

ALEXA STUDIO

As the top-of-the-line camera in the ALEXA family, the ALEXA Studio combines all the qualities that have made the ALEXA and ALEXA Plus so popular with four new unique features: an optical viewfinder, a rotating mirror shutter, a 4:3 Super 35 sensor and an internal ND filter. This establishes the ALEXA Studio as the premium digital camera for spherical and anamorphic feature films and commercials.

ARRI ALEXA Qualities

The ALEXA Studio shares the same genes as the other cameras in the ALEXA family; it offers the same exceptional image performance, unsurpassed exposure latitude, high sensitivity, natural skin tones and an organic, film-like image quality. Also, like its siblings, it provides an unrivaled choice of efficient workflow options including in-camera recording of Apple ProRes or AVID DNxHD files, simultaneous HD-SDI output in all conceivable flavors and/or ARRIRAW recording, the highest quality uncompressed and unencrypted image format. Well thought out and refined design and manufacturing techniques as well as extensive testing ensures the greatest reliability on set. A continued dialog with working professionals has led to a user interface that makes a powerful set of features easy to use.

Optical Viewfinder

The ALEXA Studio is the ideal camera for all who want the most comfortable, accurate and efficient operating experience through an optical viewfinder. By their very nature, optical viewfinders have zero delay and show a bright and sharp full color image through the taking lens. Additional advantages include natural motion portrayal, accurate color fidelity and proper white balance, i.e. that of the scene. Thus operators see exactly what is happening as it happens and experience less eye fatigue. Cinematographers appreciate the ability to judge lighting through the viewfinder and to work with the camera even when it is powered down; choosing lenses, blocking, setting up shots, pre-lighting or rehearsing before the camera is powered up can save precious time on the set.

The ALEXA Studio viewfinder has been reworked from the ground up: the new optical design shines with top image quality and compatibility with ARRIFLEX 435 and ARRICAM eyepieces, extensions and heated eyecups. The new mechanical design combines the robustness and flexibility of ARRI's film camera viewfinders with the ability to switch between spherical and anamorphic viewing. The viewfinder can be modified for either a 2x or 1.3x anamorphic de-squeeze ratio and contains an illuminated frameglow in user selectable colors. For maximum operating flexibility the optical viewfinder can be quickly replaced with the ALEXA Electronic Viewfinder EVF-1.

Rotating Mirror Shutter

The rotating mirror shutter not only makes the optical viewfinder possible, but also changes how the sensor is exposed, thereby eliminating the rolling shutter artifact that has already been greatly minimized in the other ALEXA cameras. In case frame rates are needed that exceed the mirror shutter's specifications it is possible to turn the mirror shutter off and use the electronic shutter, which also offers shutter angles beyond 180°.

4:3 Super 35 Sensor

With its 4:3 Super 35 sensor the ALEXA Studio is predestined for shooting anamorphic feature films or commercials. Utilizing the full Super 35 area squeezes every bit of resolution from the sensor for high quality CinemaScope images. But more importantly, anamorphic lenses create a unique look that has



Main Features

Top of the Line ALEXA Camera

- Exceptional image quality
- Efficient and versatile workflows
- ARRI product quality
- Simple and safe operation
- Includes Anamorphic De-squeeze, High Speed and DNxHD licenses

Optical Viewfinder Advantages

- Zero delay
- Bright and sharp full color image
- Natural motion portrayal (no motion blur)
- Accurate color fidelity and white balance
- Easy on the eye
- Works without power

ALEXA Optical Viewfinder OVF-1

- Completely new optical design
- Spherical or anamorphic viewing, 2x or 1.3x anamorphic de-squeeze
- Basic Insert Module BIM-1: RGB frameglow
- Compatible with ARRIFLEX 435 and ARRICAM eyepieces, extensions and heated eyecups
- Includes 435 8x eyepiece and 2x anamorphic de-squeeze module
- Can be replaced with ALEXA Electronic Viewfinder EVF-1

Rotating Mirror Shutter

- No rolling shutter artifacts

4:3 Super 35 Sensor

- Ideal for anamorphic shoots
- Room for vertical repositioning of spherical images

Internal ND Filter

- Reduce light to sensor and not to OVF-1
- Optical clear or ND 1.3 (4 1/3 stops)

been appreciated by directors and cinematographers for over half a century and that cannot be created in post. Some classic examples of films shot with anamorphic lenses include *Apocalypse Now*, *Blade Runner*, *Chinatown*, the *Indiana Jones* films, *Alien* and *The Last Samurai*. Shooting with spherical lenses in 4:3 is of course also possible, and the extra room above and below the 1.78:1 or 1.85:1 image allows for generous vertical repositioning.

