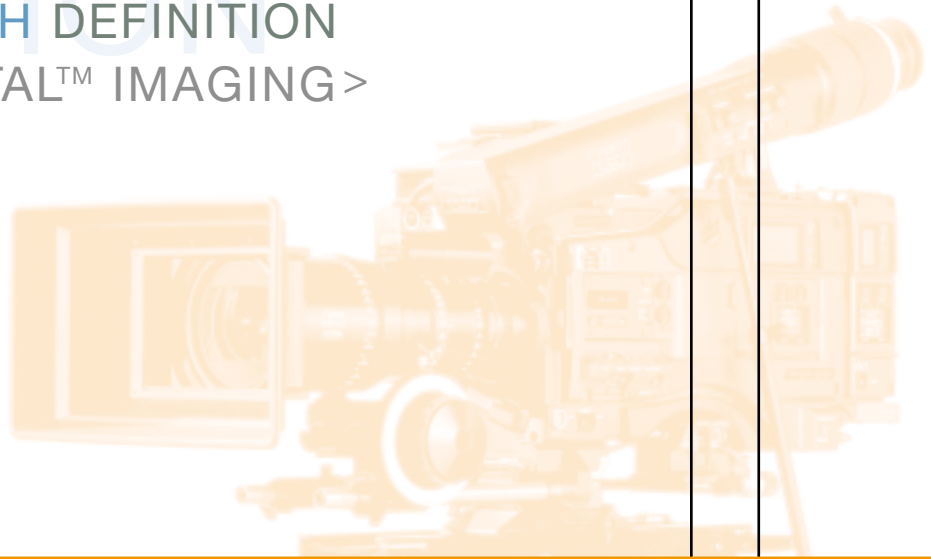


PANAVISION

PANAVISION HIGH DEFINITION
PRIMO DIGITAL™ IMAGING >



In 1997, Panavision and Sony announced their collaboration on the development of a 24 frame, progressive capture digital high definition camera suitable for use by filmmakers to create images for the motion picture screen. We knew from 45 years of experience, that a complete imaging system approach was the only way for traditional film crews to make a seamless transition into digital production. Panavising the Sony HDW-F900 camera required a disassembly of the stock camera and replacement of the top cover, carrying handle, bottom supports and mounts with more robust and flexible mounts and handles. Also, a complete new faceplate, lens lock and iris rod support system have been installed. A newly designed ULTRAVIEW® Viewfinder with enhanced optical performance and easier to use controls replaces the standard viewfinder. These changes and more were made in order to produce a film friendly system that utilizes

many of the standard Panavision accessories, such as the follow focus, matte box, heads, etc.

In addition to the mechanical modifications to the camera, a unique optical pre-filter gives you better color matching with film emulsions and enhanced resolution for blue screen effects cinematography.

In September of 2000, George Lucas completed principal photography of *Star Wars: Episode 2 Attack of the Clones*, utilizing six Panavised cameras and the first specially designed Primo Digital™ lenses.

Historically, 525 and 625 line video systems were constrained in their performance by almost everything but optics. However, with the introduction of the first progressive output 2/3", 2 million pixel (per color) CCD camera it was immediately apparent that optics were going to be critical to maximizing the performance of a Digital Cinematography System.

The 2/3" CCD imager is actually only

11mm in diagonal (as compared to the 27.5 mm diagonal of a 35mm motion picture film frame). Therefore, for any given screen size, the 2/3" CCD will require 2.5 times more horizontal magnification than a 35mm film frame. This required that our new Primo Digital™ lens series be designed to have 2.5 times the performance of our best cine lenses.

On the right side of the graphic below is a 16x9 format, 35mm film camera aperture. On the left is the image area of a 2/3" CCD drawn to the same scale. In order to have the same performance as a Primo cine lens, Primo Digital™ lenses must achieve 80% contrast at 50 line pairs per millimeter on the 2/3" CCD (2.5 times better frequency response). Another way to visualize the optical demands is to write your full name in each box, making both signatures legible.

