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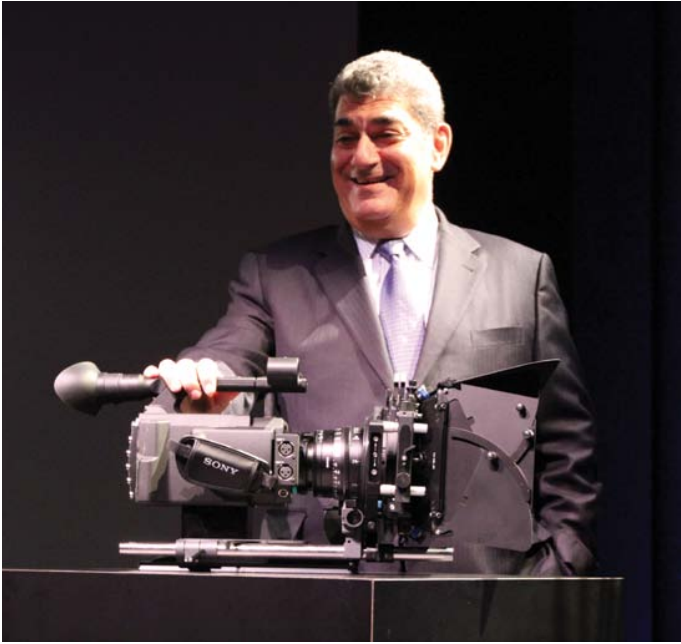
# FILM AND DIGITAL TIMES

The Journal of Art, Technique and Technology in Motion Picture Production Worldwide

## SONY PMW-F3 Special Report



## Sony Affordable 35...



First unveiled at NAB 2010 by Alec Shapiro, Senior VP of Sony Professional Sales and Marketing, it was quickly put under glass. The camera remained under glass at IBC, attracted much interest, more speculation, and only non-disclosable smiles from Sony staff about the sign that said, "Affordable 35mm Camera."

The IBC press release was short: "Sony plans to introduce an 'Affordable 35mm Camera' to join the F35 and the SRW-9000PL. The demonstration of an R&D prototype will re-affirm the goal of establishing a 35mm line-up to cover applications from high budget to lower budget production." Another big sign above the affordable prototype and its 2 Sony Cinealta PL camera siblings (F35 and SRW-9000PL) proclaimed, "It's a 35mm World." Absolutely.

## Sony's Alec...



Two months after IBC 2010, on a cold, sleety November 8th, Alec was back—this time on the lofty 35th floor of Sony's New York Madison Avenue headquarters, ready to introduce the new camera to the press, and the world.

The evolution was complete: the new camera is called PMW-F3, the third 35mm Cinealta Digital Camera. "Affordable" was an understatement.

The PWM-F3L package be will shipping end of January or early February as a basic camera with PL adaptor (no lenses): list price will be around \$16,000. Yes, the comma is in the correct place: \$16K. The PMW-F3K package consists of the camera, PL adaptor, and 3 Sony PL Primes, with a list price around \$23,000.



# Sony PMW-F3

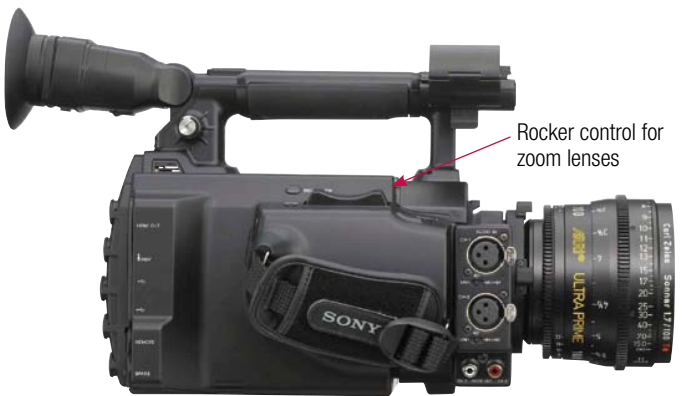


# Sony PMW-F3



This is not a tape measure hook at the image plane: it is a carrying strap hook.

