



ARRIFLEX D-21 / D-21 HD

The Film Style Digital Cameras



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The ARRIFLEX D-21 and D-21 HD combine leading edge digital technology with film camera features that have been refined over ARRI's 90-year history. They allow directors and cinematographers to shoot in the same way as they would with 35 mm film, while taking advantage of the immediacy and economy of digital acquisition.

As the top of the line digital cameras from ARRI, the market leader in professional imaging, they are equipped with a number of unique features: an optical viewfinder, the Mscope™ anamorphic output, a 4:3 format sensor, simple operation and an unequalled film-like image quality. In addition, the D-21 is the only camera capable of simultaneously outputting raw data and HD.

The bright optical viewfinder has zero delay, works without power and shows an image area outside the primary image. Through ARRI Imaging Technology (AIT), both cameras produces brilliant images with a cinematic look and feel, a high dynamic range, high contrast and the most film-like motion and color reproduction of any digital motion picture camera.

The cameras' single, Super 35-sized CMOS sensor exhibits the same cinematic depth of field as 35 mm film. The industry standard PL lens mount accepts the same vast variety of prime, zoom and specialty film lenses used on 35 mm film cameras. Since both cameras are the only digital high-end cameras with a 4:3 aspect ratio sensor, they easily accommodate all image formats, including anamorphic 2.40:1. The anamorphic image can be recorded in the new and innovative Mscope™ mode, utilizing a standard HD workflow, or, on the D-21, also in Data Mode.

Further film style features include variable frame rates from 1 to 60 fps (D-21)/1-30 fps (D-21 HD), exposure compensated speed ramps, compatibility with ARRI film style accessories, simple to use controls and the robust construction and ergonomic design for which ARRI cameras are famous.

The ARRIRAW format enables the D-21 to output raw uncompressed data. Alternatively, both D-21 and D-21 HD can output an uncompressed HD signal that works perfectly in the established HD infrastructure. With such flexibility, both ARRIFLEX D-21 and D-21 HD easily adapt to a variety of production requirements and budgets.





Main Features

■ Two Models

ARRIFLEX D-21

- the most versatile film style digital camera for all applications
- 1 - 60 fps maximum fps range
- raw data, Mscope™ and HD output modes

ARRIFLEX D-21 HD

- the film style digital camera for HD productions
- 1 - 30 fps maximum fps range
- Mscope™ and HD output modes

■ Cinematic Image Quality

- ARRI Imaging Technology for a cinematic look
- rotating mirror shutter for film-like motion portrayal
- single, Super 35 sized sensor for 35 format depth of field
- highest dynamic range of any digital motion picture camera
- super sharp, alias-free images
- extended color space for natural, film-like color reproduction
- consistent matching between cameras

■ Flexible Output Option

- 1.33:1 format sensor supports all image formats including anamorphic 2.40:1
- simultaneous data and HD outputs (D-21)
- Mscope: anamorphic images with standard HD workflow
- Data Mode: 4:3 ARRIRAW
uncompressed data for film-like data workflow (D-21)
- Data Mode: ARRIRAW T-Link connects camera to data recorders (D-21)
- HD mode: 16:9 uncompressed HD output
- HD Mode: linear or logarithmic, 4:2:2 YCbCr or 4:4:4 RGB, normal or extended range
- fibre optic option allows cable length of up to 500 m/1,600'

■ ARRI Imaging Technology (AIT)

- custom designed CMOS sensor
- powerful imaging hardware engine
- unique ARRI image processing software
- carefully tuned system integration

■ Modular Architecture

- sensor, electronics and firmware can be upgraded
- secure investment
- long product cycle





■ **Optical Viewfinder**

- zero delay
- outside image area
- bright, full color image
- works without power
- fatigue-free viewing

■ **Industry Standard PL Mount**

- use 35 format film lenses
- unequalled variety of prime, zoom and specialty lenses
- compatible with spherical and anamorphic lenses

■ **Compatibility with 35 Format Film Accessories and Support Equipment**

- ARRI matte boxes, follow focus, wireless remote control
- dollies, cranes, Steadicam, etc.

■ **A True ARRI Camera**

- silent running
- simple operation
- robust construction
- ergonomic design
- variable speed and shutter angle
- exposure compensated speed ramps

