

Panasonic

AJ-HDC27F

Variable Frame-Rate HD 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

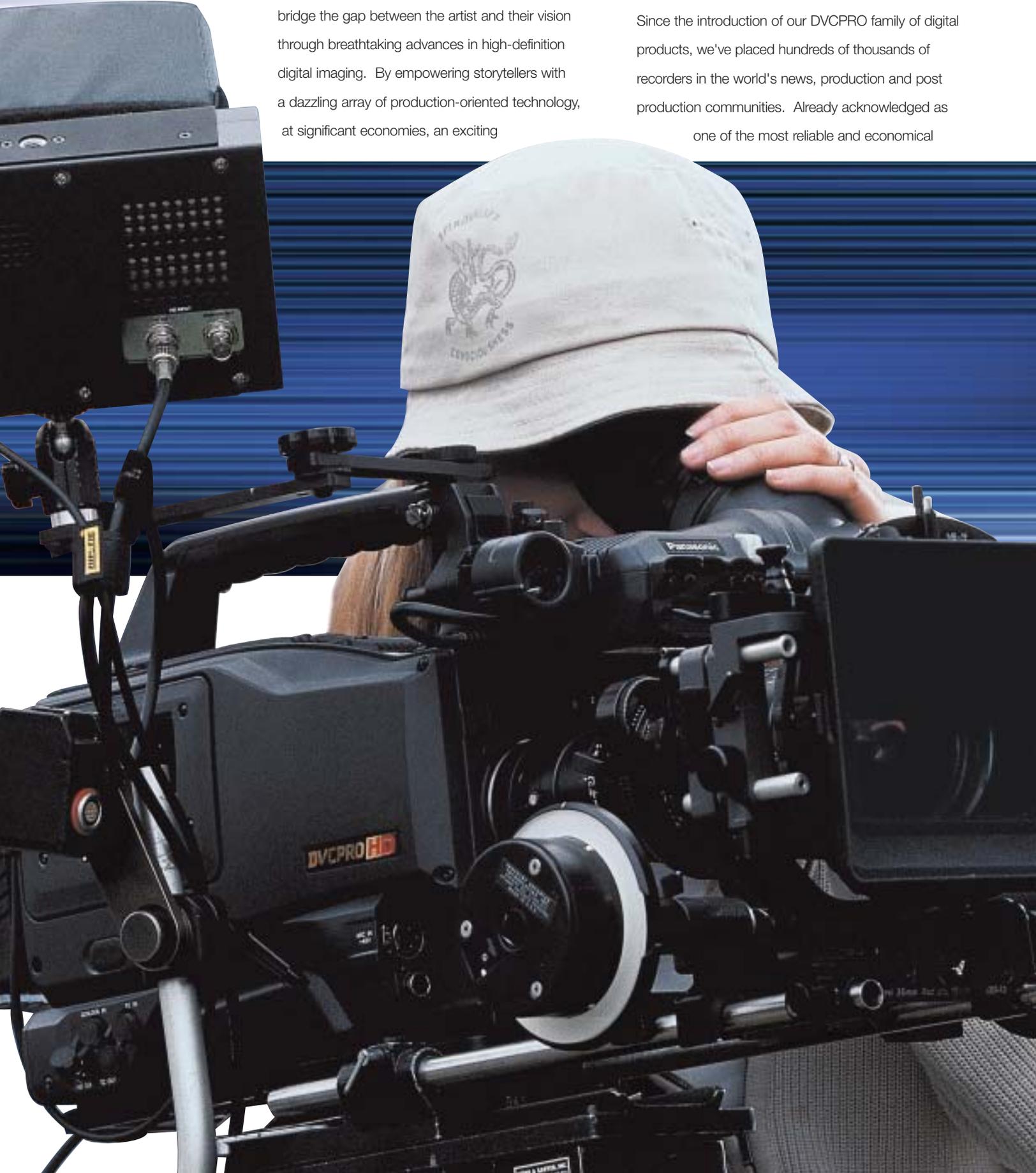
The HD Story

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 hundreds of thousands of recorders in the world's news, production and post production communities. Already acknowledged as one of the most reliable and economical



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



video systems, DVCPRO HD is now building on this history with our HD Cinema cameras and related digital VTRs.