Image plane



Rocker control for zoom lenses



Front view: F3 lens mount with PL adaptor attached

The new Sony PMW-F3 camcorder is another step in the democratization of cinematography—a 35mm format digital camcorder that is lighter, smaller, faster, cheaper. Unveiled as an “affordable 35” prototype at NAB, it was introduced at USC on November 17th with film students and independents in mind.

But its appeal is greater. The body weighs a meager 5.3 lbs (2.4 kg). Many lenses weigh more: instead of attaching a lens on this camera, you’ll often put the camera on a lens. (See lens charts later in this issue.) Power consumption is an astonishingly low 24 Watts. The Sony F3 uses an on-board 12 volt battery like the BPU-60 for about 3 hours of run-time. There are no fans.

The PMW-F3 camcorder has a Super 35mm single CMOS sensor: 23.6 x 13.3 mm, which is close to 35mm 3-perf 1.77:1 motion picture format. The newly developed Sony Exmor CMOS imager promises high sensitivity and low noise levels. The ballpark sensitivity rating is ISO 800 (1600 in S-log), with an exposure range greater than 13 stops. Up to now, Sony has been using CCDs for digital motion picture camcorders. Since image sensors for motion picture production must consider characteristics such as sensitivity, dynamic range, and smoothness of motion—by enlarging the size of each pixel in the new Exmor CMOS sensor, Sony achieved high sensitivity, low noise, and good image quality.

Looking at the front, you notice two distinctive things. The F3 has a PL mount. But it’s really an adaptor. Remove it by turning the mounting ring on the body counter-clockwise. Underneath is a new stainless-steel Sony F3 mount. It is a little wider than a PL, and reminiscent of Sony EX3 mounts.

The flange focal depth is remarkably shallow, which translates into lenses that may be non-retrofocus, (think Leica M series rangefinder) and best of all, opens up a world of adaptors. And, as if to prove this point, every PMW-F3 camera ships with a Sony F3 to PL mount adaptor. The PL mount has lens contacts in place for Cooke /i Technology and ARRI LDS.

What does this all mean? Alfred Piffel may have predicted correctly: it’s not just a PL mount camera world; cameras can now have infinite choices of 35mm format interchangeable mounts. The DSLR revolution confirmed the appeal of larger single sensors with their shallower depth of field.

The PWM-F3L package is the basic camera with PL adaptor—no lenses—with a list price around \$16,000. The PMW-F3K package consists of the camera, PL adaptor, and 3 Sony PL Primes: 35, 50, and 85 mm T2.0. This kit will cost around \$23,000. The PL lenses will support Cooke /i Technology. We also learned that Sony is planning an affordable zoom lens with the Sony F3 mount (not PL). The shorter flange depth should enable this lens to be smaller and lighter than current PL zooms.

The PMW-F3 is based on the XDCAM EX platform. This is Sony’s third 35mm CineAlta Digital Camcorder. The other two are F35 and SRW-9000PL. Their specs still exceed the F3, but this camera is no slouch, and footage shot with all 3 cameras should intercut.

The F3, above all, is a handheld camcorder. It doesn’t sit on your shoulder. You hold it like a Handycam, slipping your hand between the prosumer/video style adjustable strap and plastic handle with its zoom rocker control and start/stop button. It’s not a shoulder-resting camera. The lighter and smaller camera body was made possible by the development of the new CMOS sensor, which

consumes very little power, generates very little heat, and doesn't need a fan.

A tilting viewfinder is attached at the rear of the top handle. It looks similar to the HVR-Z7U finder, with about 1.2 million pixels. An LCD monitor pivots out from the camera's left side. I hope the next model has a detachable finder that can mount either at the rear or in front for shoulder-resting, and the 1/4-20 tripod mounts on the bottom are replaced by industry-standard 3/8-16.

