that, new creative possibilities.

Even on a wide lens, you can get shallow focus on your image and put the attention on your actor without being distracted by a busy background, but you actually see more background. It feels more real in a way. In Super35, when you want to be close to your actor, the background is narrow, because you are using a medium to tight lens. Then it's a composed image. But if you have the same size shot of your actor and you feel more background because of the wide lens, it feels more natural and emotional, but still having full attention on you actor because of the narrow DoF. The Thalias are amazing: you can use wider lenses for close ups without distorting the actor's face. The look and close focus of the lens are unbelievable.

I would be happy to shoot everything on Full Frame. I have a Japanese car commercial coming up next month that I definitely want to shoot on Full Frame. Shooting from the Russian Arm, on a wider lens in narrow roads, seeing the full car without distortion and full attention on the car with an out-of-focus background is something I have always been searching for.

The Look of Full Frame

It's a new world for us cinematographers. It feels more natural on actors. Wide and tight, the camera is closer to the actor with a wider background being out of focus. For commercials, there's more attention on the product. This depth of field is a new world in cinema. You can like it or stop down if you want to feel the usual S35 depth of field. Full Frame has a more cinematic feeling all over—it's a big picture. You have to see it and try it yourself.

VENICE in Berlin, cont'd



VENICE in Berlin, cont'd





Inside Sony VENICE



Remove 6 screws holding the PL Mount to reveal the Lever-Lock E-mount underneath.



The Sensor Block and Lens Mount Module is detachable: 4 screws.



PL Mount assembly viewed from front

PL Mount assembly viewed from rear





Outfitting VENICE



The growing family of Full Format lenses for Sony VENICE

Sony VENICE in Studio Mode with Teradek Bolt 3000 Video Transmitter, SmallHD Monitor, Anton/Bauer Cine 90 Battery and Wooden Camera mechanical and electric outfit.

Master Top Handle, V-Lock Base Station and Battery Mount, Anton/Bauer Cine 90 V-mount Battery, Unified Baseplate and Bridgeplate, etc.



Outfitting VENICE



Sony VENICE
with Angenieux EZ Zoom
and SHAPE shoulder pad
and handgrips





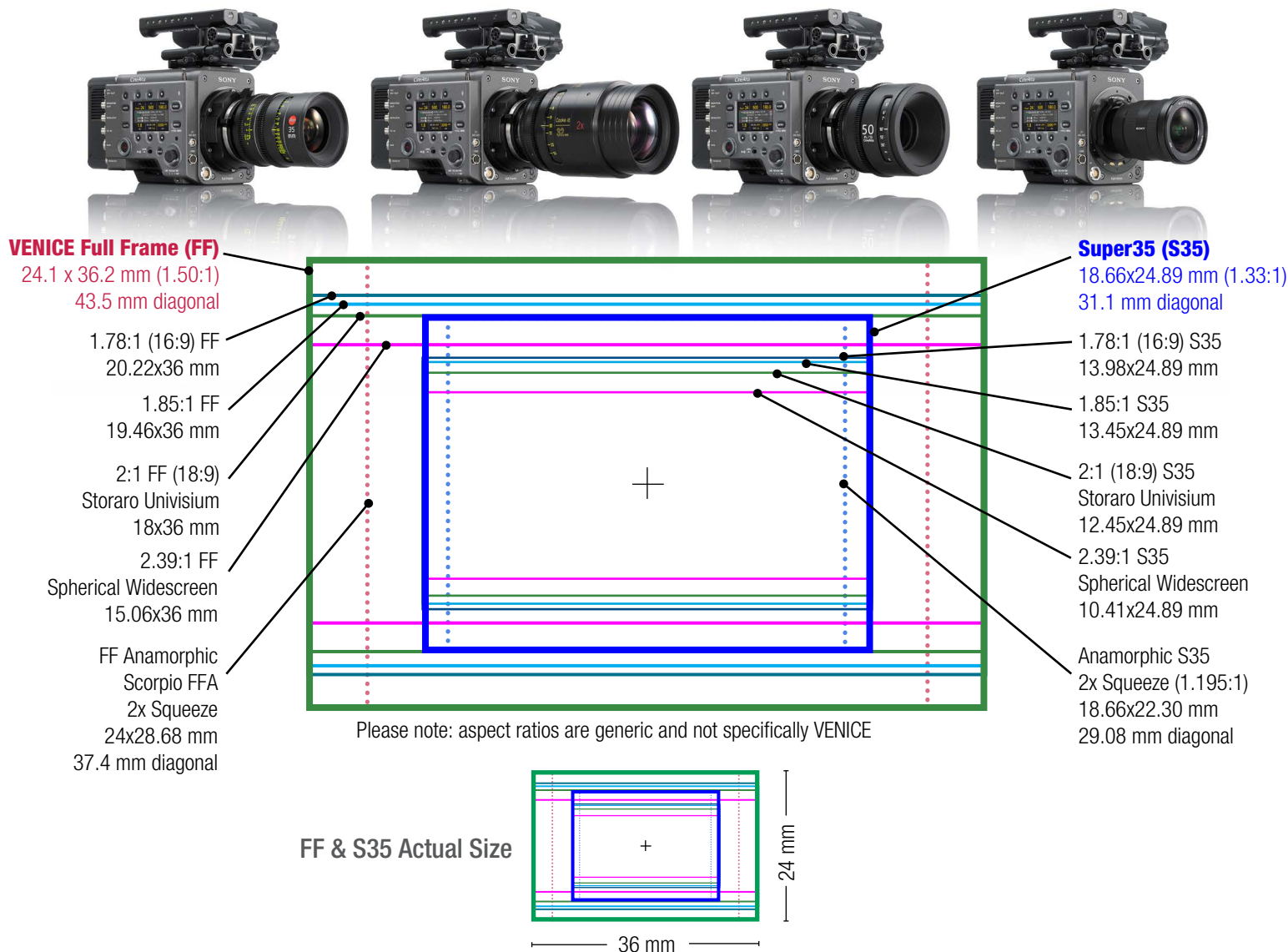
Sony VENICE
with Anton/Bauer Cine battery, Transvideo
CineMonitorHD 15, Preston LR2 Light Ranger
Focus Assist with MDR3, Angenieux Type EZ
Full Frame 45-135 mm T3 zoom lens
on Cartoni Maxima 30 head.

Outfitting VENICE

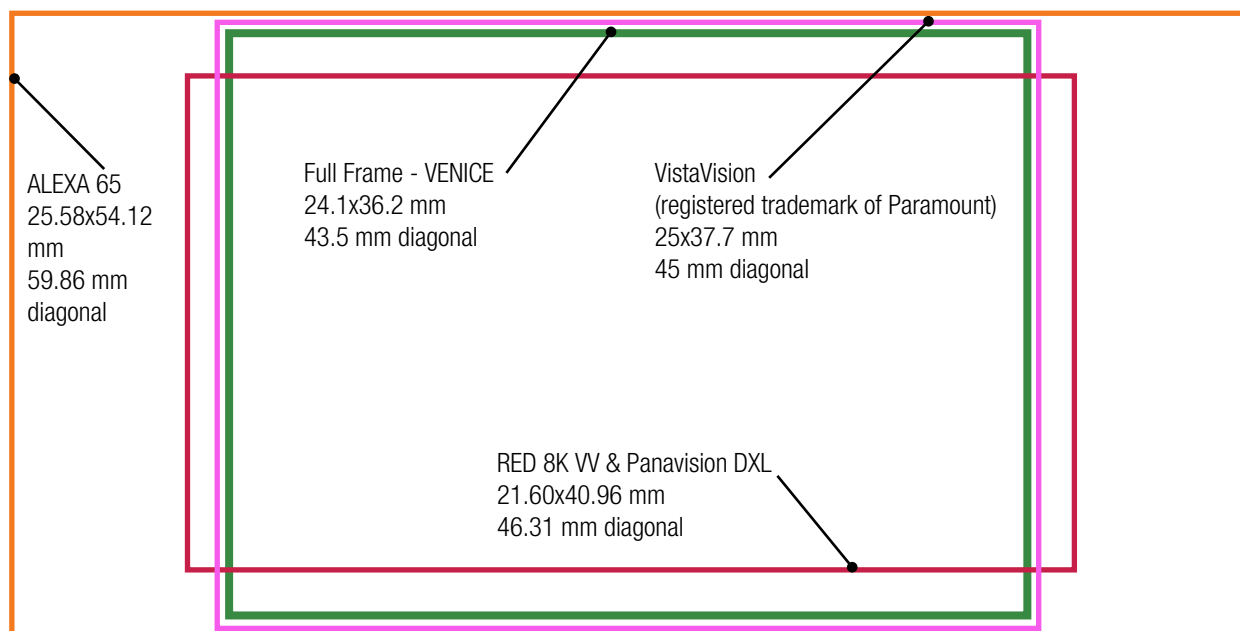


Sony VENICE
with SHAPE Shoulder Rig, SHAPE handles
and follow focus, Cinematography Electronics
CineTape, ZEISS Full Frame CZ.2 Cine Zoom
15-30 T2.9, Sony on-board battery, Cartoni
Focus 30 head

Sony VENICE Full Frame and Super35 Formats



Sensor Size Comparisons: Alexa 65, VistaVision, Sony Full Frame, RED VV & Panavision DXL



Hawk65

Hawk65



Hawk65 Anamorphic Lenses

Hawk65 Anamorphic lenses cover Full Frame on Sony VENICE.

They have a 1.3x anamorphic squeeze. This is a similar ratio to Ultra Panavision (1.25x) as used on classic movies such as “Ben Hur,” “Mutiny on the Bounty” and recently, “The Hateful Eight.”

What is it about Large Format and Anamorphic lenses?

Peter Martin explained, “I think anamorphic lenses are a way of *interpreting* reality whereas spherical lenses are *recording* reality. Most of us don’t want to see reality. We want to see stories. Anamorphic is an abstraction that actually enhances storytelling possibilities. It’s the distortion, the depth of field that isolates the subject and the unique bokeh that impresses audiences.”

Anamorphic 65 mm widescreen is even more compelling. Hawk65 lenses are designed for a large image circle, covering Full Frame, Large Format and 65mm image areas.

Hawk65 anamorphic lenses currently come in an XPL mount for the ALEXA 65 and a new Vantage-designed XPL 52mm mount for Full Frame and Large Format cameras. Vantage will provide the XPL 52 mount with the Hawk65 lenses.

vantagefilm.com

| Lens | Focal Length | Stop | CfD m | CfD ft |
|------------|--------------|-------|-------|--------|
| Hawk65 40 | 40 mm | T 2.2 | 1 | 3'3" |
| Hawk65 45 | 45 mm | T 2.2 | 1 | 3'3" |
| Hawk65 50 | 50 mm | T 2.2 | 0.8 | 2'7" |
| Hawk65 60 | 60 mm | T 2.2 | 1 | 3'3" |
| Hawk65 70 | 70 mm | T 2.2 | 1 | 3'3" |
| Hawk65 80 | 80 mm | T 2.8 | 0.8 | 2'7" |
| Hawk65 95 | 95 mm | T 2.8 | 1 | 3'3" |
| Hawk65 120 | 120 mm | T 2.8 | 1 | 3'3" |
| Hawk65 150 | 150 mm | T 2.8 | 1 | 3'3" |

Hawk65 Anamorphic Lens on Sony VENICE



Angenieux 42-420 T4.5 Anamorphic Zoom



It is an inescapable reality of life on location that zoom lenses will be an essential part of almost every camera package. Zooms are equally *de rigueur* on studio productions, even when a case full of primes are listed on the equipment order.

With anamorphic cinematography enjoying a new wave of world-wide appreciation, Angenieux now proposes a second Long Range A2S lens, based on the Optimo 44-440 A2S which was introduced in April 2016. The new 42-420 has even less distortion than the 44-440, which already was minimal.

The rear group of the lens contains cylinders and spherical elements that provide a 2x horizontal squeeze with excellent optical performance, minimal distortion and negligible breathing. The aperture is T4.5 across the entire zoom range; there is no ramping. The 42-420 provides silky, smooth skin tones and aesthetically pleasing bokeh, with a classic anamorphic shallow depth of field that elegantly separates the actors from the backgrounds.

Angenieux's IRO (Interchangeable Rear Optics) technology lets you easily convert the Optimo 42-420 anamorphic zoom to a spherical 25-250 T3.5 zoom. Simply unscrew the anamorphic rear group and swap it with an optional spherical kit that also includes the appropriate focus, iris and zoom rings.

angenieux.com

- 2x horizontal squeeze using cylindrical optics in rear group.
- Uniform color, contrast, resolution and low distortion.
- Constant T4.5 across zoom range, no ramping.
- Minimal breathing of focus (image size remains constant).
- Close Focus of 1.24m / 4'1".
- Reduced distortion at all focal lengths and all focus distances.
- Lighter and more compact long range anamorphic zoom.
- Focus ring with scale rotation of 320° rotation and more than over 40 focus marks. Interchangeable focus scale rings marked in feet or meters.
- Available in PL mount. Easily interchangeable with PV Panavision and other lens mounts.
- Spherical kit option converts anamorphic 42-420 to spherical 25-250 T3.5 zoom by swapping rear group and rings.
- Rugged cam and rod zoom and focus group mechanics.
- Can use 1.4x and 2x extenders. 84-840mm T9 (with 2x).
- Built-in encoder provides lens metadata (focus, iris, zoom) via standard /i technology in both spherical and anamorphic configurations.
- Lens data can be displayed on camera monitors to assist critical focusing and recorded in camera.
- Front thread for optional protective glass.
- Accessories: DSLR mounts, 1.4 and 2x, front protective glass
- Temperature range: -20°C to +45°C.

| Lens | Angenieux Optimo 42-420 mm T4.5 A2S Anamorphic Zoom | Angenieux Optimo Style 25-250 T3.5 Spherical Zoom |
|-----------------------------|---|---|
| Zoom Ratio: | 10x | 10x |
| Anamorphic Squeeze | 2x anamorphic | Spherical - desqueezed |
| Focal Length: | 42 - 420 mm | 25-250 mm |
| Aperture: | T4.5 | T3.5 |
| MOD (Close Focus): | 4' 1" / 1.24 m | 4' / 1.22 m |
| Image Coverage: | 28.8 mm diagonal (18.6 x 22 mm) - S35 | 31.4 mm - S35 |
| Weight (approx.): | 16.7 lb / 7.6 kg | 16 lb / 7.3 kg |
| Length (PL mount to front): | 414 mm / 16. 3" | 377.4 mm / 14.9 |
| Front Diameter: | 136 mm | 136 mm |
| Mounts: | PL. PV or EF mount available on request | PL. PV or EF mount available on request |

Angénieux 36-435mm T4.2 Full Frame Ultra 12x Zoom



Angénieux Optimo Ultra 12x FF /VV 36-435mm T4.2 (46.3mm Image Diagonal)

The new Angénieux Optimo Ultra 12x is the high-end, long range zoom for the new Full Frame era. This is a redefinition of the classic 12x zoom ratio that launched a thousand Super35 spherical zooms (and more) onto productions since 2001— the famous Angénieux 24-290.

In case you still find yourself shooting Super35, the new Ultra 12x gains speed. Interchangeable modules cover sensor sizes from S35 to Ultra35 (34.6mm Ø), boosting aperture speed in the process. While Full Frame wide open is T4.2, it opens to T2.8 in Super35.

Changing formats is simple. Unscrew the IRO rear assembly, swap the focus, iris and zoom rings, and attach the new rear group. The ingenious format flexibility of the Optimo Ultra 12x offers rental houses and owners a wide choice of formats, focal lengths and apertures in one lens with three sets of rear groups and barrels.

Nevertheless, at this NAB, I'm sure the buzz will be all about larger formats: Full Frame, Full Format, Large Format, 8K VV.
angenieux.com

| Lens | 24-290mm | 26-320mm | 36-435mm |
|-------------------|----------|------------|----------|
| Format | S35 | U35 (S35+) | FF / VV |
| Focal length (mm) | 24-290 | 26-320 | 36-435 |
| Aperture | T2.8 | T3.1 | T4.2 |
| Image Circle (mm) | Ø 31.1 | Ø 34.6 | Ø 46.3 |
| Iris Blades | 9 | 9 | 9 |
| Front diam. (mm) | 162 | 162 | 162 |
| Length (mm) | 472mm | 481mm | 523mm |
| Length (inches) | 18.6" | 18.9" | 20.6" |
| MOD (meters) | 1.22 m | 1.24m | ≤1.5m |
| MOD (feet) | 4' | 4'1" | ≤5' |
| Weight (kg) | 12.6 kg | 12.75 kg | 12.75 kg |
| Weight (lb) | 27.7 lb | 28.1 lb | 28.1 lb |

Angénieux Type EZ Full Frame Compact Zooms



22-60 T3.0 EZ-2 FF

Type EZ-2 FF 22 - 60mm T3 MOD: 0.6m / 2'
Zoom Ratio: 2.7x Front Diam: 114mm
Image Diagonal: 46mm Length: 210 mm / 8.3"
Aperture: T3.0 - 32 Wgt: 2.07 kg / 4.6 lb

Angénieux Type EZ Zoom Lenses are convertible, affordable, compact zooms that cover beyond Full Frame. Exchangeable rear lens groups let you swap between Full Frame (up to 46mm image diagonal) and Super35mm. The Angénieux EZ-2 covers wide angles. Configured for FF, it is a 22-60mm T3 zoom. Configured for S35, it is a 15-40mm T2 zoom.



45-135 T3.0 EZ-1 FF

Type EZ-1 FF 45-135mm T3 MOD: 0.6m / 2'
Zoom Ratio: 3x Front Diam: 114mm
Image Diagonal: 46mm Length: 226 mm / 8.9"
Aperture: T3.0 - 32 Wgt: 2.05 kg / 4.5 lb

The Angénieux EZ-1 covers a standard zoom range. With the FF Rear Lens Group, it is a 45-135mm T3 zoom. With the Super35 Rear Group attached, the EZ-1 is a 30-90mm T2 zoom.

angenieux.com bandpro.com jcinecast.com

Full Frame Cine Lenses: September 2017 Update

Q&A Continued from page 16

What Full Frame Cine Lenses are available for VENICE?

FDTimes: I'm glad you asked that question. From A to Z: Angénieux, ARRI, Canon, Cooke, Hawk, IB/E Optics, Leica, Panavision, Schneider, Sigma, Sony, ZEISS.

What about Large Format 65mm Lenses?

Yes, they fit, just like FF lenses cover S35 as well.

Some examples?

See the pages that follow.
Apologies to anyone omitted:
time and space ran out.



Cooke S7/i Full Frame Plus



| 18 mm | 25 mm | 32 mm | 40 mm | 50 mm | 75 mm | 100 mm | 135 mm |
|-------|-------|-------|-------|-------|-------|--------|--------|
| T2-22 | T2-22 | T2-22 | T2-22 | T2-22 | T2-22 | T2-22 | T2-22 |

SIGMA Cine Full Frame High Speed Primes and Zoom



| 14 mm | 20 mm | 24 mm | 35 mm | 50 mm | 85 mm | 135 mm | 24-35 mm |
|-------|---------|---------|---------|---------|---------|--------|----------|
| T2-16 | T1.5-16 | T1.5-16 | T1.5-16 | T1.5-16 | T1.5-16 | T2-16 | T2.2-16 |



Full Frame Cine Lenses

ZEISS Full Frame Compact Primes CP.3 and CP.3 XD



| 15 mm | 18 mm | 21 mm | 25 mm | 28 mm | 35 mm | 50 mm | 85 mm | 100 mm | 135 mm |
|---------|---------|---------|-----------|---------|---------|---------|---------|---------|---------|
| T2.9-22 | T2.9-22 | T2.9-22 | T2.1-T 22 | T2.1-22 | T2.1-22 | T2.1-22 | T2.1-22 | T2.1-22 | T2.1-22 |

ZEISS Full Frame Compact Zooms CZ.2



| 15-30 mm | 28-80 mm | 70-200 mm |
|----------|----------|-----------|
| T2.9-22 | T2.9-22 | T2.9-22 |

Canon Full Frame EF Cinema CN-E Primes



| 14 mm | 24 mm | 35mm | 50 mm | 85 mm | 135 mm |
|---------|---------|---------|---------|---------|---------|
| T3.1-22 | T1.5-22 | T1.5-22 | T1.3-22 | T1.3-22 | T2.2-22 |

Schneider-Kreuznach Xenon Full Frame FF Primes



| 18 mm | 25 mm | 35 mm | 50 mm | 75 mm | 100 mm | 135 mm |
|---------|-----------|---------|---------|---------|---------|---------|
| T2.4-22 | T2.1-T 22 | T2.1-22 | T2.1-22 | T2.1-22 | T2.1-22 | T2.1-22 |

Whitepoint Optics TS70 Large Format Primes



Hanna Myllyniemi taken with Whitepoint 100mm at T3.5 on Sony α9.

Whitepoint Optics in Helsinki, Finland reworks, rehouses and recreates venerable vintage V-series Medium Format Hasselblad/ZEISS optics into high-end Large Format cine lenses. The optical elements from these distinguished Medium Format still lenses were made by Hasselblad/ZEISS from 1979-1989.