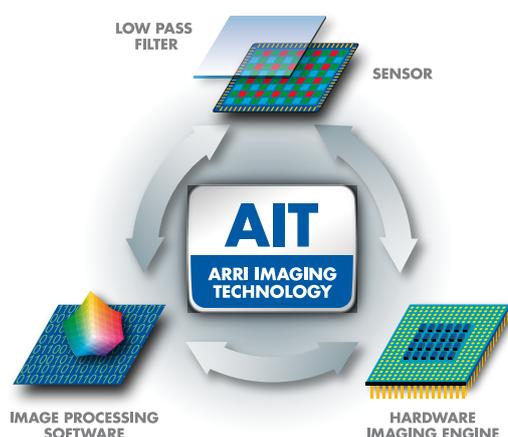
ARRI Imaging Technology

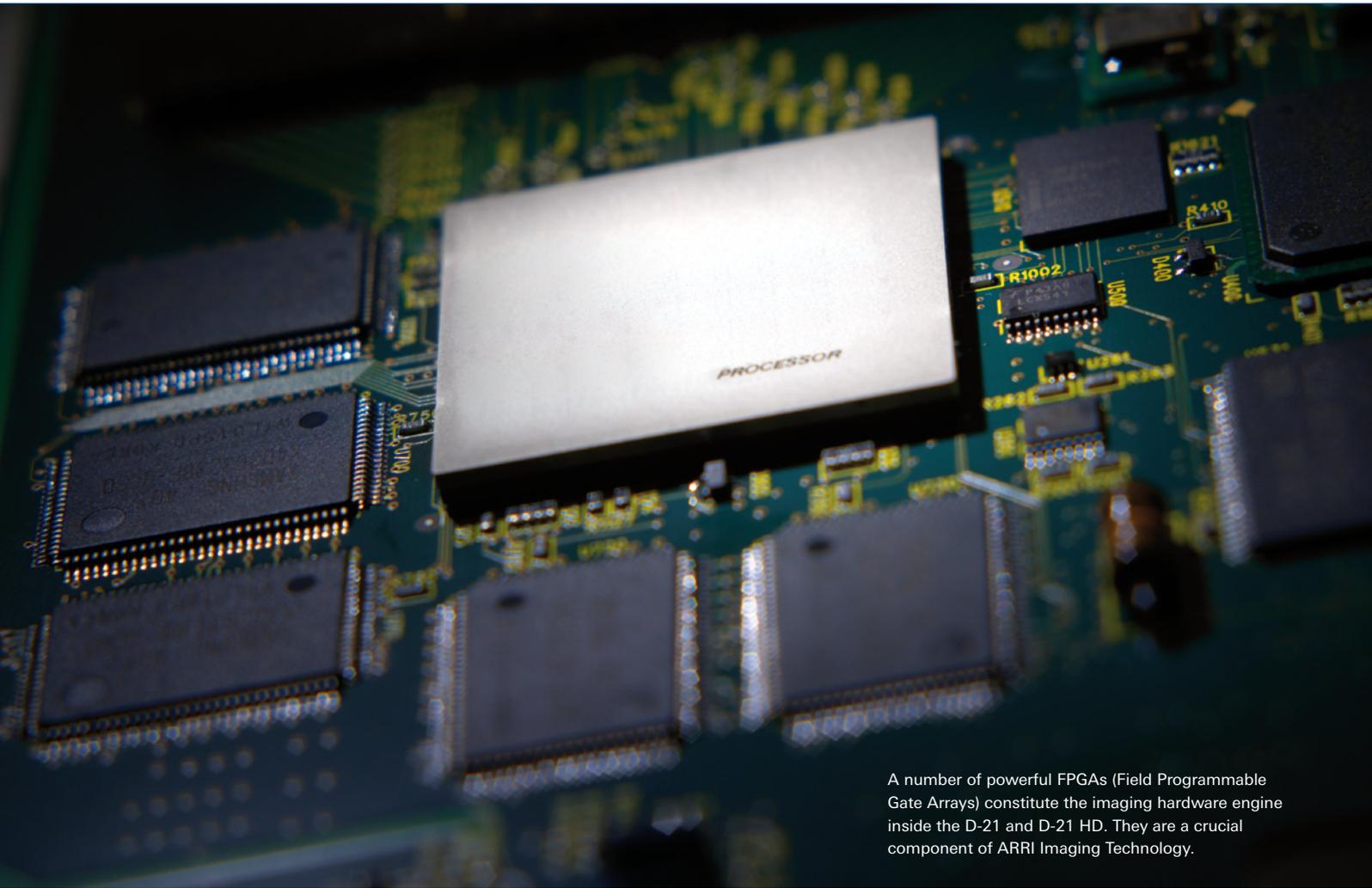
Each component of the D-21 and D-21 HD has been purpose-built with one goal in mind: to create the most gorgeous cinematic images possible. Those images are the result of a custom designed CMOS sensor, a carefully crafted optical low pass filter, a powerful imaging hardware engine and advanced image processing algorithms. Having full control of the imaging chain down to the smallest detail allows an optimization of the whole system far beyond what would be possible with off-the-shelf components. The smart orchestration of all these proprietary components is ARRI Imaging Technology (AIT).

AIT, which is in constant development, combines ground-breaking research and development with knowledge, feedback and suggestions gleaned from an on-going dialogue with professional filmmakers. AIT provides super sharp, alias-free images through over sampling, a finely tuned optical low pass filter and advanced image reconstruction algorithms.

AIT also ensures that crews can concentrate on the creative aspects of making images, by automating many of the technical aspects. The D-21 and D-21 HD have, for instance, an automated black balancing circuit (Correlated Double Sampling - CDS), which continuously calibrates the black level of each pixel in each frame without any user intervention. In addition, an automated Defect Pixel Correction (DPC) guarantees that no single defective pixel will ever be visible. DPC is a highly sophisticated process that analyzes every pixel plus a surrounding pixel field in every frame (for a staggering total of 2.5 billion pixels analyzed each second) in real-time as the camera is running.

Through AIT, the D-21 and D-21 HD produce outstanding images with a cinematic look and feel, high contrast, the highest dynamic range and the most film-like color reproduction of any digital motion picture camera.

