

# Panasonic

# AJ-HDC27F

720p Variable Frame-Rate Camera/Recorder



A variable frame-rate camera  
for an HD multi-media world.

cine gamma

720p

variable frame rate

High Definition

film user menu



**DVCPRO HD**

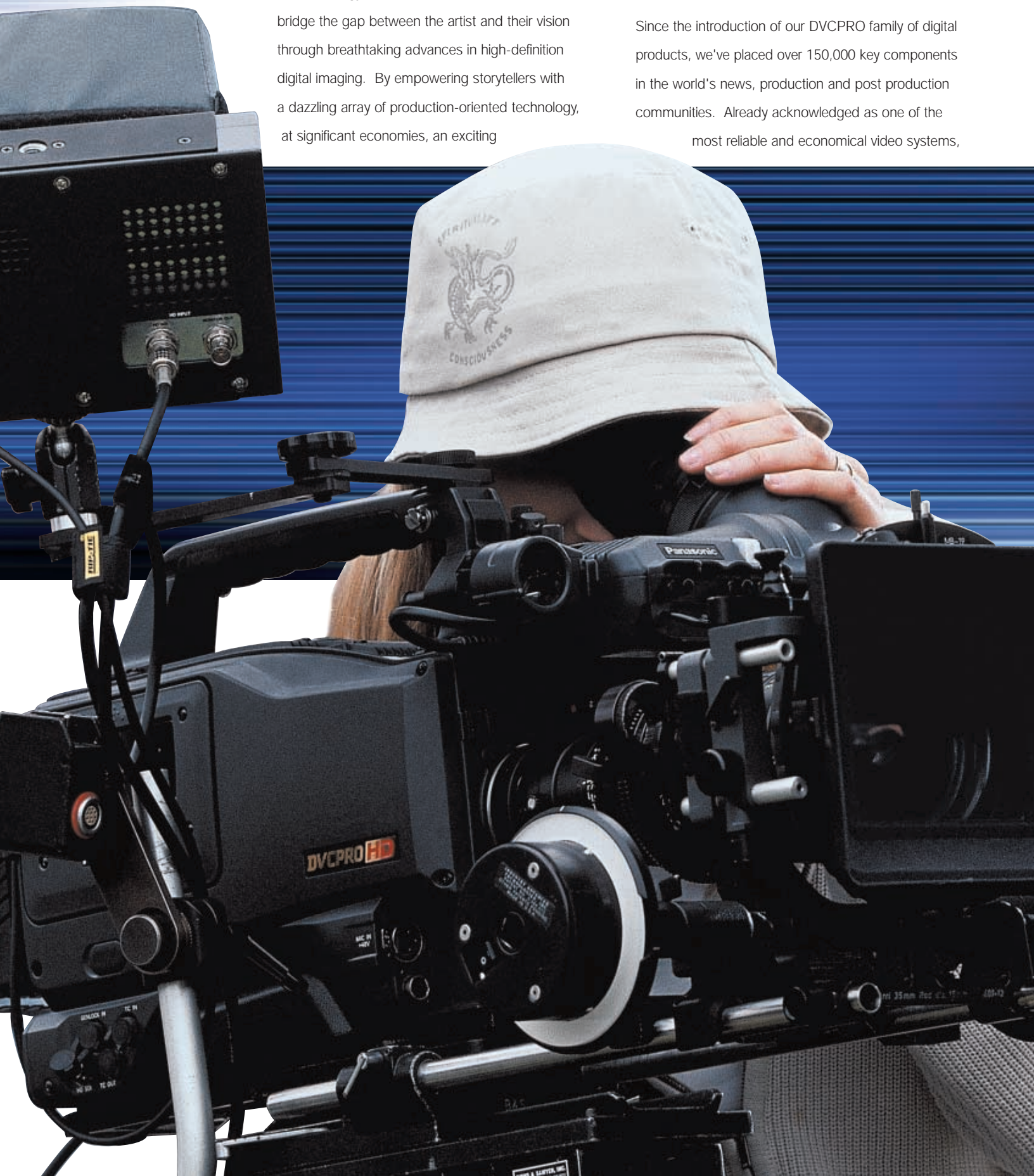
# The HD Story

## The freedom to realize your vision.

As technology evolves, Panasonic continues to bridge the gap between the artist and their vision through breathtaking advances in high-definition digital imaging. By empowering storytellers with a dazzling array of production-oriented technology, at significant economies, an exciting

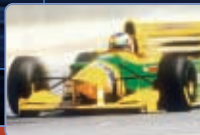
new world of creative possibilities is emerging on the multi-media horizon.