The Whitepoint TS70 primes come in classic focal lengths of 30, 40, 60, 80, 100 and 120 mm. Additional 150, 250 and 500 mm lenses are in the works. They all cover ARRI Alexa 65, RED 8K VV, Panavision DXL2, Sony VENICE, Canon C700 FF and other large format cameras. The image circle is an astonishing 82mm diameter. The rear mount unscrews and the lenses are available in PL, EF and E-mount. XPL and LPL are coming.

If you have been lusting after Arriflex 765 lenses, sometimes rentable but rarely owned (not many were made), here's a chance to have the same glass, albeit with a different look, all for yourself.

The Whitepoint Optics primes have consistent 114mm front diameters. Focus and iris gears are in the same positions. The mechanics and housings are well-made and rugged.

The look is sharp with pleasingly smooth textures and skin tones. For those raking two-shots in the front seats of cars, and other depth-of-field defying setups, Whitepoint Optics supplies a Swing-Tilt mechanism for every lens. That's the reason for the name: TS70 as in Tilt and Swing, and 70 for Large Format. The maximum swing or tilt is 9 degrees and it does not vignette. Locking and unlocking is easy.

Whitepoint Optics TS70 lenses have shot several Netflix features as well as commercials in Europe and USA. They are currently at major rental houses across the US, Canada and Europe. At NAB, see Whitepoint at Band Pro, their worldwide partner. (C10618.) whitepointoptics.com bandpro.com



From left: Timo Alatakkari, Hanna and Jussi Myllyniemi at RVZ's Micro Salon booth in Paris.



Chief lens technician Timo Alatakkari.

Whitepoint Optics TS70, cont'd



Whitepoint Optics TS70 Large Format Prime Lens Series

| Lens | T-Stop | MOD | Front Ø | Length | Weight |
|--------|-----------|--------|---------|--------|---------|
| 30 mm | T3.5 – 22 | 0.35 m | 114 mm | 155 mm | 2.75 kg |
| 40 mm | T4 – 32 | 0.35 m | 114 mm | 151 mm | 2.63 kg |
| 60 mm | T3.5 – 22 | 0.45 m | 114 mm | 120 mm | 1.74 kg |
| 80 mm | T2.8 – 22 | 0.65 m | 114 mm | 115 mm | 1.54 kg |
| 100 mm | T3.5 – 22 | 0.80 m | 114 mm | 121 mm | 1.52 kg |
| 120 mm | T4 – 32 | 1 m | 114 mm | 147 mm | 1.85 kg |

- Lens Mount: PL, E, and EF – Stainless Steel
- Front Diameter: 114mm
- Image circle: 82mm
- Matched Focus/Iris Ring Locations at all focal lengths)
- Iris Blades: 10, Circular
- Focus Scale: Metric/Imperial
- Tilt-Swing (Optional for all lenses): 9° (no vignetting or distortion, S35 - Alexa 65).



A Brief History of Whitepoint Optics

Jussi Myllyniemi is Product Manager at Whitepoint in Helsinki. He is also a prominent colorist and producer. Whitepoint provides production services, grading and high-end post production. Aleksis Pillai is the CEO. They grade footage daily, discussing looks with DPs and talking color science constantly.

Wouldn't it be a natural progression for people who "agonize" day in and day out about looks, LUTS, style and color—with especially long Finnish winters and white nights to think these things through—to wonder, "Why don't we build lenses?"

Jussi and Aleksis showed up at FDTimes a few weeks ago. Jussi told the story about how their lens business began: "I'm a long distance runner. I do marathons with a good friend, Timo Alatakkari. He has been head of a respected lens repair and optical shop for the past 10-15 years, specializing in ZEISS, Leica and Hasselblad. He was trained at the ZEISS Jena factory in the 1980s. About two years ago, I asked Timo if he could rehouse some lenses for us and he said yes, why not. Timo is an enthusiastic can-do guy. He never says no. He's worked on everything from microscopes and camera lenses to large industrial optics.

Timo is not afraid of new adventures. We did a lot of research and talked to DPs about what they were looking for. They all wanted something to add life to their images. I wanted to be part of this adventure because as a colorist, I'm working all the time with cinematographers, hearing about the lenses they are using and the styles they are seeking. It's all about looks, artistic approach and technical excellence. It also must satisfy creative and aesthetic dreams and wishes.

"So, we started Whitepoint Optics. We have a representative buying vintage ZEISS/Hasselblad lenses all over the world. We select the best lenses, take out the glass elements and throw the rest away. We only use the glass. We build new mechanical assemblies from scratch and modify the optics. The mechanism is a combination of cams and threads. The stainless steel end stops are very rugged. The lenses don't have shims. They are adjusted by loosening 4 screws and adjusting the focus scale.

"I've always been fascinated by cinema. I ran a film festival for many years in Finland. I've always tried to look ahead. It's a democratization of the art—to make the proper tools for everyone."



From left: Aleksis Pillai and Jussi Myllyniemi at FDT in NYC.



Jussi Myllyniemi with Whitepoint 60 mm, photographed with a 100 mm.

Full Frame Cine Lenses

Sony FE PZ 28-135 f/4 G OSS E-mount FF zoom

| |
|--------------|
| 28-135 mm mm |
| f/4.0-22 |



Angénieux Type EZ Full Frame Zooms



| | |
|----------|-----------|
| 22-60 mm | 45-135 mm |
| T3.0-32 | T3.0-32 |



Leica Full Frame M 0.8 Primes



| | | | | |
|----------|----------|----------|----------|-----------|
| 21 mm | 24 mm | 28 mm | 35 mm | 50 mm |
| f/1.4-16 | f/1.4-16 | f/1.4-16 | f/1.4-16 | f/0.95-16 |

Large Format Cine Lenses

Leica Large Format Thalia Cine Primes



| | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 24 mm | 30 mm | 35 mm | 45 mm | 55 mm | 70 mm | 100 mm | 120 mm | 180 mm |
| T3.6-22 | T2.9-22 | T2.6-22 | T2.9-22 | T2.8-22 | T2.6-22 | T2.2-22 | T2.6-22 | T3.6-22 |

IB/E Optics Large Format Raptor Cine Macros



| | | |
|---------|---------|---------|
| 100 mm | 150 mm | 180 mm |
| T2.9-22 | T2.9-22 | T2.9-22 |

Large Format Cine Lenses

ARRI ALEXA 65



Prime 65

| 24mm | 28mm | 35mm | 50mm | 80mm | 100mm | 150mm | 300mm | 50-110mm |
|---------|-------|---------|---------|---------|---------|---------|---------|-------------|
| T4.8-32 | T4-32 | T3.5-32 | T3.5-32 | T2.8-32 | T2.2-32 | T3.2-45 | T4.5-45 | T3.5/4.5-32 |

Prime 65 S

| mm | 35 | 45 | 55 | 75 | 90 | 120 | 150 |
|----|-----|-----|-----|-----|-----|-----|-----|
| T | 2.5 | 2.8 | 2.8 | 2.8 | 2.8 | 2.5 | 2.8 |

2017 Prime DNA Medium-Soft

| mm | 35 | 45 | 55 | 70 | 80 | 85 | 110 | 150 | 200 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T | 3.5 | 2.8 | 2.8 | 2.8 | 1.9 | 1.3 | 2.8 | 2.8 | 2.8 |

and Prime DNA Special, Prime DNA Soft...

Hawk 65 Large Format Anamorphic Lenses



| 40mm | 45mm | 50mm | 60mm | 70mm | 80mm | 95mm | 120mm | 150mm | 200mm |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| T 2.2 | T 2.2 | T 2.2 | T 2.2 | T 2.2 | T 2.8 | T 2.8 | T 2.8 | T 2.8 | T 4.0 |

Panavision Primo 70

and Primo Artiste



| mm | 14 | 24 | 27 | 35 | 40 | 50 | 65 | 80 | 100 | 125 | 150 | 200 | 250 | 28-80 | 70-185 | 200-400 |
|----|-----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-------|--------|---------|
| T | 3.1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2.8 | 2.8 | 3 | 3.5 | 4.5 |

Ultra Panavision 70 Anamorphic Lenses



| mm | 35 | 40 | 50 | 65 | 65(2) | 75 | 75(2) | 100 | 135 | 180 | 290 | 400 |
|----|-----|-----|-----|-----|-------|-----|-------|-----|-----|-----|-----|-----|
| T | 2.8 | 2.8 | 2.8 | 2.0 | 2.0 | 2.0 | 2.8 | 2.8 | 2.8 | 2.8 | 4.0 | 6.0 |

Leica Thalia



15-bladed iris is totally round and remains round at all apertures.
Bokeh's are beautiful and smooth, without "onion rings" or star bursts.



Thalia Specifications

| Focal Length (mm) | 24 | 30 | 35 | 45 | 55 | 70 | 100 | 120 | 180 |
|---------------------|-------|-----------|-----------|-----------|-------|-----------|-----------|-------|-----------|
| Aperture | 3.6 | 2.9 | 2.6 | 2.9 | 2.8 | 2.6 | 2.2 | 2.6 | 3.6 |
| Length (in) | 4.9" | 5.2" | 5.2" | 5.2" | 6.1" | 4.9" | 4.9" | 6.9" | 6.1" |
| Length (mm) | 124.5 | 131.5 | 131.5 | 131.5 | 154.5 | 124.5 | 124.5 | 175 | 154.5 |
| Front Diameter (mm) | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 95 |
| Close Focus (ft) | 1'4" | 1'8" | 1'10" | 2' | 2'4" | 1'8" | 2'4" | 1'10" | 5' |
| Close Focus (m) | 0.4 | 0.5 | 0.55 | 0.6 | 0.7 | 0.5 | 0.7 | 0.57 | 1.5 |
| Weight (lb) | TBD | 3lb 4.6oz | 3lb 1.6oz | 3lb 3.6oz | TBD | 2lb 5.2oz | 2lb 8.8oz | TBD | 3lb 9.2oz |
| Weight (kg) | TBD | 1.50 | 1.40 | 1.46 | TBD | 1.06 | 1.16 | TBD | 1.62 |

Image Circle: 60 mm diagonal (covers ARRI ALEXA 65, RED and DXL 8K VV, VistaVision, Full Frame, Super35)
 Matched Barrels: Focus and Iris Ring locations in same position for all focal lengths. 0.8M Lens Gears.
 Front Diameter: 95 mm on all lenses in set (same as Summilux-C and Summicron-C)
 Lens Mount: PL and XPL (for ARRI Rental) - Stainless Steel
 Front Filter: 92 mm screw-in (same as Summilux-C)
 Rear Net Holder: Same as on Summilux-C
 Metadata: /i Technology lens data contacts
 Focus Rotation: 270°
 Iris Blades: 15
 Iris Shape: Circular at all apertures
www.cw-sonderoptik.com



Leica M 0.8 Lenses

There are five Leica M 0.8 lenses — in focal lengths from 21mm to 50mm. They have a Leica M mount (27.80 mm flange focal depth). Leica M lenses are among the lightest and smallest Full Frame lenses.

A Leica M to E-mount adapter opens the entire world of famous Leica still lenses—modern and vintage—that have captured decisive moments for generations.

| | | | | | |
|------------------|----------------------------------|-------|-------|-------|---------------|
| Focal Length | 21mm | 24mm | 28mm | 35mm | 50mm Noctilux |
| Aperture | f/1.4 | f/1.4 | f/1.4 | f/1.4 | f/0.95 |
| Image Circle | Full Frame (testing recommended) | | | | |
| Weight (G) | 515 | 505 | 480 | 370 | 835 |
| Weight (Lb) | 1.1 | 1.1 | 1.1 | 0.8 | 1.3 |
| Length (Cm) | 8.7 | 8.7 | 8.3 | 8.3 | 9.8 |
| Length (In) | 3.4 | 3.4 | 3.8 | 3.3 | 3.9 |
| Close Focus (M) | 0.7 | 0.7 | 0.7 | 0.7 | 1.0 |
| Close Focus (Ft) | 2'3" | 2'3" | 2'3" | 2'3" | 3'3" |
| Front Diameter | 80mm | | | | |
| Screw-In Filter | 77mm | | | | |
| Lens Mount | Leica M | | | | |



Cooke Optics - New Panchro/i Classics and S7/i



Cooke Optics Panchro/i Classic

The Cooke Panchro/i Classic family gets 4 additional focal lengths: 21mm, 27mm, 65mm Macro and 135mm. Panchro/i Classics provide a vintage Cooke Look in a modern housing.

The remaining focal lengths are expected later this year. New lenses are highlighted in yellow.

| Cooke Panchro/i Classic | T-Stop Range | Min. Marked Object Distance (MOD) | | Close Focus from Lens Front | | Angular Rotation to MOD | Rotation of Iris Scale | Length: Lens Front to Mount | Maximum Front Diameter | Total Weight | Maximum Image Coverage |
|-------------------------|--------------|-----------------------------------|------|-----------------------------|--------|-------------------------|------------------------|-----------------------------|------------------------|--------------|------------------------|
| 18 mm | T2.2–T22 | 250 | 9" | 111mm | 4.6" | 270° | 90° | 87mm | 110mm | 1.6kg | 30mm |
| 21mm | T2.2 - T22 | 200mm | 8" | 80mm | 3.3" | 270° | 90° | 92mm | 110mm | 1.5kg | Super35 |
| 25 mm | T2.2–T22 | 250 | 9" | 106mm | 4.2" | 270° | 90° | 92mm | 110mm | 1.5kg | 30mm |
| 27mm | T2.2 - T22 | 250mm | 9" | 106mm | 4.2" | 270° | 90° | 92mm | 110mm | 1.5kg | Super35 |
| 32 mm | T2.2–T22 | 325 | 12" | 181mm | 6.3" | 270° | 90° | 92mm | 110mm | 1.2kg | 30mm |
| 40 mm | T2.2–T22 | 450 | 16" | 280mm | 11" | 270° | 90° | 118mm | 110mm | 1.4kg | 30mm |
| 50 mm | T2.2–T22 | 550 | 20" | 380mm | 15" | 270° | 90° | 118mm | 110mm | 1.5kg | 30mm |
| 65mm Macro | T2.4 - T22 | 325mm | 13" | 114mm | 4.5" | 270° | 90° | 197mm | 110mm | 2.8kg | Super35 |
| 75 mm | T2.2–T22 | 800 | 30" | 593mm | 23.3" | 270° | 90° | 155mm | 110mm | 1.8kg | 30mm |
| 100 mm | T2.6–T22 | 950 | 36" | 743mm | 29.3" | 270° | 90° | 155mm | 110mm | 1.8kg | 30mm |
| 135mm | T2.8 - T22 | 850mm | 2'9" | 657mm | 2'1.5" | 270° | 90° | 167mm | 110 mm | 2.1 kg | Full Frame |
| 152mm | T3.0-T22 | 1100mm | 3'6" | 903mm | 2'10" | 270° | 90° | 167mm | 110 mm | 2.1kg | Full Frame |

Cooke Optics S7/i

The Cooke S7/i Full Frame Plus lens series continues to grow, with the addition of a 16mm, 21mm, 27mm and 65mm.

The S7/i Full Frame Plus Primes have an image circle diameter of 46.31mm, covering Sony VENICE. cookeoptics.com



| Cooke S7/i Full Frame + | T-Stop Range | Min. Marked Object Distance (MOD) | | Close Focus from Lens Front | | Angular Rotation to MOD | Rotation of Iris Scale | Length: Lens Front to Mount | Maximum Front Diameter | Total Weight | Maximum Image Diagonal |
|-------------------------|--------------|-----------------------------------|-------|-----------------------------|-------|-------------------------|------------------------|-----------------------------|------------------------|--------------|------------------------|
| 16mm | TBC | TBC | TBC | TBC | TBC | TBC | TBC | TBC | TBC | TBC | 46.31mm |
| 18mm | T2 - T22 | 400mm | 16 in | TBC | TBC | 270° | 90° | TBC | 110 mm | TBC | 46.31mm |
| 21mm | T2 - T22 | 350mm | 14 in | 109mm | 4 in | 270° | 90° | 189mm | 110mm | 3.3 kg | 46.31mm |
| 25mm | T2 - T22 | 350mm | 14 in | 109mm | 4 in | 270° | 90° | 189mm | 110mm | 3.3 kg | 46.31mm |
| 27mm | T2 - T22 | 350mm | 14 in | 109mm | 4 in | 270° | 90° | 189mm | 110mm | 3.3 kg | 46.31mm |
| 32mm | T2 - T22 | 350mm | 14 in | 109mm | 4 in | 270° | 90° | 189mm | 110 mm | 3.4 kg | 46.31mm |
| 40mm | T2 - T22 | 450mm | 18 in | 209mm | 8 in | 270° | 90° | 189mm | 110 mm | 3.5 kg | 46.31mm |
| 50mm | T2 - T22 | 500mm | 20 in | 259mm | 10 in | 270° | 90° | 189mm | 110 mm | 3.4 kg | 46.31mm |
| 65mm | T2 - T22 | 475mm | 19 in | 234mm | 9 in | 270° | 90° | 189mm | 110 mm | 3.0 kg | 46.31mm |
| 75mm | T2 - T22 | 475mm | 19 in | 234mm | 9 in | 270° | 90° | 189mm | 110 mm | 3.0 kg | 46.31mm |
| 100mm | T2 - T22 | 700mm | 30 in | 459mm | 18 in | 270° | 90° | 189mm | 110 mm | 3.3 kg | 46.31mm |
| 135mm | T2 - T22 | 950mm | 39 in | 709mm | 37 in | 270° | 90° | 189mm | 110 mm | 3.7 kg | 46.31mm |



Sigma Cine Lens Specs



Full Frame High Speed Primes 14mm T2, 20mm T1.5, 24mm T1.5, 35mm T1.5, 50mm T1.5

Full Frame High Speed Primes 85mm T1.5, 135mm T2

Full Frame High Speed Zoom 24-35mm T2.2

S35 High Speed Zooms 18-35mm T2, 50-100 T2



| Lens | Aperture | Close Focus ¹ | Image Circle | Front Diam. | Filter Size | Length | | | Weight ⁴ | | |
|-----------------|-----------|--------------------------|-----------------|-------------|-------------|-----------------------|----------------------|---------|---------------------|---------|-------|
| | | | | | | EF mount ² | E-mount ³ | PL | EF mount | E-mount | PL |
| 14mm T2 FF | T2 - 16 | 0.27m 11" | FF Φ 43.3 | 95mm | - | 119.5mm | 145.5mm | 111.5mm | 1430g | 1485g | 1345g |
| 20mm T1.5 FF | T1.5 - 16 | 0.276m 11" | FF Φ 43.3 | 95mm | - | 118mm | 144mm | 110mm | 1335g | 1395g | 1240g |
| 24mm T1.5 FF | T1.5 - 16 | 0.25 m 10" | FF Φ 43.3 | 95mm | 82mm | 95mm | 121mm | 87mm | 1125g | 1185g | 1030g |
| 35mm T1.5 FF | T1.5 - 16 | 0.30 m 1' | FF Φ 43.3 | 95mm | 82mm | 95mm | 121mm | 87mm | 1135g | 1165g | 1035g |
| 50mm T1.5 FF | T1.5 - 16 | 0.40 m 1'4" | FF Φ 43.3 | 95mm | 82mm | 102mm | 128mm | 94mm | 1295g | 1355g | 1210g |
| 85mm T1.5 FF | T1.5 - 16 | 0.85 m 2'10" | FF Φ 43.3 | 95mm | 86mm | 134.5mm | 160.5mm | 126.5mm | 1475g | 1535g | 1380g |
| 135mm T2 FF | T2 - 16 | 0.875 m 2'11" | FF Φ 43.3 | 95mm | 82mm | 126.4mm | 152.4mm | 118.4mm | 1565g | 1630g | 1495g |
| 24-35mm T2.2 FF | T2.2 - 16 | 0.28 m 11" | FF Φ 43.3 | 95mm | 82mm | 122.7mm | 148.7mm | N/A | 1440g | 1500g | |
| 18-35mm T2 S35 | T2.0 - 16 | 0.28 m 11" | S35 Φ 28.4 | 95mm | 82mm | 129.5mm | 155.5mm | 121.5mm | 1445g | 1505g | 1410g |
| 50-100mm T2 S35 | T2.0 - 16 | 0.95 m 3'2" | S35 Φ 28.4 | 95mm | 82mm | 175.2mm | 201.2mm | 167.2mm | 1885g | 1945g | 1830g |

1. Close focus distance is measured from the image plane

2. Front to EF mount flange

3. Front to E-mount flange

4. Without lens support foot

Sigma Cine Lenses are available in EF (Canon), E-mount (Sony), and PL (all except 24-35mm T2.2 Full Frame Zoom)

Specifications are subject to change

IB/E OPTICS adds Large Format 60mm Macro Raptor



IB/E OPTICS designs and manufactures the RAPTOR Macro Large Format Lens Series. The first three focal lengths are available in 100 mm, 150 mm and 180 mm focal lengths. The new 60mm RAPTOR Macro lens will be available this summer. The RAPTOR lenses offer large format sensor coverage (50mm Ø), 1:1 magnification and rugged cine mechanics. They have internal focusing, APO extended color correction and consistent distance from flange to iris and focus ring.

Every lens in the set has a front diameter of 95 mm and T2.9 maximum aperture. Focus and iris rings have standard M0.8 gears. The UMS PL Mount provides Nikon F, Canon EF, Sony E-mount, etc.