Internal ND Filter

A sealed sliding mechanism places either an optical clear or an ND 1.3 filter (4.3 stops) behind the mirror shutter in front of the sensor. The ND 1.3 ensures a bright image in the optical viewfinder while only attenuating the light hitting the sensor.

Fully Loaded

The ALEXA Studio comes fully loaded with a built-in radio for camera and lens remote control through ARRI or cmotion lens control systems, connectors for lens motors and the ARRI Lens Data System for the first truly integrated lens metadata workflow. The ALEXA Studio always includes the Anamorphic De-squeeze, High Speed and DNxHD license keys.

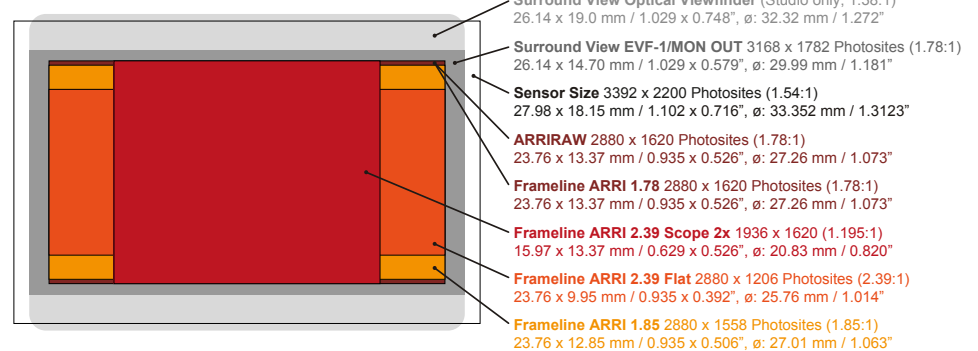
16:9 and 4:3 Sensor Modes

ALEXA Studio can be operated in either 4:3 (like ALEXA M) or 16:9 (like ALEXA, ALEXA Plus and ALEXA M) sensor mode. 4:3 mode retains the same 2880 pixel width of the 16:9 mode, but uses more pixels above and below.

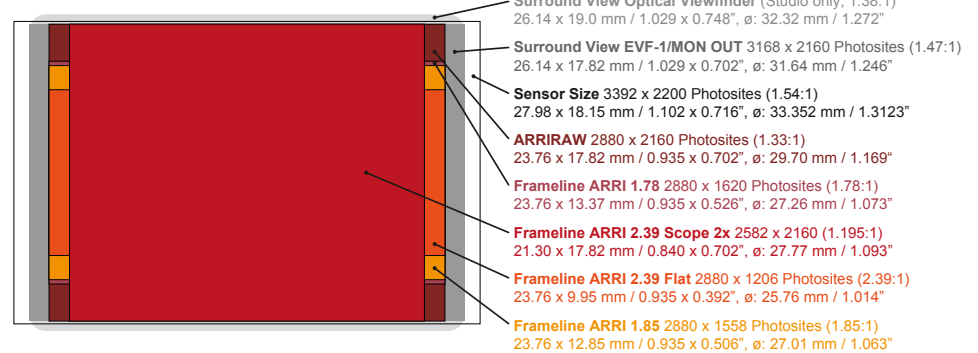
Maximum Frame Rates

Marrying a film-style mirror shutter with an all digital camera like ALEXA results in a number of different operating modes, each with its own maxim frame rate. With the sensor set to 16:9, the maximum frame rate with the mirror shutter off is 120 fps (like all other ALEXA cameras), and 60 fps with the mirror shutter on. With the sensor set to 4:3, the maximum frame rate is 48 fps, disregarding if the mirror shutter is on or off. Please note that in some operating modes the maximum open mirror shutter angle is less than 180°.