Since the introduction of our DVCPRO family of digital products, we've placed over 150,000 key components in the world's news, production and post production communities. Already acknowledged as one of the most reliable and economical video systems,





Whether episodic **television**, independent **films**, music videos, DVD, Internet or **new media** projects, Panasonic is ushering in a new era of **high definition**.



DVCPRO HD is now building on this cachet with our HD Cinema cameras and related digital VTRs.

Whether episodic television, independent films, music videos, DVD, Internet or new media projects, Panasonic is ushering in a new era of high definition, digital production, finishing and distribution. By bringing together the worlds of cinematography, digital recording and computer augmented post production, Panasonic has defined itself as the premier name for technology that fuels artistic freedom worldwide.

#### **Expanding the boundaries of digital cinematography.**

The AJ-HDC27F is the first variable frame-rate camera designed to inspire and empower cinematographers,

directors and digital artists with exciting new creative options. From infusing documentaries with a lush, cinematic quality to creating stunning new visual effects for music videos, the AJ-HDC27F gives unprecedented freedom for storytellers to realize their vision.

#### **Open systems. Open minds.**

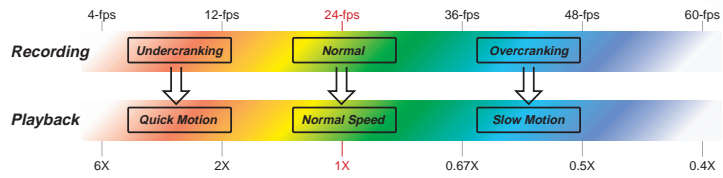
An important component of the AJ-HDC27F is its compatibility with other international formats. Not only is it backwards compatible to Panasonic's own DVCPRO 25/50/50P and DV formats, but 1080i and 720p images can also be converted to 1080p/24 – a universal master from which 25-fps PAL programming and multiple other TV formats\* are easily derived.

\*Panasonic equipment complies with ITU recommendations for HD production and international program exchange.

# The Varicam

## Variable Frame Rate

The Panasonic Varicam is the world's first video camera able to simulate the "undercranking" and "overcranking" technique of film cameras to slow down or speed up images. By varying the frame rate from 4 to 60 fps and adjusting the shutter speed from 0.8% to 97.2% of the frame rate, you can create a wide range of cinematic effects. And since the



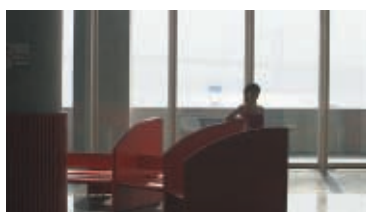
VTR section records at a constant 60 fps, you can edit offline with a conventional DVCPRO HD VTR. This lets you build a powerful 24p production system without a huge investment in equipment.



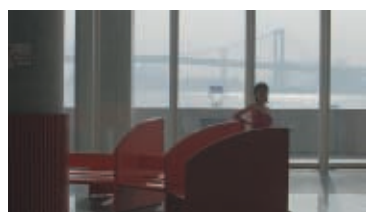
## Film Gamma Selectable

The extremely wide reproductive range of film is the key to its lush expression. Panasonic's new gamma curves -- developed specifically to allow a CCD camera to produce the tonal qualities of film -- now bring film's natural shading and rich coloration to the video camera. The Varicam also lets you switch between video and film gamma modes. Film modes include "Cine Gamma" for

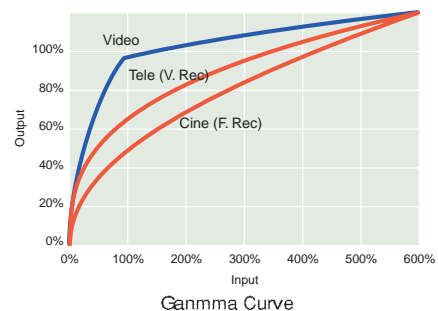
film using ARRI laser recorder and "Tele Gamma" for monitor viewing and CRT base film recorders. Select the mode that suits your production. The ISO640-equivalent sensitivity -- which surpasses even film cameras -- combines with the Varicam's brightness and superior picture quality to produce an essentially "grainless, high-sensitivity film" effect.



