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Special Sony Report

First Sony F65 Feature: *After Earth*

First F65 Documentary: *Ka Huaka'i o Ka F65*

F65 Short: *The Wind Blows*

F65 4K Workflow

Sony F65 Jumpstart

New NEX-FS700


AUX
SDI OUT2
GENLOCK IN
SHUTTER
HD-Y OUT
SDI OUT1
REMOTE
AUX IN
TC OUT
TC IN
EARPHONES
LEVEL
CH-2
CH-1
LINE
MIC
MIC +48V ON
PUSH
CTRL
AUDIO IN
AUX OUT
CAM POWER
OFF
ON
DC OUT 12V 4A
24V 4A
LENS
EXT I / O
CineAlta

Sony F65 Camera Reports

The Wind Blows

Sam Fujiishi, JSC was director/cinematographer of "The Wind Blows," the F65 short that took the audience's breath away at AFC Micro Salon in Febraury in Paris. Sam discussed the project:

Sony approached me to work on a 5-minute short movie to be screened during Inter BEE (Tokyo exhibition in November 2011) and February in Paris. Obviously my main objective was to try out the camera in various lighting conditions, with my usual choice of optics and filters. I rated the F65 at ISO 800, and exposure was defined by my light meter alone, no video village, no DIT. I had one HD monitor on set, where we reviewed some of the images played back from the onboard SR-R4 recorder.

In addition to film cameras, I have used pretty much every flavor of digital camera out there. The first thing I learned when shooting digital was not to over-expose: once the image is clipped, you cannot bring it back in DI. During camera prep, I realized that the F65 was the exact opposite. The 16-bit RAW files on the F65 have enormous headroom on the highlight side. I decided to over-expose by half a stop, and carefully adjust the blacks in DI. In other words, I am back to the way I usually expose film. Create a slightly over-exposed, rich (dense) camera negative, and bring back the whites in DI. This is the very first digital camera that allows me to work that way.

In terms of resolution, I always felt that 2K digital (or HD) image capturing is somewhere midway between 35mm and 16mm. However, the F65 belongs to a totally different league. The days we used to compare and critique digital vs. film are over. I think it is the responsibility of us cinematographers to create an immersive image that will attract the audience. I see a huge potential in the F65.

For optics, I used my favorite combination of Angénieux Optimo zoom (24-290 mm), Cooke S4 primes (14, 18, 21, 25, 32, 50, 75, 100 mm), and a Fujinon zoom (18-85 mm T2.0). These are the lenses I use day-to-day on all sorts of projects and on many cameras. It helps me to judge how different cameras behave in the real world.

For filters, the in-camera NDs were extremely handy, more than one might think. Without waiting for your assistant to change filters and clean them, you can start rolling with your ND of choice by pressing just one button. In addition, I had the ⅛ Tiffen Black Promist in front of the lens all the time, as most digital cameras have a very peaky edge transition. Perhaps it was not a wise choice for a camera that boasts the greatest resolution, but it is one of those comfort factors for me. Polarizers were used on most of the day exterior shots.

The visual concept of "The Wind Blows" started at a bookstore. I found an interesting picture of a pedestrian bridge with a nice skyline of Tokyo in the backdrop. I scouted a similar location in the eastern suburbs of Tokyo, and decided to shoot there during magic hour. Then the story was composed for the daylight part, with the night shots to follow. I am very pleased with how the glass shop shot came out. I wanted a monotone look with a slight blue overcast. The F65 was set to 5500°K shooting RAW, (the F65 can color balance between 3200/4300/5500° in camera when shooting RAW) with an HMI measuring at 6000°K.

The DI work took place at TOGEN (Tokyo Laboratory Ltd.) using the Quantel Pablo. Since the Pablo could not directly handle the F65 RAW files, they were converted to 12-bit DPX frames prior to material ingest.

First Sony F65 4K Feature

Director M. Night Shyamalan and Cinematographer Peter Suschitzky, ASC, BSC

Under a volcano in Costa Rica with the first Sony F65 digital motion picture camera on a major feature: Director M. Night Shyamalan and Cinematographer Peter Suschitzky, ASC, BSC. *After Earth*, starring Will and Jaden Smith, is about a father and son who crash-land on planet Earth after it has long been abandoned. The crew recently wrapped Costa Rica location shooting (see Shyamalan's WhoSay blog for pictures of cameras, creepy-crawly spiders and snakes), and is now working in the US.

The F65 camera and camera equipment came from the Hollywood Rental House of Otto Nemenz International. In the photo, above, by Unit Photographer Frank Masi, the Sony F65 is outfitted with, from front to rear: Cinematography Electronics Cine Tape, Angenieux 17-80 mm Zoom Lens, OConnor Head, Nemenz custom accessories and finder support. Prime lenses (not in photo) are Cooke S4/i.

The choice of lenses puts to rest the notion that existing film lenses don't work on the 8K/4K Sony camera. In fact, it confirms what one distinguished optical scientist told me, "Legacy lenses may actually look better in 4K than 2K, just as they do on better and finer-grain film stocks."

M. Night Shyamalan added, "I couldn't be any happier with the F65, which is amazing since I'm a 'film guy' and I thought I'd die a 'film guy.' It is digital media that's warm and has humanity in it which is obviously the most important thing to me."

Peter Suschitzky said, "The F65 is like a great leap forward. As soon as I did testing of the F65, I was immensely impressed by the amount of detail it captures, by its incredible flexibility, from low lights to highlights, and its great contrast range. It really is a camera for the future and I'm going to use it again on a number of films."

The camera crew includes Mitch Dubin, SOC and Buzz Moyer (Camera Operators), Steven Cueva, John Kairis, David O'Brien, and Jozo Zovko (Camera Assistants).

Several other big productions have already begun shooting with the F65, including the Tom Cruise sci-fi film *Oblivion*.

Sony started delivering the F65 camera in January 2012. Around 400 cameras have already been ordered worldwide.

Alec Shapiro, Senior Vice President at Sony Electronics said, "*After Earth* is the perfect first project for the F65. The combination of an innovative moviemaker and a script with incredibly high production values will test the limits of this camera and its powerful feature set. The result is sure to be a unique and visually immersive entertainment experience for the movie-going consumer."

Otto Nemenz and Fritz Heinzle must have held their collective breaths as the multiple F65 cameras were rapidly prepped and shipped to a hostile environment for their inaugural immersion. "We didn't even have time to build all the usual custom accessories we usually do for new cameras," Otto said. "But Sony did their homework, and everything worked well."

The F65 camera's 8K image sensor, with approximately 20 total megapixels, outputs true 4K 16-bit linear RAW files directly to SRMemory cards in its onboard SR-R4 Memory Recorder for a streamlined shoot-to-screen 4K file-based production.

M. Night Shyamalan on *After Earth*

Jon Fauer: Why the Sony F65? It was daring to be the very first with this camera.

M. Night Shyamalan: The quality of the picture it was giving was warm and detailed and, ironically, it seemed to be the most natural. I'll be the first one to tell you that I was surprised.

Its practical latitude was something that was almost too valuable to overlook because we could shoot in canopies in jungles and in very dark forests and be okay—late in the day with a kid, or early morning. Places that I wanted to see that the human eye could grab the beauty of, this camera can do.

On top of the practical things, it just has its own correct aesthetic for the movie. It seems not to have the coldness that digital usually does.

Do you find the camera has a different look?

Usually the sharpness. If it's too sharp, it makes you feel like it's too slick but this isn't the case here for some reason. It seems to be able to balance its information properly and not distill it down to something without humanity. It somehow seems pleasing to the human eye how much information that it has.

Whereas normally, the lack of information creates a beauty where the human perception can fill in the gaps, like old stock that was slow, for me it's more pleasing, like if you see the movies from the seventies, *Dog Day Afternoon* or *The Godfather* and things like that. I prefer those slower stocks because there was more humanity in them. The stocks got too fast and they started to feel too slick to me. They didn't represent the way I feel about things.

But this camera somehow can do the information and still maintain that humanity. Whereas I don't think the other digital cameras I've seen can do that. They feel strangely a hair muddy when you look back at them now compared to this.

Choice of lenses?

These are more Peter's choices. I generally feel good about using primes whenever we can but sometimes because of the camera position it's just too hard to know the exact millimeter but I think they have a good balance of them. We rarely go over 40mm, anyways, in this movie.

What is the format of the film?

It's 2.35:1

How was it working with the Sony F65? Speed? Use? Easier or harder than previous cameras?

Everything is super, super friendly. We've taken it into a lot of different territories. It takes a little bit longer to check the gate because on a film camera they literally 'check a gate' but here they're checking all the takes so it takes a hair longer which is the only thing that is slower about this camera. Everything else is faster.

Comment on set procedure: viewing, selecting takes, dailies?

The picture we are watching on the monitors is jaw-dropping. It's bizarre; it's the reverse of a film camera. The film camera you want to get your eye against the eyepiece because that's the best version that you are going to see until you see the dailies projected, so everything else looks awful compared to the eyepiece. So you're always fighting with the DP to get to the eyepiece.

It's the reverse here. The worst picture is the eyepiece, then you have the monitor on the camera which is a little better, then the monitor I'm watching is amazing, and then the one that Peter has is unbelievable (Sony BVM-E250 OLED). You literally are seeing almost a perfect picture in the jungle. It's incredible!

I've not doubted the decision (to use the F65) at all. In fact, I feel like it's one of our great secret weapons for the movie when in the hands of Peter, who's very delicate, who's bringing so much humanity to the piece. His discipline plus that camera's capability and my tendency for low light is combining to make a really, really beautiful, interesting approach.

We're using it; we're using its capabilities. We're really excited.

Peter Suschitsky, ASC, BSC on *After Earth*

Cinematographer Peter Suschitsky, ASC, BSC is currently shooting After Earth *in Costa Rica, Philadelphia, and elsewhere using Sony F65 cameras.* After Earth *is the first major feature film to be produced using the new camera. David Heuring talked with Suschitsky about the F65 at work.*

David Heuring: What's the look you are creating for *After Earth*?

Peter Suschitsky: I'm after a film look, in simple terms. I can't describe it any other way. I am avoiding an electronic look or a look that you could only get in a sort of Photoshop. It's a continuation of my work, the work that I've been doing for so long. It's just a different instrument for carrying it out.

How and why did you choose the Sony F65? Why not just shoot film?

When I came to prepare for this picture, M. Night Shyamalan said that his instinct was to shoot on film. Having shot with the Alexa on my last movie, *Cosmopolis*, I felt I never wanted to go back to film unless I was forced. I told him that if he wanted to shoot film, of course we'd do that, but that I'd like to show him what a digital camera can do.

So we tested an Arriflex film camera versus the Alexa and the Sony camera. Because we were shooting a Sony picture, Sony Pictures asked us if we would test their camera. Little did we know that it was probably only a prototype at that time. But we tested it out, and it gave very, very fine results. I thought that it gave an even more detailed image than the Alexa. The tests were pretty rushed —we only had a short day. Seeing the tests on the screen, under good circumstances, with a 4K projector, I realized at once that it gave superb results.

Now, in use, I can reiterate every day, I am astonished at the detail it gives, and the extreme flexibility from low light to highlights—it's just wonderful.

This was the maiden voyage of the camera. Did you have any trepidation about that?

We were anxious, because we knew that nobody had used it in the field. And we discovered quickly that it really was not quite ready to go into service. It was rushed into service, and adaptations were made for use. But basically, the image quality was never changed. They had to hurry to prep the other cameras, and everybody was very anxious that there might be equipment failures because it had never been put to test in the field. So we have quite a number of bodies with us. And for the first two weeks we had extra technicians from Sony to help us in case there were problems. But everything is going smoothly now.