Whether episodic television, independent films, music videos, commercials 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 variable frame-rate camera is designed to inspire and empower cinematographers,

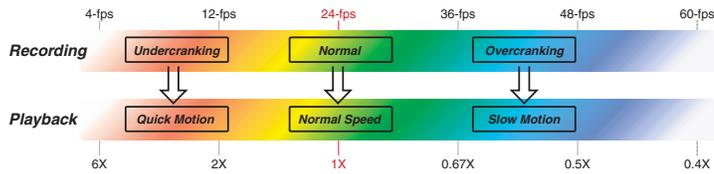
directors and digital artists with exciting new creative options. From infusing documentaries with a lush, cinematic quality to creating stunning new visual effects for music videos, the AJ-HDC27F gives unprecedented freedom for storytellers to realize their vision.

Open systems. Open minds.

An important component of the AJ-HDC27F is its compatibility with other international formats. DVCPRO HD VTRs playback DVCPRO 25/50/50P and DV recordings, and 1080i and 720p images from the AJ-HDC27F can 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



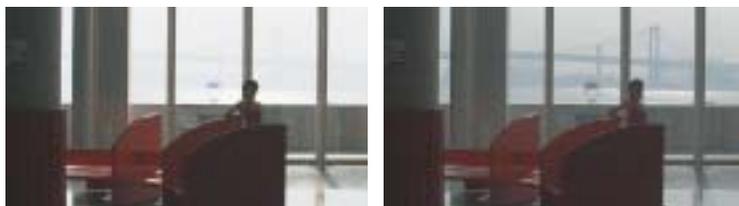
Variable Frame Rate

The Panasonic Varicam is the world's first video camera able to emulate 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

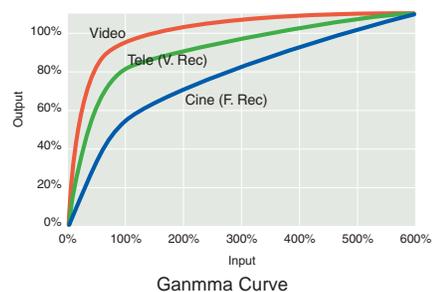
The extremely wide reproductive range of film is the key to its lush expression. Panasonic's new gamma curves -- developed specifically to allow a CCD camera to produce the tonal qualities of film -- now bring film's natural shading and rich coloration to the video camera. The Varicam also lets you switch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



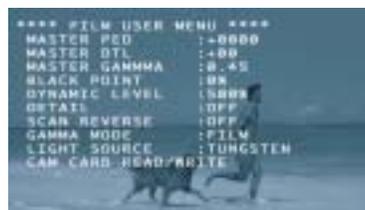
Gamma Curve

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 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 a scan reverse circuit, which corrects 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.



VTR section: High-quality recording of progressive scan images.

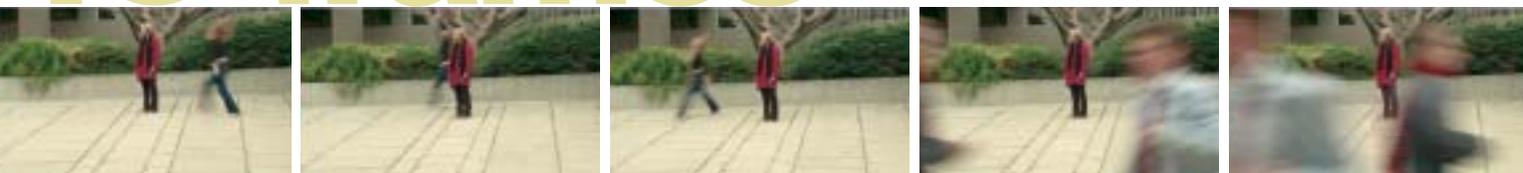
- Selectable frame frequency (59.94/60.0 Hz)
- Records up to 46 minutes on a compact DVCPRO HD cassette
- Recorded tapes can be played and edited on a DVCPRO HD studio VTR*
- Recorded results can be checked on location via the viewfinder (black & white) or monitored in color through the HD SDI out terminal
- 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 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



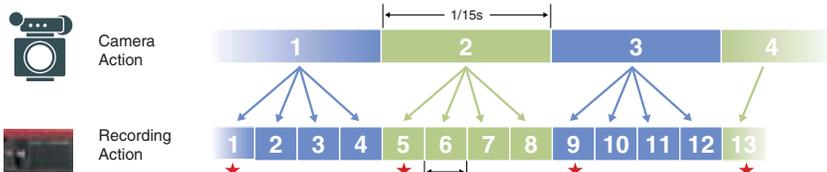
15-frames



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.