Video Gamma Image



Film Gamma Image



Gamma Curve

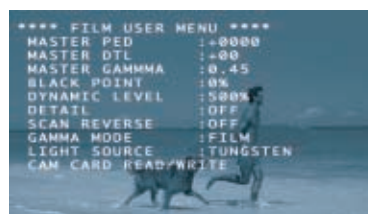


The AJ-HDC27F Varicam gives artists the power to capture images with the same expressive characteristics as film, and with intuitive operation that instantly feels comfortable.



## Film User Menu

The AJ-HDC27F Varicam is like a film camera not only in functions and performance, but in operation as well. The settings you need on the set are conveniently grouped in a single-page menu. Use this menu to select or adjust gamma, scan reverse ON/OFF, hardness/softness, shadow gradation, and latitude. Just as with a film camera, you can also select tungsten or daylight type lighting.



Film User Menu Screen

## Scan Reverse

Peripherals, beginning with lenses, are an essential part of the artist's creative toolbox. Adding the optional lens adapter configures the Varicam for an Ultra Prime film lens.

The Varicam is also equipped with the industry's first scan reverse circuit, which cancels image reversal when the adapter is in use. This function, which is easily set from the menu, also accommodates other film camera peripherals such as a slide base and matte boxes.



# Features and Functions

**Camera section: Captures a wide range of images for use in cinematic or broadcast productions.**

- Selectable frame frequency (59.94/60.0 Hz)
- 3-CCD imager with 2000-lux sensitivity at F12, and minimum illumination of 0.7 lux
- Selectable gamma curves to create desired film tones
- Variable frame rate from 4 to 60 fps, including the traditional "film look" rate of 24 fps
- Digital setup for numeric image control. Easy jog dial and menu-driven operation.
- Simple cinematic settings via the Film User Menu
- Up to 8 setup data files can be stored on an SD Memory Card (RP-SD008B, sold separately)
- Picture-enhancing circuits: Auto knee, detailing, shading compensation, 12-pole color matrix, masking
- 2-level zebra pattern and spot zebra
- Up to 10 gain values ranging from -6 dB to +30 dB; 3 values can be saved as presets. Super Gain instantly increases gain to +36 dB.
- The following functions can be assigned to the USER1/USER2 button: Super Iris, Super Gain, Super Black, Black Stretch, front/rear mic input
- 6 shutter speeds (1/100, 1/120, 1/250, 1/500, 1/1000, 1/2000 sec), plus 0.8%-97.2% variable
- Same tungsten/daylight selection as in film cameras. Also comes standard with two ND and CC optical filter wheels.
- Auto Black Balance (ABB) and Auto White Balance (AWB). AWB stores two values for each set of four CC filter positions.







### VTR section: High-quality recording of 720p images.

- Selectable frame frequency (59.94/60.0 Hz)
- Records up to 46 minutes on a compact DVCPRO HD cassette
- Recorded tapes can be played and edited on a DVCPRO HD studio VTR\*
- Recorded results can be checked on location via the viewfinder (black & white) or monitored in color through the HD SDI out terminal
- Two channels of 16-bit/48-kHz digital audio
- Users Bit Data for post-process
- Audio input selectable from the front mic or rear panel line input
- NEWS REC function prevents start/stop mistakes
- RETAKE function simplifies retakes of NG cuts
- REC REVIEW allows instant checking of recorded end
- Interval recording, with intervals from 2 seconds to 24 hours

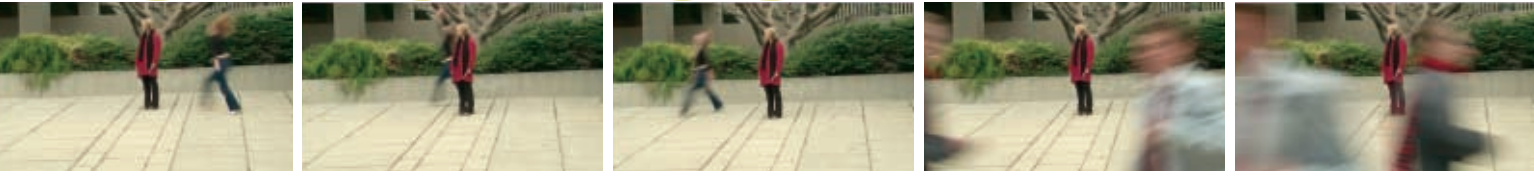
\* The AJ-HD130DC cannot play back 720/60p images. It plays back 720/59.94p images only.