How is the look you're getting from the camera different from what you've shot before?

You can make it look electronic if you want to, and you can make it look like film. It has no grain, of course, but it's totally superior to film, it seems to me, and the resolution is infinitely superior. There are no scratches, no dust specks, and there is no projector weave.

So what's to regret, except the smell of the emulsion, which we can be nostalgic about? I still use film for my stills. I use black and white film, and I develop it myself, because I like working that way. But I'm really more than happy to embrace the new technology wholeheartedly for movie shooting. I really don't want to go back to film because I think that the digital way is much better.

Tell us about your choice of lenses—I'm told you're using Cooke S4 primes and Angenieux zooms.

I've always shot either on Primos or on Cookes. I think the Cookes are a fine lens. And the zooms from Angenieux are so good that you can't really tell—I can't tell the difference between them and the primes. Even at the fantastic resolution of this camera, on a big screen, they look wonderful.

The camera package came from where?

Otto Nemenz supplied the cameras—I believe he bought 17 of them straightaway. And their engineers, in conjunction with Sony, got them ready for us. It was all done in a rush. I was not in Los Angeles at the time. I was prepping in Philadelphia, where we're based. So it was done at arm's length by the assistants who were engaged on the film, and by the technicians at Otto Nemenz and Sony themselves.

Is there any downside to the camera?

There have been certain noise problems, namely the fan. This is an ongoing problem which has not yet been resolved. The electronic finder is not worthy of the camera and is not a pleasure to use. So if you want to get a decent image, as an operator, you have to have an onboard monitor of very good quality, or my very good quality monitor in the DIT setup.

What is the aspect ratio of the images?

We're doing it in Scope ratio, 2.35:1. With this camera resolving so well, the fact that you're only using part of the sensor with spherical lenses doesn't seem to be a disadvantage. And you're getting the advantage of a lens that resolves better, especially around the edges, compared to anamorphic. They are also lighter in weight, and you can shoot at wider apertures than you could with an anamorphic lens if you need to.

In a practical sense, has the camera been easy, hard, fast, or slow to work with?

Easy. Whatever problems there might have been were ironed out, and we have an established way of working, and a workflow which doesn't seem to cause any problems. Dailies are processed and downloaded in-house. I can see the morning's shoot in the evening in our studio. We have wonderful technicians. I'm spoiled on this picture with a support team that is first class!

Any anecdotes about working with the camera in the jungle, under presumably difficult conditions?

I can make one comment. When I saw the locations on the scout, I said on the spot that we couldn't shoot some of these locations on film, because they were under trees, in the dense jungle, and at 500 ASA we'd have been shooting at 2 if we were lucky. And with a camera that says it's 800, but is perhaps 1200 ASA really, we have managed to shoot, without a problem, scenes which we could not have shot at all on film. So I'm very, very happy with the camera. I love the Alexa also, but this camera does have superior resolution for the moment. I'm sure ARRI will catch up, and other people will catch up, too. I'm not a salesman for Sony at all, but for me, I think I could say that they lead the field at the moment.

Colorworks on *After Earth*

Above, left: Bill Baggelaar. Right: Bob Bailey

We're observing the maiden voyages of the F65 on several productions, including big shows like After Earth. *Workflow is the thing everyone is asking about—the common thread that ties it all together. We spoke to Bill Baggelaar, Senior VP of Technologies for Colorworks and Sony Pictures Technologies and Bob Bailey, Senior VP, Colorworks.*

Colorworks is the digital intermediate and restoration facility on the lot at Sony Pictures Studios. Colorworks coordinates digital dailies, deliverables, storage and protection of images for the duration of a production, provides access to all the data anytime anybody needs it (editing, effects, conforming, color grading), archiving and storing. Think of it as a digital lab.

Colorworks is totally owned by Sony Pictures Technologies, which is a Sony Pictures Entertainment company. Colorworks facilities are open to all productions. It is not exclusive to Sony.

Jon Fauer: Take us through the process. I think you call it "sensor to screen."

Bill Baggelaar: We have an interesting workflow. All dailies, no matter what technology the images are captured on, go into something we call the Production Backbone. Chris Cookson (President of Sony Pictures Technologies) wanted a way to ingest all the data only once, or scan the film only once, and then all deliverables for all worldwide markets could be generated from that. So, on any picture, we'll take all of the data and put it online with the accompanying metadata. It's stored on spinning disks and LTO libraries.

(LTO-5 currently holds 1.5 TB on a cartridge that costs around $50. Each cartridge is 4 x 4 x 1 inch. LTO capacity doubles approximately every 2 years. LTO-8 is projected to hold almost 13 TB by 2018.)

After Earth is only the latest production to utilize the backbone infrastructure. Obviously we've had to come up with some new workflows on the dailies side and to handle the F65 camera and its metadata.

How is the F65 workflow different or unique?

Bill Baggelaar: The director, cinematographer and entire production crew are capturing images around the planet. In the case of *After Earth*, they started in the humidity and heat of the rainforest in Costa Rica. Then they worked in Philadelphia. They are shooting with the Sony F65 in 16-bit true 4K from an 8K sensor.

We've been working with Sony Electronics on the images that are coming off the F65 for almost a year now and offered our on-set recommendations. After the SRMemory card is ejected from the camera, it is verified to be sure that all the data is indeed there. We've worked on the application of LUTs (Look Up Tables) and on creating a viewing environment on the set and in the Video Village. The data then goes to what we call "near-set," typically a hotel room or production office where editorial is housed. It is not on set because most production executives don't want on-set color correction capabilities.

Why don't they want on-set color correction?

Bill Baggelaar: They want LUTs applied where you view the material on set—on the director's monitor in the Video Village, on the cinematographer's monitor at camera, etc. Everything else is taken off set to near-set: syncing sound, editing, making deliverables. Manipulating color for the director or the cinematographer could slow down production if it were done on the set. That's why we call it near-set dailies.

Bob Bailey: To expand on the workflow, the data from the F65's SRMemory cards is moved to a large shared-storage device. In our case, it goes directly into a Baselight or a Filmlight BLT XL system, which has a fairly substantial amount of storage in it—anywhere between 20 and 40 Terabytes. We can collect and warehouse that, dailies can be run, CDLs (Color Decision Lists) from the set applied. If the director of photography or director want to do some additional color correction at this point, they can. The color-graded shots can then be viewed in dailies and on Avids or nonlinear editing systems. We have an automation process that creates the subsequent deliverables for the studio and any ancillary materials that might be needed: DVDs, XDCAMS, and so on.

All the data is then backed up to LTO with all the metadata properly logged and tracked. Those tapes come back to the studio and are seamlessly ingested into the Production Backbone. We check and double-check that we've received everything that has been captured on set or on location.

So, from the sensor to the Backbone, we have a very good tracking system to ensure that we've captured everything and that everything is safely stored. Only then do we alert the data wranglers on set that they can recycle the SRMemory cards and reuse them on new scenes. Until that point, the SRMemory cards are treated as camera original.

Describe the post-production process of an F65 show.

Bill Baggelaar: On many big pictures like *After Earth*, editorial travels with production. The Avid editing is done near set for the duration of the shooting and then will typically move back to Sony Pictures for post-production in one of our Avid editorial rooms. The studio typically rents the Avid systems to the production. Final post is done at Sony Colorworks where we start to conform from the 4K files. We'll pull the data right off the Backbone and if some visual effects have already been delivered, they will be there too. Visual effects will continue to be delivered through the process. Once we have a reel done or enough of the picture done, we then send it downstairs to a Baselight room that has a Sony 4K projector. We will color correct the picture in 4K with supervision typically by the cinematographer and the director.

Sony finishes in 4K?

Bill Baggelaar: Yes, in 4K, and now 4K 16-bit, linear ACES for F65 shows. Actually, one of the luxuries at Colorworks is that we (Sony) make a state of the art 4K projector, we make a 4K camera, a 4K recorder, and we've designed the infrastructure to be able to move 4K seamlessly throughout the facility as if it were Rec. 709 (HDTV format standards). Typically, a 90-minute 4K feature will require 12 to 20 Terabytes. Of course, hundreds of Terabytes go into the creation of that final product.

I thought there was resistance in Hollywood to 4K?

Bill Baggelaar: Not for us. *Moneyball* had a 4K digital intermediate. We restored *Taxi Driver* in full 4K this year. We're restoring *Lawrence of Arabia* in full 4K this year. Feature 4K finishing includes *The Amazing Spiderman*. 4K is standard practice now within the Sony family.

I do believe that there's a noticeable difference. A lot is lost in 2K compared to 4K.

Bob Bailey: Oh, hands down. The argument of 2K versus 4K is, I hope, fairly dead because we've proven that with better technologies, better projection, and better ways of resolving 4K data in film restoration, we certainly get better results from original camera negative.

In 2K versus 4K, another argument has been that Hollywood is not ready for 4K post and distribution.

Bill Baggelaar: Well, I think anybody who doesn't have a 4K solution is going to say that the industry's not ready. Otherwise they would have had a 4K technology. This has been a long argument in the industry, in the 2K versus 4K argument, whether you could resolve more than 2K in film.

Bob Bailey: I think the argument was more due to the cost of infrastructure required to handle 4K as opposed to the technical validation over whether you could resolve 4K or not.

Leading question, but can the average person see the difference on screen between 2K and 4K?

Bob Bailey: Absolutely.

Bill Baggelaar: Definitively, yes. We can show you examples from a 2K scan and a 4K scan of the same piece of film and you can see detail in shots that you can read in 4K that you can't read in 2K.

Bob Bailey: We have plenty of examples. The same argument took place back when HD first came out: that people wouldn't see the difference between SD and HD, or between good 16x9 DVD versus Blu-ray. If you do a comparison on a good display, people can discern the difference, and want and prefer the higher resolution.

If you're displaying a 4K image on a 2K projector versus a 2K image on a 2K projector, we notice there's a difference, but certainly the difference is much less. If you have lower resolution display technologies, you still get an increase in quality by using a 4K source but that may not be as noticeable if you're not optimized in the display environment.

Bill Baggelaar: The Sony 4K projector has made huge inroads in thousands of screens across America and worldwide. And Christie is planning a 4k upgrade path. Our distribution and display is going to be in 4K, and we believe the consumer will notice a difference.

I spoke with The Creative-Cartel's Jenny Fulle and Craig Mumma. How do they fit in?

Bill Baggelaar: Sony Pictures works with a group of companies. We're not in the dailies on-set business. We train and work with a bunch of companies who operate the on-set and near-set solutions. If they're willing to commit to our workflow, we'll show them how to use it and implement it on pictures.

The Creative-Cartel are very trusted partners. They are actually operating our workflow out in the field on *After Earth* and other movies.

They are implementing our technologies which may include some intellectual properties that we've developed to make sure the workflow goes incredibly smoothly.

The dailies portion of the process includes all deliverables. Every studio has different deliverables. Bill and his team have written software to make sure whatever your deliverables are, you can get them: whether it's DNX 175, DNX 36, H.264S, HDCAM SR, or different compression algorithms.

We've designed a system that can service the industry. Our core mission is to make sure filmmakers can realize their vision through the digital intermediate process—not just on Sony productions, but anyone who wants to use our facilities.

L-R: Chris Cookson and Alec Shapiro

The Creative-Cartel on *After Earth*: Jenny Fulle

Jenny Fulle is founder and head of The Creative-Cartel.