Low Speed Shooting (Ex. 15-fps)



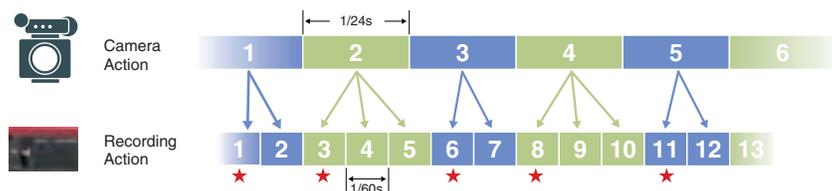
Lower-speed shooting at 4 to 23 fps

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, fast-moving 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.



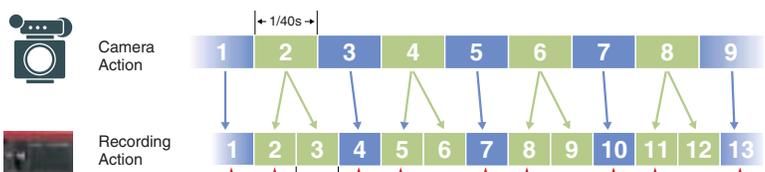
24-frames

Normal Speed (24-fps)



60-frames

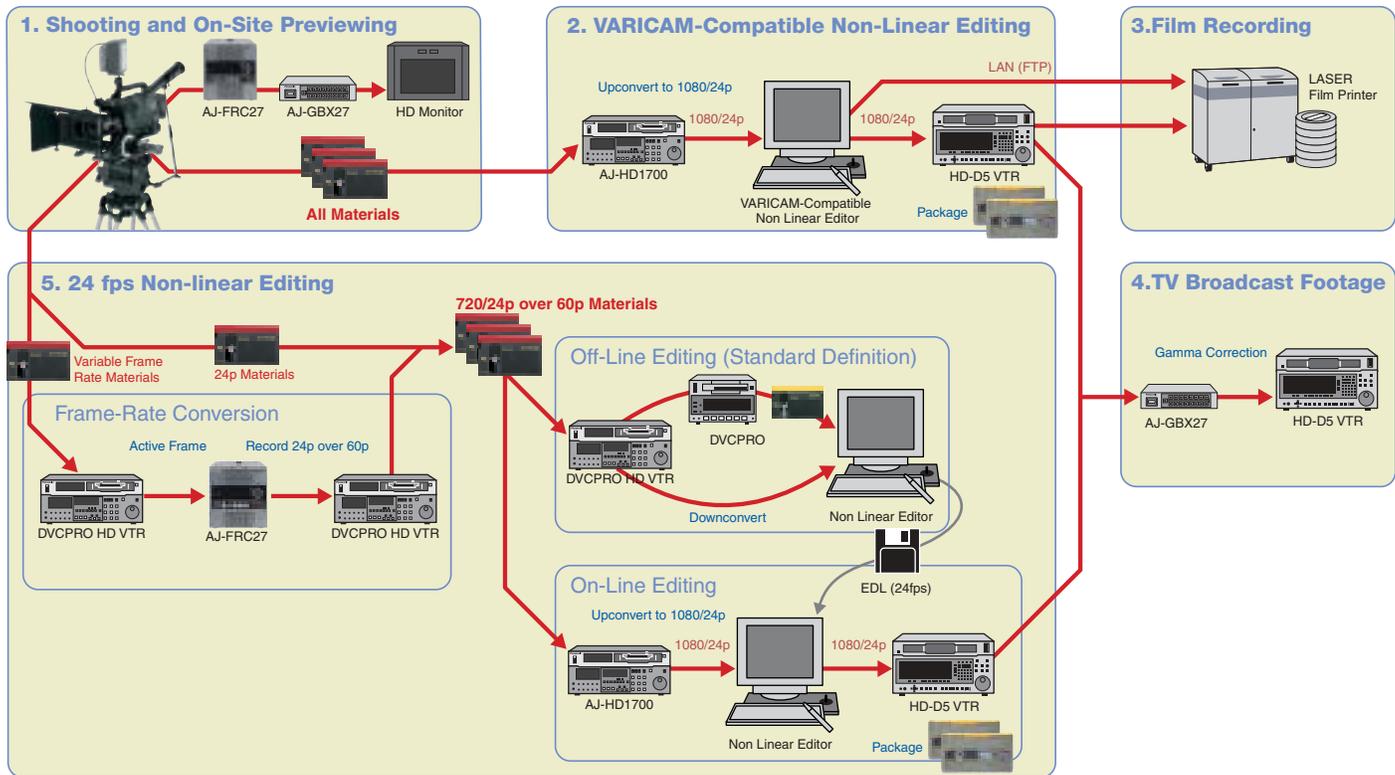
High Speed Shooting (Ex. 40-fps)