ALEXA, ALEXA Plus, ALEXA M and ALEXA Studio in 16:9 Mode



ALEXA Studio and ALEXA M in 4:3 Mode



ALEXA Studio Fps and Shutter in 16:9 Sensor Mode

Mirror Shutter	Output Format	Format Setting (1)	Fps Range (2)	Shutter Range (3)	Reduced Fps at 180° Mirror Shutter	Reduced Mirror Shutter at Max. Fps
Off	ProRes	422 Proxy	0.75 - 120	5.0° - 358.0°	-	-
Off	ProRes	422 LT	0.75 - 120	5.0° - 358.0°	-	-
Off	ProRes	422	0.75 - 120	5.0° - 358.0°	-	-
Off	ProRes	422 HQ	0.75 - 120	5.0° - 358.0°	-	-
Off	ProRes	4444	0.75 - 60	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	422 1.5G SL	0.75 - 30	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	422 1.5G DL	0.75 - 60	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	422 3G SL (5)	0.75 - 60	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	444 1.5G DL	0.75 - 30	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	444 3G SL (5)	0.75 - 30	5.0° - 358.0°	-	-
Off	HD-SDI REC OUT	444 3G DL	0.75 - 60	5.0° - 358.0°	-	-
Off	ARRIRAW	1.5G DL	0.75 - 30	5.0° - 358.0°	-	-
Off	ARRIRAW	3G SL (5)	0.75 - 30	5.0° - 358.0°	-	-
Off	ARRIRAW	3G DL	0.75 - 60	5.0° - 358.0°	-	-
On	ProRes	422 Proxy	0.75 - 60	11.2° - 180.0°	46	140.2°
On	ProRes	422 LT	0.75 - 60	11.2° - 180.0°	46	140.2°
On	ProRes	422	0.75 - 60	11.2° - 180.0°	46	140.2°
On	ProRes	422 HQ	0.75 - 60	11.2° - 180.0°	46	140.2°
On	ProRes	4444	0.75 - 60	11.2° - 180.0°	46	140.2°
On	HD-SDI REC OUT	422 1.5G SL	0.75 - 30	11.2° - 180.0°	-	-
On	HD-SDI REC OUT	422 1.5G DL	0.75 - 60	11.2° - 180.0°	46	140.2°
On	HD-SDI REC OUT	422 3G SL (5)	0.75 - 60	11.2° - 180.0°	46	140.2°
On	HD-SDI REC OUT	444 1.5G DL	0.75 - 30	11.2° - 180.0°	-	-
On	HD-SDI REC OUT	444 3G SL (5)	0.75 - 30	11.2° - 180.0°	-	-
On	HD-SDI REC OUT	444 3G DL	0.75 - 60	11.2° - 180.0°	46	140.2°
On	ARRIRAW	1.5G DL	0.75 - 30	11.2° - 180.0°	-	-
On	ARRIRAW	3G SL (5)	0.75 - 30	11.2° - 180.0°	-	-
On	ARRIRAW	3G DL	0.75 - 60	11.2° - 180.0°	46	140.2°

ALEXA Studio Fps and Shutter in 4:3 Sensor Mode						
Mirror Shutter	Output Format (7)	Format Setting (1)	Fps Range (4, 6)	Shutter Range (3)	Reduced Fps at 180° Mirror Shutter	Reduced Mirror Shutter at Max. Fps
Off	ARRIRAW	1.5G DL	0.75 - 30	5.0° - 358.0°	-	-
Off	ARRIRAW	3G SL (5)	0.75 - 30	5.0° - 358.0°	-	-
Off	ARRIRAW	3G DL	0.75 - 48	5.0° - 358.0°	-	-
On	ARRIRAW	1.5G DL	0.75 - 30	11.2° - 180.0°	-	-
On	ARRIRAW	3G SL (5)	0.75 - 30	11.2° - 180.0°	-	-
On	ARRIRAW	3G DL	0.75 - 48	11.2° - 180.0°	36	139.2°

- (1) SL = Single Link, DL = Dual Link
 (2) With High Speed license, 64 GB SxS PRO card and SUP 5.1
 (3) The value given for the mirror shutter is always the angle of the open shutter sector
 When mirror shutter is off, value for electronic shutter is given
 Electronic shutter range for speeds above 60 fps is 5.0° - 356°
 (4) with 64 GB SxS PRO card and SUP 5.2 Open Beta
 (5) Same as 1.5G DL, just over one cable
 (6) Recording beyond 30 fps with Codex Onboard require Codex High Speed Data Packs
 (7) Additionally, ALEXA Studio also supplies an HD-SDI MON OUT output and an EVF-1 image.
 in 4:3 pillarframe inside the 16:9 HD image.