### The functions that professionals need, in a compact, lightweight unit with low power consumption.

- Scan Reverse function for cinematic lens adapter
- HD SDI monitor out for line recording with HD-D5 or other VTRs
- Handheld control of camera settings and VTR section remote control using the AJ-EC3P Extension Control Unit
- Compatible with the Multi-Core Cable Transmission System
- Built-in color bar, reference audio signal generator
- Accommodates super-directional mic with phantom power supply
- Compact size, light weight — approx. 9.9 lbs (15.4 lbs in operating condition)
- Consumes only 33 W when recording in SAVE REC mode to minimize battery drain

# 15-frames



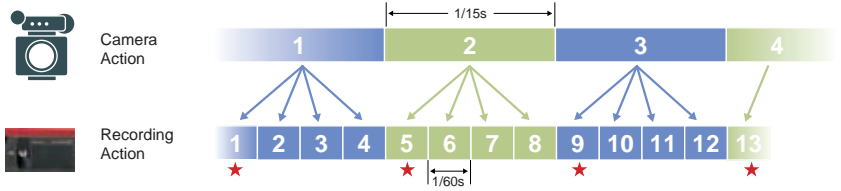
## Normal shooting at 24 fps

Normal cinematic shooting is done at 24 fps, the same rate as in film cameras. Discrete 720p images and a specially developed film gamma curve create images with the same tonal characteristics as film.

## Lower-speed shooting at 4 to 23 fps

For example, shooting at 12 fps lets you attain a 2x fast-motion effect with playback at the cinema speed of 24 fps. This technique can be combined with zooming to create a warp-speed effect, such as for giving special emphasis to flowing water, scudding clouds, or a person standing still amid a bustling crowd. Decrease the shutter speed for a strobe effect, or increase it for a ghost effect. The expressive possibilities are endless.

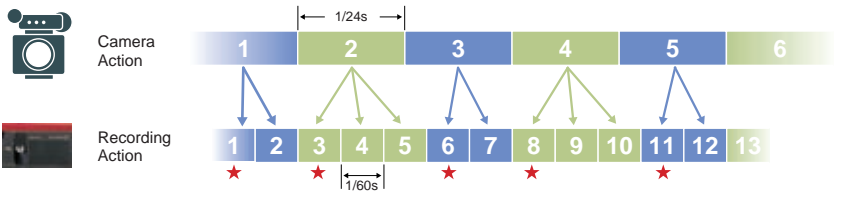
## Low Speed Shooting (Ex. 15-fps)