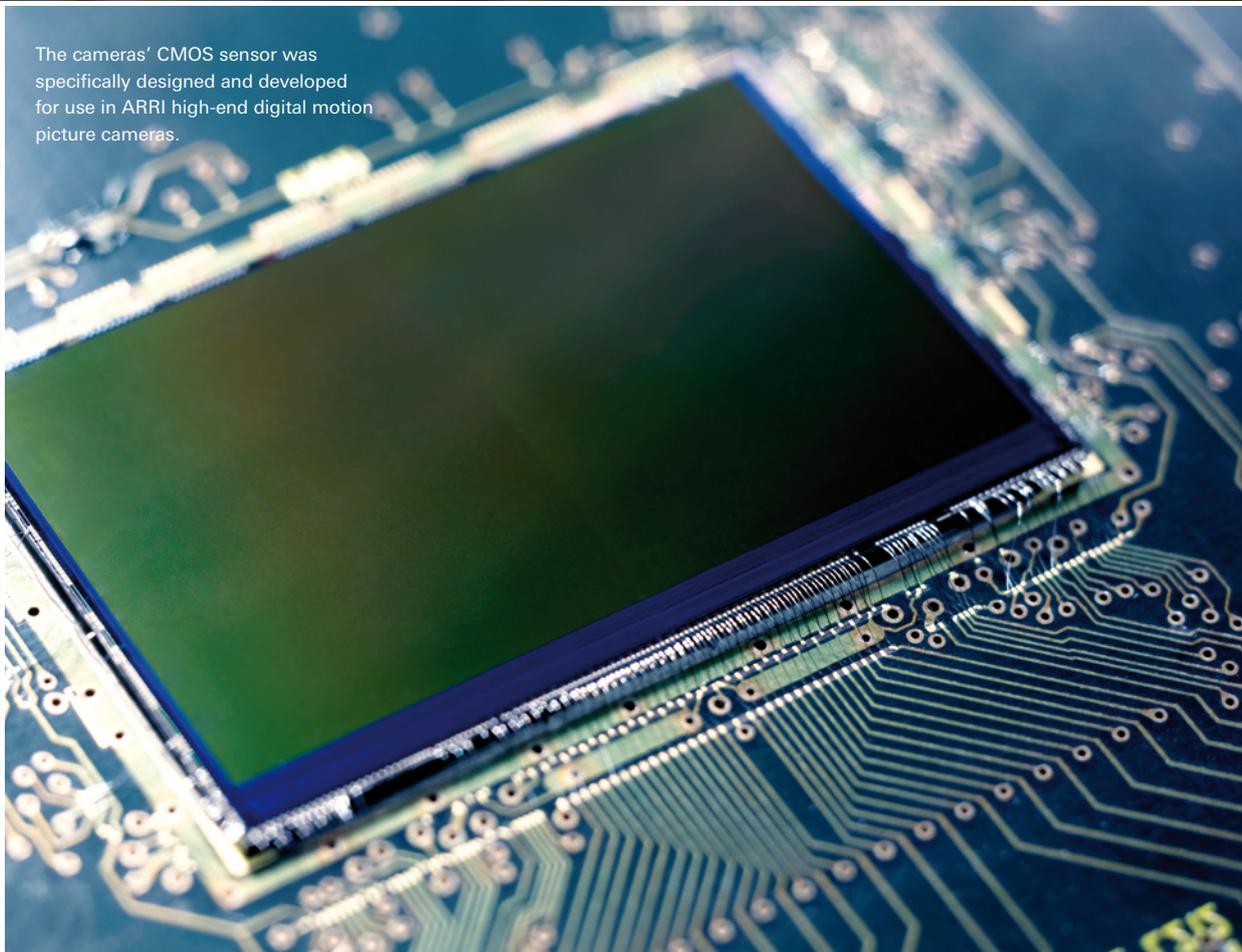


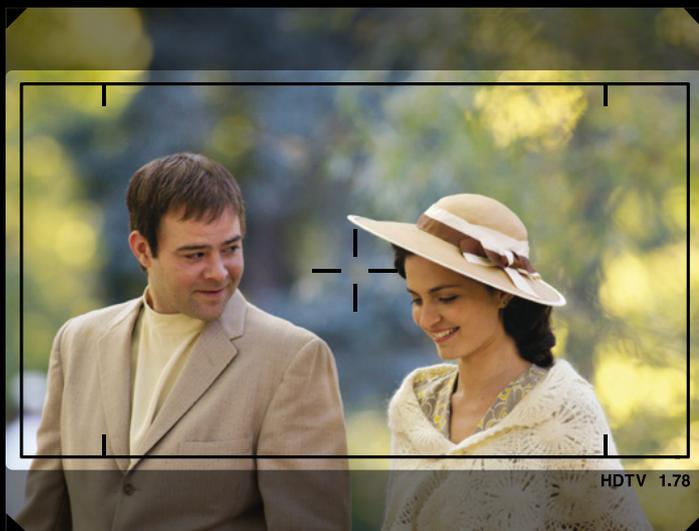


A number of powerful FPGAs (Field Programmable Gate Arrays) constitute the imaging hardware engine inside the D-21 and D-21 HD. They are a crucial component of ARRI Imaging Technology.



The cameras' CMOS sensor was specifically designed and developed for use in ARRI high-end digital motion picture cameras.





An optical viewfinder is the preferred choice of both cinematographers and camera operators. The clear, full color image enables accurate assessment of focus and facilitates precise and comfortable operating for complex camera moves through a complete lack of any delay. Most crucial of all is the fact that an optical viewfinder shows an image larger than that being recorded and therefore allows the operator to see not just what is in frame, but also what is just outside the frame. This safety area permits meticulous composition and helps the operator prevent unwanted objects (such as a boom or microphone) from entering a shot.

The Company; Photo: © Sony Pictures TV



The Optical Viewfinder

While most digital cameras use electronic viewfinders, the D-21 and D-21 HD are equipped with the same optical viewfinder as all other ARRI cameras. Thus the cameras' viewfinder always shows an image area larger than the image being recorded, and it can be used even when they are not powered up.

Light entering the taking lens is diverted by a spinning mirror shutter and generates a bright, magnified full color image in the viewfinder. This direct light path, free of any electronic image processing, ensures fatigue-free viewing as well as zero delay, a crucial feature when shooting fast action, where a delay of even a few frames can be very confusing. But even something as mundane as following a person getting up from a chair can become horrifying guesswork if the viewfinder image is delayed.

The D-21 and D-21 HD optical viewfinder can be freely rotated, extended or flipped to the other camera side for comfortable viewing in any camera position. An extension viewfinder, eyepiece leveler and a heated eyepiece are useful accessories in many shooting situations.



A Film Sized Sensor & Film Lenses for a Film Look

Depth of field is the one of the most powerful creative tools available to cinematographers, and the shallow depth of field of 35 mm film cameras has become associated with cinematic imagery in the minds of movie audiences over the last 100 years. The D-21's and D-21 HD's sensor has the same size as a Super 35 mm film frame to give cinematographers the same versatility and control of depth of field.

Having a wide range of lenses available is of immense importance, as it gives cinematographers the greatest flexibility in expressing their vision. The 35 film format enjoys the widest variety of prime, zoom and specialty lenses available for any format, and the D-21 and D-21 HD are compatible with all those lenses thanks to their industry standard PL lens mount. Since the D-21 and the D-21 HD are the only high-end digital cameras with a 4:3 aspect ratio like 35 mm film, they are also the only digital cameras that can take full advantage of the unique CinemaScope look of anamorphic lenses.

Further enhancing the film-like quality of the images is the rotating mirror shutter, which functions exactly as it does on 35 mm ARRI film cameras. This method of progressive image capture results in the most film-like motion portrayal possible.

The ARRIFLEX D-21 and D-21 HD are the only digital high-end cameras that can make full use of anamorphic lenses for the CinemaScope format.



The image, as recorded by the D-21 with an anamorphic lens.

