

Panasonic

4K 60p/50p Camcorder with 1.0-type (inch) Sensor

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* The mics shown in product photos are optional.

HC-X1
4K Professional Camcorder

4K
PROFESSIONAL

LEICA
DICOMAR

24
mm
WIDE

Optical
20x
Zoom

1.0-type
BSI

Shift Your Video Production to Professional 4K Images



The 4K Premium Camcorder with Wide-Angle 24mm and Optical 20x Zoom

Panasonic's new 4K camcorder, the HC-X1, features a host of high-end functions and specifications to meet professional 4K video production needs. This model is equipped with a newly designed compact lens featuring a wide 24mm angle and optical 20x zoom as well as an effective 1.0-type (inch) high-sensitivity MOS sensor. Its evolved Optical Image Stabilizer (O.I.S.) and high-speed intelligent AF function are suitable for professional camera work. The HC-X1 supports 4K 24p, UHD 60p/50p, FHD 60p/50p multi-format recording and HD super slow-motion. Two SD memory card slots*1 are provided to enable relay/simultaneous/backup recording for enhanced reliability, and also support UHD/FHD*2 dual codec recording for a more efficient workflow. The HC-X1's control functions, such as the triple manual rings and user buttons, as well as interfaces, such as XLR input and wired remote terminal, are engineered to meet the needs of professional video recording. Offering the same levels of agility and mobility as the conventional HD handheld camcorder, the HC-X1 provides powerful support for high-image-quality 4K video production.

Newly Developed, Industry's Widest Angle 24mm*3 and 20x Optical Zoom Lens



- The 4-Drive Lens System has achieved a wide 24mm angle and 20x optical zoom in the handheld camcorder with 1.0-type (inch) sensor.
- The Optical Image Stabilizer (O.I.S.) with a correction range expanded to approximately 900%*4 enables stable handheld shooting (compared with Panasonic's AG-AC160).
- The Micro Drive Focus Unit offers high-speed auto focus with excellent tracking performance and improved stability in 4K recording.

Effective 1.0-Type (Inch) MOS Sensor for High-Precision, High-Speed 4K 60p/50p Recording



- The effective 1.0-type (inch) MOS (approx. 9.46 megapixels in 4K 24p, and approx. 8.79 megapixels in UHD/FHD) offers an appropriate depth of field and excellent balance between image quality and sensitivity.
- 4K 24p, UHD 60p/50p, FHD 60p/50p multi-format and HD 120-fps(59.94Hz) / 100-fps(50Hz) super slow-motion recording are possible.