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.

VariCam Workflow Exam



1. On-site previewing

Use the AJ-FRC27 Frame Rate Converter to check the results of fast-motion or slow-motion effects right after recording. Combine it with the BT-LH900 HD LCD Monitor (which features gamma correction) or the AJ-GBX27 HD Gamma Corrector, and you can view images with gradation that closely approximates that of the finished images.

2. VARICAM-compatible nonlinear editing

The AJ-FRC27 lets you play VARICAM tapes recorded at 60 fps directly on a DVCPRO HD VTR. Using a VARICAM-compatible nonlinear editing system with an effective frame extraction function, you can directly upload undercranked or overcranked footage for use in 1080/24p or 720/60p (24p over 60p).

*Applicable nonlinear editing systems (as of May 2003): Interactivex Piranha HD, F/X Graphics HD Boxx, Quantel iQ

3. Film recording

By printing onto film using the conversion table, you can produce a gradation that's appropriate for screen projection. The gradation characteristics of F.REC gamma materials are equivalent to digital scanning. Those of V.REC are equivalent to telecine.

4. Conversion to TV broadcast footage

Compared with telecine systems, the AJ-GBX27 HD Gamma Corrector offers a cheaper and easier way to convert movie content into high-quality TV content with a film-like texture.

5. 24 fps non-linear editing systems

First, use off-line editing to convert the frame rate of undercranked or overcranked footage, then down-convert to the SD (480/60i) format. Next, use the EDL from the off-line editing for 1080/24p online editing. The AJ-HD1700 DVCPRO HD VTR lets you play back a 720/24p over 60p source and directly convert it to 1080/24p output.

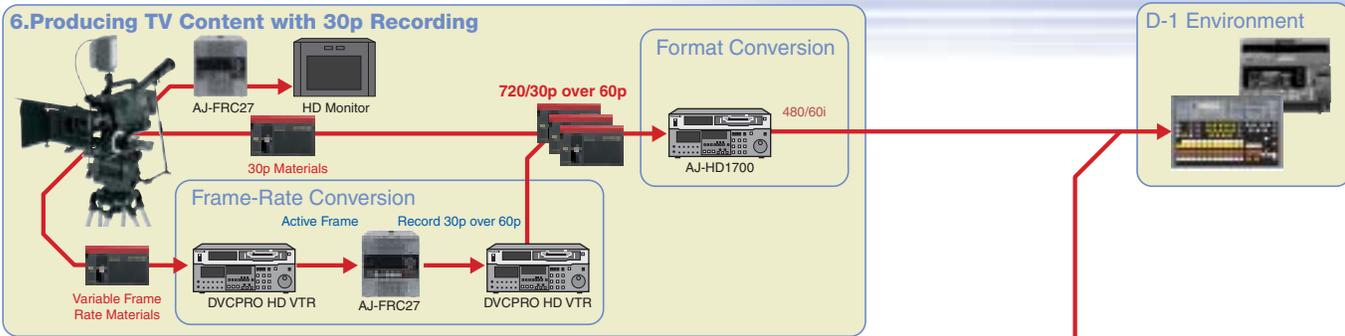


Frame Rate Conversion (Ex. 40-fps)