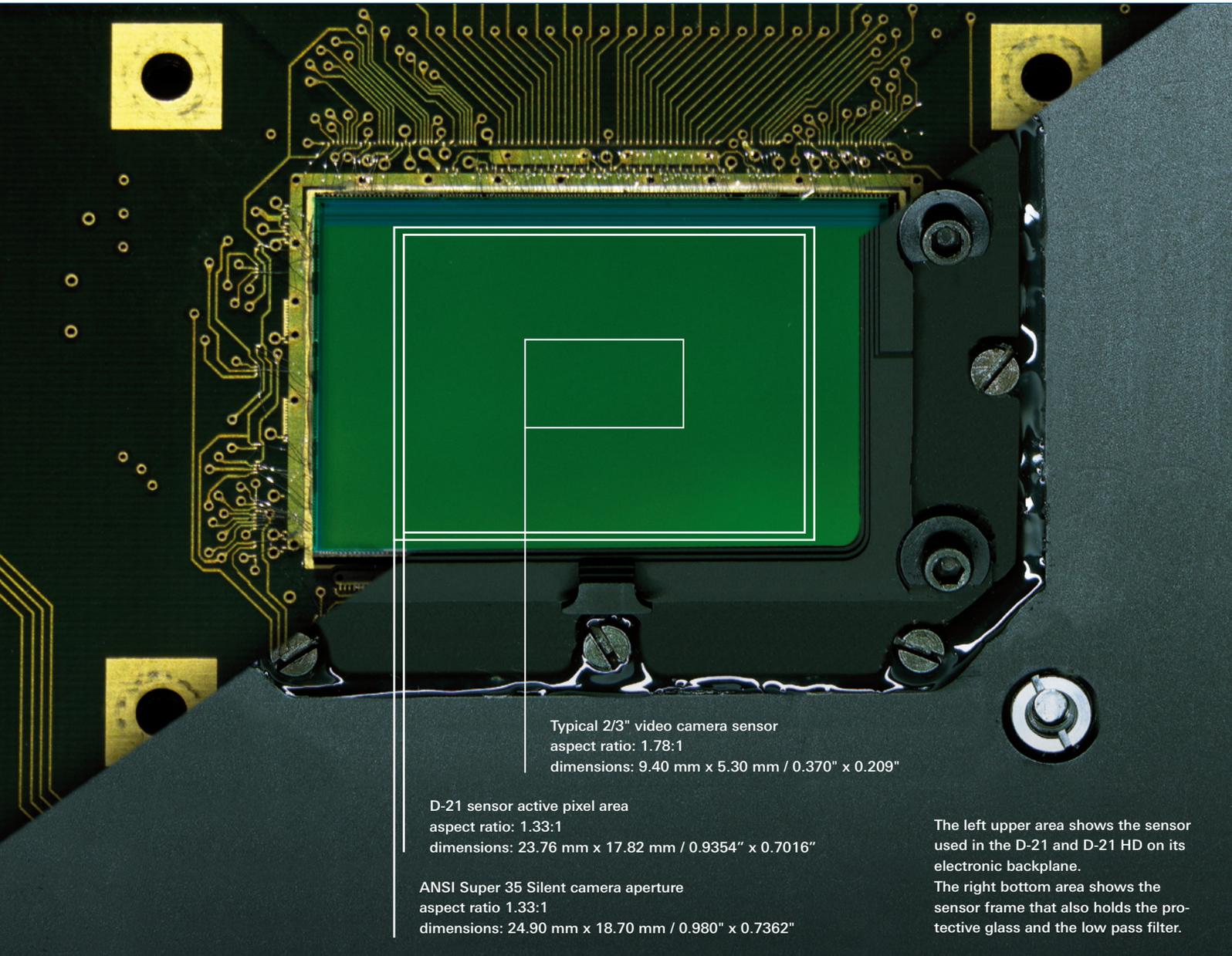


A simple 2:1 stretch and slight crop of the sides in post results in a CinemaScope format image.

FOR AN AUTHENTIC CINEMATIC LOOK

The PL lens mount.
Inside, the sensor is visible on the left, and the half closed mirror shutter is visible on the right.





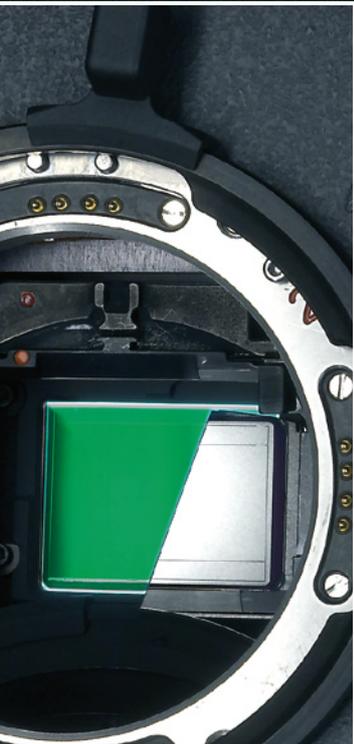
Typical 2/3" video camera sensor
 aspect ratio: 1.78:1
 dimensions: 9.40 mm x 5.30 mm / 0.370" x 0.209"

D-21 sensor active pixel area
 aspect ratio: 1.33:1
 dimensions: 23.76 mm x 17.82 mm / 0.9354" x 0.7016"

ANSI Super 35 Silent camera aperture
 aspect ratio 1.33:1
 dimensions: 24.90 mm x 18.70 mm / 0.980" x 0.7362"

The left upper area shows the sensor used in the D-21 and D-21 HD on its electronic backplane.

The right bottom area shows the sensor frame that also holds the protective glass and the low pass filter.



The rotating reflex mirror shutter.
 The mirror portion can be seen to the left, and to the right the variable shutter blade is visible, here restricting the open shutter angle to 11.2°.





Mscope™ – A New and Unique Output Format

A new and unique feature of both D-21 and D-21 HD is the patented Mscope™ process, which combines for the first time the use of anamorphic lenses with the economy of HD acquisition.

Filmmakers and audiences alike have grown up with the uniquely cinematic anamorphic look and associate it with the emotional impact of big-screen movies. The sheer width and clarity of the format, its shallow depth of field, the way it handles out of focus backgrounds and flares, all of these have been burned into the subconscious of cinema-goers for over half a century.

Both D-21 and D-21 HD are uniquely positioned to allow the use of anamorphic lenses through their 4:3 format sensor, which captures the whole image projected by anamorphic lenses. Most other digital cameras with their 16:9 sensors are less than ideal for anamorphic lenses; the Mscope™ frames contain approximately 80% more scanning lines than equivalent 2.40:1 scope images derived from ordinary 16:9 HD.