Primo Digital™ prime and zoom lenses fully incorporate the optical, mechanical and ergonomic characteristics of their Academy Award® winning cine predecessors. All Primo Digital™ lenses permit selective control of colorimetry and resolution/contrast via insertable lens filters (worldwide patents pending). Additionally, these filters provide a constant effect through focus and zoom unlike conventional filters placed in front of or behind the lens.

To maximize versatility and ensure optimal image quality, Primo Digital™ lenses employ state-of-the-art opto-mechanical components, such as ultra precision linear bearings, exotic glasses, finely ground aspherical surfaces and high efficiency

HD/FILM LENS RESOLUTION

2/3" CCD



50 CYCLES/MM

3 PERF. 35MM FILM APERTURE



20 CYCLES/MM

DEFINITION

anti-reflection coatings (up to 12 layers), in very compact, lightweight packages. Rather than treat each zoom lens design separately, Panavision has developed its Primo Digital™ zoom lenses together so that they properly address customer needs. We began with two slightly overlapping medium ratio 4.5x zooms which cover wide angle to telephoto focal lengths of 6-27mm and 25-112mm with a 20x total focal length range. Then we added a 9x larger ratio 8-72mm zoom to accommodate virtually all shooting scenarios. All Primo Digital™ lenses are optimized for maximum image quality at fast maximum apertures of T1.6-1.9 (F1.45-1.75), thus enabling depths of field similar to 35mm cine formats. For visual effects and CGI work the lenses include integral encoders for real-time sub-pixel accuracy of focus, zoom, and aperture data. Furthermore, the Panavision system philosophy of compatibility and standardization between cameras, lenses, and accessories continues and is expanded in the Primo Digital™ lens series.

In addition to requiring 2.5 times the frequency response of its cine counterpart, the smaller target also has 2.5 times greater depth of field for the same angle of view and f-stop as the equivalent cine lens (f4 on 1.85:1 35mm film format is f1.6 in the 2/3" CCD format). In order to provide creative control over depth of field, the Primo Digital™ lenses have been designed to operate two stops faster than the equivalent cine lenses.

The "film" versus the "video" look is an extremely controversial issue, and is an aesthetic decision based on many factors



that include colorimetry, gamma, frame rate, image enhancement, granularity, etc. The Primo Digital™ lenses have a unique internal design which enables interference type spectral modification filters to be incorporated within the lenses. When coupled with other optical pre-filters within the camera beam splitter optics, the "Panavised" camera can achieve a wider color gamut than standard CCD video cameras.

Panavision is committed to continuously developing our Digital Imaging System in close collaboration with our clients, just as we have done with our film systems over the last 45 years. Now your HD project will benefit from the same dedication to customer service and superior image quality that is the hallmark of Panavision.

HD/FILM DEPTH OF FIELD

2/3" CCD	1.85:1	2.40:1
F-STOPS		
0.8	2	2.8
1.1	2.8	4
1.6	4	5.6
2.2	5.6	8
3.2	8	11
4.4	11	16
6.4	16	22

The Panavised HDW-F900 Camera

Robust, flexible carrying handle and mount	ULTRAVIEW® VIEWFINDER:
New faceplate, lens lock that allows for optical recentering of the prism block CCD assembly	2 times larger image
Bottom iris rod system	Increased diopter range
Steadicam® plates	Operator side controls for contrast, brightness and peaking
Standard accessories: follow focus, matte box, etc.	More robust mount
Dual voltage 12/24 distribution	More fore/aft and side-to-side adjustment
Optical prefilter provides enhanced color gamut	More robust pivot and lock
	Modular hand held and extension finders