IB/E Optics has been building lenses, expanders and extenders for a long time: PLx1.4, PLx2, HDx1.4, HDx35, and HDx2. They custom-designed the Prime DNA Lenses, Prime 65, and Prime 65S lenses for ARRI Rental's Alexa 65, and built the Prime 65 and Prime 65S lenses in-house. ibe-optics.com



IB/E OPTICS Full Frame Expander



Full Format cameras and Full Format lenses are here. But what if you are an owner-operator or rental house with a vast inventory of superb Super 35mm Format lenses (24 x 18 mm image area)?

The IB/E Optics S35xFF Full Frame optical expander works with

most S35 lenses to cover the new, larger sensor areas. Optical quality is excellent, with little light loss, and not much blow-up. It uses IB/E's UMS PL Mount (Universal Mount System) to accommodate all kinds of interchangeable lens mounts. The IB/E S35xFF expands the image and maintains image quality and consistent illumination, without exposure fall-off (shading) toward the edges.

The IB/E Expander covers up to 46.6 mm image diagonal. That's more than enough for all current Full Frame 36x24 mm sensors (43.3 mm diagonal). It covers the RED W8K MONSTRO sensor: 21.60 x 40.96 mm (46.3 mm Ø). And it covers the ALEXA LF sensor: 36.70 x 25.54 mm (44.71 mm Ø).

Basically, the S35xFF makes the image circle larger: from a diagonal of approximately 30 mm of your Super35 format lens to the larger diagonal of Full Format. The image is expanded by a factor of 1.45x. Light loss is about 1 stop. (IB/E Optics recommends best performance at T2.8, and a maximum aperture of T2.0)

Depth of Field stays about the same as the original Super35 format. So, if DoF of a 50 mm S35 lens was 10 inches, it remains the same 10 inches with the expander covering Full Format. Angle of View also remains roughly the same. Your 50 mm lens on a regular Alexa covers about the same angle of view as a 50mm with the S35xFF on an Alexa LF.

ZEISS Full Frame Cinema Zooms CZ.2



Christophe Casenave, Product Manager at Carl Zeiss AG, and I had discussions this February at Micro Salon in Paris and subsequently by phone.

JON FAUER: ZEISS Full Frame Cinema Zooms (and Full Frame Primes) arrived long before the latest wave of Full Frame cameras. How did you anticipate this?

CHRISTOPHE CASENAVE: We started the design of the Cinema Zoom (CZ.2) lenses around 2009. At that point in time, the cinema landscape was mostly film, and it was Super35 format—and almost everybody was happy with that. So why would someone ever start designing cinema lenses with larger coverage ?

In fact, nobody at ZEISS believed that film would last forever. And for the cine industry, switching to digital meant that there would no longer be the need to have one standardized format for shooting. Nevertheless, the first digital cinema cameras adopted sensor sizes that approximately matched the Super35 format. At that time, we already believed that larger formats would come—simply because the production process of the sensor would, at some point, allow and enable it. If you removed the cost constraints of using larger imagers, then everybody would want to shoot on larger formats.

It was a tough decision to take: what larger format do we use to design our new cinema zooms, when nothing had been standardized and no camera manufacturer had dared to share any plans? So, we chose a format that people knew for ages. It had been the still photography format for the previous 100 years: Full Frame 36mm x 24mm. This format was already widely used in digital still cameras. We thought that this would probably be the next step for cinema, as Directors of Photography almost always were still photographers in their spare time. As hobby photographers, they were certainly used to Full Frame.

As you know, at ZEISS, we always need to develop things a little bit better than what we specify, so even if “designed” for Full Frame 36 mm x 24 mm, these zooms cover a bit more image area.

Obviously you want to use these Full Frame lenses on cameras with large format sensors. What would their equivalent be if you were shooting in S35 format?

It is important to understand crop factor and equivalence of focal

| Lens | Aperture | MOD ¹ | Length ² | Front Ø | Wgt |
|----------|---------------|------------------|---------------------|---------------|----------------|
| 15-30mm | T 2.9 to T 22 | 0.55m 1'10" | 252mm 9.92" | 114mm 4.5" | 2.6kg 5.7lb |
| 28-80mm | T 2.9 to T 22 | 0.83 m 2'8" | 196mm 7.72" | 95mm 3.7" | 2.5kg 5.5lb |
| 70-200mm | T 2.9 to T 22 | 1.52 m 5' | 250mm 9.84" | 95mm 3.7" | 2.8kg 6.2lb |

¹ Close focus distance (MOD) is measured from the image plane

² Front to PL mount flange

lengths. The latter is linked to the sensor size. In fact, what people are looking for is angle of view, not really focal length. So, when they shoot on Super35 they are used to a certain angle of view and focal length combination. They would like to “rediscover” these angles of view when shooting in Full Frame or larger formats.

To switch between Super35 and Full Frame, one needs to calculate the crop factor between both sensors. We can take the horizontal dimensions of the different sensors to calculate the crop factor, because the majority of people will refer to horizontal field of view (easier to remember than diagonal). For example, in the case of the new Sony VENICE, there is a 1.5x crop factor between its Large Format (36.1 mm) and a Sony F55 (24 mm wide, Super 35). Now, let’s look at the CZ.2 zoom equivalents when shooting Full Frame or Super 35.

Therefore, in summary, when used in combination with a large format sensor, the CZ.2 15–30 can be considered as an ultra-wide zoom, while the CZ.2 70–200 is then a short tele zoom.

| CZ.2 lenses used in Full Frame (36x24 mm) | Equivalent focal lengths for same field of view in Super35 (24x18 mm) |
|---|---|
| CZ.2 15 mm – 30 mm | 9.8 mm – 19.6 mm |
| CZ.2 28 mm – 80 mm | 18.3 mm – 52.3 mm |
| CZ.2 70 mm – 200 mm | 45.7 mm – 130.7 mm |

ZEISS CP.3 Full Frame Primes



From 15 mm to 135 mm, there are ten focal lengths in the ZEISS Compact Prime CP.3 Series.

Imagine a series of lenses you can customize. It's a cinematic dream to create unique and signature looks far from the competitive crowd. What if you could tweak some of the characteristics of a lens in real time, on set or on location? Now you can, as ZEISS introduces 10 new CP.3 Compact Prime Lenses. There are 6 big reasons the new ZEISS CP.3 prime lenses resonate: Full Frame, smaller size, custom looks, ZEISS eXtended Data (lens metadata), interchangeable mounts and smoother focus.

Custom Looks. This is the breakthrough moment when metadata for cine lenses becomes democratized and prevalent. It's an "aha" moment as a previously perplexing conception becomes comprehensible. Lens data is much more than contacts and connectors and rheostatic sliders that send focus, iris or zoom barrel settings to a recorder. It requires an easy, seamless, "killer app" on the recording and post side—which has been absent up to now. Working with Pomfort and Ambient, ZEISS joined the /i Technology industry group developed by Cooke and added their own extended data algorithms for distortion mapping and shading. Not only can you correct lens aberrations, but now you can also enhance it, add distortion, increase darkening at the edges, and so on.

Lens Data. ZEISS CP.3 lenses come with or without XD eXtended Data. The difference in price is much less than the buyer's remorse I think you will suffer if you don't spring for it. It would be like buying an iPhone without a data plan. As Sherlock Holmes said, "It is a capital mistake to theorize before one has data." The future belongs to those who can manage their data. More on this

in a minute.

Full Frame. All the CP.3 primes, from 15 to 135 mm, cover Full Frame format—24x36 mm (43.4 mm image diagonal). While 15 mm is quite wide in S35, it is extremely wide and quite remarkable in Full Frame.

Smaller Size. The entire set of 10 CP.3 primes have a front diameter of 95 mm. This is good. Cameras have become smaller and lighter. Meanwhile, expanded focus scales aren't as important as they were 7 years ago. That's because many, if not most, focus pullers are using wireless controls that can expand focus scales electronically on the hand unit.

Interchangeable Lens Mounts. This is essentially the third iteration of ZEISS Compact Primes. They have been the most widely distributed cine lenses in history—with more than 30,000 units sold. ZEISS introduced the CP.2 series with user-interchangeable PL, EF and F mounts. E and MFT would come later.

Smoother Focus. Another major reason to like the ZEISS CP.3 lens set is the new mechanical design of the focus mechanism. It is much smoother and gentler to the touch than earlier helical threaded focus barrels. It doesn't get stiffer as the temperature drops. Much less torque is required, so you can use smaller, lighter lens motors. This was the kind of focus feel previously associated with cams, which are great but can tend to make the lens larger and heavier.

ZEISS Compact Prime CP.3 and CP.3 XD Lenses Technical Specifications

| CP.3 & CP.3 XD | Aperture | Close Focus ¹ | Length ² | Front Diameter | Weight |
|----------------|---------------|--------------------------|---------------------|----------------|------------------|
| 15 mm T2.9 | T 2.9 to T 22 | 0.3 m / 12" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.87 kg / 1.9 lb |
| 18 mm T2.9 | T2.9 to T22 | 0.3 m / 12" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.86 kg / 1.9 lb |
| 21 mm T2.9 | T 2.9 to T 22 | 0.24 m / 10" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.82 kg / 1.8 lb |
| 25 mm T2.1 | T 2.1 to T 22 | 0.26 m / 10" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.82 kg / 1.8 lb |
| 28 mm T2.1 | T 2.1 to T 22 | 0.24 m / 10" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.84 kg / 1.9 lb |
| 35 mm T2.1 | T 2.1 to T 22 | 0.3 m / 12" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.80 kg / 1.8 lb |
| 50 mm T2.1 | T 2.1 to T 22 | 0.45 m / 18" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.77 kg / 1.7 lb |
| 85 mm T2.1 | T 2.1 to T 22 | 1 m / 3'3" | 83.7 mm / 3.30" | 95 mm / 3.7" | 0.88 kg / 1.9 lb |
| 100 mm T2.1 | T 2.1 to T 22 | 0.7 m / 2'6" | 126.5 mm / 4.98" | 95 mm / 3.7" | 1.01 kg / 2.2 lb |
| 135 mm T2.1 | T 2.1 to T 22 | 1 m / 3'3" | 126.5 mm / 4.98" | 95 mm / 3.7" | 1.15 kg / 2.5 lb |

- Full Frame coverage: 24x36 mm (43.4 mm image diagonal)
- Circular Iris with 14 blades

¹ Close focus distance is measured from the image plane

² Front to PL mount flange

Panavision Primo 70 Lenses



Panavision Primo 70 spherical lenses cover a sensor area of 20.1 x 48.1 mm (52.1 mm image circle diameter). They come with a Panavision SP 70 mount which as a 40 mm Flange Focal Depth (FFD) and an inside diameter of approx. 66 mm. Natural sharpness, Minimal chromatic aberration, Minimal breathing, Excellent field illumination, Flat field, Tunable focus, "Rounded" focus fall-off, Pleasing flesh tones, Uniform bokeh across the field of view. Feature Films: *Passengers*, *Guardian's of the Galaxy II*, *Spectre*

| | | | Close Focus Distance | | Length - flange to front | | Front Diam |
|-------|---------|--------|----------------------|--------|--------------------------|-----|------------|
| Lens | mm | T-stop | ft/in | m | in | mm | mm |
| 4P14 | 14 | 3.1 | 8 in | 0.20 m | 4.0 | 102 | 112.8 |
| 4P24 | 24 | 2.0 | 12 in | 0.30 m | 4.7 | 119 | 112.8 |
| 4P27 | 27 | 2.0 | 14 in | 0.36 m | 7.3 | 185 | 112.8 |
| 4P35 | 35 | 2.0 | 14 in | 0.36 m | 6.8 | 173 | 112.8 |
| 4P40 | 40 | 2.0 | 14 in | 0.36 m | 6.8 | 173 | 112.8 |
| 4P50 | 50 | 2.0 | 16 in | 0.41 m | 7.1 | 181 | 112.8 |
| 4P65 | 65 | 2.0 | 20 in | 0.51 m | 6.8 | 173 | 112.8 |
| 4P80 | 80 | 2.0 | 2 ft | 0.61 m | 6.8 | 173 | 112.8 |
| 4P100 | 100 | 2.0 | 2 ft 6 in | 0.76 m | 6.8 | 174 | 112.8 |
| 4P125 | 125 | 2.0 | 3 ft | 0.91 m | 7.1 | 181 | 112.8 |
| 4P150 | 150 | 2.0 | 4 ft | 1.22 m | 7.1 | 181 | 112.8 |
| 4P200 | 200 | 2.8 | 4 ft | 1.22 m | 7.9 | 201 | 112.8 |
| 4P250 | 250 | 2.8 | 4 ft | 1.22 m | 8.5 | 216 | 112.8 |
| 4PZW | 28-80 | 3.0 | 2 ft 9 in | 0.84 m | 8.8 | 223 | 126.5 |
| 4PZM | 70-185 | 3.5 | 5 ft | 1.52 m | 8.4 | 213 | 112.8 |
| 4PZT | 200-400 | 4.5 | 6 ft 6 in | 1.98 m | 15 | 381 | 126.5 |



Ultra Panavision 70 Anamorphic Lenses



Ultra Panavision 70 Anamorphic Lenses

- Anamorphic, 2.76:1 aspect ratio
- PV 65 mount - 52.832mm / 2.080" Flange Focal Depth
- 61mm Image Diagonal
- 1.3x anamorphic squeeze
- Oval bokeh's, Flares, Vertical defocus
- Updated with modern mechanics
- Soft, glamorous, classic-looking images

Feature Films that have used Ultra Panavision 70: *Ben Hur*, *The Hateful Eight*, *Rogue One: A Star Wars Story*

| | AP35 | AP40 | AP50 | AP65-01 | AP65-02 | AP75-01 |
|---------------------|---------|-------|-------|---------|---------|---------|
| Focal Length | 35 | 40 | 50 | 65 | 65 | 75 |
| T-Stop | 2.8 | 2.8 | 2.8 | 2.0 | 2.0 | 2.0 |
| Close Focus (in) | 24 | 30 | 24 | 22 | 19 | 36 |
| Close Focus (mm) | 609 | 762 | 609 | 559 | 480 | 914 |
| Front Diameter (in) | 6.96 | 5.35 | 5.35 | 5.35 | 5.35 | 4.48 |
| Front Diameter (mm) | 177 | 136 | 136 | 136 | 136 | 114 |
| | AP75-02 | AP100 | AP135 | AP180 | AP290 | AP400 |
| Focal Length | 75 | 100 | 135 | 180 | 290 | 400 |
| T-Stop | 2.8 | 2.8 | 2.8 | 2.8 | 4.0 | 6.0 |
| Close Focus (in) | 24 | 42 | 63 | 60 | 108 | 96 |
| Close Focus (mm) | 610 | 1067 | 1600 | 1524 | 2743 | 2438 |
| Front Diameter (in) | 4.48 | 4.48 | 4.48 | 5.35 | 4.48 | 4.48 |
| Front Diameter (mm) | 114 | 114 | 114 | 136 | 114 | 114 |

Scorpio FFA Full Frame 2x Anamorphics



Servicevision Scorpio 2x FFA (Full Frame Anamorphic) lenses were introduced in September 2017. They are unique in having both full-height 24mm coverage and 2x squeeze. (Ultra Panavision 70 lenses have a 1.25x squeeze and the Hawk65 anamorphics are 1.3x.)
servicevision.es

Scorpio 2x FFA

- 2x anamorphic squeeze
- Close focus. For example, the 35mm focuses to 1'6".
- Very small and lightweight
- Same maximum apertures of T2.2 and T2.8 as the Scorpio 2x Anamorphic S35 set. They are approximately the same size.
- There will be a whole set, with zooms as well.
- These are not "rear" anamorphics. The cylinders are distributed throughout the lens.
- Almost no distortion or breathing
- PL mount
- Same 95mm front diameter on all lenses
- Multiaspheric design

VENICE FF (Full Frame)
35.9 x 24 mm
6048 x 4032
(1.50:1)
43.3 mm Ø

FF Spherical Widescreen (2.39:1)
35.9 x 15.06 mm
6048 x 2534
39.02 mm Ø



Scorpio 2x FFA Anamorphic Full Frame

| | |
|-----------|------------|
| 20mm T2.8 | 75mm T2.2 |
| 25mm T2.2 | 100mm T2.2 |
| 30mm T2.2 | 135mm T2.2 |
| 35mm T2.2 | 150mm T2.8 |
| 40mm T2.2 | 200mm T2.8 |
| 50mm T2.2 | 250mm T2.8 |
| 60mm T2.8 | 300mm T2.8 |

Scorpio FFA 2x Anamorphic
28.68 x 24 mm 37.4 mm Ø
4818 x 4032 2x squeeze (1.195:1)

I set these user framelines:

- Frame Line A > User Frame Line > On
- Frame Line > choose Color, Center Marker (cross hair), etc.
- User Frame Line > Height > 269 (this is the maximum picture height, which is 24 mm, 4032 pixels. The 269 number is an engineering figure, which hopefully will be replaced by actual resolution numbers in the future.)
- User Frame Line > Width > 384 (this corresponded to 4818 width)

Anamorphic Desqueeze Math Class

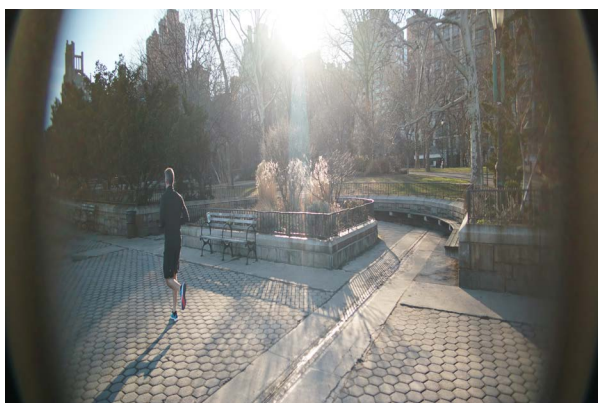
There are two ways to achieve 2.39:1 widescreen. Shoot spherical or anamorphic.

Spherical appears in the camera's viewfinder as a wide swath of picture with lots of unused top and bottom area (see diagram on opposite page). Anamorphic fills the frame and looks squished because anamorphic lenses use cylindrical optical elements to squeeze the image horizontally. The picture is desqueezed in post production or projection.

At the moment, Full Frame anamorphic comes in 2x, 1.3x and 1.25x squeeze ratios. I think we will see many more variations in the future. I also think we will become aspect ratio independent. As surely as Large Format is becoming the industry standard, cinematographers will want to fill those larger frames with squeezed anamorphic images.

An excellent way to rediscover Full Frame widescreen is with a Full Frame mirrorless still camera like a Leica M, Leica SL, Sony a7 series or α9 fitted with a PL mount adapter. The math is fun, so here goes. Let's begin by abandoning video and still photography aspect ratio numbers (16:9, 17:9, 5x7, 4x6). The math is much easier if we use traditional motion picture numbers, where aspect ratios end in a 1—as in 1.5:1 for Full Frame (not 3:2) and 1.33:1 (not 4:3) and so on.

The image below was photographed with a Scorpio 2x FFA 35mm Full Frame anamorphic lens on a Sony α9. The α9 sensor is 36 x 24 mm, which is an aspect ratio of 3:2...oops...1.5:1.



The image is squished 2x horizontally. Is it a problem that the Scorpio FFA vignettes on the left and right sides? No. That is unused picture area. The maximum area that we need has an aspect ratio of 1.195:1. How do we know it is 1.195:1? Because 1.195:1 is $\frac{1}{2}$ of the final, deliverable aspect ratio of 2.39:1 after it is desqueezed 2x horizontally. ($2.39 / 2 = 1.195$.)

Since these framelines don't exist on still cameras, you can mark the live view monitor display with chart tape.

Next, let's desqueeze. Open the image in Photoshop. In the menu, go to IMAGE > IMAGE SIZE. Simply multiply the WIDTH by 2. (Be sure RESAMPLE is checked. Use "Pixels" as units of measurement.) For example, if the Sony α9 image was 6,000 x 4,000 pixels, enter the new width of 12,000. Leave the height alone. Eureka. You have desqueezed 2x.



But, the picture is vignetting.

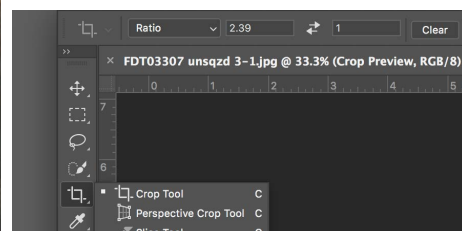
Yikes, and it also has a 3:1 aspect ratio.

How do we know this? Because Full Frame is 1.5:1 and $1.5 \times 2 = 3$.

Also, the Photoshop image resolution shows 12,000 x 4,000



Time to crop. Select the Photoshop CROP tool. Next to RATIO, enter 2.39 and 1. That's it. You now have a desqueezed 2.39:1 image. Photoshop does what cylindrical anamorphic projection lenses once did.



Anamorphic and Spherical Widescreen Field Trip

Now that we've graduated from Anamorphic Still Photography Math Class 101, let's enroll in Advanced Anamorphic Cinema Math. But first a field trip back in time for some anamorphic and widescreen history.