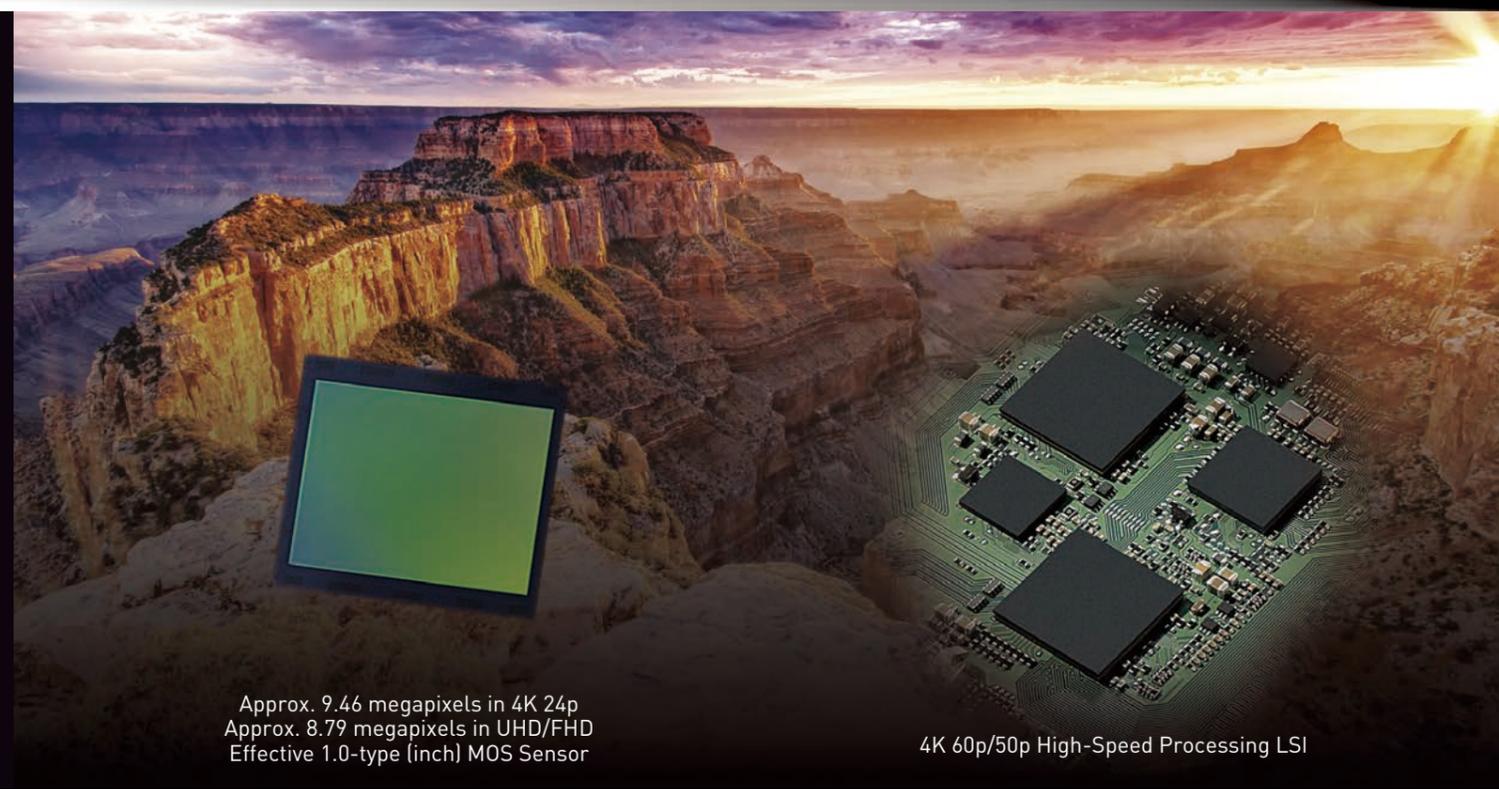
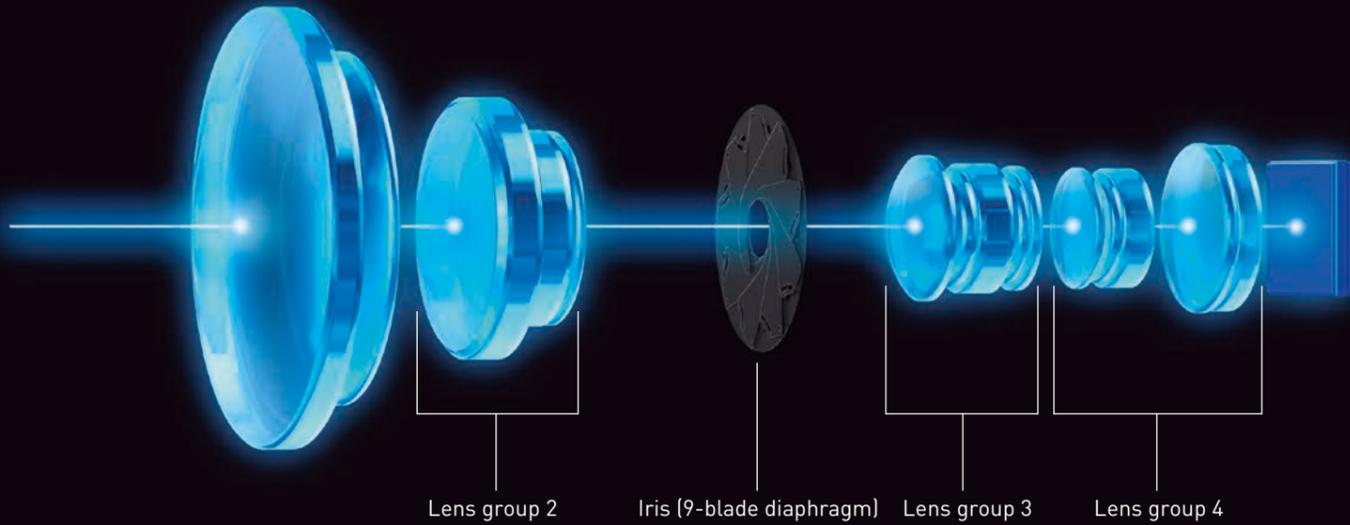
Professional Functions and Design, Including Triple Manual Rings and XLR Audio Input