HDW-F900 Camera Specifications

GENERAL

Power requirement	DC 12 V (+5.0 V/-1.0 V)
Power consumption	42 W (with 12 V power supply, REC mode, with HDVF-20A)
Operating temperature	0° C to +40° C (+32° F to +104° F)
Storage temperature	-20° C to +60° C (-4° F to +140° F)
Operating humidity	25% to 80% (relative humidity)

INPUTS/OUTPUTS

Genlock video input	BNC, 1.0 Vp-75Ω
Time code input	BNC, 0.5 V to 18 Vp-p, 10 kΩ
Audio CH1/CH2 input	XLR-3-pin type (female), -60dBu/+4dBu selectable, high impedance, balanced
Mic input	XLR-3-pin type (female), -60 dBu
Monitor output	BNC (x3, Y/PB/PR), 1.0 Vp-p, 75Ω, unbalanced
Audio output	XLR-5-pin type (male) 0 dBm
Time code output	BNC, 1.0 Vp-p, 75Ω
Earphone	Mini-jack, 8 Ω, -∞ to -18 dBs variable
DC input	XLR-4-pin type (male), 11 to 17 V DC
DC output	11 to 17 V DC, Max. 100 mA
Lens	12-pin
Remote	8-pin

VTR SECTION

Recording format	HDCAM
Tape speed	Approximately 77.4 mm/s (24P mode)
Playback/recording time	Maximum 50 minutes with BCT-40HD (24P mode)
Fast forward/rewind time	Approximately 6 minutes with BCT-40HD

AUDIO PERFORMANCE (playback with standard HDW-F500)

Frequency response	20 HZ to 20 kHz, +0.5 dB/-1.0 dB
Dynamic range	More than 85 dB (emphasis on)
Distortion	0.08% maximum
Cross talk	-70 dB
Wow & flutter	Below measurable limit

CAMERA SECTION

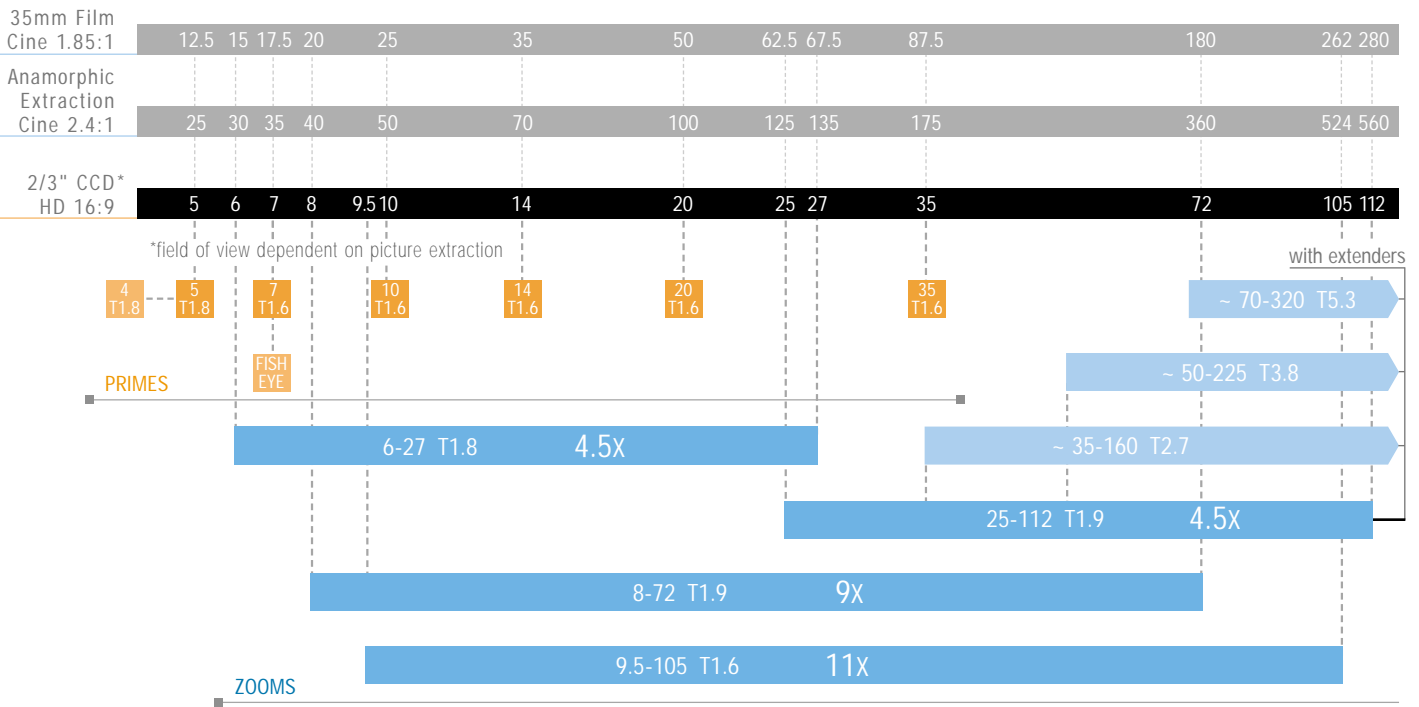
Pickup device	3-chip 2/3-type FIT type CCD, 1920 x 1080
Optical system	F1.45 prism system
Built-in filters	A: Cross B: 3200K C: 4300K D: 6300K; 1: Clear 2: 2-stop 3: 4-stop 4: 6-stop ND
Clear scan	(ECS) 24 to 4300 HZ (minimum setting depends on frame rate selected)
Sensitivity	f10.0 at 2000 lux, 89.9% reflective, at 24 fps, with a 1/48-second shutter speed (equivalent to a 180° film camera shutter setting), the exposure index is approximately equivalent to 320 ISO