Jon Fauer: Tell me a little bit about your company.

Jenny Fulle: I started The Creative-Cartel about three years ago, focusing on visual effects and functioning as a visual effects management hub—kind of an independent visual effects department for hire.

We were working on trying to figure out how we could expand our business. On the film *Ted* we started taking all of the original digital files and bringing them here. We started doing our own pulls. Instead of having to go to a lab and have editorial send a pull sheet and have the lab pull it and wait a couple of days to get the data so that we could ship to our vendors, we brought everything local and we were able to start turning things around in more like a half hour.

So, it's like, 'Well, this makes a lot of sense.' The process saved the filmmakers money. It saved us time and it's a much more efficient process. So then we thought, what else can we do? Craig Mumma, who's my partner in the company, comes from the camera world. We always talked about how it's like the football that gets passed from the time the footage is shot and it goes to the on-set person and then it goes to the lab, and then it goes to editorial. And each time, each step of the way, a different LUT may be applied and different people touch the image, and metadata may or may not get attached. By the time we receive it in visual effects it can be a bit of a mess. So, we started exploring what if we oversee the whole process so there's accountability and integration from the camera all the way to the time it's turned over for final DI.

We had been exploring that possibility and we got our first opportunity on *After Earth* with the Sony F65.

We did some camera tests on *After Earth*. M. Night Shyamalan, our director, is a film guy. We weren't sure if he was even going to go for a digital camera. But, it was an amazing image on the F65. And, so that was his choice.

We worked closely with Colorworks and with Sony to figure out how to manage the near-set Lab. It was definitely a joint cooperation to set up. We started shooting in Costa Rica and we set up our near-set Lab and we provided a grading station for dailies. We had an editor with an Avid and we were able to do the whole process, verifying all of the data, all of the backup and archiving in Costa Rica. We provided color timed dailies for viewing the next day. It's been a fairly amazing process.

Our on-set crew included Craig Mumma, the Digital Acquisition Supervisor; Toby Gallo, the DIT; and Bobby Maruvada, Dailies Colorist. And, we had Mike Whipple from Colorworks for the first three weeks. He was fantastic in helping us make sure that everything was running smoothly because we went onto location with a lot of Colorworks equipment. They had been working with Sony F65 footage longer than anybody.

What is the near-set Lab?

When we were in Costa Rica we did twice-daily drops at lunch and at the end of the day from the camera. Within 30 minutes of receiving all of the data we had verified the images and we're backing up and archiving. After those steps were complete, they moved three feet to the left to the Baselight or the Truelight that we had there with Bobby for grading. And, Peter Suschitsky was able to come in at wrap each day and see the footage.

The next morning it would be transcoded, sent over to editorial, turned into dailies and viewed by the team and the crew.

I had heard rumors that the data cards had to fly to L.A. and then back to Costa Rica. I guess that's not true.

No, but we had plenty of back ups because we never want to lose anything.

We were being very careful because it was a brand new camera. This was the first production it's been in. We made a primary LTO back up and a secondary. We kept it on a local server and we kept the original SRMemory card (which was like the original camera negative). And, we would ship an LTO back to Colorworks in Los Angeles. We would hold the card. Only after it was verified by them would we clear off the contents so the card could be used again. We made sure that we had no less than four copies at any one given time.

You must have had enough SRMemory cards to do that?

We did. We erred on the side of too much. But, we're streamlining that a little bit. Being in the jungle, you can't really FedEx anything overnight to where we were. In fact, they had a once a week UPS drop off there. We had to be very careful.

But, we definitely expedited that whole process once we were in Philadelphia and a little bit more in civilization.

I think it's a good idea not to be hasty erasing those SRMemory cards. Some people try to be frugal and spare every expense, but those cards are like your negative.

Yes, and that's one of the reasons why Craig is so great; he insists on redundancy and treats the data with great respect and care.

Creative-Cartel on *After Earth*: Craig Mumma

Craig Mumma is the CTO of The Creative-Cartel. He is the digital acquisition supervisor on After Earth.

Jon Fauer: Tell us how your data flows.

Craig Mumma: The Creative-Cartel was hired by Sony Pictures on this production. We protect the images as they are moved along the entire pipeline by various departments from camera through Digital Intermediate (DI). Toby Gallo is on our team as the DIT. And Bobby Maruvada is our near-set dailies colorist.

Most people think from the camera forward. We think from the DI back. We want to be sure that when data gets to the very end, all the information is there that everyone needs: picture, metadata, DP comments, script supervisor notes, visual effects work, and so on. Original camera data must flow through the entire chain without getting lost. It is like passing the football from production to post so that nothing gets lost between departments.

How do you work with the Director and Cinematographer?

The Creative-Cartel takes responsibility for the footage all the way from camera to the DI, and becomes the holder of the information. I sit down with the DP during pre-production with a stills catalog. We go through all kinds of stills and examples of what the final look should be—so I can include those notes and examples for the visuals all the way along the line.

Let's get specific. You're on set. The Director is happy with the scene. Does the AD say, "Check the gate?"

Yes. And Toby Gallo, our DIT, reviews every take, playing it back from the camera. Before we began this show, the Director and the DP asked whether we would treat the F65 differently than a film camera. It was going to be, after all, a digital shoot. I said, "Don't change anything you do. When you ask us to 'check the gate,' that's what we'll do." It's the same process. So, yes we check every setup.

Are the camera assistants actually pulling the lens and checking the sensor's cover glass?

(Laughter) No, just checking the playback.

Another example. The SRMemory card on your Sony F65 is almost full. What happens next and who does what?

An ICG 600 (International Cinematographers Guild) loader, digital loader, ejects the SRMemory card from the camera's onboard SR-R4 Memory Recorder. The card is handed over to Toby Gallo. He's on set with his DIT cart. He inserts the "exposed" card into his SR-PC5 and spot-checks all the shots to verify that everything is there. It's like checking the gate as we just described. But production doesn't stop. It's run like a film set. The digital loader puts a fresh card into the camera's SRMemory Recorder and shooting continues.

After that, the card is collected by our near-set coordinator and taken away from the set to our near-set lab for copying, archiving and dailies creation.

Where is this near-set place?

It's at production's base camp, a conference room, or hotel room.

Why near set and not on set?

In the near-set lab the data is ingested (this could be via SR-PC4 or SR-PC5) into a RAID protected array, and verified again to be sure that all information is there from our set reports. We check that all takes are there, everybody rolled when they were supposed to—typical lab functions. We try to treat this the way your traditional film lab does, with the same way of reporting back to the DP about exposure, look, if there were any anomalies with the camera.

Your job went on location to Costa Rica and Philadelphia studios? Discuss going from camera to near set and beyond.

As you know, the image coming out of the F65 is amazing. Everything that we need on set fits on the DIT's cart. We provide an on-set one-light look. We are in an ACES CDL (Academy Color Encoding Specification Color Decision List) workflow with on-set Sony OLED monitors with Truelight on-set values. From there, the data cards, typically 512 GB (1/2 hour) SRMemory cards are delivered to our near-set lab. We check just like a regular lab. We do a quality check. It then goes into our near-set color grading system. We make all our deliverables for both editorial and the studio and picks. We did all that in Costa Rica. And then we back up, typically to LTO-5. We also have RAID protected back ups and then ship one of those sets off to post production—to Colorworks.

So the card is basically treated like a negative and you're not erasing it until much later, I assume.

Correct. There's never deletion on set. I've been doing this for almost eight years now and that is my number one rule: we do not delete on set.

That's something a lot of people should take notice of.

I need the head space—a moment to step away from the chaos and make sure that all reports and everything coincide before that card gets deleted and re-used in the camera. If there's ever a question, I do not delete original camera data until those questions are answered. That is why I like to walk away from the set environment before I delete and verify that a card can go back to set.

Typically how much time passes after a card is ejected until you reformat or erase it to be used again in camera?

It's a 24 hour maximum turn-around for me, from the moment I

receive a card. We do all our verifications and checks within the 24 hour period and we also have several copies before those cards are deleted and verified. One of the other things that people don't realize with these cards is that if there is ever a problem with camera data, once the SRMemory card is erased, and you don't have the original camera data, you can't fix a lot of problems that could have been fixed from the original camera data.

You check in real time?

I check in real time, absolutely.

So it's similar to a traditional lab checking dailies on a screen.

Yes. My background is film, so I have taken that traditional sensibility and moved it into the digital world. It's a system that worked for a hundred years. Why would we treat it any different? I'm very traditional in that sense.

How many of these SRMemory cards do you have?

I think a lot of my work is based on what we learned in the Codex-ARRI Alexa world and dealing with data there. The numbers kind of correlate. On a big feature, I calculate around ten cards per camera. That's figuring on a couple hours of footage a day. Of course, it depends on what you're shooting.

How do you make copies or clones?

When you order a Sony F65, it comes with an SR-PC4. That's basically your transfer station. It uses an Ethernet interface at the moment to transfer data to mounted external hard drives. You insert your SRMemory card and you can copy it to RAID arrays. All the cameras that we got from Otto Nemenz included an SR-PC4 for each one.

The SR-PC4 is the entry-level transfer station. The more expensive rack mount one is called the SR-PC5. It has a fiber card for much faster transfer speeds.

For viewing on set, are the monitors calibrated? Are you using the S-Log or Rec. 709?

We have our own LUT management that we have built into this. On-set viewing is a calibrated environment. It is a color calibrated workflow off of the F65's HD-SDI video output. The camera "video assist" is set to Rec. 709. It goes into a Truelight box for basic on-set look. From there it goes to Sony E250 OLED monitors. We have our LUT transforms that transport the signal into a good neutral environment that we call WYGIWYSM (what you get is what you see on the monitor).

We typically don't do more than a one-light on set. I think it's a waste of time pursuing more than a one-light.

You theoretically could use the default Sony F65 S-Log or Rec. 709 coming out of the camera?

If the director or the DP wants a certain look and that's what they want to film, I will give them that look based on the transforms that we build and they approve. We can also use the defaults. I can do it either way, but remember the great thing about this camera is that if you didn't want the DIT cart, you wouldn't need it. You could expose and work just like film, and that's the beauty of RAW. When you're not working with a video signal, you can literally set your ASA on the camera, take out your light meter, and the exposure will be spot on.

You hit on the theme here. This is a camera that's simple to use.

Oh yes. We do not want to be NASA on set, you know. What we do is we want the filmmakers to feel like filmmakers and act like filmmakers. We don't want them to feel like NASA is sitting behind them. We give them the freedom to treat it like a film camera. If you don't see the monitor, it's no big deal, trust your light meter.

SR-PC4

SR-PC5 Front and Rear

Ka Huaka'i o Ka F65 (Journey of the F65)

Photo: Vincent Ricafort

Ruben Carrillo: *Journey of the F65*

Ruben Carillo is a Producer, Pirector, Cameraman in Hawaii with a long list of credits on National TV, commercials, documentaries, 60 Minutes, The Amazing Race, Hawaii 5-0, and *the award-winning* Mana I Ka Leo: Power of the Voice. *He recently wrapped the first 4K documentary shot on the new Sony F65 with Leica Primes in Hawaii.* Ka Huaka'i o Ka F65 *means* Journey of the F65.

Jon Fauer: How did this production start?

Ruben Carrillo: Hawaii is such a beautiful place. I've been here for 17 years. It just felt like it was time to capture the islands with aerials. This is the most beautiful place in the world I've ever been.

Tell us about your background and your career.