- The triple manual rings, user buttons and other controls are specially designed to satisfy professional users.
- Equipped with professional interfaces such as XLR input, and wired remote control.

*1 UHS Speed Class 3 (U3) SD memory card is required for a video recording mode of 100 Mbps or higher. *2 For information of available codecs, please see page 09. *3 Equivalent to 35mm under 4K 24p (aspect ratio of 17:9). Wide angle 24mm is the widest in the industry for a camcorder with integrated lens. [As of July 2016, according to Panasonic survey.] *4 Except 4K 24p mode. * With regard to "24p" and "60p" other than that included in "4K 24p" in the text, images are actually recorded at 23.98p and 59.94p, respectively.

Wide-Angle 24mm + Optical 20x Zoom LEICA DICOMAR Lens with 1.0-type (inch) MOS Sensor



Approx. 9.46 megapixels in 4K 24p
 Approx. 8.79 megapixels in UHD/FHD
 Effective 1.0-type (inch) MOS Sensor

4K 60p/50p High-Speed Processing LSI

4-Drive Lens System

The 4-Drive Lens System simultaneously and independently drives 4 lens groups (group 2, iris, group 3, group 4). The lens size and drive range for each of the 4 groups can be efficiently suppressed to optimize image quality, zoom power, and achieve compact body.

Industry's Widest Angle of 24 mm*1 at the Wide-Angle Setting

The integrated lens boasts the industry's widest angle of 24 mm at the wide-angle setting. It enables wide-angle shooting with little distortion, without the use of a wide conversion lens and also allows video recording/production in narrow spaces.

*1 35 mm film equivalent. Varies depending on the video recording format. 4K/24p: 24.0 mm (17:9 aspect ratio), UHD/FHD: 25.4 mm (16:9 aspect ratio).



An image shot on the aircraft using the wide angle.

World's First*2 Optical 20x Zoom in a Camcorder with 1.0-type (inch) Sensor

The optical 20x zoom lens covers the range from 24mm wide-angle to 480mm telescopic (35mm film equivalent at 4K 24p). The lens can zoom from wide-angle to telescopic very quickly.

*2 World's first for a camcorder with integrated lens having a 1.0-type (inch) or larger sensor. (As of July 2016, according to Panasonic survey.)



Intelligent Zoom for Maximum 30x Zoom in Super-High Resolution

In FHD shooting modes, the Intelligent Zoom function increases the zooming capability to a maximum of approximately 30x, while maintaining high resolution. When it reaches to 20x optical zoom limit, it seamlessly switches to Intelligent Zoom.

Digital Zoom (2x, 5x or 10x)

The HC-X1 is equipped with 2x, 5x and 10x digital zoom. Using the 20x optical zoom and Intelligent Zoom together, it gives you super-telephoto magnification equivalent to a 300x zoom without dropping the light intensity.