VIEWFINDER

CRT	2" monochrome
Controls	Brightness control, Contrast control, Peaking control, Tally switch, Zebra Pattern switch, Display/Aspect switch
Horizontal resolution	500 TV Line (at center)

Primo Digital™ Imaging

PRIME AND ZOOM LENS FOCAL LENGTHS, RATIOS AND FEATURES



OPTICAL

- High contrast at full aperture
- Very low veiling glare
- Low lateral color
- Low ghosting
- Low distortion
- Flat field
- Color balanced
- Colorimetry filter (drop-in)
- Resolution/contrast filter (drop-in)

Consistent image quality through focus & zoom

MECHANICAL

- Precision linear bearings
- Direct drive systems (no gears)
- Low static & dynamic friction
- Minimal backlash & slop
- Ultra smooth movements
- Stable boresight
- High reliability
- High durability
- Ease of service

ERGONOMIC

- Dual focus, zoom, iris scales
- Individually calibrated scales
- Expanded focus scales
- Linear iris scales
- Optimal zoom scale markings
- Compatible with Panavision accessories
- One matte box, prime or zoom

THE ONLY LENS SERIES
OF ZOOMS
AND PRIMES
SPECIFICALLY DESIGNED
FOR
24P HIGH-DEFINITION
CINEMATOGRAPHY



- Woodland Hills 818.316.1000
- Hollywood 323.464.3800 Orlando 407.363.0990
- Wilmington 910.343.8796 Dallas 972.929.8585 New York 212.606.0700
- Toronto 416.444.7000 Vancouver 604.291.7262
- Melbourne 011.613.9646.3044 Sydney 011.612.9436.1844
- Brisbane 011.617.5588.6543 Wellington 011.644.384.4191
- Auckland 011.649.378.9492 London 011.44.208.839.7333
- Manchester 011.44.161.872.4766 Shepperton 011.44.1932.572440
- Glasgow 011.44.141.221.5175 Dublin 011.353.12.860811
- Paris 011.331.4813.2550 Marseille 011.334.91.21.43.14
- Hong Kong 011.85.2.2338.6311 Tokyo 011.81.3.3280.2101