At the rear of the F3 are 2 Sony SxS ExpressCard slots. The F3 records natively onto SxS cards at 35 Mbps in 4:2:0 8-bit XDCAM EX format. The SxS cards are formatted in standard FAT file format; a 32 GB card will record 100 minutes in highest quality. Many users will be happy with this. But, like *Oliver Twist*, many will want more. And they can have more—with onboard SxS cards as immediately editable proxies, while simultaneously recording to a higher standard. That might include 4:4:4 10-bit S-Log HD-SDI dual link to an SRW-1 /SRPC-1 SRW tape recorder at visually lossless 440 and 880 Mbps or (next year) 1 TB Solid State Memory Cards with potentially even greater data rates.

HD-SDI dual link outputs enable external recording (4:2:2 1080 50/59.94P normal; and RGB 1080 23.98/25/29.97PsF as an option). You'll be able to select S-Log and HyperGamma to seriously increase the dynamic range. S-Log is Sony's take on RAW "Digital Negatives." The image, uncorrected, looks pale and washed out (like a negative), but when a Look-Up Table (LUT) is applied, shows the full dynamic range of the image, giving you greater flexibility for color and contrast correction in post.

Recording formats include 1920x1080, 1440x1080, and 1280x720 at 23.98/25/29.97p, 50/59.94i and, in DVCAM mode, 25/29.97PsF and 50/59.94i. Under- and overcranking is called S & Q for "slow" and "quick" recording, from 1 to 30 fps at 1920 x 1080 (17 to 30 fps in dual-link mode) and 1 to 60 fps at 1280 x 720 (17 to 60 fps in dual-link mode). Sony's column-parallel A/D converter mechanism makes 60 fps possible with less noise.

Who's going to shoot with Sony's F3—and how? If you're a student or independent, you'll probably take the simplest package possible: a zoom or primes, record to SxS onboard cards, and go directly to edit. Of course, you'll be sure to diligently back up those SxS cards using Sony's PXU-MS240 Mobile Storage Device, which not only backs up the cards, but also carefully checks the data to be sure it's all there (parity). Next, you'll copy the SxS card to your Avid or Final Cut Pro system. (Go to [sony.com/cinemon](http://sony.com/cinemon) to download the Sony Cinemon plug-in. It enables MPEG to be transparent to FCP Quicktime. You'll be able to edit natively in FCP, with drag and drop capability. All files will be instantly viewable on a Mac. Avid's AMA (Avid Media Access) plug-in mounts the XDCAM EX files directly into Avid Media Composer.)

When shooting documentaries, commercials or TV, you might follow a similar path. Of course, you will not reformat your SxS cards until the job is safely completed and many archives and copies have been cloned. Cards are relatively cheap. The dreaded word "Oops" is very expensive when a once-in-a-lifetime scene is reformatted. I shudder when I see people reformatting cards during a job. It's like re-recording over your existing videotape.

High-end productions, recording to SR tape or memory, should soon have native support of SR codec on Avid and Final Cut Pro. The HD-SDI outputs of the Sony F3 will be eyed with great interest





The right side of the camera has a familiar Sony camcorder handgrip with zoom rocker control—a clear indication of commitment to an upcoming zoom lens specific to the F3. There are two 3-pin XLR audio connectors (Line/Mic/+48v).



by after-market recording gurus at Codex, Cinedeck, etc.

3D Link is a future option that connects two F3 cameras in sync for stereo shooting. When connected, both cameras can be managed by one remote control. Genlock in and Timecode out are handled, along with Metadata. You'll be able to record the left and right cameras onto one memory card, if you like.

The camera that began as the “affordable 35mm” prototype may soon become “the awardable 35mm” camera—providing an innovative avenue to award-winning productions.