ALEXA Studio – Specifications

Camera Type	35 format film-style digital camera with optical viewfinder, rotating mirror shutter, integrated shoulder arch, built-in support for the ARRI Wireless Remote System (WRS), cmotion evolution lens control system and ARRI Lens Data System (LDS).
Sensor	35 format ALEV III CMOS sensor with Dual Gain Architecture (DGA) and Bayer pattern color filter array. 1.5x oversampling for 1920 x 1080 outputs.
Photosites	16:9 sensor mode: 2880 x 1620 for ARRIRAW, 2880 x 1620 down sampled to 1920 x 1080 for HD video, ProRes and DNxHD 4:3 sensor mode: 2880 x 2160 for ARRIRAW, 2880 x 2160 down sampled to 1440 x 1080 (pillar box) for monitoring in EVF-1 and HD video (MON OUT only)
Operating Modes	Mirror shutter on or off. Switching takes approximately 3 seconds through camera display. 16:9 or 4:3 sensor mode. Switching takes approximately 15 minutes (currently update to a different SUP necessary). 4:3 is currently only available for ARRIRAW; a pillar box format is used for 16:9 EVF-1 as well as HD-SDI MON OUT; ProRes or DNxHD recording is currently not supported. Regular or High Speed mode. High Speed mode requires license purchase. Switching takes approximately 40 seconds. 4:3 High Speed mode currently limited to 16:9.
Filter	Sealed behind-the-lens motorized filter mechanism provides optical flat or ND 1.3 (4 1/3 stops)
Frame Rate	16:9, mirror shutter off: 0.75 - 120 fps 16:9, mirror shutter on: 0.75 - 60 fps; 4:3, mirror shutter off or on: 0.75 - 48 fps Frame rate setting precision: 1/1000 fps
Shutter	Rotating mirror shutter (11.2° - 180.0°) or electronic rolling shutter (0.75 - 60 fps: 5.0° - 358.0°; 60 - 120 fps: 356°). Shutter angle setting precision: 1/10 degree. At some frame rates mirror shutter needs to be less than 180°.
Exposure Latitude	14 stops for all sensitivity settings from EI 160 to EI 3200, as measured with the ARRI Dynamic Range Test Chart (DRTC)
Exposure Index	EI 160 ^{+5.0} _{-9.0} EI 200 ^{+5.3} _{-8.7} EI 400 ^{+6.3} _{-7.7} EI 800 ^{+7.4} _{-6.6} EI 1600 ^{+8.4} _{-5.6} EI 3200 ^{+9.4} _{-4.6} Values behind the exposure index are the number of stops above and below 18% grey. These values are for Log C. Rec 709 and DCI P3 are the same except for 0.5 stops fewer in the low end at EI 160, 0.4 stops fewer in the low end at EI 200 and 0.2 stops fewer in the low end at EI 400.
White Balance	Separate white balance (red/blue) and color correction (green/magenta) adjustment through Auto or manual setting. Red/blue: 2000 to 11000 Kelvin, adjustable in 100 K steps, with presets of 3200 (tungsten), 4300 (fluorescent), 5600 (daylight) and 7000 (daylight cool). Green/magenta: -8 to +8 color correction (CC), 1 CC = 035 Kodak CC values or 1/8 Rosco values.
Sound Level	Under 20 db(A) @ 24 fps, mirror shutter on and ≤ +30° Celsius (≤ +86° Fahrenheit) with lens attached and fan mode set to 'Regular', measured 1 m/3 feet in front of the lens. Silent operation at higher temperatures possible with fan mode set to 'Rec low'.
Power In	Three inputs: BAT connector, battery adapter back and battery adapter top. All accept 10.5 to 34 V DC. When running over 30 fps with mirror shutter on, voltage of 18V or more is recommended. 90 W power draw for camera and OVF-1 in typical use recording 24 fps to SxS PRO cards, mirror shutter on, without accessories.
Power Out	12V connector: limited to 12 V, up to 2.2A. RS, EXT and ETHERNET: input below 24V is regulated up to 24V, above 24V: input = output voltage. Both RS and EXT connectors combined: up to 2.2A. ETHERNET: up to 1.2A. Maximum power draw is also limited by the power source.
Weight	ALEXA Studio camera body + SxS Module: 8.0 Kg/17.6 lb ALEXA Studio camera body + SxS Module + OVF-1 + Center Camera Handle CCH-1: 10.2 Kg/22.5 lb
Dimensions	With OVF-1 and SxS Module: Length: 402 mm/15.83", width: 268 mm/10.55", height: 241 mm/9.49"
Environmental	-10° C to +45° C (+14° F to +113° F) @ 95% humidity max, non condensing. Splash and dust proof through sealed electronics. System cooling through radiator/single fan.
Lens Mount	ARRI Exchangeable Lens Mount (ELM); ships with Lens Adapter PL Mount with LDS contacts, 54 mm stainless steel PL mount, Super 35 centered
Flange Focal Depth	52.00 mm nominal
Viewfinder	Optical viewfinder OVF-1 shows a bright, high contrast image for through-the-lens viewing with low distortion, accurate color fidelity and no delay. Can be used camera left or right and the viewfinder arm telescopes closer/farther from the camera body. Automatically keeps an upright image in all positions with an optional override for manual image rotation. Includes a flip in ND 0.6 contrast filter and 2x de-squeeze module for 2x anamorphic lenses (a 1.3x de-squeeze module is also available for retrofit). Includes Basic Insert Module BIM-1 for RGB frameglow. Accepts 8x and 10x 435 eyepieces, 435 eyepiece extensions and heated eyecups. With the optional ARRICAM Eyepiece Adapter AEA-1, the OVF-1 can accept the 8x ARRICAM Studio eyepiece, ARRICAM Studio Viewfinder Extension Medium and ARRICAM Studio Viewfinder Zoom Extension. Not compatible with Lite Universal Eyepiece. Can be replaced with the ALEXA Electronic Viewfinder EVF-1 by using the Electronic Viewfinder Adapter EVA-1.