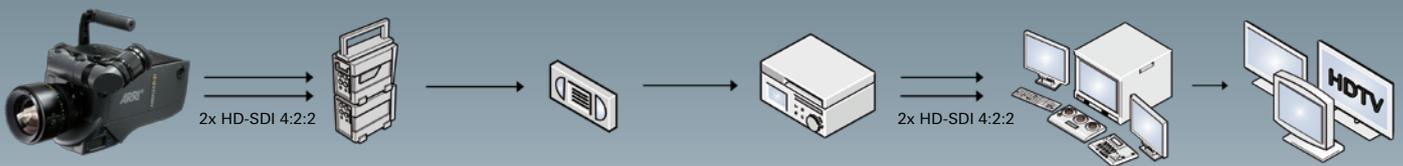
TRUE ANAMORPHIC IN HD



The anamorphically squeezed image as it appears on the D-21 or D-21 HD 4:3 sensor (2880 x 2160 pixels)



After post production the image has been downscaled and cropped to cover a 2.40:1 area (1920 x 800 pixels for HD distribution or 1728 x 1440 for ARRILASER film recording)

**D-21 / D-21 HD**

Anamorphic lens squeezes the image by a factor of 2 (circles become ovals).

Camera sensor creates a 2880 x 2160 pixel (1.33:1) Bayer raster image.

Image is reconstructed and downscaled to a 1920 x 1440 (1.33:1) HD image.

Image is split into two HD-SDI streams, one containing the even, the other the odd lines.

HD RECORDER

Each HD-SDI stream contains 1920 x 720 (2.66:1) pixels of image content in the 1920 x 1080 HD image.

Any HD recorder capable of recording in dual stream mode can capture Mscope™ images. Examples: SONY SRW-1, S.two DFR2K, Codex Digital.

Each stream contains half the lines, thus presents an unsqueezed image (circles are circles) for on set previewing.

STORAGE MEDIA

Both streams are stored interleaved on one tape or data magazine.

POST INGEST

For off-line editing, only one stream is used to save bandwidth.

For image recombining, both streams can be ingested either in parallel or one after another.

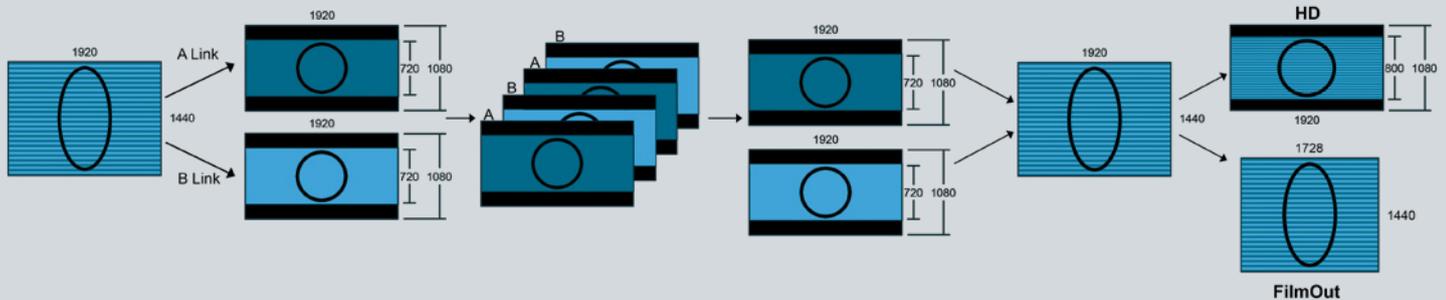
RECOMBINING

After ingest, the two streams are recombined and rendered in postproduction, resulting in the same anamorphically squeezed 1920 x 1440 (1.33:1) HD image that was present in the camera.

The first company to support Mscope™ is Quantel with the Quantel iQ.

FURTHER POST

Images are de-squeezed, cropped and scaled to the desired delivery resolution, for example HD Letterbox or anamorphic film-out.



CinemaScope in Standard HD

While the D-21 can record the full 4:3 sensor image in Data Mode, both D-21 and D-21 HD can use the Mscope™ format which utilizes a more economical standard HD workflow. In Mscope™, a regular anamorphic lens is used on the D-21 or D-21 HD. The camera divides the resulting 4:3 image into two HD streams: the A-stream contains the even lines of the original frame while the B-stream contains the odd lines. These streams are recorded on any HD recorder capable of recording dual HD-SDI streams. In postproduction the two streams are recombined to produce a high resolution Mscope™ HD image. From then on the project can be treated as a 35mm anamorphic feature, right up to HD distribution or laser film-out for theatrical distribution.

An added benefit of the process is how easy it is to monitor an undistorted image of the proper aspect ratio on set. Though the anamorphic lens creates a squeezed image, each of the two HD streams contains only half the lines of that image, so a monitor displaying either the A or B-link will show a picture of the correct proportions. The quality of this picture is more than adequate for assessing performance, exposure and focus; furthermore, either stream can be used immediately for off-line editing.



The Mscope™ process divides the anamorphically squeezed image into two HD streams. Since each stream consists of half the image lines, the image is automatically stretched and thus an undistorted HD image can be previewed on the set and used for off-line editing.



D-21 Only: Data Mode Main Features



■ Best Image Quality

- uncompressed, unprocessed 12 bit raw Bayer sensor data (ARRIRAW)
- the output option with the highest dynamic range and lowest noise
- improved image quality through advanced image processing in post
- 2880 x 2160 (4:3) at 1 - 25 fps
2880 x 1620 (16:9) at 1 - 30 fps