I come from an artist family. I was raised in Santa Cruz, California. Both of my parents went to UCLA Art School and that's where they met. I was always around the arts. I couldn't draw, I couldn't paint, but I was a very visual person, and I really enjoyed taking photographs when I was younger.

When I was a senior in high school, they had a video class. That was my major in college at San Francisco State. In my second year of college, I got a job at an NBC station, and within about six months I was one of the news photographers there. I basically did that for the next seven years. I worked in San Jose, San Francisco, and then finally in Los Angeles.

Hawaii always intrigued me. So I started a company in 1996 here in Hawaii and ran it. Liquid Planet Studios became one of the largest production companies in the state, if not the largest, and I ran that up until December of last year. I was also co-founder of Four Miles, a company we set up five years ago to do Hawaiian cultural productions—and that's actually the company that produced this F65 job. I have two partners in Four Miles: Dawn Kaniaupio, who was integral to this project, and Dirk Fukushima.

What really drove this project from the beginning was my love and respect for the host culture that I live in: the Hawaiians. It was their "oli" (chant) and "hula" (dance) that actually inspired and was the foundation for what we ended up shooting. Both oli and hula are derived from and mimic the movements of the earth and the sounds of nature. It was the Hawaiians' way of emulating and communicating with the world around them and each other. We planned and designed the shoot around the chant and hula that we filmed on the cliffs.

A very well-respected Kumu (teacher) and sister of the woman whom we filmed on the cliffs writes it like this: "Hula begins with the movement of the sun, the wind, the sounds, the growth on the land and the ocean. Hula is ritualized as it personifies nature. Like nature, hula is rhythmic, inclusive, transformative, physical, spiritual, healing, and above all, it is Hawaiian."

I gave Band Pro a call. I asked if they could lend me a camera. Nir Reches said they could send an F35. Three days later I got a phone call from Amnon Band asking me why I am shooting with the F35. And I'm like, "Well, I would have preferred the F65, but..."

Then Amnon said, "Hang on. Nir told me what you are doing. We just got the first Sony F65 cameras. I'm going to send you our top F65 guy, Randy Wedick, and an F65 for a week. I'll make sure that all the gear is first class. We'll send you a complete set of Leica Primes, Anton/Bauer batteries, Leader monitors, OConnor head and legs, and anything you need. Let us show this at NAB, and I'll finance the aerials and the production. Let's make history together. No one ever shot F65 4K RAW of Hawaii."

Planning was critical. We mapped out locations. We scouted volcanoes and lava flows. It was really not much of a budget, so we were restrained by that, and we put together a small crew, booked the helicopter and pilots.

If you as an operator have a relationship with the pilot, that's what enables you to get great shots. I've flown with Calvin Dorn for many years. I trust and respect him. His company, Paradise Helicopters, has quite a few helicopters on the Big Island and one on Oahu. Our other pilot at Paradise was Josh Lange. Both of them were incredible and did amazing things on the shoot, and enabled us to get some fascinating footage.

That was a Jet Ranger?

We used the Bell 407 with a Tyler nose mount.

What were the most memorable moments of the production?

One of the memorable scenes was on Kauai. In the afternoon, all of a sudden it started to clear up. There was a high overcast; the sun was under the clouds and we were flying along the Na Pali coastline. There are incredible valleys and waterfalls.

Just as we were coming around, the sun dropped below the cloud layer and it was sunset time, golden orange light, an incredible moment. The next morning we ended up shooting more of the Na Pali coastline and Waimea Valley Canyon, which is known as the Grand Canyon of the Pacific. There was a low fog layer. We saw dramatic red earth mixed in with bright green and white water. It really should look incredible in 4K.

At one point we had to clean the lens, and our pilot landed on a peak with maybe a 20-foot circumference. We were standing on the top of a spire in the middle of a spectacular Grand Canyon type setting, and Randy Wedick was cleaning the lens, and I couldn't believe it. I was out there trying to take pictures of him and what he was doing, but it was like a surreal setting in an amazing place that you could never get to unless you just plopped down in a little helicopter.

What lenses did you use mostly on the aerial nose mount?

Primarily the Leica 18 mm Summilux-C. We frequently used the 21 mm. And in other locations, we went through the entire package.

And how did you protect the front element, or didn't you?

Randy had a clear filter that clipped on. We treated the filter with Rain-X to repel rain and condensation.

What was the percentage of aerials to regular footage?

90 to 10 percent. About 16 hours of air time. I believe by the time we finished the production we had shot somewhere between six and seven Terabytes combined aerials and on-the-ground.

What were your camera settings?

Camera settings: ISO was 800. Shooting 16-bit RAW. 24 fps. We did some different shutter angles, but the majority of it was 180°.

Did you ever shoot wide open?

Yes. Most of the late evening and night shots were wide open. The Waikiki shots and a lot of the lava scenes were wide open. What really helped us out a lot was the T1.4 speed of the Leica lenses. Also, because the Leicas are all the same size and have similar focus and iris rings—when we were changing lenses we didn't have to

Photo by Bruce Omori

waste a lot of time trying to readjust things. It was quick and it was easy. We could easily change any lens in the set in no time at all. They were very lightweight so they didn't add a lot of weight on the nosemount.

Slow Motion?

We did a little overcranking, not a lot, but I shot some surf where we overcranked at 60 frames.

How was it working with the F65 camera system?

I found it very easy to learn, very easy for me to jump from the F900 to the F65, and be able to manipulate it the way I wanted. I felt very comfortable with the camera right away. It did not take long at all for me to feel at home with it. I was kind of blown away by the portability. The camera is around 12 pounds, and you can build it up to a film style digital feature film package or, as we did, configure it documentary-style for a small crew because it is so light.

The amazing thing is the way that you were running and gunning with a small crew.

I think I would do one thing differently next time: there should be a dedicated digital media manager. Randy did a fantastic job, he is an amazing technician, knows the F65 inside and out, and managed the data perfectly. But he was also focus puller, loader, camera technician, data wrangler, and much more. He must have slept 36 hours straight when he got back to LA. We had long days from 4 am to midnight. At the end of each day, he had to go back and do all the media management. Which was probably too much for us to ask of one person and too precarious for all of us because, if you lose that footage you're not going to get it back. But he never lost any footage, never complained, and did a great job.

But you were on a limited budget.

Because we did so much work by helicopter, that limited the number of crew. We were packed inside the helicopter with all the gear basically shoved all around us. We had to take everything with us, and it was completely packed. I don't think you could have put another thing in the helicopter.

What kind of "look" were you attempting with this camera?

We did low light scenes flying over Waikiki at dusk, and then as it started to get dark we kept rolling just to see how the camera handled in low light and with city lights. It really looked incredible, and we were really able to shoot in very minimal light.

We flew over the lava fields when the light was getting very low. Red hot lava is pretty bright. The dark lava dries really quickly, hardens, and gets dark black. With the contrast between those two, I think we pushed the limits of the dynamic range of the F65. Happy to say it held really nicely. We have a sunrise with dancers and chanting. It's a beautiful aerial shot flying over black cliffs with the dancers in the foreground.

We had an extraordinary opportunity to bring the camera and lenses into places few people have seen. Being able to take the F65 and challenge it in many ways was exciting, and I look forward to seeing our project on the big screen.

(See Journey of the F65 *in 4K at the Band Pro NAB Booth C10308 and Sony C11001.)*


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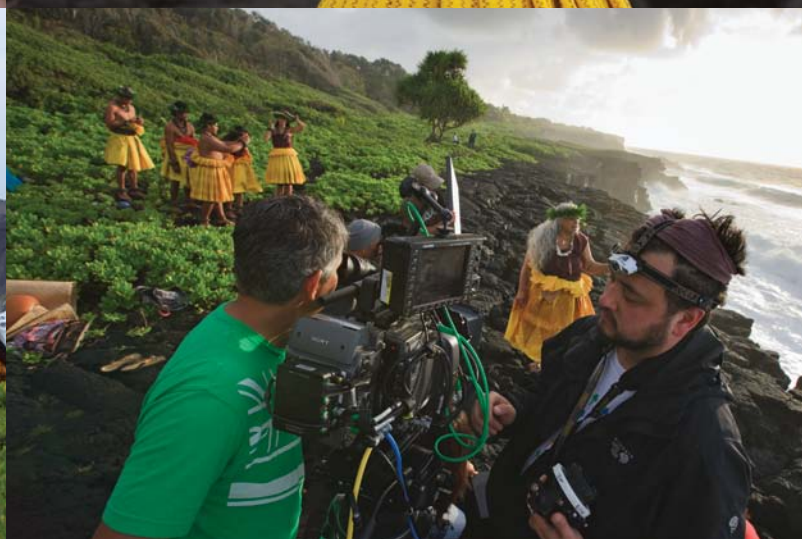


Wedick on Workflow, Aerials, F65

Above: Laptop, SR-PC4, eSATA drives.

Below: SR-PC4 Control on a laptop, showing MEM Control window with picture preview, files on the SRMemory card, selects to transfer.

Randy Wedick cleaning the front of a Leica lens

Randy Wedick started at Band Pro in 2006 as a technical support tech. He is currently their leading technical consultant, dealing with all aspects of imaging and workflow, forming a bridge between the end-user and the manufacturers. He studied film at Art Center College of Design in Pasadena, CA. As part of Band Pro's support of leading cinematographers and digital productions, Randy worked with Ruben Carrillo on Journey of the F65 *in Hawaii.*

Jon Fauer: Describe how you wrangled data on this documentary-style production.

Randy Wedick: It was mostly file transfer. We shot, filled up the SRMemory cards, and had enough cards to keep going. I kept the "exposed" cards in their cases, inside a Ziploc bag that went into a Pelican case. Each evening, after a typical 16-hour day, we'd arrive at a new hotel. I would set up 3 items: A Sony SR-PC4 with an eSATA card, a G-RAID 6 TB external storage array with eSATA drives, and a laptop.

You attach the SR-PC4 directly to an external hard drive via eSATA or Firewire. The computer is really just the interface to control the SR-PC4, and connects via Ethernet cable. Insert an "exposed" SRMemory card in the SR-PC4. Open a web browser like Safari, Firefox or Internet Explorer on your laptop, and type in the address of the SR-PC4. The web page comes up, and you see what is on the card. The laptop shows playback controls and your connected drives. It allows you to browse those drives, create new folders, select those folders, and then export the contents of the cards. The file transfer happens between the SR-PC4 and the hard drive. The files do not pass through your laptop.

The SR-PC4 takes all the 4K RAW files, with audio and metadata, and moves them into an MXF file which is not necessarily the MXF file that you're used to using in your Avid. It's just a convenient container that holds all those elements, recorded separately on the SRMemory card. The SR-PC4 has the hardware and software to combine all that. With eSATA I was getting very close to real time file transfer.

Compare your workflow to how a big feature would do it.

The F65 RAW workflow for the camera, by the time this article goes to publication, should include a number of choices: Colorfront On-Set Dailies, Baselight, Assimilate Scratch, YoDailies by YoYotta, Blackmagic Design's DaVinci Resolve, and Codex. You're able to use the free stuff to do file transfers and viewing. But to actually do big level transcodes, create dailies, and do the finishing you need to use one of these programs.

With a small setup, I was doing commando team size workflow. In addition to pulling focus and prepping the camera and handling the recording, I was also doing all the downloads. So I wanted to keep my task as error-proof as possible. Because I would be doing these downloads at the end of extremely strenuous physical days myself, I wanted to keep it really simple.

But, on a larger shoot you're going to need a near-set or on-set cart that can generate dailies and push them out to a variety of deliverables.