Marc Shipman-Mueller, ARRI Product Manager of Camera Systems, is our tour guide. He wrote, "Up until 1952, cinema formats were easy to understand because almost all mainstream movies and television were shot and projected in a 4:3 (1.33:1) aspect ratio of. When anamorphic productions surfaced after 1952, a number of aspect ratios were tried, including 2.66:1 and 2.55:1. (The need for further cost-reduction subsequently spawned the spherical widescreen formats of 1.85:1 and 1.66:1).

"An SMPTE specification for anamorphic projection from 1957 (PH22.106-1957) finally standardized the aperture to 2.35:1. An update in 1970 (PH22.106-1971) changed the aspect ratio to 2.39:1 in order to make splices less noticeable. This aspect ratio of 2.39:1 was confirmed by the most recent revision in August 1993 (SMPTE 195-1993).

"Unfortunately, most people were so used to referring to anamorphic films as 2.35:1, that many still used that aspect ratio even when talking about films shot after 1970. Similarly, 2.40:1

is incorrect, an unfortunate and unnecessary rounding up; a proper rounding up would be 2.4:1. The correct aspect ratio for anamorphic films shot after 1970 is 2.39:1."

And then there's spherical 2.39:1—shot with regular spherical lenses, not anamorphic.

Glenn Kennel, President of ARRI Inc, who worked on many committees in the transition from film to digital, added, "The DCI spec for the DCP (digital cinema package) used for distribution and projection is the aspect ratio (as defined in the original film specs) of 2.39:1.

"Scope" is shorthand for 'CinemaScope,' but in DCI documents may be used loosely to refer to the widescreen 2.39:1 format, which is distributed as "flat" or "1:1 pixels", whether it is captured with an anamorphic lens or just cropped from a spherical lens."

OK. Enough history. Let the games begin. Shoot. Edit. Desqueeze with DaVinci Resolve.

By the way, the examples that follow were shot with a Sony VENICE camera. The theory should also apply to other Large Format cameras: ARRI ALEXA LF, RED MONSTRO 8K VV, Panavision DXL, Canon C700 FF, with slight differences in the math because of different sensor sizes.

Anamorphic 2x Cinema Math Class

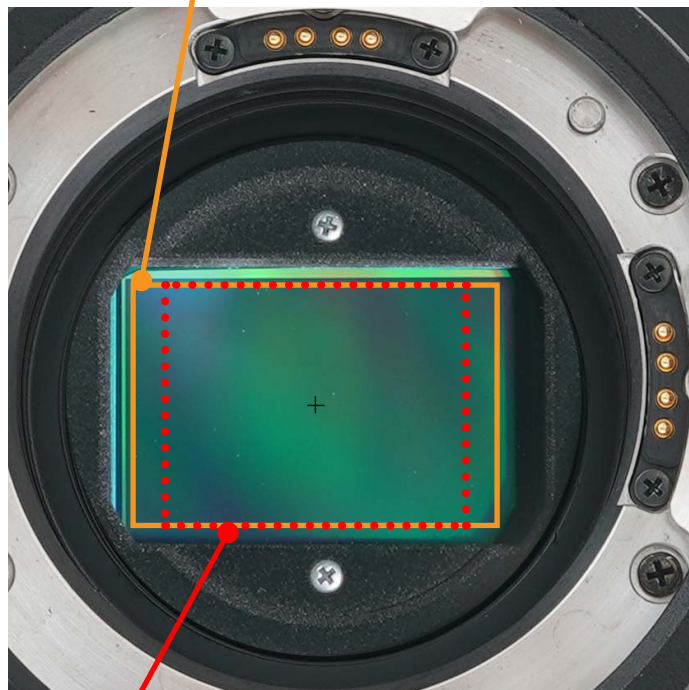
1. Scorpio FFA 2x 35mm Anamorphic lens on Sony VENICE.

VENICE Imager Mode: 6K 3:2 (1.5:1) 6048 x 4032 Full Frame, covering the entire sensor area of 35.9 x 24 mm. 23.98 fps. Recording X-OCN ST to AXSM card in AXS-R7 onboard recorder.



2. Here's the sensor. An Anamorphic 2x desqueezed 2.39:1 image begins life as a 1.195:1 aspect ratio on the image sensor. So, it is full height, but not as wide as the Full Frame sensor:

VENICE FF 35.9 x 24 mm sensor 43.3 mm Ø
6K 3:2 (1.5:1) 6048 x 4032 Full Frame



Scorpio FFA 2x Anamorphic - 28.68 x 24 mm (37.4 mm Ø)
2x squeezed (1.195:1) image area 4818 x 4032
will be 2.39:1 aspect ratio when desqueezed in DaVinci Resolve

Make your own User Frame Lines

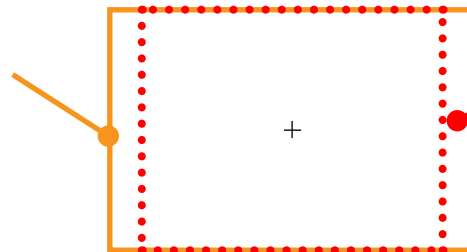


List of pre-defined aspect ratio framelines. Full Frame anamorphic is not a frameline listed here (yet).



Make your own User Frame Lines

VENICE FF 35.9 x 24 mm sensor
43.3 mm Ø 6K 3:2 (1.5:1)
6048 x 4032 Full Frame

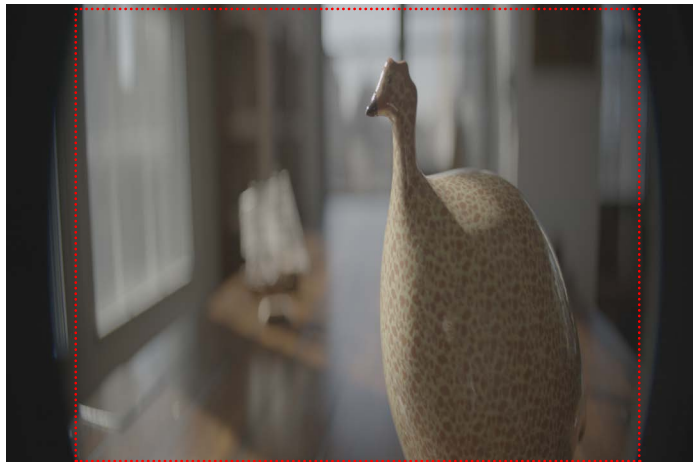
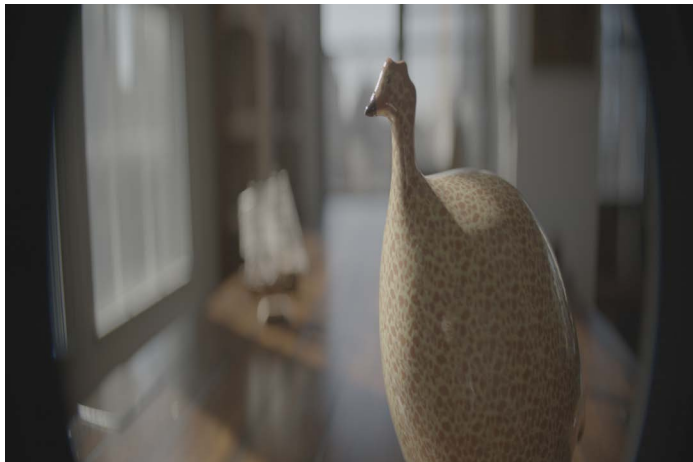


Scorpio FFA 2x Anamorphic -
28.68 x 24 mm (37.4 mm Ø)
2x squeezed (1.195:1) image area
4818 x 4032
will be 2.39:1 aspect ratio when
desqueezed in DaVinci Resolve

To set user frame lines for 2x squeezed anamorphic Full Frame:

- MENU 3 seconds > Project > Basic Setting > Imager Mode > 6K 3:2 > BACK
- Basic Settings> AXS Rec Format > X-OCN ST (or X-OCN LT) > BACK
- Basic Setting > Base ISO > ISO 500 (or ISO 2500)
- Monitoring > VF OSD (Viewfinder on Screen Display > Frame Line ON > Frame Line Select > Frame Line A> BACK
- Monitor OSD (on Screen Display > Frame Line ON > Frame Line Select > Frame Line A > BACK
- Frame Line A > Aspect Ratio > Off (these are predetermined frame lines which we are not using) > BACK
- Frame Line A > User Frame Line > On
- Frame Line > choose Color, Center Marker (cross hair), etc. > BACK
- User Frame Line > Height > 269 > BACK
- (this is the maximum picture height, which is 24 mm, 4032 pixels, The 269 number is an engineering figure, which hopefully will be replaced by actual resolution numbers in the future.)
- User Frame Line > Width > 384 > BACK
- I'm estimating here. The best way to figure this out is to aim at a 1.195:1 framing chart and adjust the width accordingly. The other way is to measure picture height (vertical) in millimeters on your monitor and multiply that number by 1.195. Next, stretch your tape measure horizontally and centered in your monitor and adjust VENICE's Frame Line Width. On my 13-inch monitor (330mm), I measured 143mm high. 143mm x 1.195 = 171mm monitor picture width. I then adjusted the Frame Line Width until the left and right frame lines lined up with 171mm on the tape measure. And that read 384 on the Frame Line Width menu. Crude but effective.
- VF Display > Frame Line > On > BACK
- VF Display > Frame Line Select > Frame Line A > BACK
- Press the HOME button to get back to the Main Display Home Page.
- VENICE does not at this time desqueeze Full Frame anamorphic, so hopefully you have a monitor that does.

Desqueezing with DaVinci Resolve

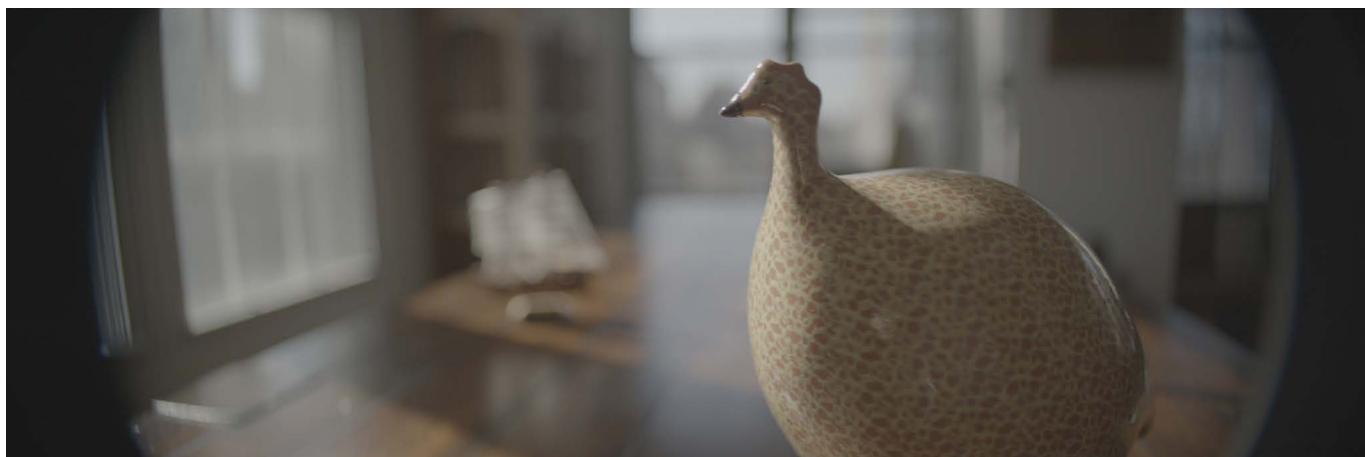
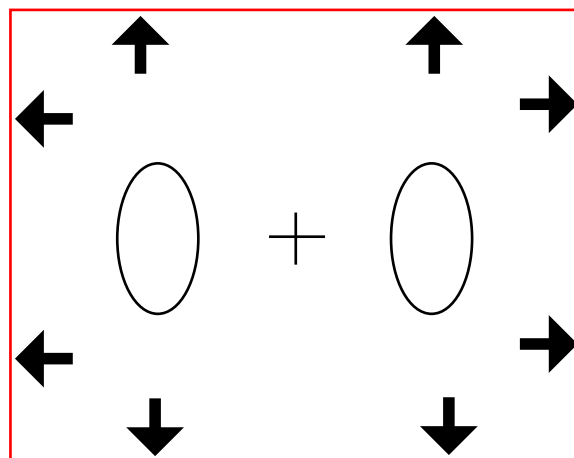


3. (Above) This is a framegrab of the Sony VENICE Full Frame 6048 x 4032 squeezed image. As with our Sony a9 still photography test, the sensor size is the same and so is the vignetting on left and right.

4. (Above, right) So, as with the Sony a9 test, we only need the active 1.195:1 area within the entire 1.5:1 Full Frame for our 2.39:1 final desqueezed picture.

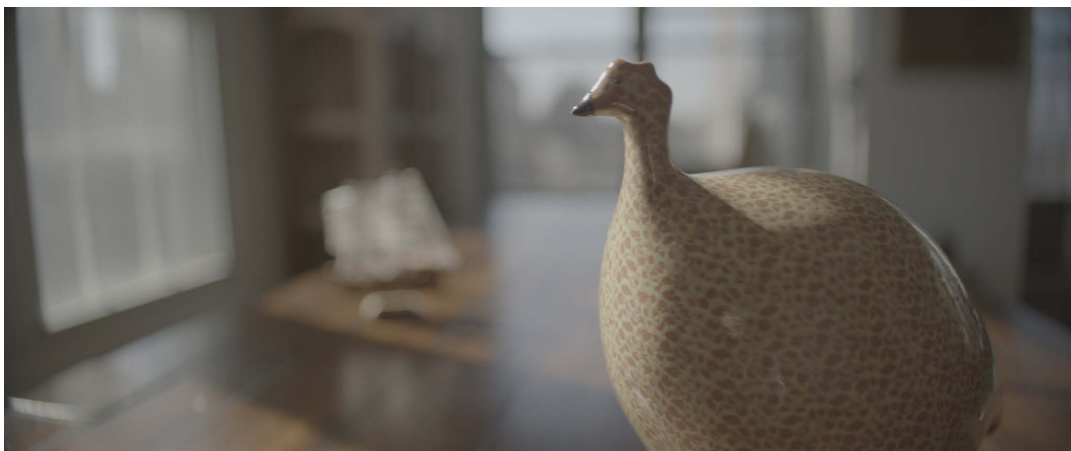
4. (At right) Because 2x Full Frame Anamorphic framelines don't yet seem exist, be sure to shoot a framing chart for your friendly DaVinci Resolve post production crew. Shoot the chart at right. When desqueezed, the ovals will be circles.

It's also a good idea to shoot framing charts as often as possible, because as the expression goes, "The projectionist has final cut."

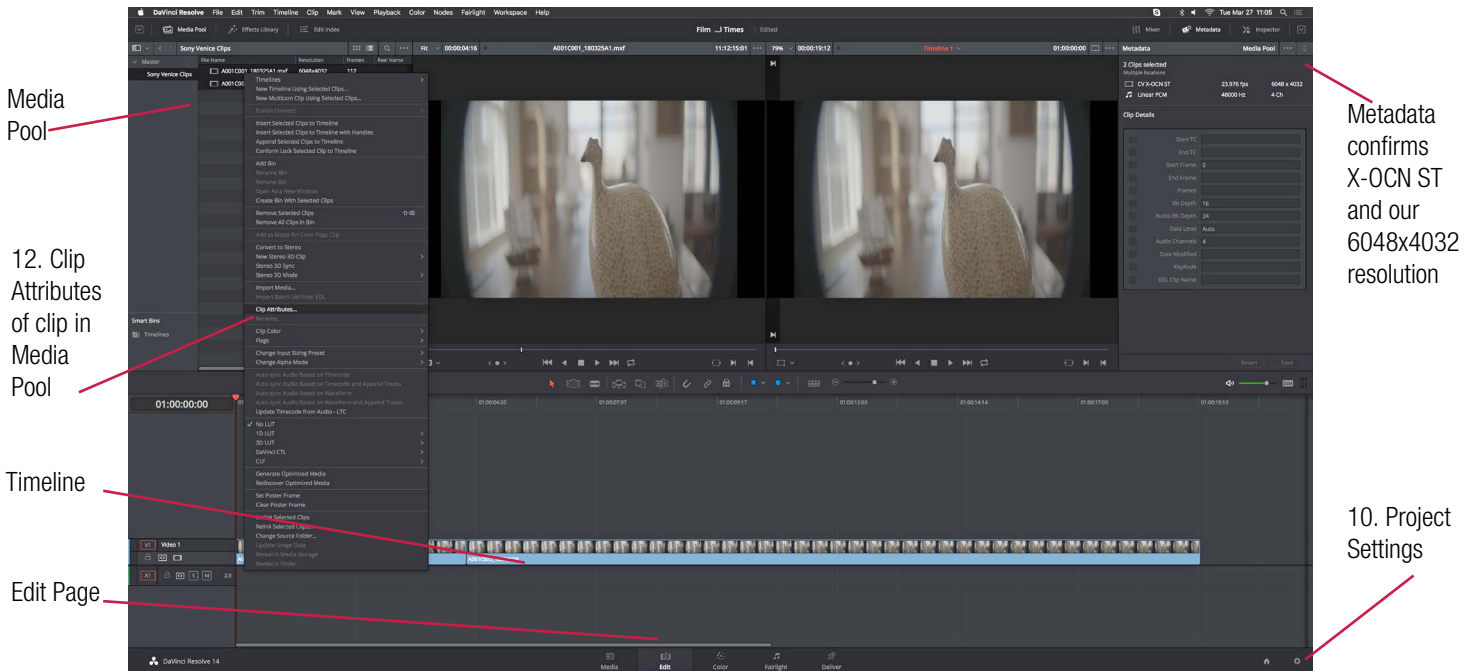


5. (Above) This is what the 2x desqueezed image will look like in DaVinci Resolve. It's Full Frame 1.5:1 x 2 = 3:1. But we want 2.39:1 instead.

6. (Right) In the lesson that follows, Blackmagic Design's Jason Druss will take us on a tour with DaVinci Resolve to desqueeze and crop 2x Full Frame anamorphic cinematography. Thanks Jason Druss.



Desqueezing with DaVinci Resolve, cont'd



A great thing about DaVinci Resolve is that there are often several different ways to accomplish a task. The following steps are the ones we took. Your style of driving and mileage may vary.

8. Sony VENICE X-OCN ST files are visually lossless and RAW. We copy these files from AXSM Memory Card onto hard drive with a Sony AXS-CR1 USB 3.0 Card Reader, and launch DaVinci Resolve.

9. Go to blackmagicdesign.com/products/davinciresolve/ to download the free version and the Studio version, or if you are already a customer, go to blackmagicdesign.com/support/family/davinciresolve-and-fusion for the latest software updates..

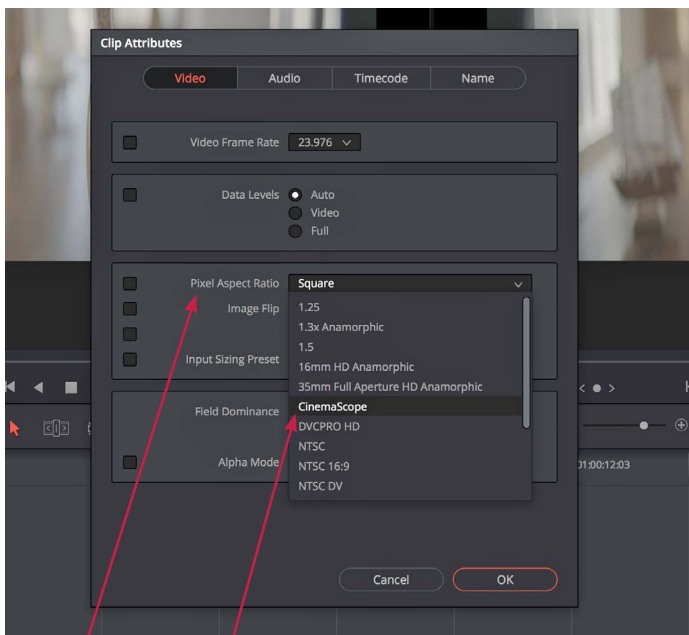
10. Go to DaVinci Resolve's MEDIA page. Drag the X-OCN file folders into the Media Storage Browser. Then drag the desired clips down to the Media Pool.

11. The clips have a 1.5:1 Full Frame aspect ratio. The image still looks squished. There's still vignetting on the left and right side. As Tom Hanks says in *Bridge of Spies*, "You don't seem alarmed." And Mark Rylance replies, "Would it help?"

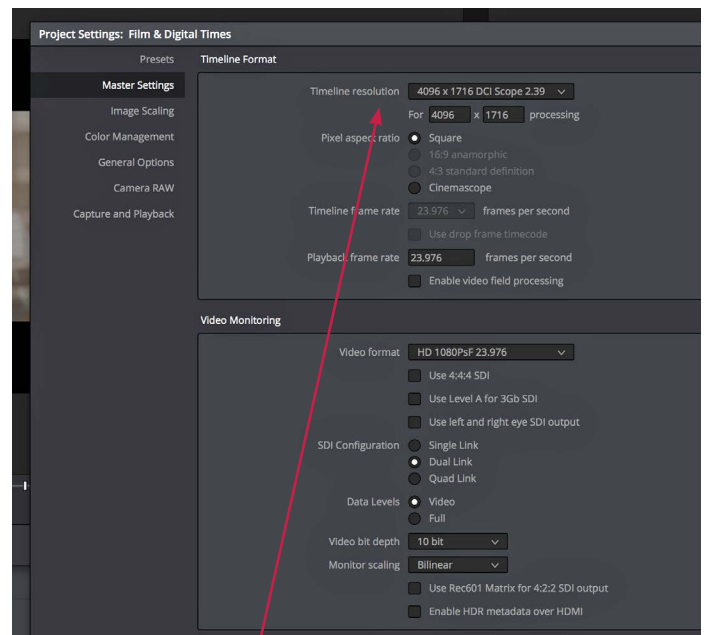
12. Here's help. Go to the EDIT page. Right click on a clip (or all clips by highlighting them all) in the Media Pool on the left side of the screen. Or right click on a clip within your timeline. Right click and select CLIP ATTRIBUTES from the drop down menu.