* The larger the digital zoom magnification, the more the image quality is degraded.

High-Image-Quality, High-Sensitivity 1.0-type (inch) 4K Sensor

An effective 1.0-type (inch) MOS sensor (approx. 9.46 megapixels in 4K 24p, approx. 8.79 megapixels in UHD/FHD) provides an appropriate depth of field and excellent balance between image quality and sensitivity. Images can also be recorded with a resolution of 4K (4096 x 2160)/24p, UHD(3840 x 2160)/60p/50p or FHD (1920 x 1080)/60p/50p.



LEICA DICOMAR Lens

This high-performance lens has passed the stringent quality standards of Leica Camera AG. A multi-coating process minimizes ghosts and flaring, resulting in especially clear images.

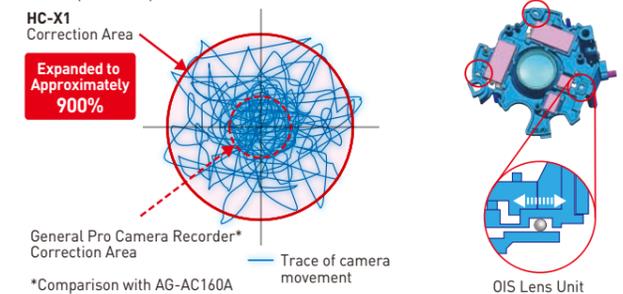
* Leica is a registered trademark of Leica Microsystems IR GmbH.
 * DICOMAR is a registered trademark of Leica Camera AG.
 * LEICA DICOMAR products are manufactured using Leica-certified measuring instruments and quality assurance systems based on rigorous quality standards approved by Leica Camera AG.



Advanced Optical Image Stabilizer [4K/UHD/FHD]

The correction area of the Optical Image Stabilizer (O.I.S.) has been expanded to approximately 900%* over the conventional area (as compared to the Panasonic AG-AC160). This provides powerful correction even in unstable shooting situations, such as low-angle or high-angle shots. The ball OIS system reduces wear on the drive section, and greatly improves correction for small-amplitude hand-shake.

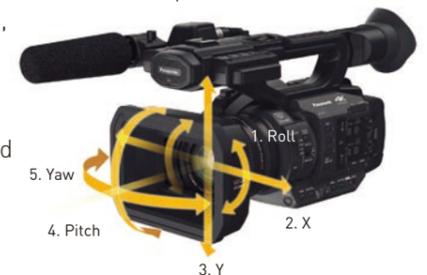
* Except 4K 24p mode.



*Comparison with AG-AC160A

5-Axis HYBRID O.I.S. + [FHD]

In HD shooting modes, by using hand-shake correction that combines the effects of both optical and electronic image stabilization, hand-shake in various directions, including the roll rotation, is detected and corrected.

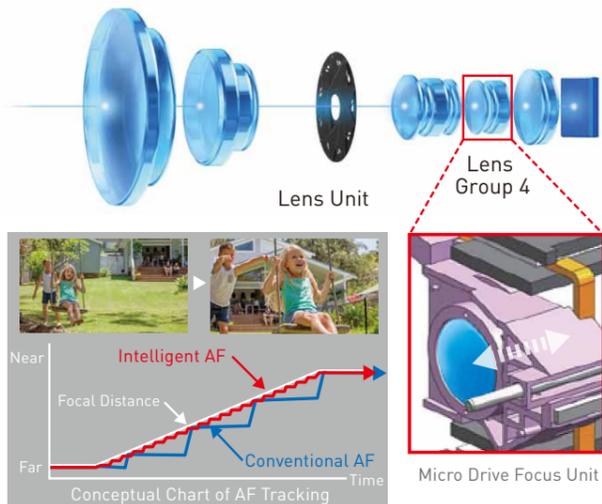


High-Speed, High-Precision Intelligent AF and Comprehensive Manual Focus Assist



Intelligent Auto Focus Offering High Speed, Excellent Tracking Performance and Stability

By moving the Micro Drive Focus Unit minutely and quickly, highly precise AF performance is also achieved when shooting in 4K or shooting with a shallow depth of field.