# 24-frames

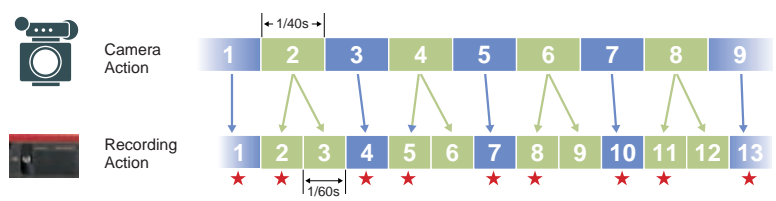


## Normal Speed (24-fps)



# 60-frames

## High Speed Shooting (Ex. 40-fps)

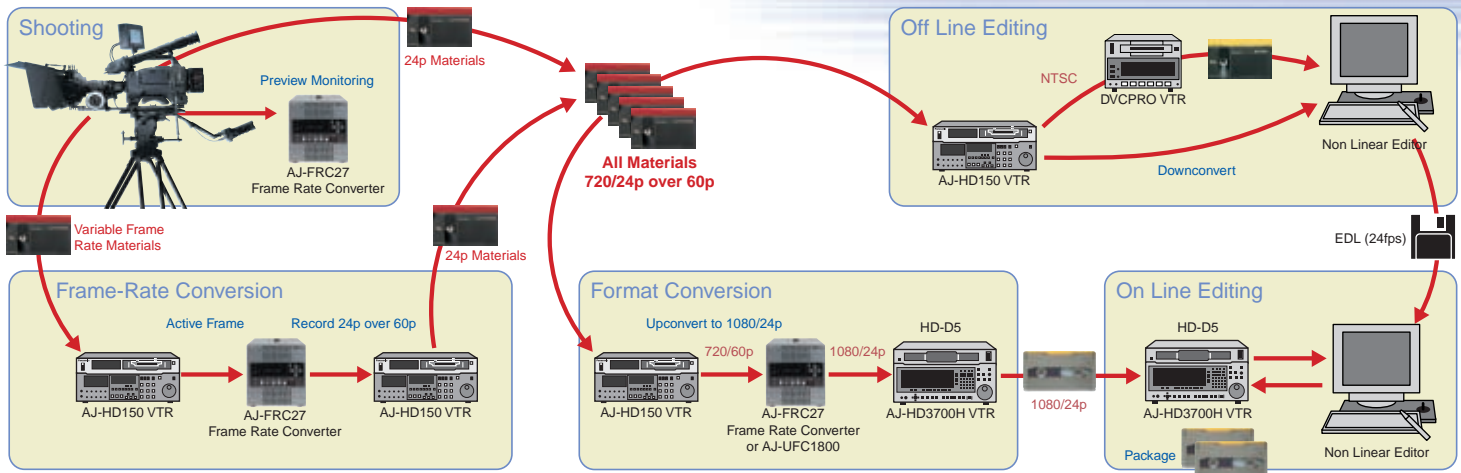


## Higher-speed shooting at 25 to 60 fps

For example, shoot at 48 fps to attain a 1/2x slow-motion effect with playback at the cinema speed of 24 fps. This is especially effective for high-action scenes such as car chases or spectacular crashes, or for scenes with great dramatic impact. Unlike the slow motion captured at playback speed by ordinary video cameras, the Varicam captures highly dense frames to provide a smooth, naturally flowing slow-motion effect with vivid picture quality.

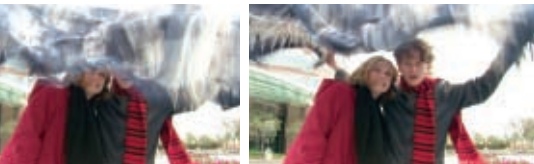


selectable shooting frame rate of 4 fps to 60 fps, in 1-fps steps.



### Recording at 60 fps

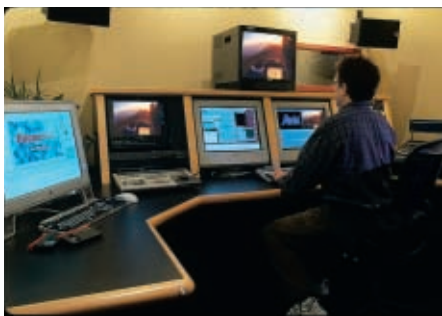
Although CCD frame rates may change, the VTR records at a constant 60 fps so that the audio timing is not affected. This is particularly important for avoiding audio synchronizing



issues in post-production (unless a second audio recording system is used). Another Varicam advantage is that tapes recorded at 60 fps can be played back directly on any DVCPRO HD VTR -- eliminating the need to invest in a second, special VTR. Plus, because the Varicam's HD SDI out terminal outputs 60-fps non-compressed images, high-quality recording is possible on an extended-bandwidth HD-D5 recorder.

### Frame rate conversion

The AJ-FRC27 Frame Rate Converter lets you extract only the frames you want from footage recorded by the Varicam at various frame rates. This lets you play fast-motion or slow-motion effects in their actual timeframes. At the same time, you can up-convert from 720p to 1080/24p or 1080/60i, or down-convert to NTSC or PAL. Edit online with a HD-D5 recorder, or offline with DVCPRO. Again, the possibilities are unlimited.



### SXGA nonlinear editing

The 1280 x 720-pixel progressive scan images recorded by Varicam are fully compatible with the SXGA-resolution desktop nonlinear editing systems commonly used in high-end image production. User bits mark effective frames for extraction by nonlinear systems.

### HD Cinema

Panasonic HD Cinema recording and video projection technologies represent the cutting edge of a new digital age in cinema. The combination of HD digital acquisition with HD

digital projection opens up a host of new business and programming opportunities -- such as live pay-per-view concerts, sporting events, theater, and other special events.