What's going to be cool, and I really hope to accomplish this in our NAB booth, is a demonstration of the workflow itself. We'll have Leica lenses on the F65. We'll be shooting footage on the floor, taking the footage out of the camera and over to the cart. We'll transfer the files into a server and then emulate on-set backups

with a Codex Vault. We'll be doing post production backups using the Colorfront system, creating dailies, and doing live color correction in 4K. We'll send that out to iPads all around. Hopefully we're going to have a full 4K ecosystem in our booth that will replicate the workflow for almost any production, from run-and-gun to high-end feature.

If you don't have a Vault, how do you make backups and clones?

You transfer the footage onto a Mac formatted drive. Then you clone that drive the way you clone any files. As soon as they become MXF files, they're just files. You can do almost anything—from drag and drop to a fully managed multi-destination LTO and hard drive situation.

I heard that in F65 workflow you don't format external drives as journaled—you should format the Mac drive unjournaled.

Yes, journaling the drives causes an incompatibility with the Linux HFS+ driver. You should turn the journaling off, which is an option in the Mac Disk Utility when you format a drive.

Is this drive readable both by Mac and PC?

You can use MacDrive to read and write a Mac formatted drive on a PC. (www.mediafour.com)

How were the ergonomics of the camera?

It is no heavier than a film production camera. I believe it's slightly lighter weight than an Alexa. We had the F65 outfitted with a Leica Summilux-C prime, mattebox, BP-9 bridgeplate for 15mm rods (BP-8 uses 19mm rods), cmotion wireless focus system, an OConnor 2060 with baby legs or regular legs, an Anton/Bauer Cine VCLX 14.4/28V battery, and Leader monitors. I had no problem picking this thing up and carrying it wherever I wanted to go. We were on some pretty tricky terrain. We had a really small crew—usually just 2 or 3 people. The other primes went into a backpack, with lens cleaning supplies, tools, and spare SRMemory cards.

How did the camera hold up?

Luckily we were able to push the F65 to its limits. Ruben is a very creative person, and always wanted to keep pushing the envelope.

For aerials, we wrapped the camera in Saran Wrap, except the air intake and exhaust vents. On top of the Saran Wrap we used pantyhose to keep it secure. Underneath, it got kind of kinky—we used panty liners over the camera's air intake vents. As you may know from the commercial, they are both breathable and absorbent.

I think the camera took a bit of a beating from helicopter vibrations. It never gave up on us during the shoot. It never issued us any strange humidity or temperature warnings even though we subjected it to hot lava flows that were about 6 feet away from the camera. It felt like we opened up an oven in a professional kitchen. The ambient temperature had to be somewhere around 150 degrees in some of those areas. But we were only exposing it to those kind of temperatures for under 10 minutes at a time.

I saw pictures of you wearing a garbage bag and cleaning lenses. Did you use optical flats in front of the lens?

There was a lot of cleaning optical flats. They got dirty because we were shooting aerials from a nose mount. I had to clean or replace them constantly. But better to clean a removable, coated optical flat costing a couple hundred dollars than to replace the damaged front element of a $20,000 Leica lens. About the garbage bags: we

were up on an active lava flow. We thought that there was a chance that it might rain. This was before we had the Elaine Fasula Ombre. US custom F65 rain cover that I just looked at today. We were on pioneering ground here with this camera, the early stages, so we had to improvise.

What were the high points for you on this shoot?

The first high point was right when I landed. This was a foreshadowing of what the pace of the production would be. I flew from LA, was picked up at the airport, within 60 minutes we had the camera fully outfitted and mounted on a Tyler Nose Mount, and we were flying above Honolulu. That pace kept up basically until we landed back in Honolulu a week later.

There were many other incredible moments. Flying over the top of a crater was incredible. On Kauai, the garden island we got a break in the rain right at magic hour, when the sun was setting. It was the Na Pali coastline, one of the quintessential Hawaiian nature images of all time. The coastline was just rippling with waterfalls on one side, and there was a crater of an extinct volcano. There were rivulets and waterfalls around us.

What was your setup in the helicopter?

Ruben used a Leader 5380 Monitor in the front seat of the helicopter for viewing. I used the Leader LV5330 in the back to set exposure and also to check focus. For exposure, I used the Multi function to view the picture with a waveform overlaid on it. Sometimes I used the Cinezone function, which is a false color exposure. To check focus, I used the Picture function, which features a 1 to 1 zoom. Occasionally, we loaded the helicopter up to the point where I couldn't see the person next to me. At the most we had five people plus a ton of gear.

In summary?

Another thing that is really neat. Our producer, Dawn Kaniaupio was the location producer for the UHD shoot for NHK a couple of years ago. So she had previous experience working with an 8K camera. That 8K camera was the size of a horse. And the workflow for it was the size of three 18-wheeler trailers. So here we were, several years later, with an 8K camera (shooting 4K images) that fits into a carry-on bag. And the workflow fits into a Pelican case.


N402S
OTTO NEMENZ

SONY F65 Jumpstart

19mm carbon rods

SDI OUT1: BNC Connector for HD-SDI signal to monitor

Top Carrying Handle

Tape measure hook - Image Plane

1 of 4 mounting threads for side bracket (to hold remote Control Pad)

1 of 2 levers to adjust viewfinder forward or aft

SDI OUT2: BNC Connector for HD-SDI signal to monitor

Onboard SR-R4 Memory Recorder

Exhaust vent—do not block

DC IN: Main Power 8-pin LEMO:

3 pairs supply 12VDC to run camera (10.5 - 17V).

1 pair can supply 24 volts DC for accessories.

CAM POWER: Main Camera Power On/Off Switch

DC OUT 12V4A: 11-pin Fischer receptacle supplies 12VDC up to 4 A when CAM POWER is on.
Pin 9 - Ground
Pin 11 +12VDC

24V4A: 3-pin Fischer industry-compatible RS receptacle. Supplies 24 V up to 4 A when 24VDC is connected and CAM POWER switch is on.
Pin 1 - Ground
Pin 2 +24VDC
Pin 3 Start/Stop.

LENS: 12-pin Hirose (video lens) connector. Might be used for Camera Run/Stop

Wrench: Thoughtfully included storage compartment for a 3mm wrench—used to attach handle and accessories

EXT I/O: 5-pin for future Speed-Iris Control and Ramping

3/8 - 16 thread: Could be used to attach a handgrip if a small additional adjacent locating hole is drilled

SONY F65 Jumpstart (cont'd)

M-SHUTTER-E:
Buttons for Mechanical or Electronic Shutter. Mechanical eliminates "jello" effects and works from 1-60 fps. Electronic shutter works from 1-120 fps. Use the M Button to stop the mechanical shutter from spinning when checking the gate...um... sensor.

Status Display. Sony calls this the Subdisplay. In this example, we are shooting at:
23.98 fps (progressive format)
180° shutter
ND Clear: No behind-the-lens filter
800 EI (ISO, ASA, Sensitivity)
6.2E: At 800 EI, we get 6.2 stops of highlight latitude
3200K: color temperature
S-Log LUT viewing in finder and on monitors

ASSIGN 1-4. User assignable buttons. The defaults for 1-3 are good:
1 Mag: Magnifies image in finder and via SDI OUT by 2x, 4x or Off with each press of the button.
2 Mag Position: Positions the magnified image to 1 of 9 areas. Each press of the button the selection from top left to lower right.
3 Hi/Lo: Each press of the button toggles to check highlights, shadows and normal.

SD/Memory Stick slot for future capability to save and recall camera setup files, LUTs, etc.

SR-R4 Memory Recorder Remote Control Panel

REC: Starts and Stops recording to the onboard SR-R4. If the button's LED indicator flashes red, you probably have a low battery.

LOCK: Prevents recording—a good setting when visitors to the set want to look through the viewfinder.

LOCK: This slide switch locks out all buttons except REC and PAGE. This helps prevent accidental changes of camera settings—for example, when moving camera positions.

Step 1. SETTING: This is the first button you push (for 1 second or longer) to enter and navigate the Menus. This button would be labeled "MENU" on Alexa, C300, or Epic.

PAGE and BACK are self-explanatory menu page navigation buttons. Currently there are 3 pages.

Step 2. MENU SEL/ENTER: rotate the dial to navigate; push to select/enter.

VF DISPLAY: Toggles Viewfinder information text on and off.

VF MENU: The bigger, more complete menu. Push this button to display Viewing settings and many other choices in the Viewfinder and on a monitor. Navigate with the MENU SET/ENTER button.

SONY F65 Jumpstart (cont'd)

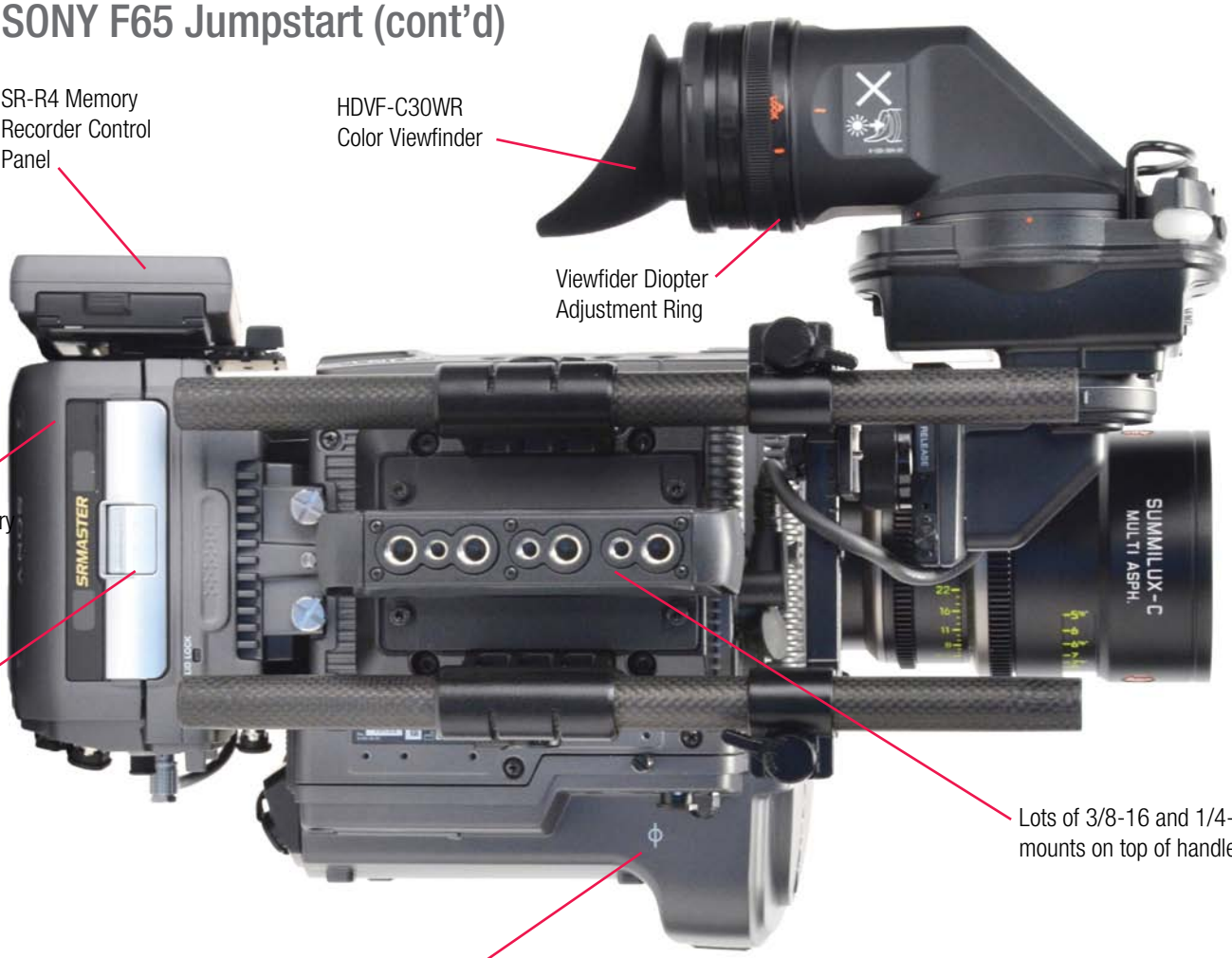
The Control Panel may tickle your ear in handheld mode.