■ CinemaScope

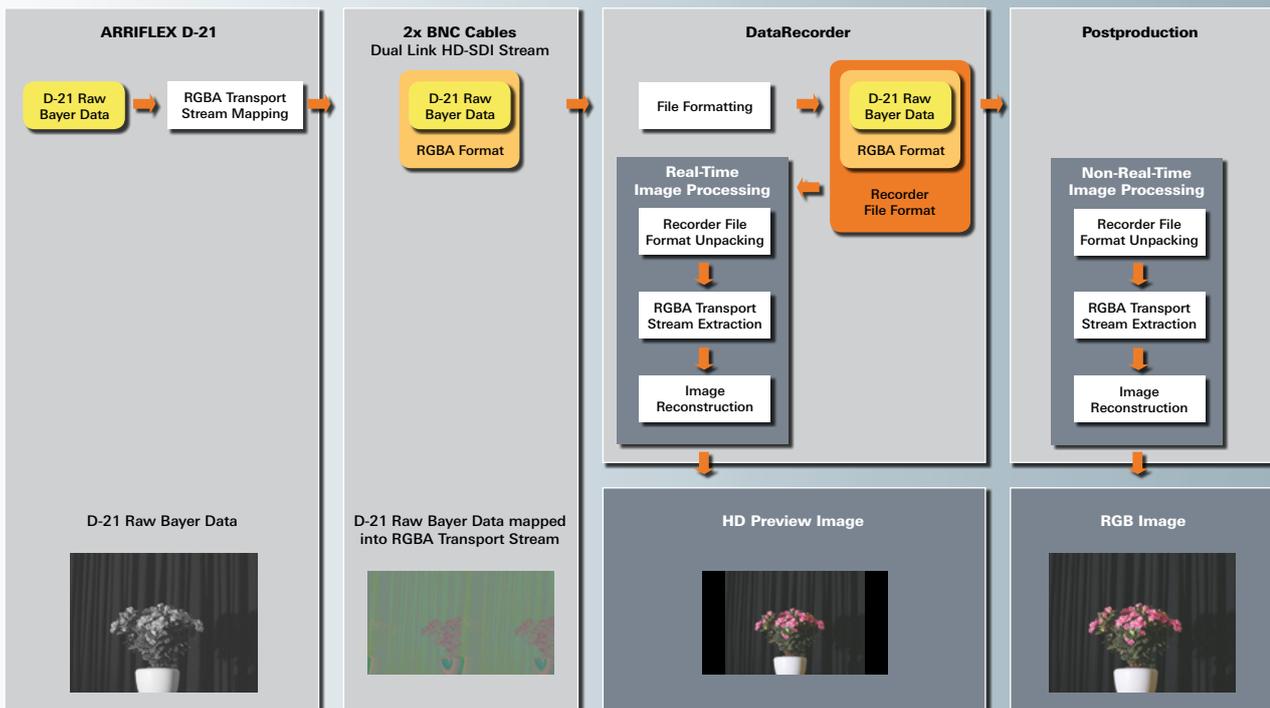
- anamorphic lenses can be used

■ Greatest Flexibility on the Set

- ARRIRAW T-Link: transport ARRIRAW via dual link HD-SDI
- simultaneous data and HD output for HD video monitoring and offline editing
- ingest converted data files from data recorder to NLE

■ Greatest Flexibility in Post

- finer detail and crisper edges
- higher resolution works better for compositing
- familiar workflow: 2K output files have the same resolution and colorimetry as 2K scans from film
- color conversion and lookup table decisions can be made in post
- simple image reposition and cropping
- upgraded image reconstruction can be applied to archived raw data for better image quality



FLEXIBLE OUTPUT OPTIONS

Different Productions Require Different Outputs

Different projects have different production requirements, budgets and distribution channels; the equipment chosen has to be flexible enough to accommodate those differences. The unique construction of the ARRIFLEX D-21 and D-21 HD allows for various output signals to be generated, accommodating diverse production needs and pipelines.

Both the D-21 and the D-21 HD are capable of generating the Mscope signal, as well as a number of HD signals. HD output options include 'Linear' or Logarithmic output, 4:2:2 YCbCr or 4:4:4 RGB, Normal or Extended Range, as well as an optional fiber optic link. These output formats are well established standards that integrated the cameras seamlessly into the existing HD infrastructure.

Additionally, the D-21 is capable of generating a raw data signal that can be output concurrently with the HD signal. The uncompressed, 12 bit raw Bayer data from the D-21's 4:3 sensor is thus available in full resolution. The ARRIRAW T-link (Transport Link) is a method of transporting the ARRIRAW data over a standard dual link HD-SDI connection. The data files which result from processing of the ARRIRAW recordings are as easy to grade as those scanned from film because they have the same pixel raster and colorimetry as film scans.

ARRIRAW T-Link

One of the obstacles that has held back the use of raw data in the past has been the problem of how to get data easily from the camera to a recorder. ARRI engineers have found a way to utilize a standard dual link HD-SDI connection to transport the raw D-21 Bayer data. This transport method is called "ARRIRAW T-Link" (Transport Link). It allows any recorder capable of recording an uncompressed dual link HD-SDI stream to record raw D-21 Bayer data, greatly simplifying the raw data workflow for manufacturers and users alike. The properties of the dual link HS-SDI connection are defined in SMPTE 372M. The standard specifies a maximum data rate of 2.97 Gb/s, which is enough bandwidth to carry the 12 bit D-21 raw Bayer data. SMPTE 372M also defines a number of standardized source signal formats to be sent through two BNC cables (affectionately known as Link A and Link B).

One of those source signal formats is the RGBA format. RGBA stands for red, green and blue plus an alpha channel, technically called 4:4:4:4 (R'G'B'+A)/10 bit. The ARRIRAW T-Link works by mapping the 12 bit raw Bayer data into this RGBA data stream, so that it can be transported via a dual link HD-SDI connection.

Any recorder that is capable of recording a SMPTE 372M compliant RGBA signal and playing it back without compression or further encoding can record this signal. If the signal is recorded by a data recorder, the additional option of a live preview exists. The data recorder can extract the original D-21 raw Bayer data out of the RGBA data stream, and use a real-time image reconstruction algorithm to display the 4:3 image as a 1440 x 1080 preview HD image. If anamorphic lenses are used on the D-21 a suitably "de-squeezed" image can be displayed on an HD monitor.

A similar but more refined process is used in postproduction. The original raw Bayer data is extracted from the RGBA stream, and advanced image reconstruction algorithms are used to reconstruct a pristine image in HD, 2K or 2.8K. Doing this in post has the added advantage that it does not have to be done in real-time, so a significantly better image quality and greater flexibility are possible. Note that throughout the whole process, the image always stays uncompressed, at the highest quality.



Data recorders that can record and play back the ARRIRAW T-Link signal can be certified by ARRI.

A True ARRI Camera

The D-21 and the D-21 HD are true ARRI cameras; they run silently and have the same robust construction and ergonomic design for which ARRI cameras are famous. Their controls are also simple and straightforward for fast and safe operation.

Both cameras are compatible with a broad selection of film accessories. Mounted on a standard sliding baseplate, they share matte box, support rod and follow focus options with the ARRI 35 mm film cameras.

The extensive range of available accessories allows the D-21 and D-21 HD to be configured for any style of shooting. A studio setup might involve a production matte box and follow focus, extension eyepiece with leveler and a heavy zoom lens, while a stripped-down setup would permit handheld or Steadicam shooting.