# Supporting Cast



## CLA35HD Cine Lens Adaptor

The "angénieux" cine lens adaptor allows mounting the Carl Zeiss 35 mm ultra prime film lens with AJ-HDC27F



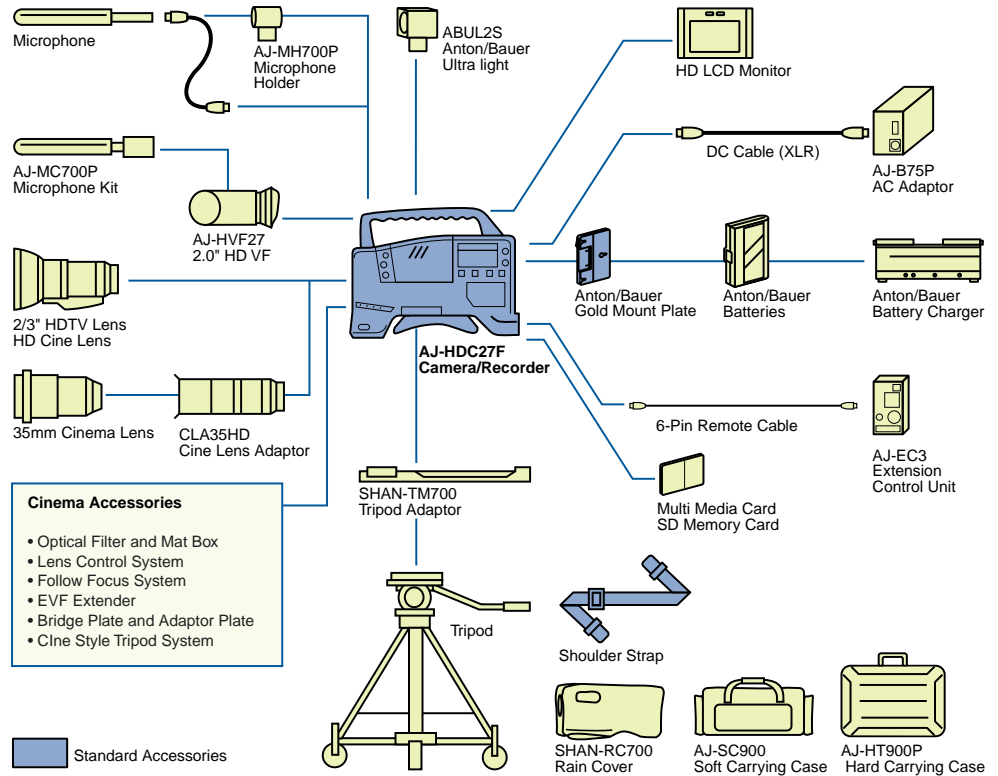
## Canon Cinema Lens

5mm (T1.7), 9mm (T1.5), 14mm (T1.5), 24mm (T1.5), 35mm (T1.5), 4.7~52mm, 7.5mm~158mm



## Fujinon Cinema Lens

5mm (T2), 8mm (T1.5), 12mm (T1.5), 16mm (T1.5), 20mm (T1.5), 34mm (T1.5), 40mm (T1.5), 54mm (T1.6), 5~50mm, 7.8~133mm, 7.8~156mm



## AJ-FRC27 Frame Rate Converter

The AJ-FRC27 converts the frame rates of images recorded using the Varicam. It extracts the frames you designate, records them to an internal HDD, and plays them back. This lets you play fast-motion or slow-motion effects in their actual, intended timeframes.

The AJ-FRC27 also serves as a format converter. You can convert 720p images to 1080/23.98(24)psF, 1080/59.94(60)i, or 1080/50i (see conversion table). A built-in, simplified down-converter lets you monitor SD analog output. Adding an optional down-converter board also gives you high-picture-quality

Real Time Conversion Table (EE through)

Output	1080			720		480		576		
	23.98psF	24psF	50i (25psF)	59.94i	60i	59.94p	60p	59.94i	60i	50i
23.98p over 59.94psF	Yes	No	No	Yes with 2:3 pull down	No	Yes with 2:3 pull down	No	Yes	No	No
24p over 60psF	No	Yes	No	No	Yes with 2:3 pull down	No	Yes with 2:3 pull down	No	No	No
25p over 60psF	No	No	Yes	No	No	No	Yes	No	No	Yes
29.97p over 59.94psF	No	No	No	No	No	Yes* with 2:2 pull down	No	Yes	No	No
30p over 60psF	No	No	No	No	No	No	Yes with 2:2 pull down	No	No	No

\* Cross conversion to 1080/59.94i is possible with AJ-HD150 DVCPRO VTR.