- **Top-level* focusing speed in 4K:** Even when a subject suddenly enters the frame, it is instantly focused.
- **Top-level* tracking performance in 4K:** The subject's movement is also tracked.
- **Top-level* stability in 4K:** The subject stays in focus even when there are some obstacles passing through.

* As a camcorder with integrated lens having a 1.0-type (inch) sensor. [As of July 2016, according to Panasonic survey.]

Custom AF Function for Adjustment of AF Speed, Tracking Sensitivity and Area Settings

Auto focus operation can be customized by adjusting the AF Speed, AF Sensitivity and AF Area Width. This function enables the AF to operate exactly as intended by the user in accordance with the subject type or application.

- **AF Speed:** AF speed can be set in seven steps from one to seven. The larger the figure, the faster the AF.
- **AF Sensitivity:** AF sensitivity can be set in ten steps from one to ten. The larger the figure, the easier it is to track fast-moving subjects.
- **AF Area Width:** The width of the area in which AF is effective can be adjusted.



Auto Focus Speed Setting



Auto Focus Area Width Adjustment

Focus Assist (Expand and Peaking)

When the Focus Assist button is pressed, Expand (enlargement)* or Peaking (colored emphasis of focus point) is displayed to assist the user's manual focusing operation. Expand and Peaking can also be displayed simultaneously.

* The part to be expanded is designated by touching the screen.



Expand and Peaking

One-Push AF

This function temporarily activates Auto Focus when shooting in Manual Focus mode, using a "PUSH AUTO" button.



PUSH AUTO Button

Manual Focus Assist

Focus is automatically optimized after you adjust it with the focus ring in Manual Focus mode. This enables quick and accurate focusing.

* Not operable in combination with VFR or wired remote controller (commercially available).

Focus Transition

Up to three focus positions can be preset. The focus can be shifted to a preset focus position (focal distance) with a single touch. The user can set the focus transition time (immediate, 2 to 15 sec, 20 sec, 30 sec, 45 sec, 60 sec, 90 sec) and the wait time until the start of focus transition (0 sec, 5 sec, 10 sec).



Focusing Transition

Area Function

Auto Focus is easily possible with just a touch on the LCD panel. You can also change this to Auto Iris and Brightness Display on the screen.



Area Function



Versatile Recording Functions for Professional Needs



VFR (2 to 60 fps)*1/Super-Slow Motion (120/100 fps)

- **FHD VFR (variable frame rate) Recording:** VFR (variable frame rate) recording can be set in ten steps*2 from 2 to 60 fps.
- **Super-Slow Motion:** Slow-motion effect can be achieved by high-speed HD recording at 120 fps (59.94 Hz) or 100 fps (50 Hz).

*1 When the system frequency rate is set to 59.94 Hz
*2 At 1080/23.98p



Super Slow

VFR

Recording Mode	System Frequency		
	59.94Hz	50.00Hz	
	1080/29.97p [30]	1080/23.98p [24]	1080/25p [25]
	2 [0.07x]	2 [0.08x]	2 [0.08x]
	15 [0.5x]	12 [0.5x]	12 [0.48x]
	26 [0.87x]	20 [0.83x]	21 [0.84x]
	28 [0.93x]	22 [0.92x]	23 [0.92x]
	30 [1x]	24 [1x]	25 [1x]
	32 [1.07x]	26 [1.08x]	27 [1.08x]
	34 [1.13x]	28 [1.17x]	30 [1.2x]
	45 [1.5x]	36 [1.5x]	37 [1.48x]
	60 [2x]	48 [2x]	50 [2x]
		60 [2.5x]	

Super Slow

Recording Mode	System Frequency		
	59.94Hz	50.00Hz	
	1080/29.97p [30]	1080/23.98p [24]	1080/25p [25]
Super Slow fps	120 [4x]	120 [5x]	100 [4x]

IR (Infrared) Shooting in Dark Places

The IR Cut Filter can be turned ON/OFF (allocated on the User button). When the filter is turned OFF, commercially available IR lights*1 can be used for shooting in dark places.