13. In the Pixel Aspect Ratio dropdown window (below, left) select CinemaScope and OK.

14. Change the timeline resolution to 4096 x 1716 DCI Scope 2.39 by accessing the drop down menu in your timeline resolution settings. They're accessed in project settings in the master settings tab (below, right).

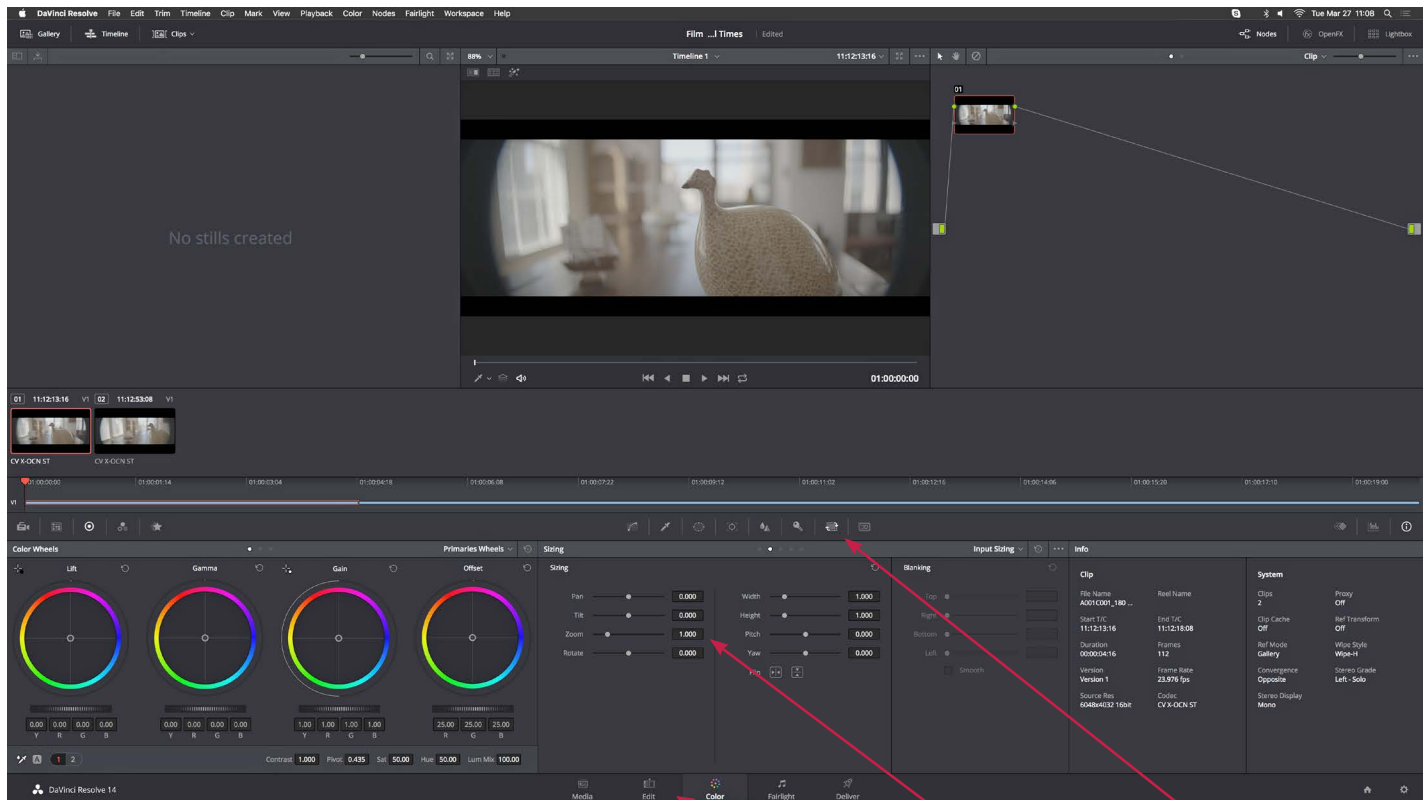


13. Pixel Aspect Ratio > Cinemascope



14. Project Settings > Timeline Resolution: 4096 x 1716 DCI Scope 2.39

Desqueezing with DaVinci Resolve, cont'd



16. COLOR Page

18. ZOOM Slider

17. SIZING

15. The image delightfully desqueezes (*above*). But the left and right sides are still vignetting because the aspect ratio is 3:1 and we see a letterbox top and bottom.

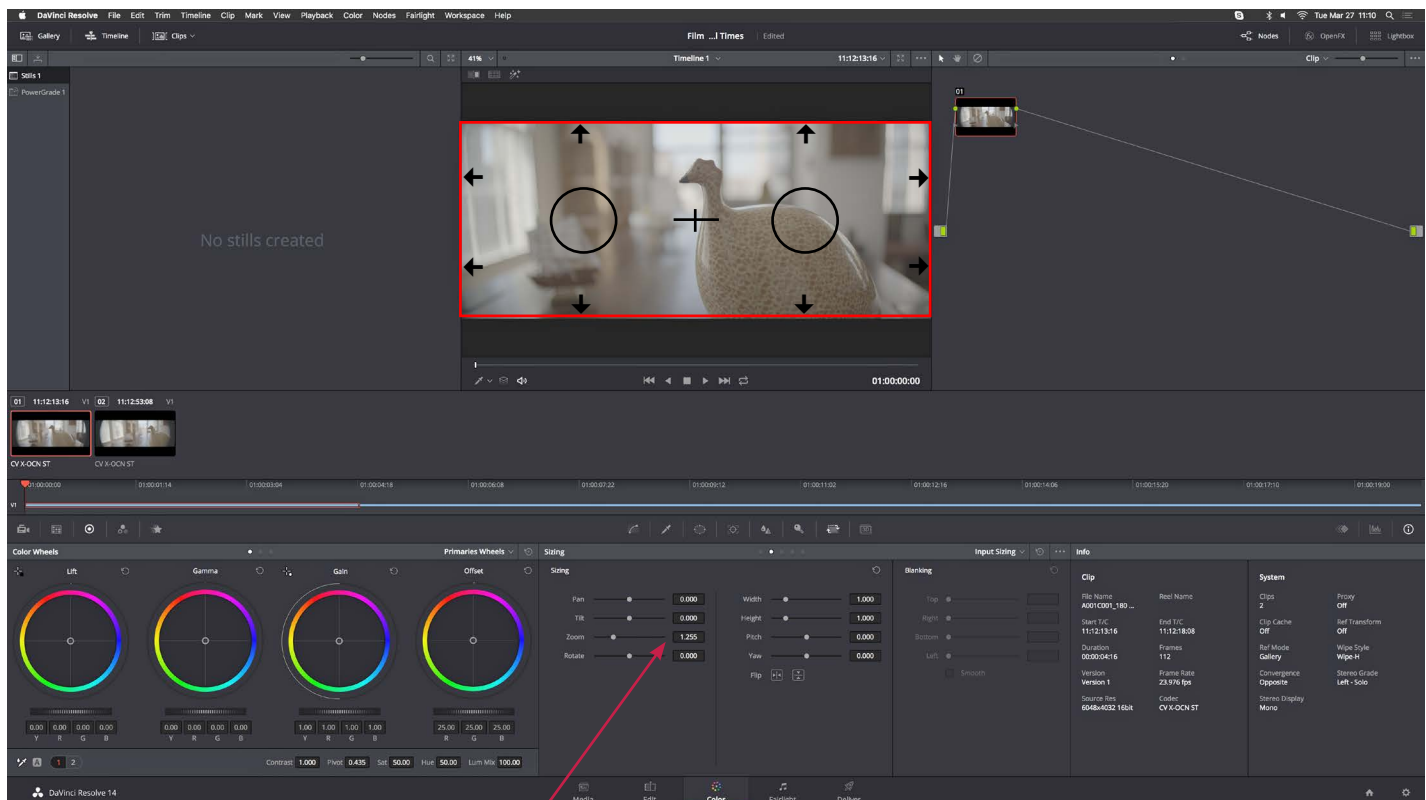
16. We are on the COLOR Page now.

17. If SIZING is not visible, click on the sizing tab immediately to the left of the 3D icon.

18. Adjust the ZOOM slider until the vignetting disappears. (Remember the framing chart you hopefully shot earlier. This is where it comes in very handy. Notice that the oval shapes are now circles, confirming the 2x desqueezing process is correct.)

19. We found the value of 1.255 worked well for the zoom setting.

20. *Below*: vignette is gone. 2.39:1 aspect ratio is correct.

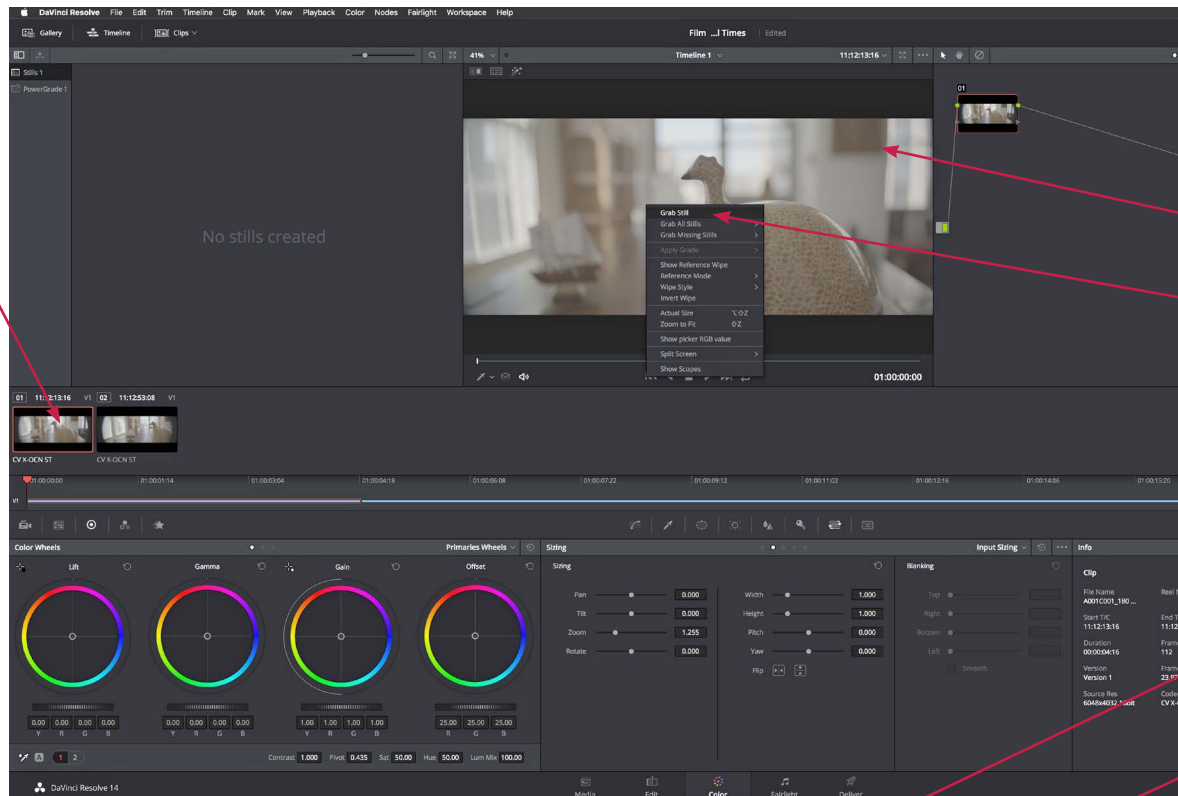


ZOOM to 1.255

Desqueezing with DaVinci Resolve, cont'd

22. Right click on clip to apply grade

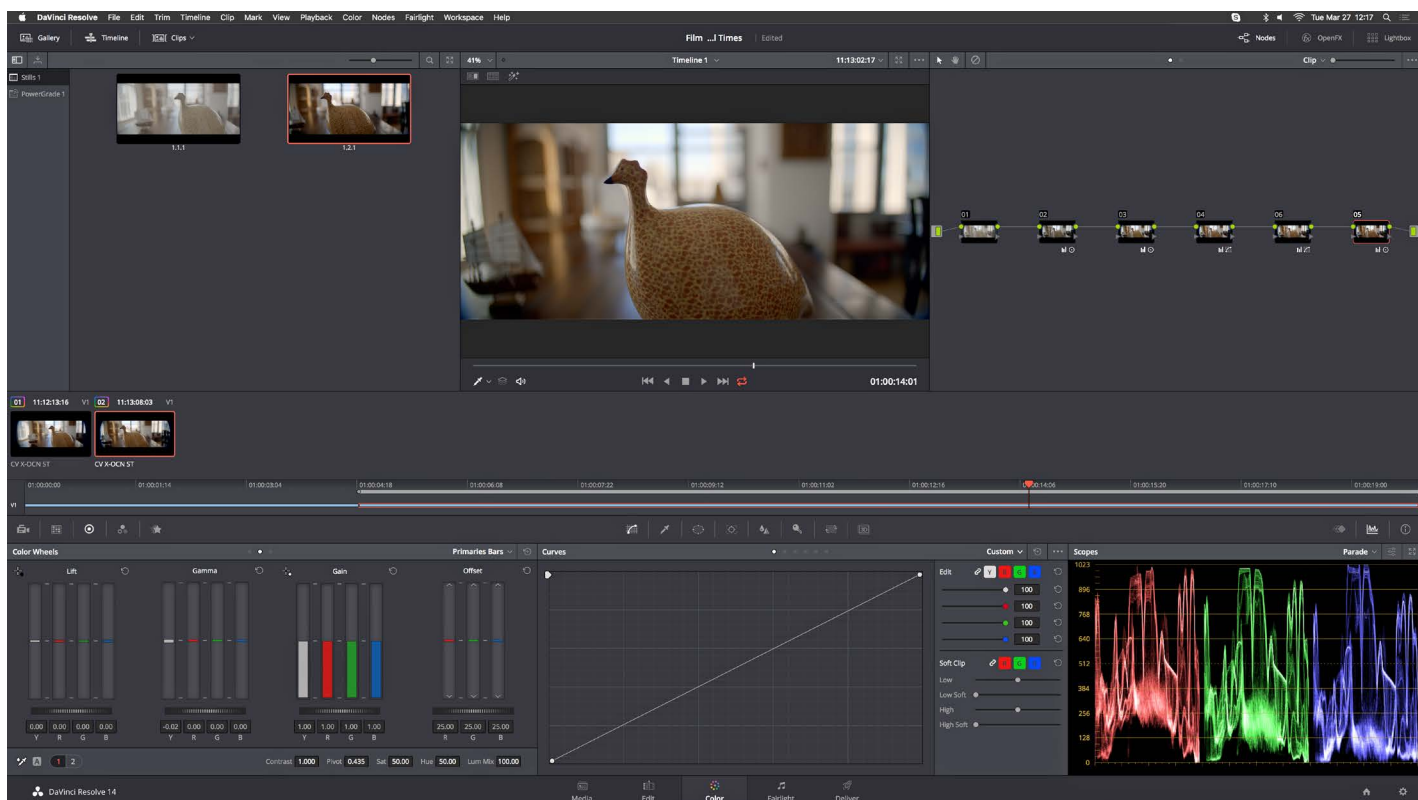
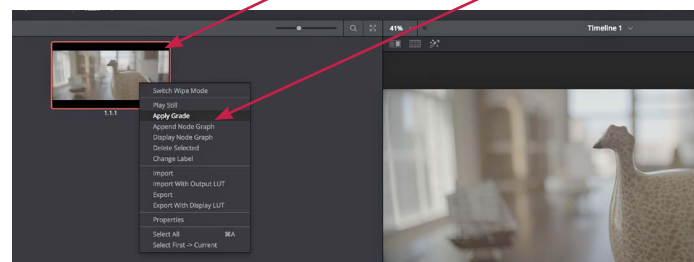
21. Right click on Viewer
21. GRAB STILL



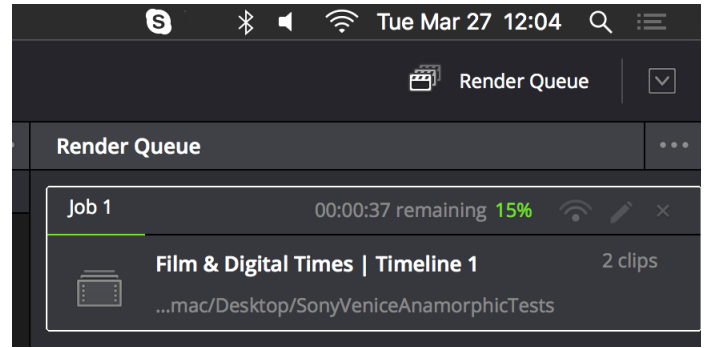
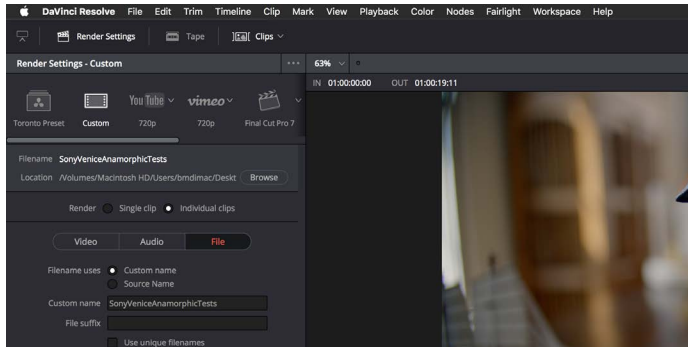
21. To automate the de-vignetting process with a node, right click on the viewer and GRAB STILL (above).

22. Select a clip (or all clips by highlighting them all). Right click on the still you just grabbed and select APPLY GRADE. The grade, in this case, refers to the input sizing adjustment, (right).