2:2 pull out is impossible

conversion to NTSC or PAL. The time code is automatically converted at the same time, ensuring that optimal image sources are output in the desired format. The AJ-FRC27's compact, half-rack size and 5U profile make it good fit for applications ranging from studio use to EFP or relay use.

INFO	<b>AJ-FRC27</b>	Frame rate and format conversion	
	720/59.94p and 60p	Record/play 100 minutes	
	HD SDI I/O	SD Composite out	Half-rack size





## AJ-HD150 Full-Featured Studio VTR

Supporting playback and record of both 1080i and 720p HD formats, the AJ-HD150 is one of the most capable, most versatile HD VTRs ever. It plays back all DV-based cassettes including Mini-DV, DV, DVCPRO, DVCPRO50, DVCPRO P (480/60p), DVCPRO HD and even DVCAM. With the addition of its dedicated format converter card, the AJ-HD150 readily converts standard definition formats into 1080i or 720p HD formats – in real time. It also handles simultaneous aspect ratio conversion to best suit playback requirements.

With its wide range of capabilities, exceptional reliability and affordable cost of ownership, the AJ-HD150 should be considered essential equipment for every broadcast and production facility that's even thinking about HD.

Variable-speed playback ranges from -1 ~ +1x; in 0.02x steps via AJ-A95 remote controller or standard edit controller.

8 digital audio channels accommodate 5.1 surround sound plus stereo.

INFO	<b>AJ-HD150</b>	Plays/Records 720p and 1080i		
	Playback all DV-based formats	Full editing		
	Converts SD or HD	8-Ch audio	Slow-motion	



## AJ-UFC1800 Universal Format Converter

Convert between any ATSC format with superb picture quality. Automatic time code conversion and 8-channel audio processing/delay are standard features. Variable/multiple aspect ratio conversion is built-in along with image and color enhancement.

The AJ-UFC1800 accommodates slow-PAL operation with its 3:2 pull-down function, and is a perfect complement when working with film-based material. This universal format converter is ideal for today's digital video facilities.

INFO	<b>AJ-UFC1800</b>	16:9/4:3 aspect ratio conversion		
	Programmable color matrix for HD or SD			
	GPI activated presets	3U rack mount		

## AJ-HD3700H Multi-Format/Multi-Standard Mastering VTR

The AJ-HD3700H VTR meets all high quality HD and SD production requirements in one VTR. HD studio quality is assured by full band width (1920 x 1080) in 1080i, and 4:2:2 digital 10-bit component recording, plus 1080/24p, 1080/25p, as well as standard definition non-compressed 480i. Metadata recording and playback is built in without sacrificing audio channels and conversion between formats is as simple as an optional converter card set. With a newly designed, easy-to-use front panel operation, full editing capability, and lower power consumption, the AJ-HD3700H is designed for integration into today's modern post and production facilities.

The advantage of reduced rack space with the 5 RU profile means less real estate devoted to multiple VTRs. The AJ-HD3700H provides the flexibility of having a single machine function in both HD and SD, plus the popular 1080/24p and 1080/24psF. With the optional built-in format converter card, SD to HD and HD to SD conversions are handled internally - without the need for outboard gear.

INFO	<b>AJ-HD3700H HD-D5</b>	Plays/Records ATSC formats		
	Supports multiple frame rates	10-bit recording		
	Format Conversion	Metadata	8-Ch audio	



## PT-D9610U HD Cinema projection system

Using advanced licensed DLP (Digital Light Processing™) along with the proprietary re-sizing technology of Panasonic's Emmy® award-winning Universal Format Converter results in remarkably bright, vivid images. Combine that with Panasonic's Digital Cinema Reality™ circuit, which eliminates motion judder for an exceptionally smooth and sharp digital moving picture, and the realities of the digital future become unmistakably clear.

\*DLP is a trademark of Texas Instruments. Emmy is a registered trademark of the National Academy of Television Arts and Sciences.