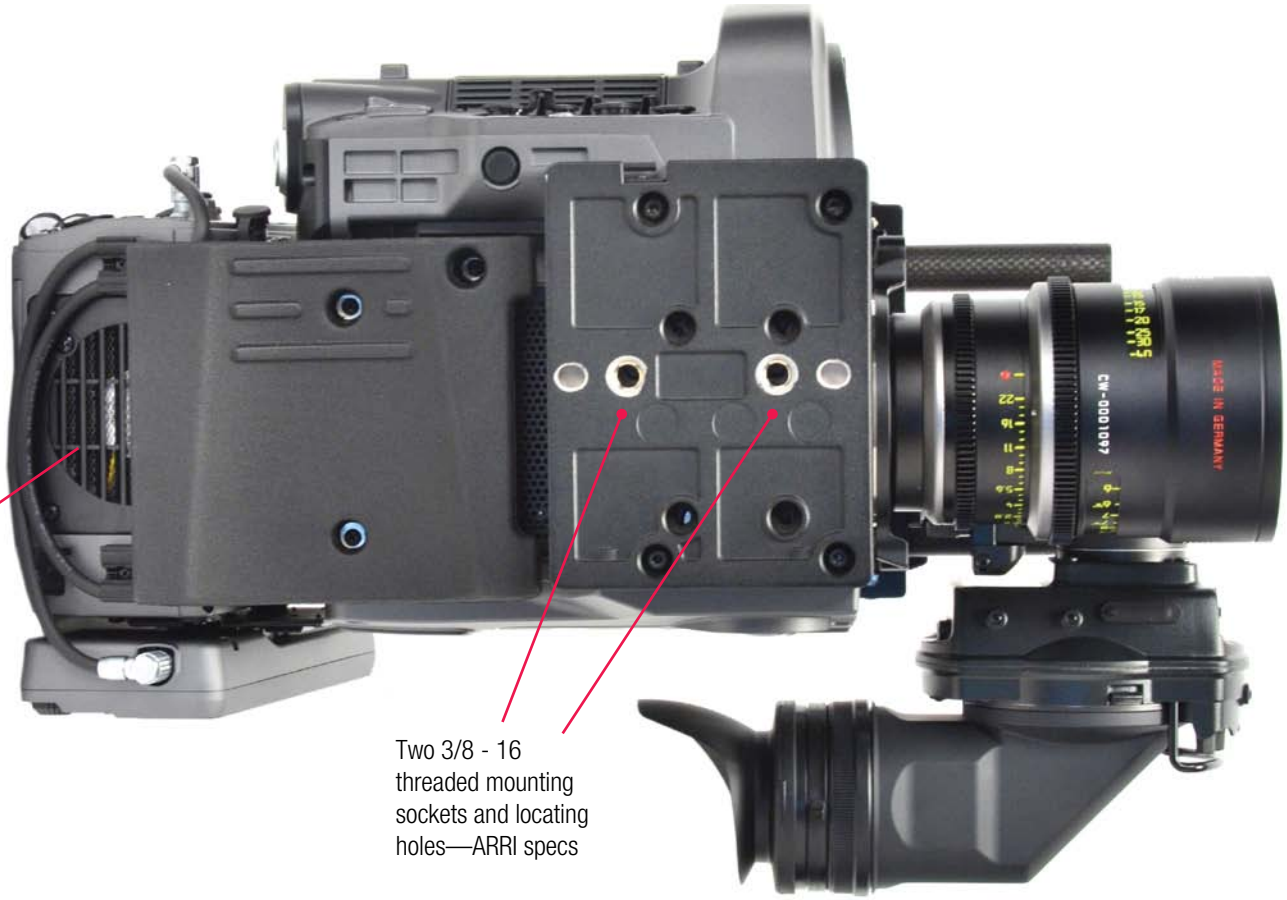
To put it on the camera right side, attach Sony's SRK-CP1 Optional Control Panel Bracket to the right side with 4 M3x5 screws.

Sony's Battery Pack Adapter attaches to the back of the SR-R4 with 4 screws.

There's no direct electrical connection, so on-board batteries power the camera with a cable.

SONY F65 Jumpstart (cont'd)

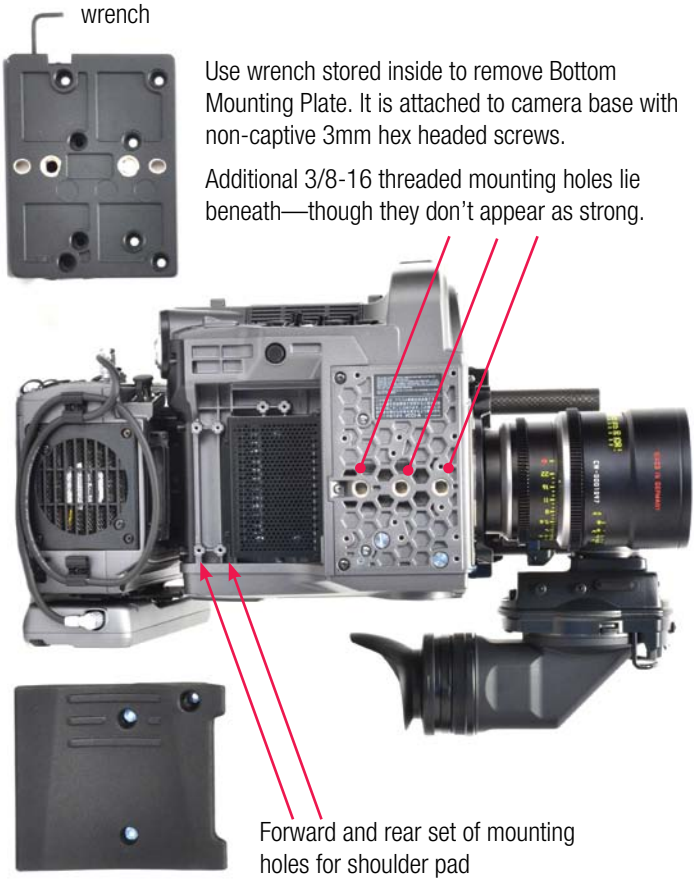




F65 Nuts and Bolts

Base

The base shoulder pad is attached with 3 non-captive screws. Unscrew them to reposition the pad in the forward or rear set of mounting holes for better balance on your shoulder.



Removing Top Handle and Viewfinder Assembly

Top handle and viewfinder assembly is removed with 3mm hex screws

Sony F65 Weight and Size

Weight of Body only: 11 lb
Body and Base: 11.5 lb
Body, top handles, Viewfinder Bracket: 14 lb
Body, top handles, Viewfinder Bracket, Viewfinder: 16 lb
Body, top handles, VF bracket, VF, SR-R4 and SRMemory Card: 20.5 lb

LWH of F65 body is 10 x 9 x 8"

F65 Nuts and Bolts (cont'd)

Flange focal depth: 52 mm

Flange to cover glass: 31.5 mm

(Angenieux Optimo DP rear element protrudes 31 mm beyond lens flange—so it is safe here.)

Sensor is 1.89:1 (24.7 x 13.1)

20 million pixels; 18.7 used for imaging. The others are for black balance, image correction, and output functions.

14 stops of exposure latitude

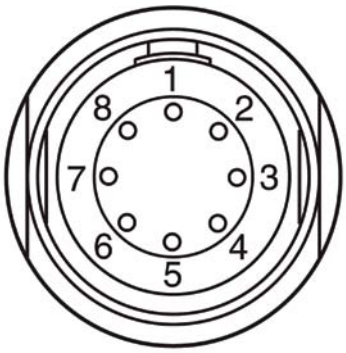
EI: 200 - 3200

Color temperature: 3200, 4300, 5500 °K

1-60 fps in full 4K. 60-120 fps coming soon

F65 cameras with mechanical shutters have behind-the-lens filters: Clear, ND.9, 1.2, 1.5, 1.8 (3, 4, 5, 6 stops)

With a CBK-WA01 Wi-Fi adapter connected to the USB port of the F65, an iPad or Sony Tablet S with the free F65Remote app lets you check and change camera settings: fps, shutter angle, EI, color temperature, ND filter,Rec Start/Stop, etc.



Wiring of Main Power Connector—3 pairs for 12VDC (needed to share all that amperage over 3 strands of cable) and 1 pair for 24VDC accessories. Needless to say, this is a good reason to convert your accessories back to 12 volts.

1 Gnd for 12V
2 Gnd for 12V
3 Gnd for 24V
4 +20 to +30V for accessories
5 +10.5 to +17V for camera
6 +10.5 to +17V for camera
7 +10.5 to +17V for camera
8 Gnd for 12V

SR-R4 Memory Recorder on F65

To make the SR-R4 home screen's display more readable when the Control Panel is mounted vertically:

Simultaneously hold the BACK, FUNCTION and HOME buttons.

The text is now level.

The blue bar below the 16-track audio display tells us the unit is in Playback Mode.

The F65 cannot record when the SR-R4 is in Playback Mode. Seamless Record/Playback mode will be available in May. Until then, to quickly jump from Playback to Record Mode:

Push the VIDEO button.

Rotate the SELECT/ENTER dial to toggle between Record and Play.

Press the SELECT/ENTER dial to confirm.

RED means you are now in Record mode.

The KEY INHIBIT slide switch locks out buttons and controls—preventing accidental mayhem during shooting.

For Diagnostics, simultaneously hold the HOME and SYSTEM buttons.

Credits

Thanks to Jeff Cree, CTO of Band Pro for the tutorials and reviews, Randy Wedick for workflow, Seth Emmons and Amnon Band for the facilities, equipment, lights, sweeps, and support for this article. For technical advice, thanks to Denny Clairmont, Michael Condon, Brett Reed at Clairmont Camera; and to Otto Nemenz, Ryan Sherican, Dan Lopez, Fritz Heinzle at Otto Nemenz International. At Sony: Peter Crithary and the Sony staff who checked, advised and reviewed.