23. Next, grade the image for look, (below).

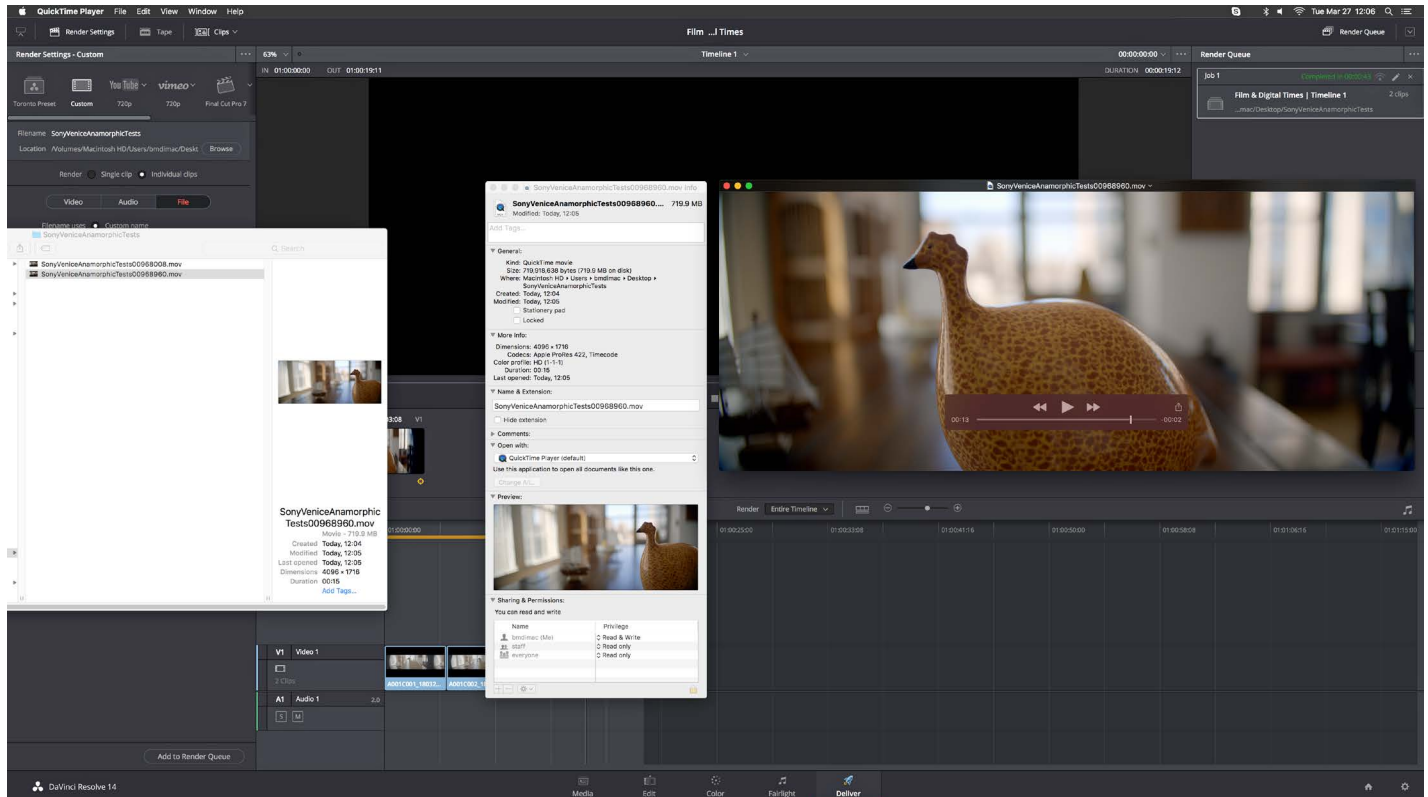


Desqueezing with DaVinci Resolve, cont'd

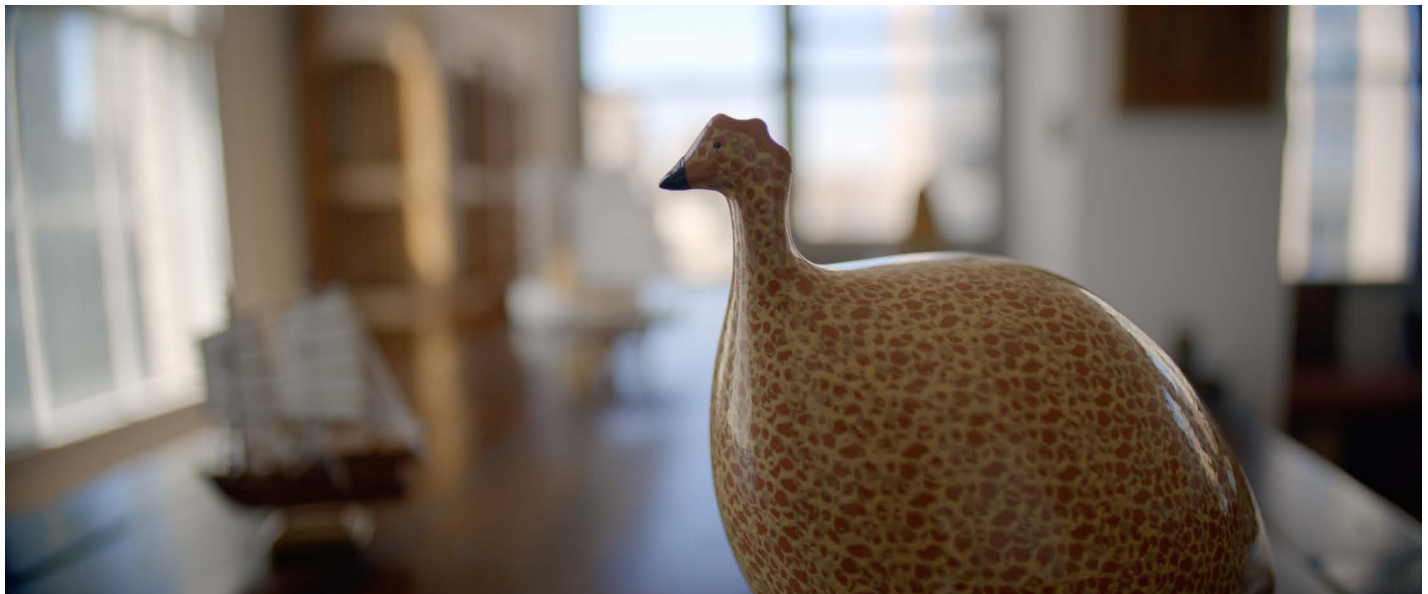


24. Go to the DELIVER page. Enter your render settings, destination and ADD TO RENDER QUEUE (above left).

25. START RENDER (above right).



26. Our Apple ProRes 422 Quicktime shows a resolution of 4096 x 1716, which is 2.39:1 (above). 27. Success! (below).



BOLT on VENICE



FDTimes has learned that Teradek is working with Sony on an integrated Bolt wireless video transmitter that...er...bolts onto the back of VENICE cameras. Essentially, it's a Bolt 3000 designed to integrate seamlessly with VENICE. It mounts to the back of the camera, passes power and RAW data through its 1-inch thick housing and then connects to the AXS-R7 Recorder and/or onboard battery. "BOLT on VENICE" matches Sony's color, finish and style. The rounded corners and profiles of the camera are carried through in the onboard Bolt design. Status indicators and connectors are on top of the unit—clearing the sides from clutter and maintaining a clean aesthetic.

teradek.com



Wooden Camera

Hollywood your VENICE.

Wooden Camera has all the things you would ever wish to find on VENICE: top handle, accessory power, baseplate, dual audio XLR 3-pin inputs, power distribution—and good looks.

woodencamera.com

VENICE AKS

Finder Extender:
AIR EVF Extension Arm
for Sony Venice

D-Box for Sony Venice —shown with
Gold Mount. Also available in V-Mount

- Intelligent power distribution
- Digital fuse
- 1x 4-pin XLR DC Input — when powered, allows accessories to remain powered during hot swap of batteries
- 2x D-Taps with 14.4 V DC power for accessories
- 1x USB 5 V
- 1x 5-pin connector and cable to Power Strip

Wooden Camera
Master Top Handle

Top Cheeseplate for
Sony VENICE

Tape hook

Power Strip (part of D-Box
System)

- 2x RS 3-pin Fischer 24 V
with Remote Start/Stop
- 2x 2-pin LEMO 14.4 V

A-Box for Sony VENICE
2x XLR Audio Inputs
(VENICE only has 1x
5-pin Audio XLR)

Solid Baseplate for
Sony Venice

Quick Release



Variously known as Touch 'n Go, Euro Plate, Sachtler Quick Release or RBQ (Ronford Baker Quick Release), these are undoubtedly one of the fastest and most secure ways to attach a camera to a head. There are two parts: the plate that screws to the bottom of the camera and the receptacle to grab it.

Initially, there were two sizes: 80mm mostly for 16mm cameras and 120mm for 35mm. Sachtler, O'Connor and Cartoni had Quick Release "receivers" in their heads. Ronford Baker made helpful Quick Release receptacles that many assistants had on the camera truck shelf, their carts and on low-hats. They are indispensable.

Now Wooden Camera makes the plate, the receiver and calls it the Touch and Go System. Get many of them.



Rosettes



Wooden Camera and many other companies make comfortable handgrips. The annoying thing about many of them (except SHAPE) is having to turn a thumbscrew to loosen, adjust and tighten.

Wooden Camera's new Push Button Rosettes let you adjust the a rosette itself with a push of the button.

The SHAPE of VENICE



Above: Shaping VENICE

NEW SHAPE Top Handgrip for Sony VENICE

The new SHAPE Top Wooden Handgrip is designed with a closed handle for secure handling. It attaches to the SHAPE Sony VENICE Top Plate for rig and tripod configurations. It has an ergonomic wooden grip. 19 mm and 15 mm removable rod clamps can be mounted in parallel or perpendicular orientations on both ends of the Cheese Rail. They can be attached in three different positions on top of the handle. Also, the Handgrip is screwed on the Top Plate using 1/4-20 UNC socket-head cap screws and can be removed from the Top Plate using the Hex Key included.

NEW SHAPE Top Plate for Sony VENICE

The rugged, CNC-machined aluminum Top Plate is designed to support and facilitate handling of the Sony VENICE Camera. It is secured on top of the camera using four 1/4-20 UNC socket-head cap screws. The Top Plate offers an array of 3/8-16 UNC threaded mounting holes on top and on both sides. ARRI-style anti-rotating locating holes are available to prevent your accessories from loosening onto the Top Plate and Top Rail. Two Velcro strap attachment slots are available for cable wrangling.

The SHAPE Top Plate also works with the original Sony VENICE handle and can be placed further forward for better balance. The 15mm Top Plate Rods allow you to mount the original Sony viewfinder and bracket. It is equipped with a 15mm rod clamp and removable 19mm rod clamps that can be mounted at the front of the Top Plate, allowing easy positioning of 15mm and 19mm rods to set the accessories at the proper height with respect to the Sony VENICE camera optical center.

In addition, the original Sony VENICE Camera Top Handle can be used with the SHAPE Sony VENICE Top Plate. The SHAPE Top Plate comes with a tool box and magnetic Hex Key, which are useful for adjusting and installing the Top Plate onto the camera. shapewlb.com

Opposite page: Charles is holding a SHAPE Telescopic Handle and Canadian Maple Hardwood Handgrip





Vocas has new accessories for Sony VENICE.

Top handgrip Pro kit for Sony VENICE

The Top handgrip Pro kit is designed with a closed handle. This gives the user extra grip, even when wearing gloves. It can be placed more forward than the original Sony handle for a better balance. The separate 19 mm viewfinder adapter for top handgrip allows the user to mount the original Sony viewfinder and bracket.

Dovetail adapter plate for Sony VENICE

When using the Dovetail adapter plate, the Sony VENICE can be part of the Vocas Sliding System. This adapter plate fits the Quick release dovetail plate, USBP-15 and Base plate BP-19.



Quick release dovetail spacer for Sony VENICE

For 19 mm base plates, Vocas has a Quick release dovetail spacer. The new Vocas Dovetail adapter plate fits the quick release dovetail spacer and this spacer is compatible with the BP-18 and BP-8.

MFC-6 kit 1:2

The new Vocas studio follow focus MFC-6 has a self-adjusting drive arm. By simply pulling the drive arm backwards and then releasing it, the drive arm will return to the lens and exert the correct pressure to the lens.

MFC-6 follow focus kits are available with gear ratios of 1: 1 and ratio 1:2. The kits include the MFC-6 gear box 15 mm, 2x MFC-2 / 6 knob standard, MFC-6 driver arm 1:1 or MFC-6 drive arm 1:2 and MFC-2 / 6 drive gear M0.8/40T.



Dovetail adapter plate

Matte box kit MB-623

The MB-600 matte box system is the biggest Vocas matte box currently available. It has exchangeable rotatable filter holders, a single filter and a double filter holder. A swing away and a regular bracket are both available for this 6.6"x 6.6" matte box. It includes externally operated patented eyebrows. Complete kits are available.

Vocas products are now available worldwide in their new webshop. vocas.com

Quick release dovetail plate



USBP 15 Mk II



Baseplate BP-18 MkII

VENICE in Tokyo



by Randy Wedick, Cinematographer and Band Pro Senior Technical Consultant

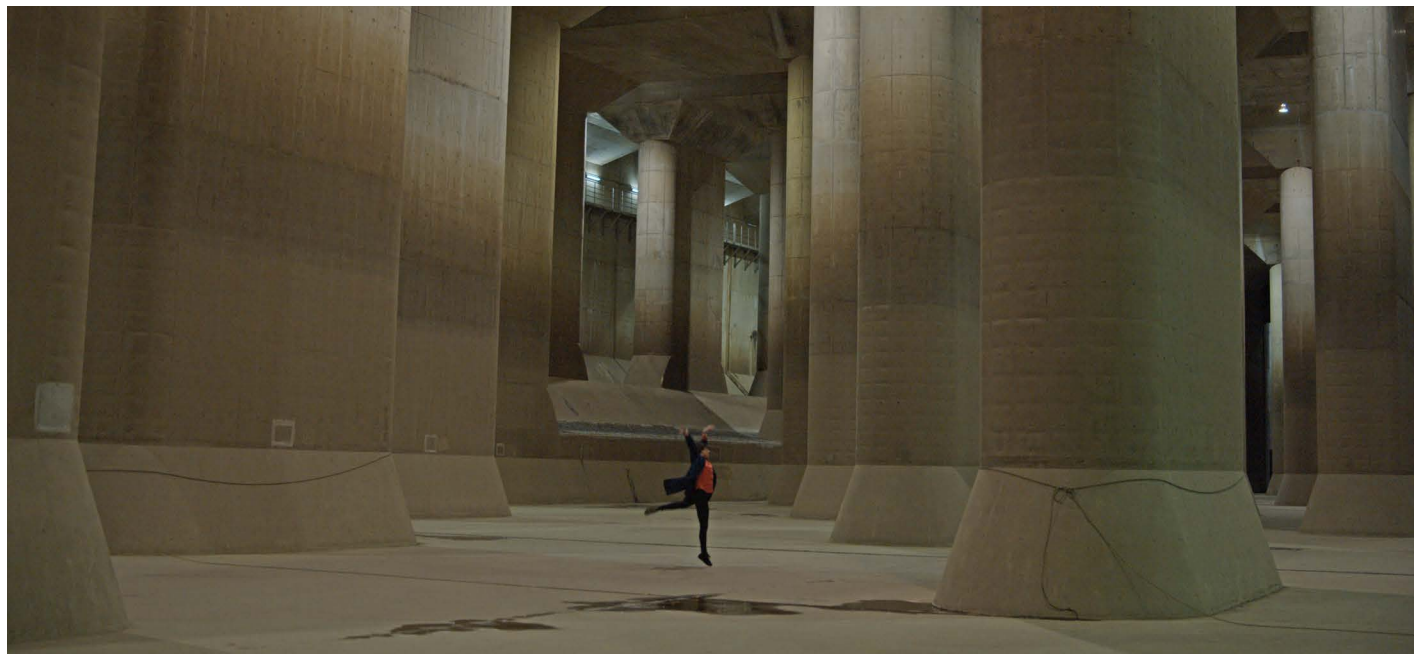
I traveled through Japan with a crew to make a demo film for the new Sony VENICE camera. My mother is from Japan and I've been visiting all my life. I have been photographing there extensively in the last 6 or 7 years, so I already had some choice locations in mind. Luckily, my friend Katie Malia was traveling with us as well. She is a very talented dancer. So we arranged to film her performing an improvised dance piece and we would have the Sony VENICE "dance" with her throughout a variety of locations. We'd shoot magic hour and high noon, with hard sun and soft light, and underground under artificial lighting. We would also change out the wardrobe and location colors to see how the camera picked up the subtleties.

We contacted our Tokyo producer Allan McIntyre and he got us in touch with local Tokyo Steadicam operator Tetsuo Suzuki. Peter Crithary from Sony contacted Takahiro Kagawa in the Atsugi office and had a camera delivered to Sanwa Cine Equipment Rental Company in Tokyo where we were checking out. Osamu Tsukada from Leica CW Sonderoptic and Yasuhiko Mikami from Angenieux brought Full Frame lenses: the Leica Thalias and the Angenieux EZ lenses. Masa Yasumoto and Yoichi Kunii from Sanwa Cine oversaw a first class prep for our skeleton crew. Joel Knoernschild was my 1st AC. He is also a talented director and helped me with some of the direction, leaving me free to supervise the visuals.

We shot in 11 locations over the course of the next 3 days. Some of them were long-time favorites of mine, others were suggested by our producer Allan, who has worked on many shoots in Tokyo and knows some great spots. We were very lucky to shoot in the Tokyo Metropolitan Area Outer Underground Discharge Channel, which is an enormous underground tunnel facility straight out of a sci-fi movie or James Bond set. It controls the flood water and rain water flow for all the water around the entire Tokyo Metro area. We took advantage of our one sunny day and shot on the beach in Odaiba and also in the Yushimi Tenjin Temple which was having the Ume Matsuri (Plum Blossom Festival) at the time,



VENICE in Tokyo, cont'd



where the plum trees flowered in brilliant pink, which we mirrored in our wardrobe choice for that scene.

We flew the camera on a Steadicam all three days. Suzuki-san, our Steadicam Operator, is married to a dancer, and was able to find the rhythm of the improvisation rather quickly, which was essential. For a few shots, we stripped down to sticks or a sandbag on top of an apple box.

Now that I am back in LA and looking at the footage, I'm able to draw some conclusions on the image quality of the VENICE as well as the lenses.

The Sony VENICE is the first camera that I am aware of that has a color palette that exceeds Rec 2020. That is a big deal, as it means that almost no colors are out of bounds. This means smoother transitions between colors and also leads to richer shadow saturation and highlight detail, both of which are very important when you are delivering in HDR. One of the big things I have seen with HDR displays is not just the amazing contrast range and ability to deliver super bright peak whites, but also to hold color saturation deep into the shadow region. This is one of the hidden reasons why HDR imagery is so impressive.

The S709 LUT that is shipped with the camera is an enormous artistic step for Sony. They worked closely with some bright minds in Hollywood to create a transform that will take the vast amount of dynamic range and color space and shape it into a pleasing, gently rendered, beautifully artistic-looking image. Often in the past, Sony cameras have been associated with the look of very accurate tones, but with a broadcast sensibility. This camera makes a departure from that look and creates cinematic imagery through its color palette and contrast rendering.

We shot on two ends of the economic spectrum, using Leica Thalia primes, which are extremely high-end lenses that are often used on the Alexa 65. We were lucky to have the current set of 5 lenses (30, 45, 55, 120, 180 mm) so we could frame up a lot of different shots with those choices. The 55mm lens played on the camera quite a bit. It is a custom-made focal length, not descended from an existing still lens. These lenses are extremely beauti-

ful. The coatings on them allow for tight sharpness and flare to exist at the same time. There is a lot of pleasing micro-contrast in the rendering, which means great details for the subjects that are in focus and pleasant roll off into creamy softness for the out of focus areas. It's really an incredible look. We commonly shot backlit into the sun and often flared the lens. These lenses have very beautiful coatings and elegant designs which result in some complex and beautiful flares.

In a few locations I knew we would only have 10-15 minutes to shoot and didn't want to lose a few minutes for a lens change and Steadicam re-balance. We needed a zoom that would cover a Full Frame 36x24 mm imager, so we got the EZ lenses from Angenieux. These gave us the coverage we needed but also maintained a T3 stop wide open and cinematic rendering as well. They offered less micro-contrast than the Leicas, but still rendered beautiful gentle images, and with pleasing flares. The sunset shots at Odaiba beach and the sequence in the underground water channel were shot on these lenses.

The Sony VENICE is a 1.0 camera and there are still many firmware revisions left to come, opening up many key features. Nevertheless, one thing I can say is that the camera works, it never crashed, it always rolled when we needed to roll. It makes beautiful images in 6K 3:2 FF format, which we shot in, but also can shoot up to 60p in 4K S35 mode. It's a very rugged, very stable camera. The internal ND filter wheel inside the camera is an incredible asset. Being able to cycle among 8 stops of ND in single stop increments when you are shooting magic hour, with the sun going down and needing to keep a matching exposure, is pretty incredible, especially in an environment like the one we had, flying on a Steadicam the whole time.