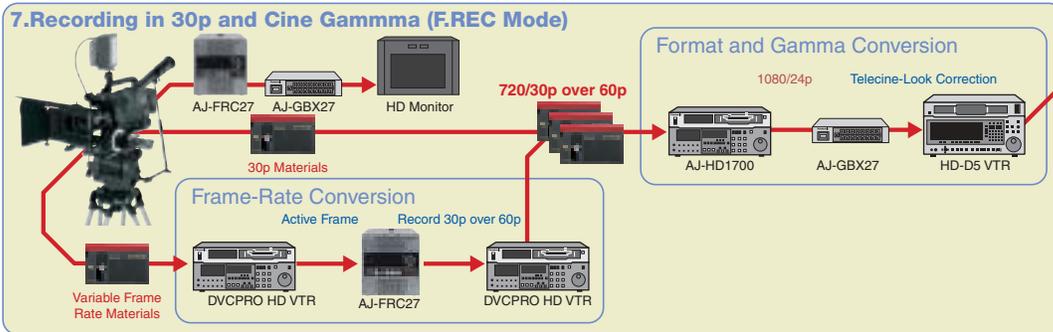
= Active Frame Frag



6. Producing TV Content with 30p Recording



7. Recording in 30p and Cine Gamma (F.REC Mode)



6. Producing TV content with 30p recording

It's even simpler to use 30p and V.REC gamma recording to produce TV (60i) content or commercial footage with a film-like texture. Simply play the recorded source on a DVCPRO HD VTR to down-convert to 480/60i output. The 480/60i output will flow smoothly into a component video environment.

7. Recording in 30p and Cine Gamma (F.REC Mode)

The AJ-GBX27G HD Gamma Corrector smoothly handles footage recorded in F.REC mode, with its distinctive film-like look. It also lets you check images and lighting on the spot with an ordinary HD monitor. Handling everything from format conversion to final production, the AJ-GBX27G gives telecine-look gamma characteristics to raw camera data, allowing you to produce TV content with a film-like texture.



Supporting Cast

AJ-FRC27

Frame Rate Converter

Check Variable Frame Rate Effects On-Site, Line-Convert from 720p to 1080p, and Down-Convert to SD



The AJ-FRC27 converts the frame rates of images recorded using the AJ-HDC27F. 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.

You can select the playback frame rate from 24-, 25- or 60-fps, up-convert to 1080/24psF or 1080/60i, down-convert to SDTV (480/60i), working either on-line or off. If frame rate conversion is not required, you can also directly convert the input signal into EE-through for output.

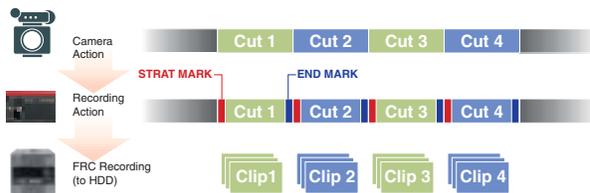
Playback Image Signal

NTSC (59.94p) source: 720xp over 59.94p (x = 24, 25, 30, 60)
1080/23.98psF, 1080/59.94i (23.98p), 480/59.94i

PAL (60p) source: 720xp over 60p (x = 24, 25, 30, 60)
1080/24psF, 1080/25psF, 1080/50i,
1080/60i (24p), 576/50i

Data can be automatically recorded by connecting to the AJ-HDC27F via HD-SDI, and clip files of cuts that you designate by linking to the camera's REC/STOP control can be stored to an HDD for backup. These functions are also supported during studio editing, and the resulting tapes can be played on a DVCPRO HD VTR, making it possible to automatically create a clip of each cut by simple frame rate converter recording. Management of OK/NG cuts is fast and easy.

Auto REC Function (in Recording)



Pre-Roll Image Insertion (in Playback)



During playback, a pre-roll image of up to 10 seconds in length can be automatically inserted and output with a continuous time code. This helps to speed up shooting by letting you use the leading/trailing parts of each cut as editing material, something that was difficult to do in conventional HD cinema production.

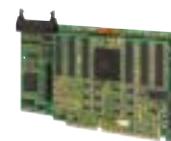
The AJ-FRC27's compact, half-rack size and 5U profile makes it good fit for applications ranging from studio use to EFP or relay use.