Assistive Displays For EVF-1 and MON OUT: frame lines, surround view, camera status, false color exposure check, peaking focus check, electronic level, compare stored image with live image, RETURN IN video and anamorphic de-squeeze. MON OUT only: Reel & clip number.

For OVf-1: Warning LEDs for REC (recording), BAT (battery low), FULL (SxS PRO card full). ALEXA Studio uses the same physical ground glass holder and framerglow frames as ARRICAMS, so ARRICAM ground glasses and framerglow masks could be used. However, the actual frameline dimensions are different, so for a precise alignment of framelines and captured pixels only ALEXA Studio ground glasses and framerglow masks are recommended. For frameline markings beyond the options in the price list, please use the online ground glass composer at http://www.arri.com/camera/ground_glass_composer.html.

Control Camera right: main user interface with 3" transfective 400 x 240 pixel LCD color screen, illuminated buttons, button lock and jog wheel. Camera left: operator interface with illuminated buttons, button lock and card swap button.

In-camera Recording Records Apple QuickTime files with ProRes encoding or MXF files with DNxHD encoding onto either one or two (Dual Recording) SxS PRO cards in 16:9 mode only. All codecs legal range with embedded audio, timecode and metadata.

Codec	Compression (1)	Bit Rate in Mb/s at 30 fps	Bit Depth	Color Coding	Recording time in hrs:min (2)	Application
QuickTime/ProRes 4444	5:1	330	12	4:4:4 RGB	0:22	High quality television or cinema applications requiring color correction and/or compositing.
QuickTime/ProRes 422 (HQ)	8:1	220	10	4:2:2 YCbCr	0:34	High quality television applications requiring color correction.
QuickTime/ProRes 422	12:1	147	10	4:2:2 YCbCr	0:52	Basic television applications if images do not require adjustments in postproduction.
QuickTime/ProRes 422 (LT)	18:1	102	10	4:2:2 YCbCr	1:14	On set monitoring and proxy editing when the master is captured with an external device.
QuickTime/ProRes 422 (Proxy)	40:1	45	10	4:2:2 YCbCr	2:42	Same as above when a longer recording time is desired.

(1) Compression rate calculated based on 10bit full HD RGB with 1.8Gbit/s
(2) Approximate time at 30 fps with SxS PRO 64 GB card

Recording Outputs 2x 1.5 G or 3G REC OUT BNC connectors for ARRIRAW (4:3 or 16:9) or HD-SDI video (16:9 only). Both with embedded audio, timecode, metadata and optional recording flag.