I look forward to more VENICE shoots and more VENICE capabilities as we go forward. I feel this camera marks a brave new step for Sony in the world of high-end cinema, away from the look of high-end television broadcast cameras and much further into the world of digital cinema raw image capture cameras than before.

bandpro.com

sanwa-group.com

sony.com/venice

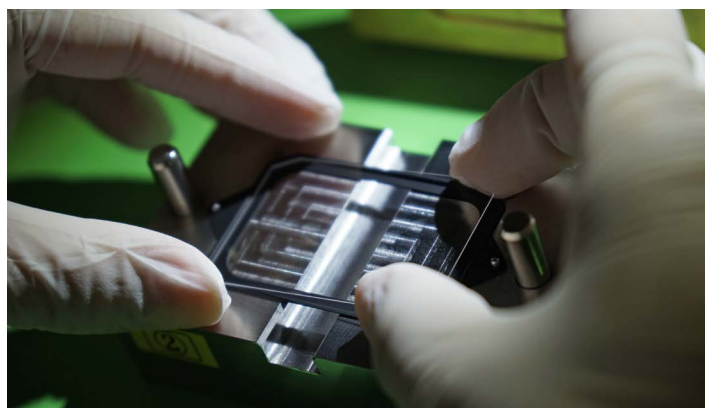
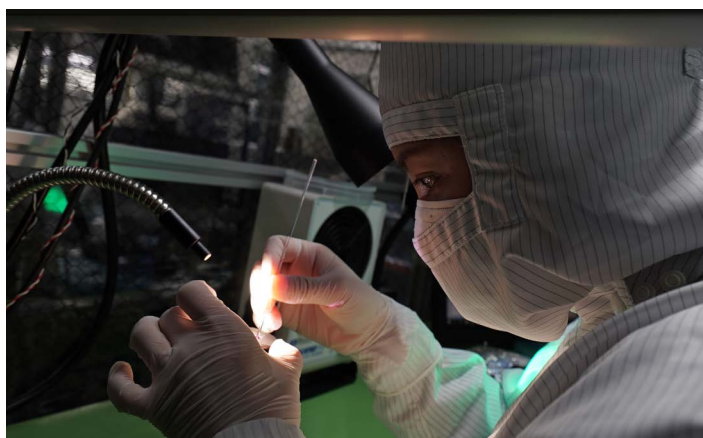
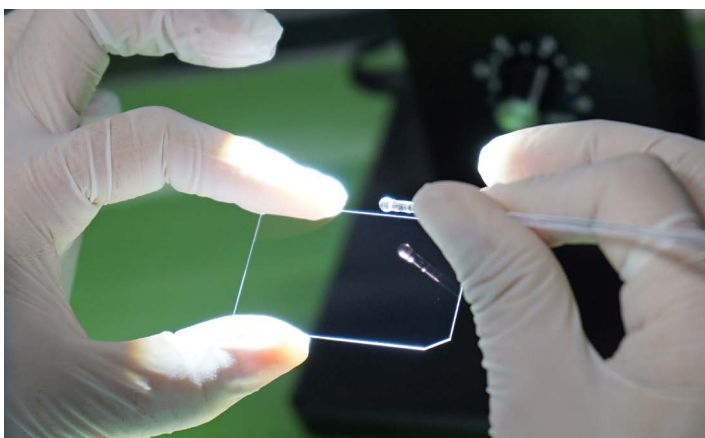
angenieux.com cw-sonderoptic.com

VENICE in Kosai - Sony Factory Tour

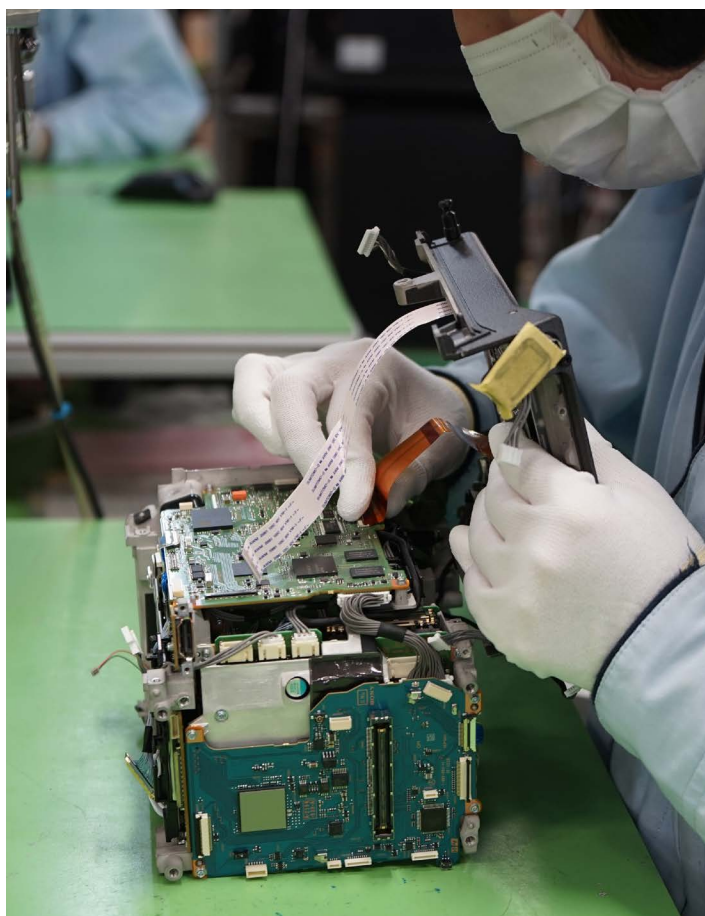
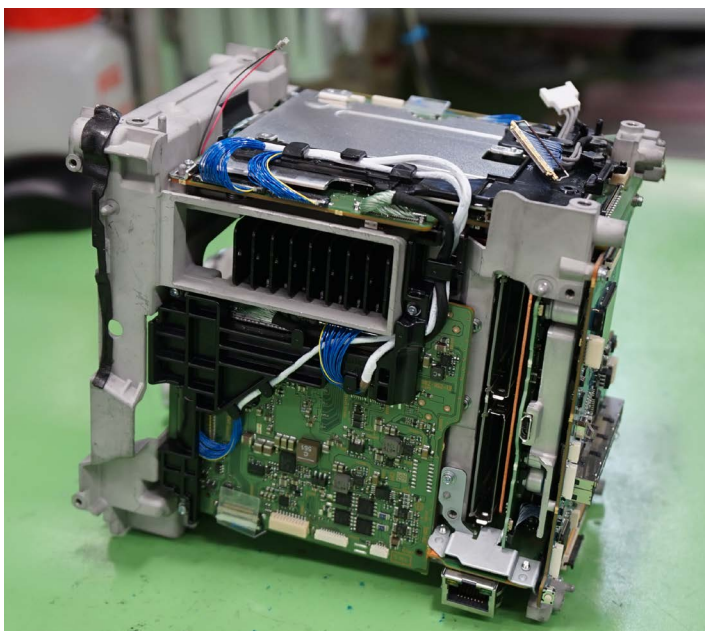
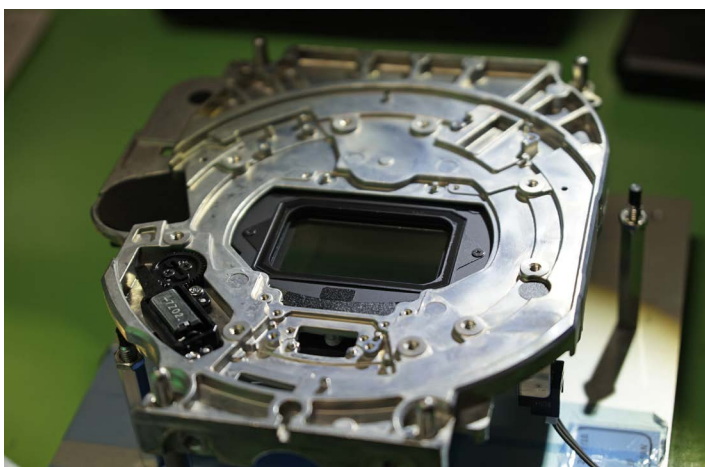
Sony VENICE cameras are assembled at the Kosai Technology Center, on the shore of Suruga Bay, with Mount Fuji towering to the West. It's 140 miles south from Tokyo Station.

Here is a whirlwind tour of the Kosai Factory and a quick look at

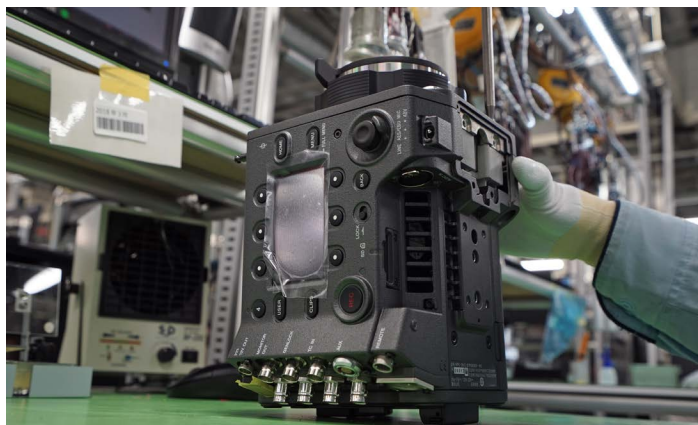
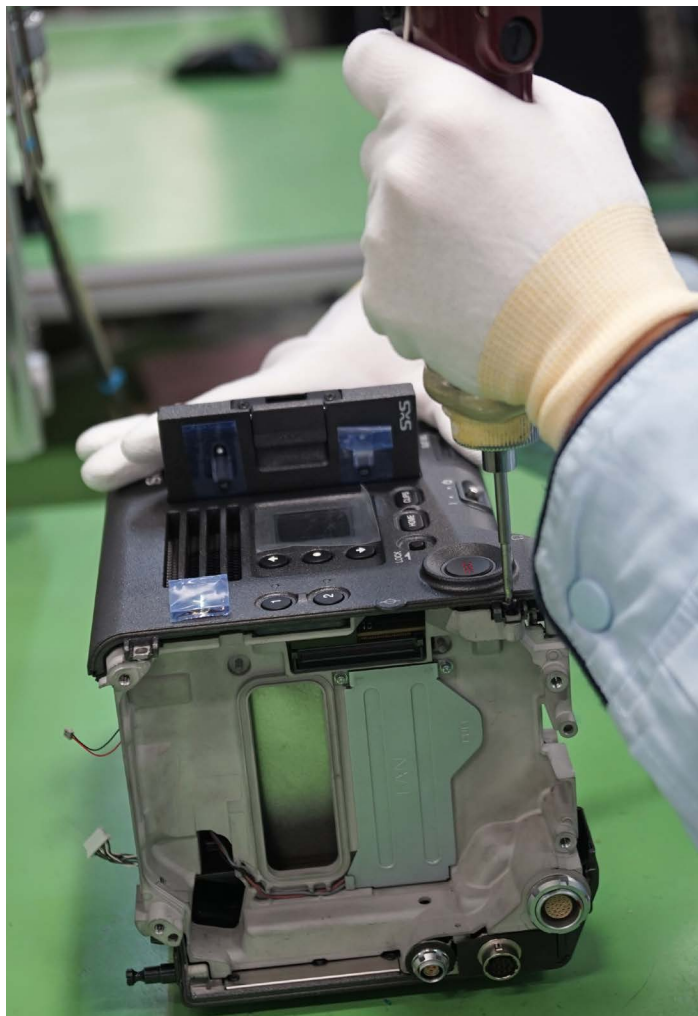
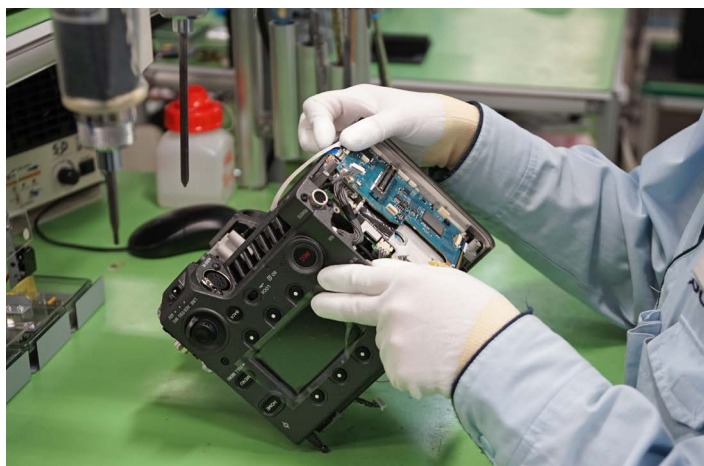
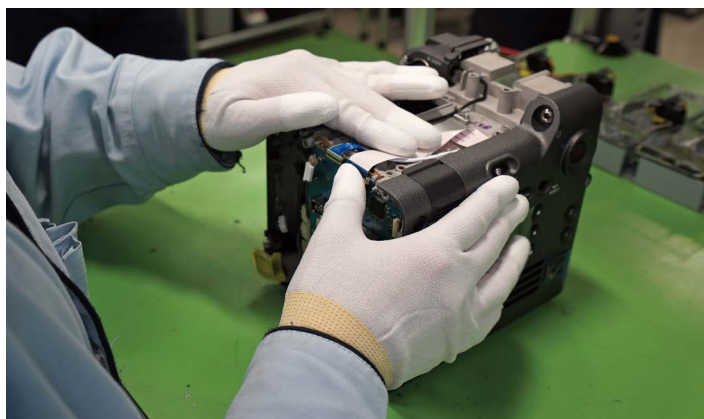
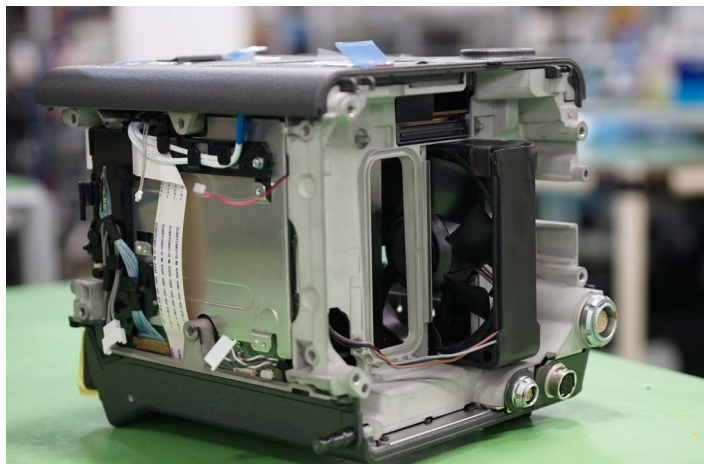
how VENICE is put together. It's interesting to see the engineering and craftsmanship involved in positioning the 8-step, 8-stop ND filter wheels between the sensor and the native E-mount, in a space that's less than 18mm deep.



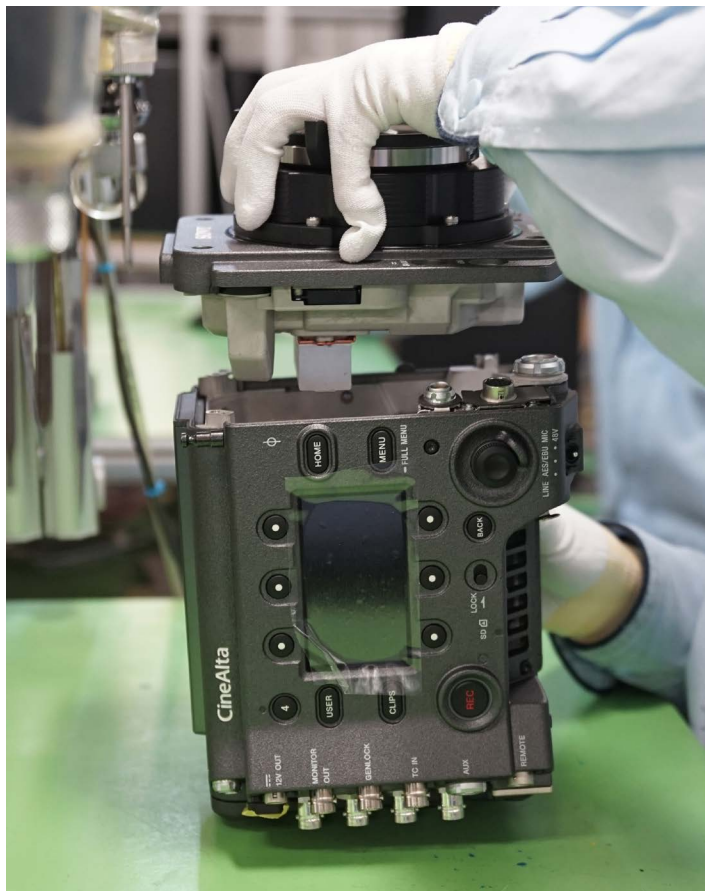
VENICE in Kosai, cont'd



VENICE in Kosai, cont'd



VENICE in Kosai, cont'd



Sony E-Mount Lenses



Sony NEX VG900 Full Frame E-Mount Camcorder



September 2013

Sony NEX-VG900. Sony introduced their first Full Frame digital cine camera at Photokina in September 2013. The NEX-VG900 Full Frame interchangeable lens, E-mount camcorder was intended for the prosumer market. It had a 24.3 MP 24×36 mm sensor and recorded 1080 HD at 24p/60p/60i.

History of Sony α-series and Full Frame E-mount

Most cinematographers grew up with Full Frame photography and continued to carry a familiar Full Frame still camera on set for personal use at all times. When the Sony α7 series first appeared, it was the beginning of a new relationship. I think the α7 series cameras and their 18mm flange depth E-mount were significant in establishing some of the fundamental design philosophies of Sony VENICE .

The Sony α7 and α7R were announced on October 16 2013. They were Sony's first full-frame mirrorless interchangeable lens cameras and were officially named ILCE-7 and ILCE-7R. "ILCE" stands for Interchangeable Lens Camera, E-mount." The α7 series used the same E-mount that were already popular on Sony's APS-C format NEX series.

The cameras looked similar on the outside. Inside, Sony's α7 had a 24.3 Megapixel sensor. The α7R was 36.4 MP, without a low-pass filter.

The α7S arrived on April 6, 2014. Instead of more pixels, it was an astonishingly meager 12.2 MP. This was a sensation; native ISO was 102,400 that could be expanded to 409,600. The α7S also offered Full-pixel readout and 4K video and slow motion to 120 fps. The race was on.

The α7 II came later that year in November 2014 with refreshed ergonomics and an updated body. The α7R II was announced in June 2015. New models appeared at regular intervals and each came with impressive new features that few could resist: α7 II, α7S II, α7R III, α7 III, α9.



Sony α7R PL Finder

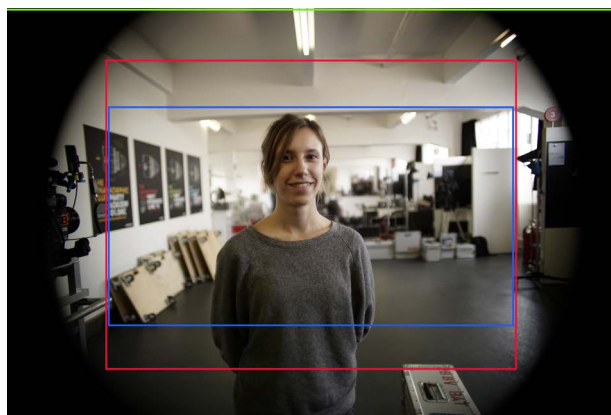
Sony α7R with Vocas PL to E-mount Adapter.



Every cinematographer loved the E-mount of the α7 series.

The mirrorless 18 mm flange focal depth of the E mount and full frame sensor made it an excellent director's finder with, for example a PL (or any other lens mount) to E-mount adapter.

Full frame 24x36 is important because APS-C cameras crop the height of anamorphic lenses. Full frame is also an excellent way to see the image circle of the lens—and how much you can get away with and how much shading (vignetting) you're willing to accept.



Red frame: 18 x 24 mm format. Blue frame: APS-C format. This is a Super35 cine lens and it definitely doesn't cover Full Frame.

Selectable Formats and the Sony α7R—November 2013

α7R has a Full Frame 24 x 36 mm sensor and E-mount



α5000 has an APS-C (15.4 x 23.2 mm) sensor. Note how both the α7R Full Frame camera and the α5000 use the same E-mount.



I wrote this in November 2013.

Rather than reading tea leaves, many clues to next directions for motion picture cameras come from the world of digital still photography. It was evident at the Sony Gallery in Ginza and at InterBEE this November: full frame 24 x 36 mm still format, frameline independent, any-lens cameras.

Why is this such a good idea? It predicts more cameras that let you attach almost any lens on the planet if you have the right mechanical adapter. It also means that these cameras will automatically detect the lens, the image circle (diagonal), calculate the format, let you indicate framelines, and the camera's software will automatically scale and crop the picture to fill the frame in viewfinder, monitor and recording device.

The next generation of cameras, I'm convinced, will be equally comfortable with just about any other lens and aspect ratio you can conjure.

There's little doubt that anamorphic lenses are going to be big this year. ARRI Alexas with 4:3 sensors (18 mm high) are compatible without cropping the picture height. Most other brands have sensors with a height of 15.8 mm or less. So rather than try to stretch a mere 3 mm more in height, my guess is that these manufacturers will leapfrog directly to sensors with 24 mm height.

After all, that's a ready-made sensor size in the digital still arena, and there are millions of them being fabricated.

Sony is building both still and motion picture cameras. The convergence is clear.

Sony's new α7 and α7R digital cameras are full-frame, 24 x 36mm, interchangeable lens cameras. They have the familiar Sony E mount—also used on their FS700 and NEX, which are APS-C size—but we now learn that the E mount covers full frame as well.

The α7R has a 36.4 megapixel CMOS sensor and no optical low pass filter. The α7 has a 24.3 megapixel CMOS sensor with faster autofocus and an OLPF. Both cameras have a crisp, focusable, 2.4 million pixel built-in OLED viewfinder. We're getting close to the point where EVF is almost as good as optical mirror reflex viewing. Both cameras record impressive full HD AVCHD 1920 x 1080 60p video.

The benefit of mirrorless electronic viewing is the opportunity for reduced flange focal depth. Without a mirror, you can position the rear element of the lens closer to the image plane. This means the lens can be lighter and smaller. Take a look at the new, compact, full-frame E-mount zoom and prime lenses for the α7R and α7 cameras from Sony and ZEISS.



Vario-Tessar FE 24-70 mm F4 ZA OSS zoom for Sony α7

Sony α7S—April 2014



Weight body only:
approx. 446 g
15.7 oz



Size (W x H x D):
126.9 x 94.4 x 48.2 mm
5 x 3 3/4 x 1.9 in

This was written in April 2014.

Sony sent aloft another signal flare at NAB 2014: more full frame sensors (24x36 mm).

My favorite part of Sony's annual NAB press conference is the unveiling with flourish of a previously secret new product. This year, it was Mr. Shigeki Ishizuka, President of Sony's Digital Imaging Group who proudly presented the new Sony α7S camera. Noting how the two worlds of consumer and professional imaging are merging, he introduced this third member of the Alpha 7 line (joining the α7 and α7R). Like its siblings, the α7S is a mirrorless camera with a 24x36 mm CMOS sensor and E-mount (18 mm flange focal depth.)

But there are big differences between this camera and its siblings. The α7S camera's 12.2 megapixel sensor is sensitive to an astonishing ISO 409,600. It shoots stills and UHD/4K video: 3840x2160, to be recorded to an external device. It has a superbly sharp OLED viewfinder (2,359,296 dots) and a 3" TFT LCD monitor (921,600 dots) built in.

Sony calls it "the world's first full-frame camera with full pixel read-out (without pixel-binning) during movie shooting. Pixel-binning is a way to combine image data from a group of pixels and treat them as if they were a single pixel. Pixel-binning can help increase sensitivity or reduce noise, but the trade off has been reduced resolution in the image.

The camera can process data from each of the sensor's photosites and can output HD and UHD/4K (3840 x 2160 pixels) video using the full-width of the full frame sensor. The pictures we saw at NAB were superb.