Power: 11-17VDC

Amps (F65 RAW 23.98p recording)
F65 camera only: 65W
SR-R4 recorder only: 37W
Total: 102W

SR-R4 Memory Recorder on F65 (cont'd)

The F65 and its onboard SR-R4 deck record to iPhone-sized SRMemory Cards. They come in orange, blue and black trim to identify the different write speeds and proportional prices. Recording times, below are for F65 RAW at 23.98 fps:

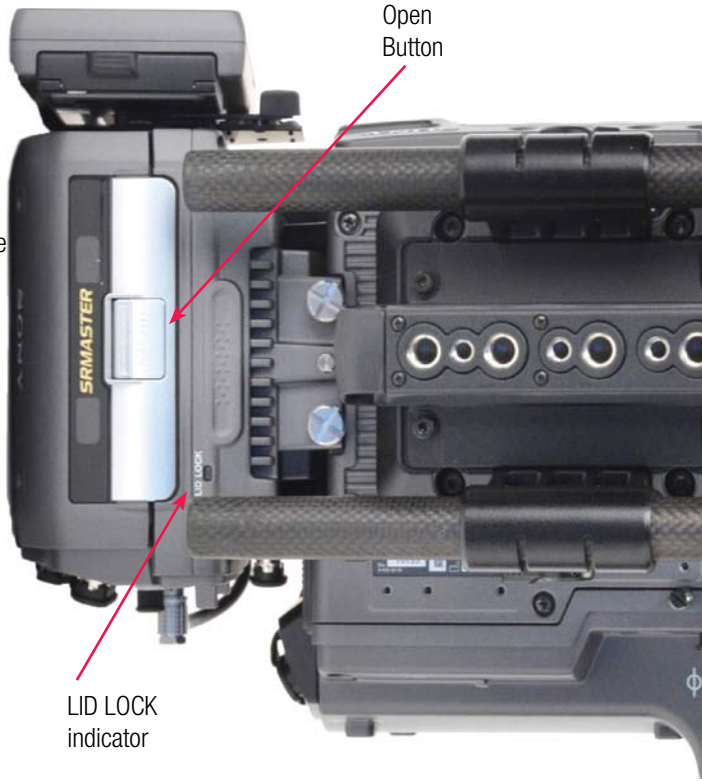
Orange=1.5 Gbps	
256 GB	Does not record RAW
Blue=2.5 Gbps	
512 GB	29 mins
1 TB	59 mins
Black=5.5 Gbps	
256 GB	14 mins
512 GB	29 mins
1 TB	59 mins

Black 5.5 Gbps SRMemory cards will record 120 fps F65RAW when available: 5 minutes on the 256 GB card, 11 minutes on the 512 GB card, and 23 minutes on the 1 TB card.

In comparison, HDCAM SR tape records at 440 and 880 Mbps and SxS cards can record short bursts of up to 1.2 Gbps.

When opening or closing the SRMemory Card door on the SR-R4, be sure the LID LOCK indicator is not glowing orange.

- Orange means an SRMemory Card is mounted inside and the door is locked. Press the EJECT (blue button on the Control Panel) to unmount the card. Think of it as similar to unmounting an External Hard Drive on your Mac by dragging it to the Trash.
- Once unmounted, the LID LOCK indicator will no longer glow and you can press the silver Lid Open/Close button to open the hatch.
- If you lose power, eject the card but do not use it until you have performed an auto-recovery with the SR-PC4, SR-PC5, or R1000.
- You could do an auto-recovery on the SR-R4, but it takes longer.

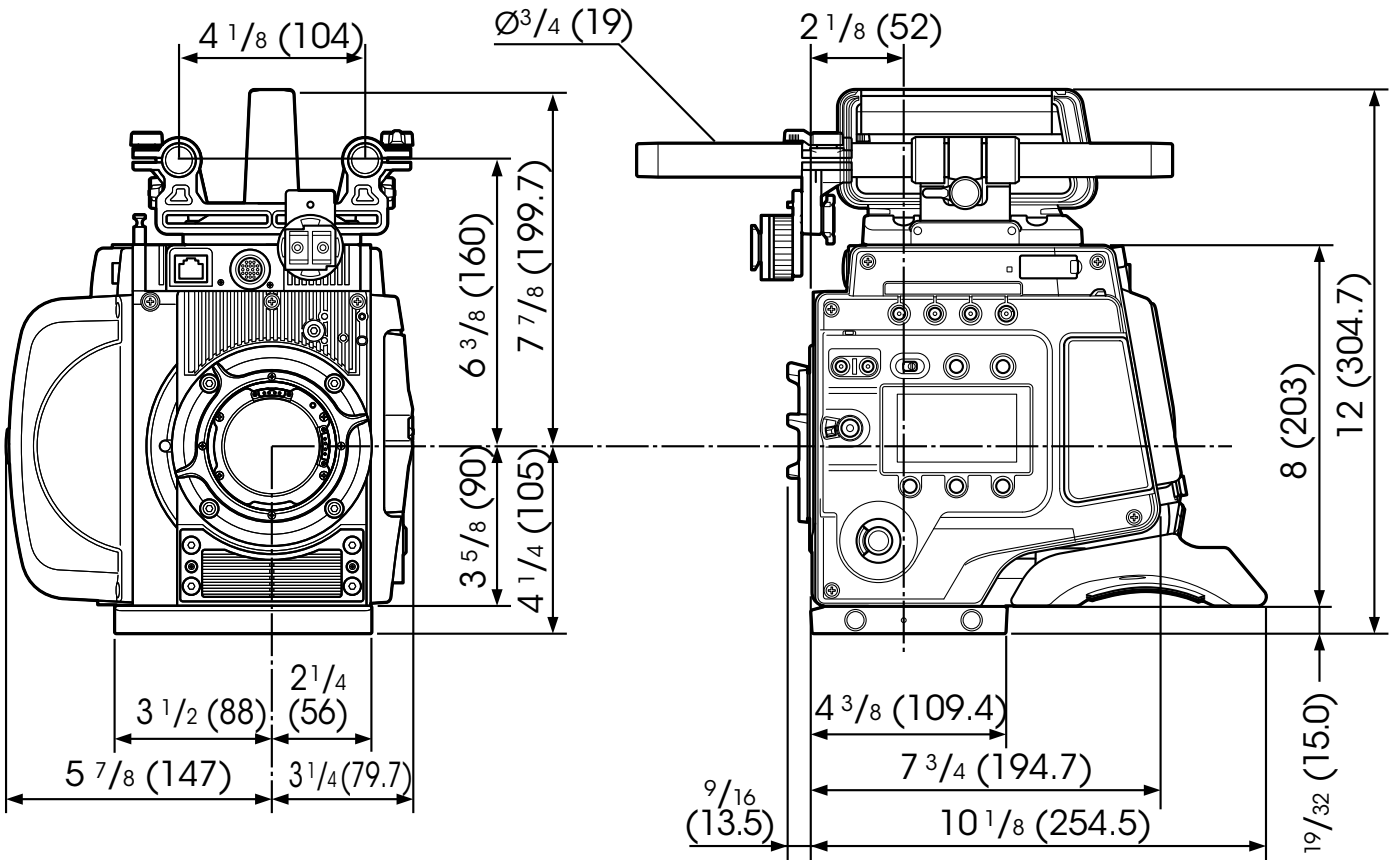


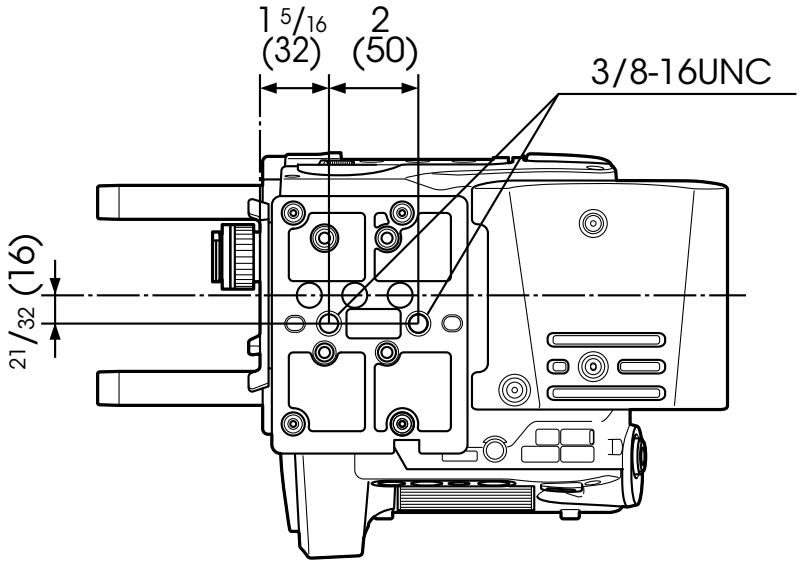
Which Memory Card to Use on a big feature?

On a big feature, I'd use 256 GB (Black, 5.5 Gbps) SRMemory Cards. They record about 14 minutes of 4K RAW at 24 fps. This comes closest to the 11 minutes of shooting time on a 1000' 35mm film magazine. 256 GB cards download quickly, and risk is spread. If anything goes wrong, at least it's only 14 minutes and not a ½ or a full hour at risk. "Exposed" cards go into a mini Pelican case: one card per case, like a film can.

SRMemory cards go in with the writing on top and facing the rear

F65 Measurements





8K Sony CMOS Image Sensor

Plugging Preston and Accessories into F65

There are many ways to connect Preston Cinema's MDR (Motor Driver) to a Sony F65 Camera. How you do it depends on whether you are powering F65 accessories with 12V (actually 14.4) or 24V (28.8) batteries. The F65 and its onboard SR-R4 Memory Recorder use 12V, so any 24V accessories require additional power.

The F65's DC IN connector has 3 pairs of pins to supply 12 volts to the camera, and one pair to pass 24 volts through to the 3-pin (ARRI RS Style) 24V4A receptacle to power accessories.

Block batteries that supply both 12V and 24V to power both the camera and accessories would seem to be the most flexible option.

For handheld, a single 12V onboard battery will power the camera and pass 12 volts to the 11-pin Fischer (DC OUT 12V/4A) receptacle. The downside to this approach is that the additional current drain from the accessories will shorten the run-time of the camera battery.

Adding a second onboard battery for powering the usual crate-load of accessories has the advantage of allowing high current draw without the possibility of affecting the camera power. Some rental houses are looking into adding breakout boxes with Lemo 2-pin connectors for 12 volt accessories, and others are thinking of a 12 V to 24 VDC up-converter box with 3-pin Fischer connectors.

Preston's MDR has separate receptacles for R/S (Run/Stop) and Power. The F65 has Run/Stop control available from either the 24V/4A 3-pin or the 12-pin Hirose LENS receptacle. Cable numbers below are Preston parts.

Here are some choices to use separate cables for power and R/S:

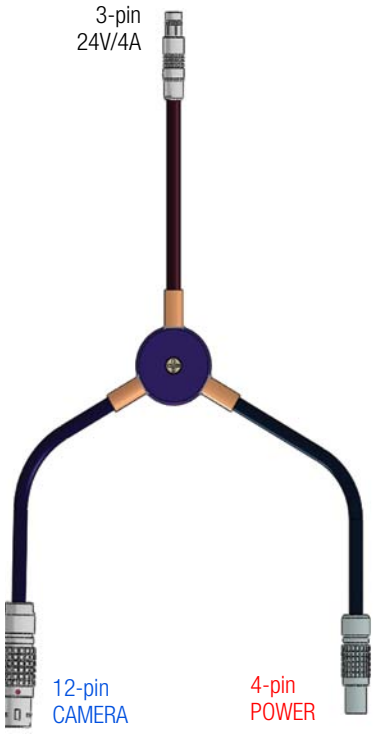
1. F65 3-pin 24V/4A to Preston MDR POWER: Cable 4499.
   Preston MDR CAMERA R/S to F65 12-pin LENS: Cable 4521.
2. F65 DC OUT 12V/4A to Preston MDR POWER: Cable 4474.
   Preston MDR CAMERA R/S to F65 3-pin 24V/4A: Cable 4521.