The FEM-2, a Functional Expansion Module that attaches to the side of the D-21 and D-21 HD, houses a built-in radio module for lens and camera control with the ARRI Wireless Remote System (WRS). It also contains motor drive electronics that allow the ARRI Controlled Lens Motors (CLM) to be plugged directly into the cameras, minimizing the number of boxes attached.

The cameras' modular system architecture allows upgrading when advances in sensor, electronics or firmware technology become available, thus ensuring a long product cycle for the camera.

Lens motors plug directly into the FEM-2 portion of the D-21 and D-21 HD, which can also accommodate the Universal Radio Module URM-3 for wireless lens and camera remote control.







The Company; Photo: Jan Thijs © Turner Broadcasting 2006



The Company; Photo: © Sony Pictures TV



The Company; Photo: © Sony Pictures TV



The Andromeda Strain;
Marty McNally, A Camera Operator (center)
with Jon Joffin, Cinematographer (right)
Photo: © A&E/Diyah Pera

Mikael Salomon, ASC -
 Director of *The Company* and *The Andromeda Strain*

"I'm very pleased with the final look of the six-hour miniseries The Company, which we shot in Canada, Hungary and Puerto Rico under very varied circumstances."

"I've had questions from industry professionals asking how much was digital and how much was shot on film. Great surprise when they learn that it was all digital except for a few slo-mo shots - the film intercuts seamlessly with the digital images."

"Ridley [Scott] asked me to direct another miniseries and we decided - once again - to go with the ARRI digital camera. We're currently shooting in the Vancouver and getting great feedback on dailies."

"I've been fielding calls from DP's interested in using the ARRI digital camera system. As I tell them, the best recommendation is that I'm using it again!"



The Company; from left to right:
 Michael Zimbrich (1st AD), Ben Nott (Cinematographer),
 Michael Carella (A Cam OP), Mikael Salomon (Director)
 Photo: Jan Thijs © Turner Broadcasting 2006



Prisoners of the Sun; Cinematographer Ed Wild

Ed Wild - Cinematographer on *Prisoners of the Sun*

"Because it's a full-sized chip and a PL mount, there is a full choice of all the film lenses."

Prisoners of the Sun; Photo © Miromar Entertainment AG



Afrika Mon Amour;
Camera equipped with
"workhorse" ARRI Master Zoom

Frank Küpper - Cinematographer on *Afrika, Mon Amour*

"No grain, instant availability of full resolution images and a 35 mm look."

Afrika Mon Amour;
Cinematographer Frank Küpper framing a detail shot,
Photos: © Andreas Berkl



FROM THE FIELD

Jason Statham stars in *THE BANK JOB*. Photo: © Jack English

Michael Coulter, BSC - Cinematographer on *The Bank Job*

*"After using the ARRI digital camera on *The Bank Job*, I was very pleased with the end result. I look forward to the future developments of this camera."*

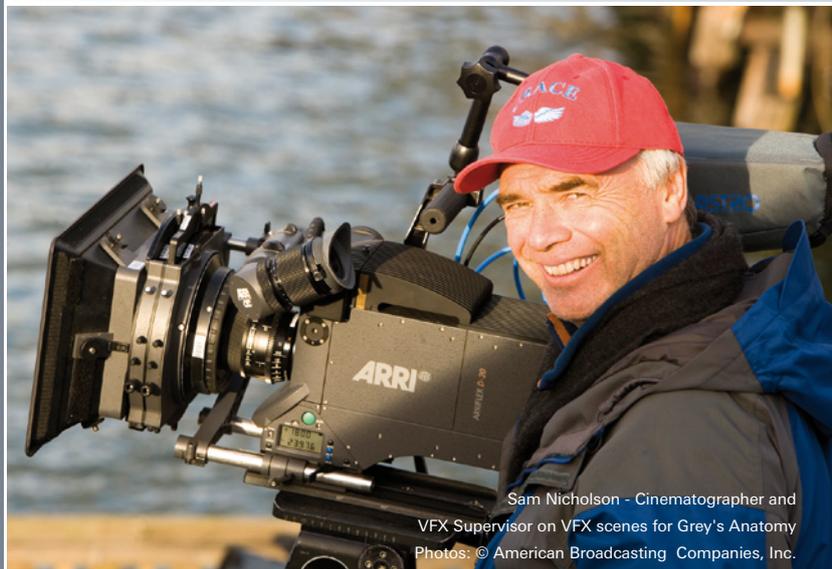


Before and after compositing:
the final scene with visual effects and Seattle background footage.



Sam Nicholson - Cinematographer and VFX Supervisor on VFX scenes for *Grey's Anatomy*

"As predicted, it pulled the keys beautifully and the cinematography looks great as well."



Sam Nicholson - Cinematographer and
VFX Supervisor on VFX scenes for *Grey's Anatomy*
Photos: © American Broadcasting Companies, Inc.

Common Technical Data

	ARRIFLEX D-21 / D-21 HD
Lens mount	54 mm PL, centered for Super 35, with Lens Data System (LDS) contacts Flange focal depth 52 mm nominal
Display	Camera display on left side with individual buttons for: camera RUN, PHASE (electronic inching & mirror rotation), NORM-PS/CCU control, LOCK, MODE, SEL and SET. Video menu over composite video output for control of operational parameters: Output mode, standard frame rates, white balance and color matrix, signal output range, contrast characteristic and sensitivity.
Shutter	Spinning, electronically adjustable reflex mirror shutter. Adjustable to 11.2°, 22.5°, 30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°, 144°, 150°, 172.8° and 180°
Viewfinder	Optical reflex viewfinder with interchangeable ground glass. Spherical or universal (adjustable to spherical or anamorphic) viewfinders available. Viewfinders are adjustable in two axes with automatic or manual image compensation, laterally extendable for left eye operation and show illuminated frame lines (ARRIGLOW, adjustable in brightness). Optional medium or long finder extender including magnifier. Optional heated eyecup.
Video assist	SD monitoring (PAL/NTSC video downsampled from captured image) with composite video or S-Video outputs
Recording	HD recording devices supporting HD-SDI (SMPTE 292M) or dual link HD-SDI (SMPTE 372M) signals for HD Mode operation. Optional on-board HD recording using solid-state memory recorder Flash Mag.
Common connections	2x composite video out (CVBS), 1x S-Video out (Y/C), 1x power in (BAT), 1x 12 V accessory power out (Fisher 11-pin), 1x 24 V accessory power out (RS), 1x lens data display (LDD), 2x lens control system bus (LCS), 1x accessory interface (ACC), 1x camera control unit (CCU), 1 each focus, iris, zoom for lens motors.
Power	24V DC (acceptable voltage range: 20.5 to 36 V DC)
Power consumption	2.1 A @ 24 fps, 1.9 A in Standby
Sound	Less than 20 dB(A) @ 24 fps
Dimensions	Length: 39 cm/15.35" Width (viewfinder left): 27 cm/10.83" Height with handle: 30 cm/11.81" Height without handle: 23 cm/9.06"
Accessories	Accepts the whole range of ARRI matte boxes (15 or 19 mm rods), follow focus and ARRI electronic accessories, Lens Data System (LDS), Wireless Remote System (WRS), Wireless Remote Control WRC-2, Iris Control Unit for speed/iris ramps (ICU-1), Remote On/Off Switch (RS-4), External Synchronization Unit (ESU-1). Specifically for ARRIFLEX D-21/D-21 HD: Low mode support set for Steadicam operation or underslung use and top-mounting of accessories without bridge plate, Flash Mag Mounting Adapter (FMA-1), Fibre Unit and Fibre Remote for an optical link to the recorder.
Misc.	Extra attachment points for rigging