Compared to the α7R camera's 36.8 million photosites (ISO 25,600), this camera seemed almost stingy with a paltry 12.2 million—until I remembered the bucket analogy. The fewer the photosites, the bigger they can be, like buckets catching rainwater, or in this case, photons.

In addition to the benefits of very low-light shooting, the read-out of all pixels keeps the video free from aliasing and moiré.

UHD (3840x2160) can be recorded to an optional external 3rd party 4K recorder. Full HD (1920x1080) at frame rates of 60p, 60i, 30p and 24p can be recorded directly to an internal memory card.

Here's where it gets very interesting for FDTimes. Video modes

can be changed from full-frame to APS-C, which is very close to Super 35mm format. In this crop mode, the camera can support high frame rates up to 120 fps at standard HD resolution (1280 x 720p). So, attach a PL to E-mount adapter from Vocas, Solid Camera, Wooden Camera, Denz, or anyone else, and you suddenly have a tiny camera for almost any PL mount on the planet.

Note to machine shops: include an electronic component in the adapter that tells the α7S to crop and scale the 18x24 mm image.

Also, I guess the next generation of this camera will evolve with a denser sensor that crops APS-C to 4K.

The α7S camera is equipped with S-Log2 gamma, like the F5, F55, FS700, and F65. S-Log2 expands dynamic range up to 1300% to retain highlight shadow detail. The α7S uses an XAVC S recording format as well as AVCHD and MP4. XAVC S handles full HD at a data rate of 50 mbps and lower compression.

Settings for gamma, black level and color can be adjusted and saved. It also has Full HD and 4K baseband HDMI output, time code/user bits, frame markers and zebra displays on both the LCD screen and viewfinder.

Sony's complete α lens system is now up to 54 lenses for both A and E mounts, including premium Carl Zeiss and Sony G Series—and Sony has announced a new, full-frame 28-135 mm F4 power zoom lens in E-mount.





Above: a7RII E-Mount and diagram of image sizes.

Top left: Kimio Maki, Senior Gen Mgr, Digital Imaging Group, Sony Corp.
Left: Mike Fasulo, President of Sony Electronics. Photo: Forman.

NEW YORK, Jun. 10, 2015. At a penthouse press preview in the Parker Meridien Hotel overlooking midtown New York and Central Park, Sony introduced the a7R II (model ILCE-7RM2). It's a mirrorless E-mount 42.4 megapixel Full Frame 24×36 mm camera that does almost everything photographers and filmmakers were asking for:

- Full Frame 24×36 mm sensor for 4K UHD video.
- Windowed S35 format that also for 4K UHD video.

Sony's new a7R II Mirrorless Digital Still/Video Camera has innovative technology that, I'm convinced, foreshadows additional hybrid 4K Full Frame and Super 35 cinema cameras to come.

The internal hardware/software is powerful enough to process and record Full Frame video internally. Sony says this is a world's first. The a7R II camera shoots 4K UHD 3840×2160 video in either Full Frame or APS-C/Super 35mm mode—16:9 aspect ratio.

In Full-Frame mode, the a7R II uses the full width of the 35 mm sensor for 4K UHD recording: 20.25 mm high x 36 mm wide.

APS-C/Super 35mm mode retains 4K UH resolution. The camera uses full pixel readout without pixel binning and oversamples the data. It's still UHD 4K, 16:9 aspect ratio, on a "windowed" sensor area of 13.2 mm high x 23.4 mm wide.

A menu setting lets you select Full Frame or APS-C size automatically or manually. Automatic mode will sense the lens being used (as long as it is so equipped—mainly E-mount lenses) and fills the frame regardless of whether it's an FE or APS-C E-mount lens.

If you're shooting traditional 35mm 2x squeeze anamorphic (18 x22 mm image size, set the camera to MANUAL (OFF):

MENU→(Custom Settings)→[APS-C/Super 35mm]→On/Auto/Off.

The camera records XAVC S codec, 100 Mbps 4K UHD, at 24p,

25p or 30p, with 4:2:0 sampling, using Long GOP data compression in an MPEG-4 AVC/H.264 wrapper (.MP4 files).

Color management includes Picture Profile, S-Log2 Gamma and S-Gamut. Use an SDXC Memory Card with UHS Speed Class 3.

The a7R camera's E-mount with 18 mm flange depth offers a world of adapters for almost any photo or cinema lens known to man—including PL and PV.

There are many other interesting things about this camera that will be helpful for cine production. Image stabilization is provided by the sensor itself, not digitally, but physically. The sensor actually moves in 5 axes to compensate for pitch, yaw and shake. This could be great for drones, rigs, planes, trains and automobiles.

How does the new a7R II compare with the a7S? The new a7R II camera has a 42.4 megapixel sensor and a top sensitivity of ISO 25,600 (expandable to 102,400). Its 5-axis image stabilization system is equivalent to shooting at a shutter speed approximately 4.5 stops faster. There's no OLPF (Optical Low Pass Filter).

The a7R II Full Frame 24×36 mm 42.2 megapixel back-illuminated sensor has a gapless OCL (On Chip Lens) design and a copper wiring layer, instead of aluminum, that reads out 3.5x faster than the previous a7R model. The XGA OLED 1/2" (1.3 cm) EVF is very sharp, with 2,359,296 dots and 0.78x magnification.

The a7S has a 12.2 MP sensor and ISO maxes out at 409,600.

Of course, there never was a DP born who didn't ask, like Oliver Twist, for more. The APS-C/S35 center crop is 13.18 mm high—but what we'd really like is 18 mm high (and choice of 22 or 24 mm wide) to accommodate all the anamorphic lenses out there. Anamorphic desqueeze in the viewfinder and monitor would be nice. SDI output? RAW uncompressed output? Maybe the next model: a7R Mark III. No, matter, the a7R II is still astounding.

Motoyuki Ohtake on Sony Lens Design



Motoyuki Ohtake, Sony Distinguished Engineer in Optical Department



Motoyuki Ohtake with Sony a7RII at Chao Praya River, Bangkok

Sony E-mount lenses have been getting great attention among still photographers. With Sony VENICE's E-mount, it's only a matter of milliseconds before cinematographers will try out some of the high-end G-Master lenses. I think it also would not take a great stretch of the imagination to wonder whether Sony will develop these G-Masters into a line of cine lenses.

Motoyuki Ohtake is a Distinguished Engineer in the Optical Design Department of Sony's Digital Imaging Group. We first met at a seminar during Cine Gear. He was slightly jetlagged and sore from his daily run (he's a marathon runner). But at the end of our long discussion, he said, "One day you have to visit our lens factory. It's very advanced and interesting."

So here we were a couple of weeks ago, sitting on the terrace of the venerable Oriental Hotel on the banks of Bangkok's Chao Praya River. I was here to visit the Sony factory in Chonburi, where the a7 series Cameras, G and G Master Series Lenses are assembled. As we sipped Thai jits (Mekhong Rum, Brown Sugar Cane, Fresh Lemon-grass, Fresh Lime, Fresh Ginger), Mr. Ohtake discussed lens design.

JON FAUER: How long have you been at Sony?

MOTOYUKE OHTAKE: I have been working for 13 years at Sony headquarters in Shinagawa, Tokyo.

Where were you before that?

I studied optics in university and I have been working as an optical engineer for more than 25 years.

How did you get into the business of designing lenses in the first place?

I was originally interested in studying waves. As in audio—sound waves. In the university, they didn't teach audio, so I switched to optics. Some of the theories are similar. I was interested in learning as much as possible about optics and light.

Take us through the design process of a Sony camera lens.

First the product planning team offers us the idea of the new lens. We work with the planners on the specifications and optical design to come up with the best balance of optical performance, size, weight and cost. We begin on a rough design.

Let's fast forward to the latest series of lenses that you've just introduced, the G Master Series. Was the design process differ-

ent from what you had done before?

Yes. When they asked us to make an f/2.8 zoom lens, I thought that we should also improve the optical performance.

It was at first a regular Sony 70-200 G Lens, not a G Master?

Yes, but we had to change and improve some things about the lens. We targeted the ultimate level of the performance, which was the starting point of the G Master.

How did the G Master come about?

In the beginning we had lots of discussions with the product planners, the marketing team and the business unit responsible for selling interchangeable lenses. First, I proposed the criteria for optical performance that would define the characteristics of the series. Then I offered to improve the resolution.

Our existing G lenses have good bokeh (the out-of-focus highlights). However, it's difficult to combine high resolution and pleasing bokeh. Finally we found an answer. The result is the G Master, with a characteristic combination of high resolution power and good bokeh.

What are the optical specifications?

At least 50 line pairs, high MTF, high contrast. In the design process, it's difficult for us to improve the spatial frequency. And in our mass production, it also can be difficult to maintain accuracy. So we made a new machine to make the lenses very accurately. The XA (extreme aspherical) lens elements are made in our factory in Japan, and we developed new techniques for processing the glass.

When you make molded lenses, do you begin with glass that's almost the right shape, then heat it up to the consistency of Jello, and finally press it with a precise mold to give it the final shape?

Yes, and to avoid bokeh that look like onion rings, we changed the process of making the aspherical lenses.

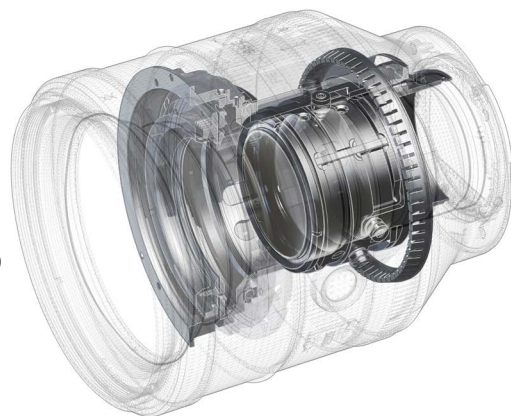
A process that you won't reveal to us, of course. The G Master optical elements are then shipped from Japan and assembled at your factory in Chonburi, Thailand. Why?

That's a difficult question but it is mainly because of quality and mass-productivity. The Thailand factory has already been making



Sony G Master FE 70-200mm
F2.8 GM OSS, FE 24-70mm
F2.8 GM, FE 85mm F1.4
GM, 2x Teleconverter, 1.4x
Teleconverter

Cutaway rendering of
G Master focus group



products with very high quality.

There are currently three G Master lenses now: 85mm f/1.4, 24-70mm f/2.8, and 70-200mm f/2.8. Will there be more?

Yes, we should have more G Master lenses in the near future.

Is your design influenced by the fact that Sony makes the cameras, the sensors and the lenses?

Yes. The camera body is usually renewed every year or two. But the lens design lasts for more than 5 years, sometimes over 10 years. So we need to make the lens design future-proof for the future camera body or image sensor plans.

Does one camera having an OLPF and another one not having it affect the design?

We have a rule about the thickness and the variety of the cover glass on the sensor. Also, because the flange focal depth of the E-mount is very shallow, we take these factors into account.

The flange focal depth of the E-mount is 18 mm. As a lens designer, does that short flange focal depth enable you to make a smaller lenses?

Yes. The E-mount is good for designing wide angle lenses. I think that a short flange focal depth is helpful in designing for greater optical performance. You can easily understand the advantage of the E-mount because the wide angle lenses have a very high MTF.

Was the E-mount intended to be full frame when it was first introduced on the APS-C format cameras?

Yes, in the beginning of the E-mount system, we concentrated only on APS-C format. Then we introduced full frame E-mount cameras with the a7 series.

When you look into the future, which Sony interchangeable lens camera is going to be more popular: APS-C or Full Frame?

I think both of them.

Do you think the professional cine business will migrate to Full Frame for the same reasons?

Yes, definitely.

But some rental houses are worried that the next generation of Full Frame sensor cameras could make their existing lenses obsolete. That should not be a concern, because an interchangeable lens mount would accommodate any format lens. A full frame sensor lets cinematographers use almost any lens that's

ever been made and offers a lot more flexibility.

Yes, and another benefit of Full Frame is that we can control the bokeh even more by changing the iris.

Oh, tell me about that.

Because focal length, for the same angle of view, is longer in Full Frame than in APS-C format. So the bokeh is more effective and there are more creative choices.

Tell us about the collaboration process between the Sony product planners, your design team, and the engineers.

The planners come up with some ideas that we discuss together with the technical engineering teams. We define the specifications of the lens first. After that we spend much time in the design process. We have a lot of meetings to discuss and decide detailed parts of the product while designing.

How much has it changed from the initial concept?

We always have several different ideas in the design process. That is because we'd like to make the new lens as special as possible with the highest image quality.

When you're discussing a future lens with the planners, aside from resolution and bokeh, how do you determine the look?

First of all we have to satisfy the standard specifications about the MTF and resolution. After that, we'll discuss, with the planning team, parameters like size, weight, cost and other characteristics. We will arrive at a consensus about the image quality, and after that we discuss the design.

You are called a "distinguished engineer." What does that mean?

Distinguished Engineer means top engineer at Sony. I'm one of them. I'm a specialist in optical design.

Which lens are you most proud of?

I think that the G Master is very nice because many customers wanted such a lens and also it was quite difficult to make. So far, every customer has said, "Wow." That's very important for us.

It's almost similar to working on a movie. Like the director or cinematographer, you don't really know until the audience sees the finished film whether it's a success or not. Is there anxiety waiting to get the customers' reactions?

Sometimes yes, because in the design process we never see the actual image created by the new lens. We simulate the images in soft



Sony G Master FE 24-70mm F2.8 GM

ware. Sometimes there can be some problems in the actual lens, so the first prototypes are very important for me. Sometimes the first prototypes make me excited but sometimes they make me sad.

After you do the simulations, do you make prototypes or go right into production?

We make prototypes first.

Do you sometimes reject those prototypes?

Sometimes. If we don't like the result, we have to re-design after checking the prototype. It's very tough for us to have to re-design.

Do you see Sony getting even further into the cine lens business?

I hope so. But unfortunately, I can't make any comment.

A lot of cinematographers talk about "the look" of the lens. Do you as designers think of it as a look or do you think of it more in terms of mathematical values and functions?

I think the look of the lens is important. But we should concentrate on optical performance first. Because no one wants to be looking a good lens having bad optical performance. For example, fortunately, many cinematographers have asked us to let them try the new FE 85mm F1.4 GM. I think everyone feels the marvelous optical quality and is fascinated. So I think the look of the lens comes after optical performance.

When you are designing a lens, what is the priority? Is it the look, the personality of the lens or the technical specification?

I think that the combination of lens with camera body is very important. I believe that the lens should maximize and enhance our cameras' performance.

When you design for a full frame sensor as opposed to APS-C, does that mean the lens has to be twice the size in general?

Almost. After the initial design phase, we try to make it as compact as possible. The first priority is optical performance. The cost, size and weight come after that.

Do you work hand-in-hand with the mechanical designers?

Yes, always. We are on the same team.



Sony Factory in Chonburi, Thailand

Were we dreaming or jetlagged? The next morning, Motoyuki Ohtake, Peter Crithary, Shinichi Ohno and I seemed to be flying in a car. We were driving on the Bang Na Expressway, a spectacular precast concrete highway built 46 feet in the air, above an older, existing road, and one of the longest elevated structures in the world. Built at a cost of \$1 billion, it stretches 35 miles south-east from Bangkok towards Chonburi, and our destination, Sony Technology Thailand Co, Ltd (STT). Sony is located in a huge and modern 496,054 square foot facility in Amata Nakorn Industrial Estates, where at least 500 major corporations, many of them Japanese, also have manufacturing facilities.

We were welcomed by board members Yoshiaki Murakami, Intira Burana and Kenichiro Aridome. Thailand has 64 million citizens and a GDP of \$387 Billion, putting in second in Southeast Asia (after Indonesia). Unemployment is 0.7%. Among other products, STT is where Sony interchangeable lenses and still cameras are assembled with pride and a culture of *monozukuri* (craftsmanship). And that's why we are here—to see how Sony's a7 series cameras and E-mount lenses are made. It's been quite a success story.

We changed into clean-room clothing. The first stop was the enormous area where full frame a7II, a7RII, a7SII and APS-C format a6300 cameras are assembled. We followed the progress of an a7RII as it progressed from sub assembly to sensor installation, main assembly to adjustment, then inspection and packing. Quality control is handled visually as well as by automated photo checking to spot any missing screws or misalignment. It was remarkable how clean, calm and quiet the area was—and the notion of *Kaizen* was clearly at play. The skilled workforce is encouraged to make suggestions, and more than 1,000 improvements based on ideas from the people who make the products are implemented each year.

Next stop was the vast clean room, the size of a football field, where the lenses are put together. Optical elements are delivered from Japan. Mechanical parts come from a variety of locations, including high-tech local suppliers. Upon arrival, they are ultrasonically cleaned, inspected, assembled, tested, checked, and packed. Sony STT manufacturing is highly automated and aimed at high volume production.

Sony Lens and Camera Factory Tour, cont'd



Entrance to Sony Technology Thailand Co, Ltd in Chonburi



a7 II, a7R II and a7S II with G Master 70-200, 24-70 and 85mm lenses



Pity the person in a camera company taking a picture—many critics



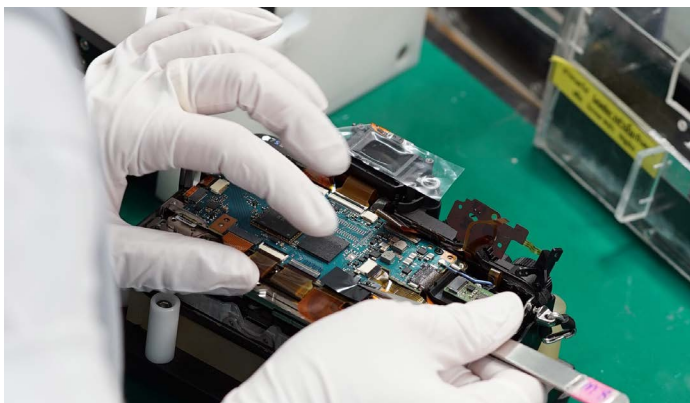
Cleaning lens elements. This is a familiar and essential procedure.



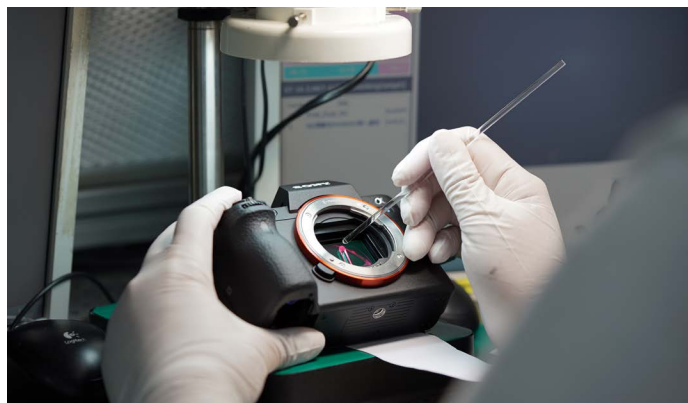
All work takes place in a clean room the size of a football field



Advanced techniques eliminate optical imperfections in the surfaces



Connecting circuit boards in main assembly of alpha series camera



Checking the full frame sensor

Sony E-Mount Adapters

Lenses with a flange focal depth greater than 18mm will fit on Sony VENICE's native E-mount by using an adaptor.

Adapters are made by MTF, Vocas, P+S Technik, Denz, Wooden Camera, Metabones, 16x9 inc, IB/E Optics, Fotodiox, Novoflex, etc.

Use a lens support when mounting heavy lenses.



Lens Mounts and their Flange Focal Distances

| | | | |
|-----------------------|----------|------------------|----------|
| Sony E mount | 18.00 mm | Sony Alpha mount | 44.5 mm |
| Sony FZ mount | 19.00 mm | Pentax K mount | 45.46 mm |
| Micro Four Thirds MFT | 20.00 mm | Contax/Yashica | 45.5 mm |
| Samsung NX | 25.5 mm | Olympus OM mount | 46.0 mm |
| Leica M mount | 27.80 mm | Nikon F-mount | 46.50 mm |
| Konica AR | 40.70 mm | Pentax K mount | 45.46 mm |
| Canon FD mount | 42.00 mm | Leica R mount | 47.00 mm |
| Minolta MD | 43.50 mm | Arri PL | 52 mm |
| Canon EF mount | 44.00 mm | Panavision PV | 57.15 mm |
| Sigma SA mount | 44.00 mm | | |

More History of Sony Lens Mounts



Sony F55 FZ intermediate mount and FZ to PL adapter

Sony launched the FS7 II Super35 cine camera (above, right) in November 2016. It introduced the new Lever Lock Type E-mount, similar to the one on VENICE today. It had the same 18mm flange focal depth. However, the VENICE lens mount is much more rugged and is designed to hold heavy lenses.

The FZ mount on the Sony F55 was an innovative universal mount into which lens adapters could be attached. Its had a large breech lock to enable the use of adapters: e.g. FZ to PL, FZ to EF and FZ to all kinds of other mounts. The native flange focal depth was 19 mm—which was not conducive to using native 18mm flange depth E-mount lenses. The engineering involved to shave off that 1mm difference was substantial, and very much worth the effort.

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An In-Depth Look at Sony's Full Frame (36x24mm Sensor) CineAlta Camera



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