AJ-FRC27 Specifications

Power Source:	AC100V±10%, 50/60Hz
Power Consumption:	98W
Operating Temperature/Humidity:	5°C to 35°C/10% to 80%
Dimensions:	210 (W) x 222 (H) x 492 (D)mm
Weight:	15.0 kg
Recording Format:	DVCPRO HD (720/60p)
HDD:	36GB, 68-pin connector
Recording Time:	40 min (at 720/60p), 100 min (at 720/24p)
HD-SDI Input:	BNC x 1 (throughout x 1)
HD-SDI Output:	BNC x 1, with Embedded Audio in EE mode
Monitor Output:	BNC x 1
Remote Input:	RS-422A (D-sub 9P)
Option Board:	AJ-YA27G SD Output Interface Board

AJ-YA27G

SD Output Interface Board



Plugging this board into the AJ-FRC27 lets you convert playback or input HD signals into SD signals and output them (see table below). Select from five aspect ratio conversion modes: Crop, Letterbox, Squeeze, 14:9, and 13:9. You can also choose either wide or standard frequency characteristics settings. The AJ-FRC27 includes an edge emphasis function for outputting SD images, with settings of 0, +1, +1.5, and +2 dB.

Playback or Input HD Images	SD Converted Output Images
720/60p, 1080/24p, 1080/60i	480/60i
1080/25p, 1080/50i	576/50i

AJ-GBX27

HD Gamma Corrector



Use Monitor and Movie Content for TV Production by Giving F.REC Mode Images a Telecine Look

The AJ-GBX27 corrects images recorded in cine gamma (F.REC mode) for converting monitor and content data, and for a variety of other uses. The AJ-GBX27 is extremely easy to use -- simply choose the desired correction mode.

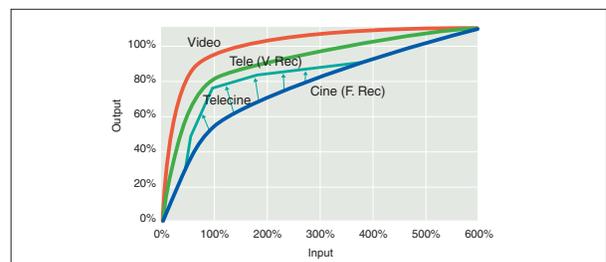
Field mode corrects underexposed and low-contrast F.REC gamma images, and outputs monitor images with full film texture that can be used to check the lighting. There's a setting for ordinary daylight and one for nighttime shooting.

Telecine mode is a post-processing mode that uses movie footage to produce TV content with a film-like texture (a telecine look). This mode preserves the high image quality by correcting intermediate gradation while maintaining highlights and shadows.

The Video Rec and Video modes are simulation modes for converting images with F.REC gamma characteristics to V.REC gamma or video gamma characteristics for comparison.

CG mode is a film production mode that reverse-converts images into F.REC images after they were previously converted to telecine mode and CG-processed for production ease. Also provided is a user mode that lets you install any desired conversion table from a PC.

In addition to 720p (59.94/60 Hz), the AJ-GBX27 is compatible with 1080i (59.94/60/50 Hz) and 1080p (23.97/24 Hz) HD formats.* This makes it ideal for VARICAM recording and for editing, package production, and a host of other applications. The 12-VDC power supply (XLR 4-pin terminal) lets you take the AJ-GBX27 into the field. One HD-DDI input, two HD-DDI outputs, and an analog HD (Y/Pb/Pr) output are provided for convenient monitor connection. Make contacts let you control conversion ON/OFF from a switcher.

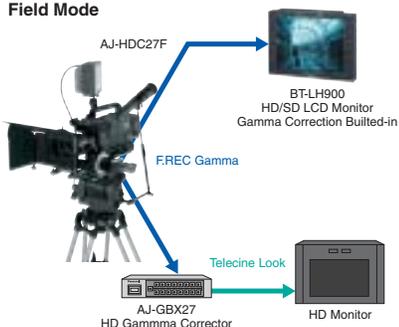


*This is not a format conversion function. It allows input/output of the same format only.

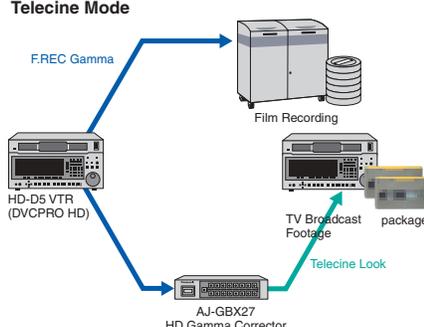
Specifications

Power Source:	DC11 to 17V (EXT DC Input)
Power Consumption:	25W
Dimensions:	213 (W) x 43.5 (H) x 330 (D)mm
Weight:	Approx. 3 kg
Video Format:	720/59.94p, 720/60p, 1080/24psF, 1080/23.97psF, 1080/59.94i, 1080/60i, 1080/50i
Gamma Table:	R.G.B. each x 16 set (preset:12/user:4)
Input:	HD SDI Input (BNC x 1)
Output:	HD SDI Input (BNC x 2)
Analog HD Output:	Y/Pb/Pr (BNC x 3)
Data Input:	RS-232C (D-sub 9P)
Remote:	Control (make-connector)