All data subject to change without notice.

Divergent Technical Data

	ARRIFLEX D-21	ARRIFLEX D-21 HD																											
																													
Camera type	35 format digital film style camera with an optical viewfinder	35 format film style HD camera with an optical viewfinder																											
HD-SDI connections	2x dual link HD-SDI out	1x dual link HD-SDI out																											
Frame rate	<table border="1"> <thead> <tr> <th>Mode</th> <th>Setting</th> <th>Camera fps</th> </tr> </thead> <tbody> <tr> <td rowspan="2">HD Mode</td> <td>HD422 (16:9)</td> <td>1 - 60</td> </tr> <tr> <td>HD444 (16:9)</td> <td>1 - 30</td> </tr> <tr> <td>Mscope™</td> <td>Mscope™ HD422 (4:3)</td> <td>1 - 25</td> </tr> <tr> <td rowspan="2">Data Mode</td> <td>ARRIRAW (16:9)</td> <td>1 - 30</td> </tr> <tr> <td>ARRIRAW (4:3)</td> <td>1 - 25</td> </tr> </tbody> </table>	Mode	Setting	Camera fps	HD Mode	HD422 (16:9)	1 - 60	HD444 (16:9)	1 - 30	Mscope™	Mscope™ HD422 (4:3)	1 - 25	Data Mode	ARRIRAW (16:9)	1 - 30	ARRIRAW (4:3)	1 - 25	<table border="1"> <thead> <tr> <th>Mode</th> <th>Setting</th> <th>Camera fps</th> </tr> </thead> <tbody> <tr> <td rowspan="2">HD Mode</td> <td>HD422 (16:9)</td> <td>1 - 30</td> </tr> <tr> <td>HD444 (16:9)</td> <td>1 - 30</td> </tr> <tr> <td>Mscope™</td> <td>Mscope™ HD422 (4:3)</td> <td>1 - 25</td> </tr> </tbody> </table>	Mode	Setting	Camera fps	HD Mode	HD422 (16:9)	1 - 30	HD444 (16:9)	1 - 30	Mscope™	Mscope™ HD422 (4:3)	1 - 25
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Mode	Setting	Camera fps																											
HD Mode	HD422 (16:9)	1 - 30																											
	HD444 (16:9)	1 - 30																											
Mscope™	Mscope™ HD422 (4:3)	1 - 25																											
	Frame rates other than the standard HD video frame rates of 23.976 PsF, 24 PsF, 25 PsF, 29.97 PsF, 30 PsF, 48 PsF, 50 PsF, 59.94 PsF and 60 PsF can be achieved with a recorder that can interpret the Variframe Flag.	Frame rates other than the standard HD video frame rates of 23.976 PsF, 24 PsF, 25 PsF, 29.97 PsF and 30 PsF can be achieved with a recorder that can interpret the Variframe Flag.																											
	All frame rates are crystal controlled and can be set with 0.001 fps precision. Exposure compensated speed ramps are supported by the electronic mirror shutter.																												
Aperture	23.760 x 13.365 mm/0.9354" x 0.5262" in HD Mode 23.760 x 17.820 mm/0.9354" x 0.7016" max. in Data Mode & Mscope™	23.760 x 13.365 mm/0.9354" x 0.5262" in HD Mode 23.760 x 17.820 mm/0.9354" x 0.7016" in Mscope™																											
Signal output	HD Mode – HD-SDI (SMPTE 292M): - 1920 x 1080 4:2:2 YCbCr 10 bit @ 23.976, 24, 25, 29.97, 30 PsF	HD Mode – HD-SDI (SMPTE 292M): - 1920 x 1080 4:2:2 YCbCr 10 bit @ 23.976, 24, 25, 29.97, 30 PsF																											
	HD Mode – dual link HD-SDI (SMPTE 372M): - 1920 x 1080 4:4:4 RGB 10 bit @ 23.976, 24, 25, 29.97, 30 PsF - 1920 x 1080 4:2:2 YCbCr 10 bit @ 48, 50, 59.94, 60PsF	HD Mode – Dual link HD-SDI (SMPTE 372M):* - 1920 x 1080 4:4:4 RGB 10 bit @ 23.976, 24, 25, 29.97, 30 PsF * available with software packet 1.16																											
	Mscope™ – dual link HD-SDI (SMPTE 372M): - 1920 x 1080 4:2:2 YCbCr 10 bit @ 23.976, 24, 25 PsF	Mscope™ – dual link HD-SDI (SMPTE 372M): - 1920 x 1080 4:2:2 YCbCr 10 bit @ 23.976, 24, 25 PsF																											
	Data Mode – ARRIRAW T-Link (ARRIRAW transmission protocol mapped into RGBA dual link HD-SDI stream according to SMPTE 372M): - 2880 x 2160 RAW 12 bit Bayer data @ 23.976p, 24p, 25p - 2880 x 1620 RAW 12 bit Bayer data @ 29.97p, 30p																												
Weight (without lens)	Body only: 8.6 kg/19.0 lbs Body and viewfinder: 10.9 kg/24.0 lbs	Body only: 8.5 kg/18.8 lbs Body and viewfinder: 10.8 kg/23.8 lbs																											

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