## SONY PMW-F3 Specs

- Weight, body only: Approx. 2.4kg
- Size, body only: (W x H x D): 151 x 189 x 210mm
- Power: DC 12V; DC input: XLR type 4-pin (male)
- Power consumption: Approx. 24.0 W
- Battery operating time: Approx.130 Min (w/ BP-U60)
- Recording format: MPEG-2 Long GOP
- HD HQ mode: VBR, maximum bit rate: 35 Mb/s, MPEG-2 MP@HL
  - HD SP mode: CBR, 25 Mb/s, MPEG-2 MP@H-14
  - SD mode: DVCAM
- Audio: Linear PCM (2ch, 16-bit, 48-kHz)
- Recording NTSC:
  - HD HQ mode: 1920 x 1080/59.94i, 29.97p, 23.98p,
  - 1440 x 1080/59.94i, 29.97p, 23.98p,
  - 1280 x 720/59.94p, 29.97p, 23.98p
  - HD SP mode: 1440 x 1080/59.94i, 23.98p
  - SD mode: 720 x 480/59.94i, 29.97p
- Recording PAL:
  - HD HQ mode: 1920 x 1080/50i, 25p,
  - 1440 x 1080/50i, 25p,
  - 1280 x 720/50p, 25p
  - HD SP mode: 1440 x 1080/50i
  - SD mode: 720 x 576/50i, 25p
- Lens mount: PL mount (with supplied lens mount adapter)
- Imager: Super 35mm size Single Chip Exmor CMOS Image Sensor
- Built-in ND optical filters: OFF: Clear, 1: 1/8ND, 2: 1/64ND
- Shutter speed: 1/32 - 1/2000 sec
- Slow Shutter (SLS): 2, 3, 4, 5, 6, 7, 8 frame accumulation
- 720P: 1 - 60 fps selectable (17-60 fps when HD-SDI Dual Link active)
- 1080P: 1 - 30 fps selectable (17-30 fps when HD-SDI Dual Link active)
- White balance: Preset, Memory A, Memory B/ATW
- Gain: -3, 0, 3, 6, 9, 12, 18dB, AGC
- Audio input: XLR Type 3-pin (female) x2, LINE/MIC/MIC +48V selectable
- Composite output: BNC (x1), NTSC or PAL, S-Video output
- SDI output: BNC (x1), HD-SDI/SD-SDI selectable
- HD-SDI Dual Link Out: BNCx2 4:2:2 1080 50/59.94P 10-bit output
- i.LINK: IEEE1394 S400 Connector
- Timecode in: BNC (x1); Timecode out: BNC (x1); Genlock in: BNC (x1)
- USB: Mini Type-B connector and standard USB
- HDMI output: HDMI connector (Type A)
- Viewfinder: 0.45", Aspect Ratio 16: 9
- Built-in LCD monitor: 3.5", 16: 9, Hybrid (semi-transmissive) type
- Media: ExpressCard/34 slot (x2)

# Lenses

## Sony PL Primes



Sony 35mm format PL Primes: 35, 50, 85 mm. T2.0



The PWM-F3L package consists of the camera with PL adaptor (no lenses). The PMW-F3K package includes the camera, PL adaptor, and 3 Sony PL Primes: 35, 50 and 85 mm, T2.0.

Two custom zooms are also in the works, using Sony's F3 mount.

Since the F3 has a very shallow flange focal depth, a huge array of lenses can be used with all kinds of adaptors.

## Sony F3 Mount and PL Adaptor

Every PMW-F3 camera ships with a PL mount adaptor. It has lens contacts in place for Cooke /i Technology and ARRI LDS in the 12 and 3 o'clock positions. Lens information (metadata, T-stop, focal length, aperture, serial number) can be supplied continuously, in real time.



# Sony F3 Launch in LA

by Seth Emmons

Those of us who spend way too much time on camera technology websites and travel the major industry tradeshow circuit like to think we're always one step ahead. We traffic in substantiated rumors and informed speculation. We don't guess at what's coming next—well, some of us do. Many of us thought we knew what to expect from Sony's Super 35mm launch at the George Lucas Building on the University of Southern California's Los Angeles campus. We were in for some surprises.