Since many rental houses are building electrical breakout boxes to power accessories (but not add R/S) with multiple 3-pin 24V/4A receptacles, here's a third cable combo:

3. AKS Box 3-pin 24V/4A to Preston MDR Power: Cable 4521.
   Preston MDR CAMERA R/S to F65 24V/4A: Cable 4499.

Finally, the most elegant approach is a single Y-cable. It takes up only one receptacle on the F65 camera.

4. Preston MDR CAMERA R/S and POWER to F65 3-pin 24V/4A receptacle: Cable 4547 does it all.



F65 Connectors:
Camera right side

Preston's new Y cable 4547 occupies only one receptacle on the F65.

Plug the single end into the F65 3-pin 24V4A receptacle.

The opposite ends plugs into Preston's CAMERA and POWER receptacles.

Camera=
Starts/Stops F65
Recording

Power=
12 or 24 V from
F65 to power MDR

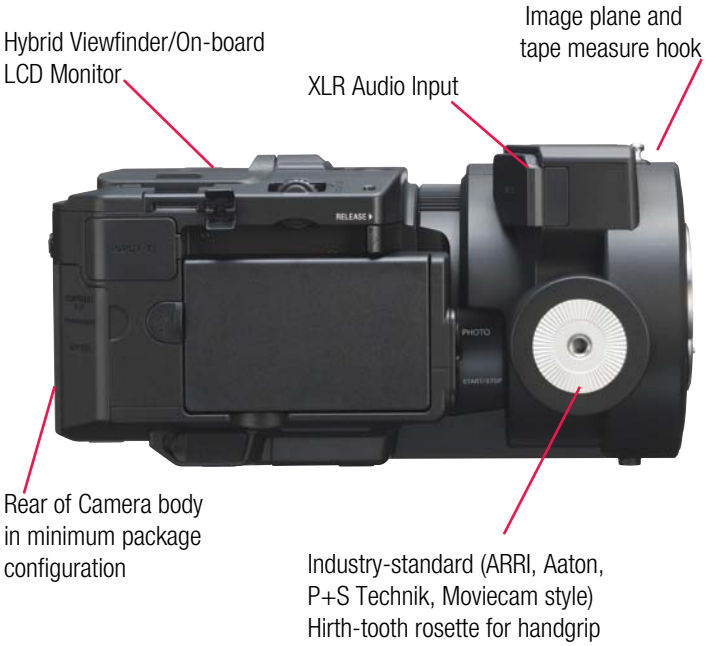
Preston Microwave Receiver
Motor Driver (MDR)

Sony 35mm NEX-FS700


nxcam
Exmor
ND FILTER
FOCUS
AUTO
MAN
IRIS
HOLD
AVCHD Progressive MPEG2 SD
PEAKING
HISTOGRAM
FACE DETECTION
ZEBRA
MARKER
LAST SCENE
SONY
GAIN/ISO
WHT BAL
SHUTTER SPEED
AUTO
MANUAL
S&Q
REC/PUSH EXEC
MENU
DISPLAY
PICTURE PROFILE
STATUS CHECK
BATT RELEASE
LOCK

Sony NEX-FS700

Camera Right Side



Sony digital motion picture cameras come from two design teams. The F65 camera system is designed at Sony's Atsugi Tech Center, in the countryside not far from the famous Kamakura Buddha. A one hour train ride northeast to downtown Tokyo takes us to Sony's Shinagawa design group—who have been equally busy on a new 35mm digital motion picture camera.

This is actually Act 2 of the popular saga of the NEX-FS100, aka NXCAM S35. Act 2 is usually where the action really gets going. Which it does with Sony's new NEX-FS700. The designers listened to users, made improvements, and came up with excellent new capabilities and features.

Here are some reasons to line up at Sony's NAB booth and get your hands on this Hasselblad-sized 4K camera.

1. The NEX-FS700 camcorder uses a new 4K Exmor Super 35 CMOS sensor (Total 11.6 million pixels). Pre-release sources say its "high-speed readout chip is optimized for motion picture shooting, giving high sensitivity, low noise and minimal aliasing."

2. Sony is planning a future firmware upgrade that will enable the NEX-FS700 to output a 4K bitstream data over 3G HD-SDI when used with an optional Sony 4K recorder.

2. Up to 28 Mbps 1080/60p MPEG-4 AVC/H.264 to internal SD or Memory Stick Pro.

3. Shoots stills: 8.4 Megapixels in 16:9 and 7.1 Megapixels in 4:3 format—with Sony Alpha still camera look and color.

4. Slow motion to 240 fps at full HD.

5. Up to 960 fps (with reduced resolution).

6. Behind-the-lens Clear, ND.6, ND1.2, and ND1.6 filters.

7. Industry-standard handgrip Hirth-tooth rosette.

8. Sensitivity: 500 ISO to 16,000 ISO.

Sony NEX-FS700 (cont'd)

The NEX-FS700 can continuously record slow motion to 1920x1080 up to 60p on the internal SD or Memory Stick single slot, or FMU Memory Unit.

Simultaneous recording to FMU and Memory provides peace of mind and the possibility to hand over a card when shooting is complete.

The FS700 will overcrank to 240 fps (Sony calls it Super Slow Motion) at full HD.

Super Slow Motion is recorded to an internal buffer (as do most slow motion cameras). At 120 fps, the camera records about 16 seconds of real-time, and at 240 fps, the camera records around 8 seconds. Screen time, played back at 24 fps, is 80 seconds in both instances.

You will be able to control whether the 8 - 16 seconds of internally buffered memory is triggered from the beginning of the take, the middle, or the end.

It will shoot 480 fps at 1920 x 432 skipped readout interpolated to 1920 x 1080, and 960 fps with reduced resolution interpolated to 1920 x 1080.

Estimated cost is probably below $10,000 and the camera ships in June.

Look for the FS700 at NAB in Sony's booth, next to the Cine Alta F65 and F3.

Camera Left Side

Sony NEX-FS700 (cont'd)

Behind the Lens ND Filters

This is quite an engineering feat: putting 4 filters in the 18 mm gap between the sensor and the E-mount lens flange. "E" in Japanese sounds like the number 18, which may be how the mount was named (18 mm flange focal depth).

The sensor is protected by an OLPF cover glass. Clean carefully.

The 4 behind-the-lens filters are:

Clear = maintains flange focal depth
1/4 = ND.6 = -2 stops
1/ 16 = ND1.2 = -4 stops
1/64 = ND1.8 = -6 stops

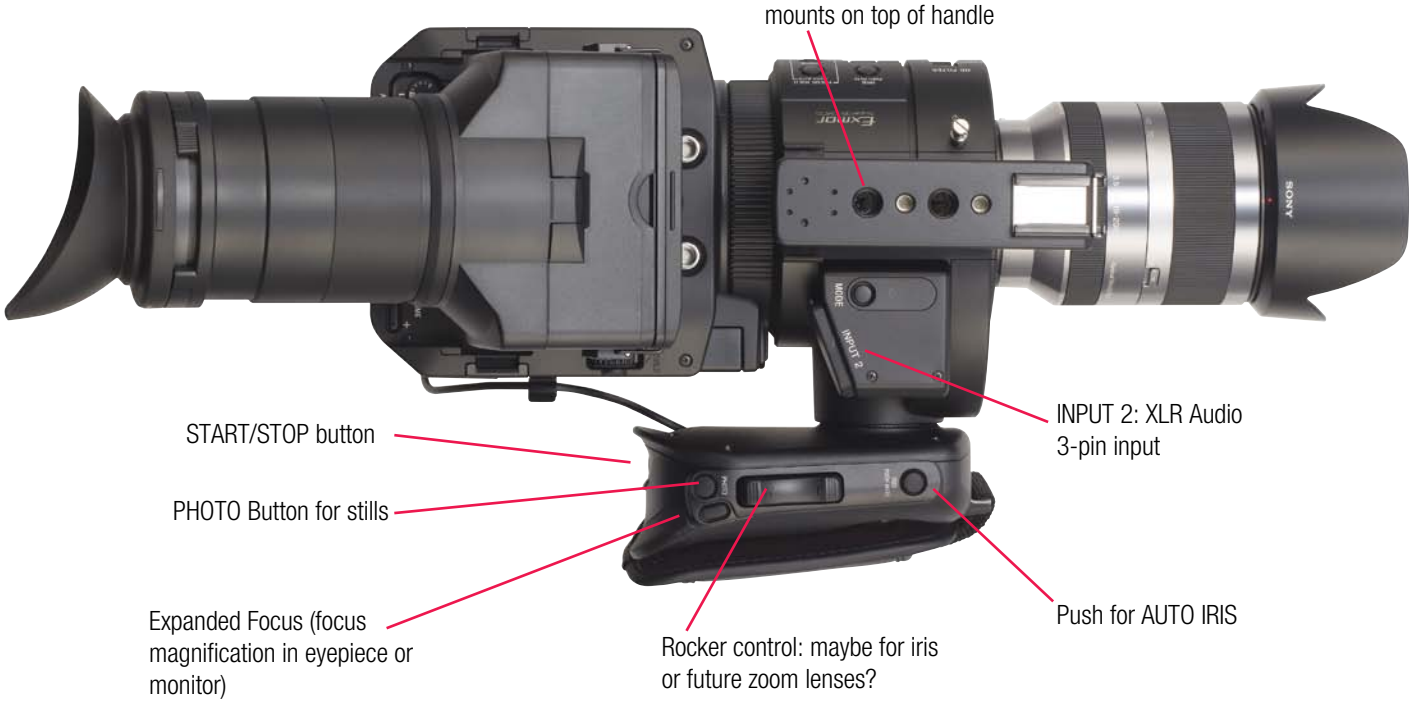
The fractions indicated on the side of the camera require more math than I want to deal with when chasing the most beautiful sunset the world has ever seen, or when being chased by the wild animal that a few moments ago was seen in the eyepeice as gently grazing. I will cover the fractions with a piece of chart-tape onto which I have written the stops reduced (Clear -2, -4, -6 Stops).

POWER: Main On/Off Switch

Hybrid Viewfinder/On-board LCD Monitor flips up. 3.5" screen, 921K, 16:9.

Sony NEX-FS700 (cont'd)

Top View



Rear View

The Sony NEX-FS700 has face detection and face tracking: highlight a face in the finder and it will automatically track and keep that person in focus.

Expanded focus magnifies the viewfinder or monitor image by 4 or 8 times, and also can reposition the magnification window in 4 positions—very similar to the much more expensive F65 camera's focus system.

Picture profiles include Cine Gamma 1-4.

The FS700 is switchable from 60 to 50 Hz.

24 fps is possible in PAL countries.

Framelines in the finder are available for 1.78:1, 1.66:1, 1.851, and 2.35:1 (letterboxed widescreen).

ISO, Focus and Shutter Angles can be displayed in the finder.

Sony NEX-FS700 (cont'd)

Optional A to E NEX (Alpha to NEX) Lens Mount Adapter LA-EA2 lets you attach A-mount lenses to an E-mount Camera Body. The adapter uses a thin partial mirror (Translucent Mirror Technology) to provide fast and accurate Autofocus while shooting both stills and video.

Front view: E-mount, Sensor and Lens Contacts

The NXCAM's E-Mount is designed to accept almost all SLR and DSLR 35mm lenses—using simple, inexpensive adapters without optical degradation. Most are mechanical. FS series owners can make use of their existing lenses and add more lenses, remaining brand-agnostic.

Right Handgrip: Outside

Right Handgrip: Inside. Standard Hirth-tooth rosette attachment.

Photo: Vincent Ricafort

FILM AND DIGITAL TIMES

SONY

www.sony.com/35mm