INFO	<b>PT-D9610U</b>	DLP™	1,000:1 contrast ratio	
	Bright 12,000 ANSI lumens		HD/SD multi format	
	Digital processing	Edge blending for multi-screen		



# AJ-HDC27F Specifications

General		Video	
Power Supply	DC 11V to 17V	Sampling Frequency	Y: 74.1758MHz, Pb/Pr: 37.088MHz (59.94Hz) Y: 74.25MHz, Pb/Pr: 37.125MHz (60Hz)
Power Consumption	33 W (without VF, SAVE REC MODE); 39 W typical operating conditions	Quantization	8 bits
Operating Temperature	32° F to 104° F (0° C to 40° C)	Error Correction	Reed-Solomon product code
Operating Humidity	Less than 85%	Compression Ratio	6.7:1
Weight	About 9.9 lbs (4.5 kg) About 15.4 lbs (7.0 kg) in operation	Bit Rate	100 Mbps
Dimensions (W x H x D)	5-1/4" x 8" x 12-5/16" (132 x 204 x 313 mm)	Video Band	Y: 20MHz, Pb/Pr: 10MHz
Camera Section		Audio	
CCD Elements	2/3" IT 3-CCD (RGB)	Sampling Frequency	48kHz (59.94Hz)/48.048kHz (60Hz)
Picture Elements	1,019,280 pixels (total, 1,370 x 744) 921,600 pixels (effective, 1,280 x 720)	Quantization	16 bits/sample
Optical Filters	CC: Cross, 3200K, 4300K, 6300K ND: CLEAR, 1/4ND, 1/16ND, 1/64ND	Frequency response*	20Hz to 20kHz, ±1.0dB (reference level)
Quantization	10 bits	Dynamic range*	More than 85dB (1kHz, AWTD)
Processing	74.1758MHz (59.94Hz), 74.25MHz (60Hz)	Distortion*	Within 0.1% (1kHz, reference level)
Gain	Programmable: -6/-3/0/+3/+6/+9/+12/+18/+24/+30 dB	Wow & Flutter*	Below measurable limit
Super Gain	+18/+24/+30/+36 dB	Headroom*	20dB
Shutter Speed	1/100, 1/120, 1/250, 1/500, 1/1000 and 1/2000 sec.	Input	
Syncro Scan Shutter	20-99.5%	Audio IN	XLR x 2 (CH1/CH2) MIC/LINE/MIC+48V switchable MIC: -60 dBu LINE: +4dBu
Frame Rate	4 fps to 60 fps (in single increments)	MIC IN	XLR x 1, balanced Phantom +48V (On/Off)
Sensitivity	2000 Lux at F12 (89.9% reflection, 23.98p, 50% shutter)	Genlock IN	BNC x 1, 1.0Vp-p 75Ω
Minimum Illumination	0.7 lux (F1.4, +36 dB gain 59.94p)	TC IN	BNC x 1, 0.5 to 8Vp-p, High-impedance
Video S/N	54 dB (typical)	Output	
Horizontal Resolution	700 TV lines at center	HD SDI OUT	BNC x 2, 0.8Vp-p 75Ω
Registration Error	Less than 0.03% (whole zone, without lens distortion)	Audio OUT	XLR-5pin x 1, +4dBu
Geometric Distortion	Below measurable limit	TC OUT	BNC x 1, 2.0Vp-p low-impedance
Lens Mount	2/3" Bayonet type	Phones	Stereo mini-jack x 1
Viewfinder	AJ-HVF27 (optional)	Others	
VTR Section		DC IN	XLR-4pin x 1 DC11V to 17V
Recording Format	DVCPRO HD (720p, 59.94Hz/720p, 60Hz)	DC OUT	4P x 1, DC11V to 17V, 100 mA
Tape	1/4" DVCPRO HD cassette tape	Lens	12P x 1
Tape Speed	135.28 mm/s (59.94Hz), 135.42 mm/s (60Hz)	ECU	6P x 1
Recording Time	Max. 46 minutes using AJ-HP46LP	EVF	20P x 1
FF/REW Time	About 3 minutes using AJ-HP46LP		

\*The above specifications were measured by playing back tapes recorded by this unit on standard DVCPRO HD VTRs.

Weight and dimensions shown are approximate.

Features and specifications are subject to change without notice.

These products may be subject to export regulations.

# Panasonic

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