Sony's original promotional images for the event showed a cine-style mattebox and cine lens poking out of a red cloth with what looked like a camcorder-sized bump behind it. Many guessed (correctly) that it would be the new XDCAM EX-like 35mm digital camera that Sony had teased at NAB and shown under glass at IBC. Sure enough, preliminary specs on the PMW-F3 were "leaked" on the Sony UK website a week before the event.

Sure enough, Sony's Peter Crithary, Marketing Manager, Production, gave those in attendance an in-depth presentation on the features of the PMW-F3. A new 35mm digital camera with a huge amount of horsepower for such an affordable little package that fits seamlessly into Sony's existing motion picture camera line.

We were treated to a screening of material shot on the F3: two shorts by USC students and faculty, and one short by Sam Nicholson, ASC of Stargate Studios. Sam was the same cinematographer who shot the Sony F23/F35 demo "Thoroughbred."

The footage showed that the F3 has an impressive dynamic range, even when recording directly to SxS cards. Nicholson's short included a good amount of nighttime exteriors, all shot with available light and the camera set to 18db gain, which was one of the features that impressed him most.

Nicholson said, "It's like glass. This is one of the best signal-to-noise ratios on any digital camera I've ever seen. We cranked it up as high as the camera would go and couldn't find the noise in it." However, the camera he used only had an Exposure Index of 800. With the upgrade option to S-Log, Sony estimates the EI "conservatively" at 1600.

Crithary also came up with the biggest surprise of the night. SR Memory is closer than you think, and more affordable. Although he declined to put a price tag or delivery date on the SR Memory recorder, called SR-R1, he did expect it to be within reach of many cinematographers. The ability to record up to 440 Mbs (and higher) onto solid state, RAID-5 protected cards of up to 1Tb should meet the needs of any high-budget, VFX-heavy feature.

As with all Sony cameras, one can rest assured that when the camera arrives the post production path will be ready and waiting for it. The PMW-F3 is no exception. The onboard SxS cards with XDCAM EX 4:2:0 8-bit format provide the proxies with LUTs baked in for offline editing. The dual link HD-SDI outputs provide RGB 10-bit S-Log (available by software upgrade) as the master format (recordable to SRW-1 tape now, SR-R1 solid state down the road). And for on-set monitoring, enjoy a 4:2:2 10-bit image with LUTs on your Sony BMV-L231. Use the EDL from your proxies to pull from the S-Log originals and let the folks in post do what they do best.

All of this originates from a \$16,000 camera.







# Solid State Memory



PMW-F3 camera



SR-R1 Memory Recorder

Sony HDCAM SR solid state memory cards have been announced, with a capacity up to 1TB and sustainable transfer speeds exceeding 5Gbps.

The SR-R1 Memory Recorder was announced at the recent F3 launch at USC School of Cinematic Arts. The SR-R1 will record onto solid state memory cards at 220Mbps and 440Mbps. The unit can handle Single Link 4:2:2, two HD-SDI outputs for 4:2:2 1080/60p, 3G and Dual Link RGB at 440Mbps, all of which the PMW-F3 can output to the SR-R1.

In addition, the SR Memory format has the capability of simultaneous dual stream recording, which opens up the possibility of 3D stereo shooting from two cameras (left-eye, right-eye) up to 30p onto one recorder and one Memory Card. This is the same core technology announced for Sony F35 and SRW9000PL cameras.



Prototype Memory Card



Actual 1 TB Memory Card

# F3 3D

Sony's SR Memory format has the capability of simultaneous dual stream recording, which opens up the possibility of 3D stereo shooting from two cameras (left-eye, right-eye) up to 30p onto one recorder and one Memory Card.



SR-R1 Memory Recorder



Two F3 cameras can currently sync together for 3D shooting using Genlock.

3D Link is a future option that will connect two F3 cameras in sync for stereo shooting. When connected, both cameras will be managed by one remote control.

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For further details about the Sony PMWF3: [www.sony.com/PMWF3](http://www.sony.com/PMWF3)  
To see shorts shot with Sony PMWF3: [www.sony.com/videON](http://www.sony.com/videON)

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