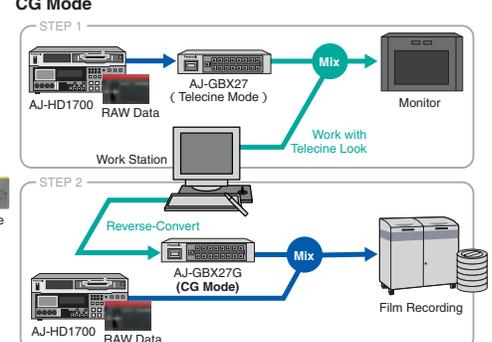
Field Mode



Telecine Mode



CG Mode





AJ-HD1700 Full-Featured Studio VTR

The AJ-HD1700 is a DVCPRO HD high-end studio master VTR that answers today's most advanced needs in high-definition production and broadcasting.

Featuring the new DVCPRO HD-LP format, the AJ-HD1700 records and plays up to 126 minutes with an XL cassette. It can record three types of HD images — 1080/60i, 720/60p, and 1080/50i — and is equipped with eight digital audio channels for 5.1-channel surround sound.

The AJ-HD1700 plays all DVCPRO HD, DVCPRO50, DVCPRO P, DVCPRO, DV, and DVCAM tapes. It has an advanced HD-SD conversion function that provides simultaneous output of HD/SD signals from a wide variety of sources.

The AJ-HD1700 can even output a 1080/24p signal from a 720/24p over 60 VARICAM source tape for convenient editing in 1080/24p such as mastering to D-5 HD on the AJ-HD3700B VTR.

INFO	AJ-HD1700	Plays/Records 720p and 1080i	
	Playback all DV-based formats	2-hour rec. time	
	1080/24p output from Varicam™	8-ch audio	

AJ-HD3700B Multi-Format/Multi-Standard Mastering VTR

The AJ-HD3700B 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-HD3700B 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-HD3700B 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	AJ-HD3700B HD-D5	Plays/Records ATSC formats	
	Supports multiple frame rates	10-bit recording	
	Format Conversion	Metadata	8-Ch audio

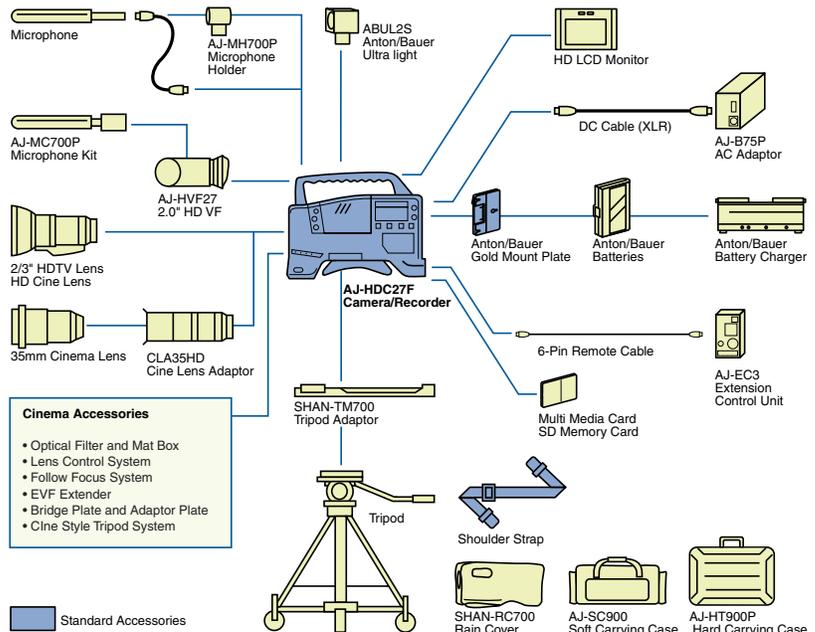


PT-D9610U HD Cinema Projection System

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



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.



AJ-HDC27F Specifications

General		VTR Section-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)
Programmable Gain	-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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