ARRIRAW 16:9: 2880 x 1620, 4:3: 2880 x 2160. Both uncompressed 12 bit log without white balance or exposure index processing applied. Requires an ARRIRAW T-Link certified recorder.

HD-SDI video 16:9: uncompressed 1920 x 1080 4:4:4 RGB or 4:2:2 YCbCr; both legal or extended range. Recording frame rates other than HD standard (23.976, 24, 25, 29.97, 30, 50, 59.94, 60 fps) requires a recorder with Variflag support.

Monitor Outputs 2x MON OUT BNC connector for uncompressed 1.5G HD-SDI video (4:3 or 16:9): 1920 x 1080, 4:2:2 YCbCr; legal range.

Image Processing 16 bit linear internal image processing. Target color spaces for ProRes, DNxHD 220x, REC OUT and MON OUT: Log C (film matrix off), Log C (film matrix on), Rec 709 or DCI P3. Target color spaces for DNxHD 145: Rec 709 or DCI P3. For Rec 709 and DCI P3 a customized look can be applied during record and playback with ARRI Look Files. Optional horizontal image mirroring.

Synchronization Master/Slave mode for precision sync of settings, sensor, processing, HD-SDI outputs and QuickTime/ProRes or MXF/DNxHD recording for 3D applications. Automated sync of lens settings for 3D applications in Master/Slave mode.

Playback QuickTime/ProRes or MXF/DNxHD clips can be played back from SxS PRO cards to the EVF-1, MON OUT and REC OUT. Playback audio is available embedded in the MON OUT and REC OUT signals and on the headphones jack.

Audio 1x XLR 5 pin AUDIO IN connector for 2 channel, line level balanced audio input, 24 bit/48 kHz A/D conversion, works at 23.976, 24, 25, 29.97 and 30 fps. Audio is recorded uncompressed into the QuickTime/ProRes or MXF/DNxHD files and embedded uncompressed in all HD-SDI outputs, including ARRIRAW T-Link. Max of 2.5 dBm output from AUDIO OUT headphones connector.

Connectors

- 2x slots for SxS PRO cards SxS
- 2x BNC recording out HD-SDI, 1.5G/3G REC OUT 1/REC OUT 2
- 2x BNC monitoring out HD-SDI, 1.5G MON OUT
- 1x XLR 5 pin audio in AUDIO IN
- 1x BNC return signal HD-SDI, 1.5G RET/SYNC IN
- 1x LEMO 16 pin external accessories EXT
- 1x Fischer 2 pin 24 V power in BAT
- 3x Fischer 3 pin 24 V remote start and accessory power out RS
- 1x LEMO 2 pin 12 V accessory power out 12 V
- 1x LEMO 5 pin timecode in/out TC
- 1x TRS 3.5 mm headphone mini stereo jack out AUDIO OUT
- 1x LEMO custom 16 pin electronic viewfinder EVF
- 1x LEMO 10 pin Ethernet with 24 V power ETHERNET
- 2x Fischer 5 pin Lens Control System LCS
- 1x Fischer 5 pin Lens Data Display LDD
- 1x Fischer 12 pin for CLM-2, CLM-3 or later IRIS
- 1x Fischer 12 pin for CLM-2, CLM-3 or later ZOOM
- 1x Fischer 12 pin for CLM-2, CLM-3 or later FOCUS

BNC connectors designed for fast exchange without camera disassembly. Special tool required.

SD Card For importing ARRI Look Files, camera set up files, frame line files, feature license keys and custom lens tables for the Lens Data Archive (LDA). Stores captured stills from the REC OUT image path in ARRIRAW (.ari, 12 bit), TIFF (.tif, 16 bit), DPX (.dpx, 10 bit) and JPEG (.jpg, 8 bit) format as well as logging files. Also used for software updates.

Upgrades The Storage Interface Module (currently available for SxS PRO cards) can be exchanged for future storage modules. The Electronics Interface Module can be exchanged for future control electronics. Exchangeable Lens Mount (ELM) allows other lenses beyond PL mount lenses to be used. Simple camera software updates. License keys included in purchase: Anamorphic De-squeeze, High Speed and DNxHD.

Note: All technical data based on Software Update Packet (SUP) 5.1 (16:9) and SUP 5.2 Open Beta (4:3), except DNxHD, which will be available with SUP 6.1 in April 2012.. A SUP that makes switching between 16:9 and 4:3 and further features possible will be available later in 2012..