*1 Waveform length of 850 nm is recommended.

* When the IR Cut Filter is ON, the shutter and aperture are fixed at OFF and AUTO, respectively.



Infrared Shooting Function

* Image captured from actual footage shot on HC-X1 and graded for printing.

4K/UHD/FHD/SD Multi-Format Recording

Versatile and easy-to-use MOV (QuickTime), MP4 and AVCHD file formats are supported. The variety of recording modes with selectable image quality, frame rate and bit rate settings respond to a wide range of applications, from cinema production to online distribution.

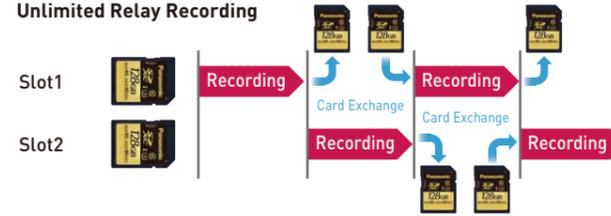
	Recording Size	Frame Rate	Bit Rate	Compression	Sound	File Format	
4K/UHD	4096x2160	24.00p	100Mbps	LongGOP	LPCM	MOV or MP4	
	3840x2160	59.94p/50.00p	150Mbps				
		29.97p/25.00p/23.98p	100Mbps				
HIGH BITRATE FHD	1920x1080	59.94p/50.00p	200Mbps	ALL-Intra	LPCM	MOV or MP4	
		29.97p/25.00p/23.98p	200Mbps	LongGOP			
		59.94p/50.00p/29.97p/25.00p/23.98p	50Mbps				
AVCHD	1920x1080	59.94p/50.00p	25Mbps	LongGOP	AC3	AVCHD	
		59.94i/50.00i/23.98p	21Mbps				
		59.94i/50.00i	17Mbps				
	1440x1080	59.94i/50.00i	5Mbps				
		1280x720	59.94p/50.00p				8Mbps
		720x480	59.94i [16:9/4:3]				9Mbps
	720x576	50.00i [16:9/4:3]					

Dual SD Memory Card Slots

Two SD card slots are provided. This enables unlimited* relay recording by simply changing SD cards, and also allows simultaneous recording and background recording for ensuring high recording reliability.

* The maximum amount of data that can be recorded over multiple SD cards is 96 GB. Recording will not stop even when the data size exceeds 96 GB.

Unlimited Relay Recording



The recording media switches automatically and seamlessly from Slot 1 to Slot 2. By changing a full SD card with a new SD card, images can be recorded continuously for many hours.

Simultaneous Recording



Identical data is recorded onto cards in both slots in this redundant recording mode.

Background Recording



One SD card can be set in Slot 2 to record continuously, and another SD card can be set in Slot 1 to record necessary scenes by turning REC on and off.

UHD/FHD Dual Codec Recording

This function records images simultaneously into two different formats, Main and Sub (see the following table). Sub-recording files can be used for preview, off-line editing and online transmission. FHD (8 Mbps) sub-recording files can be transmitted via mobile networks so editing work can be performed before the delivery of the main recording files, thus improving the workflow efficiency.



Dual Codec Recording (when FHD 50 Mbps mode)

	File Format	Recording Mode
Main-Recording Side	MOV/MP4	UHD 29.97p/25p/23.98p 100Mbps
Sub-Recording Side	MOV/MP4*	FHD 29.97p/25p/23.98p 50Mbps

* Same file format selected in the main-recording side.

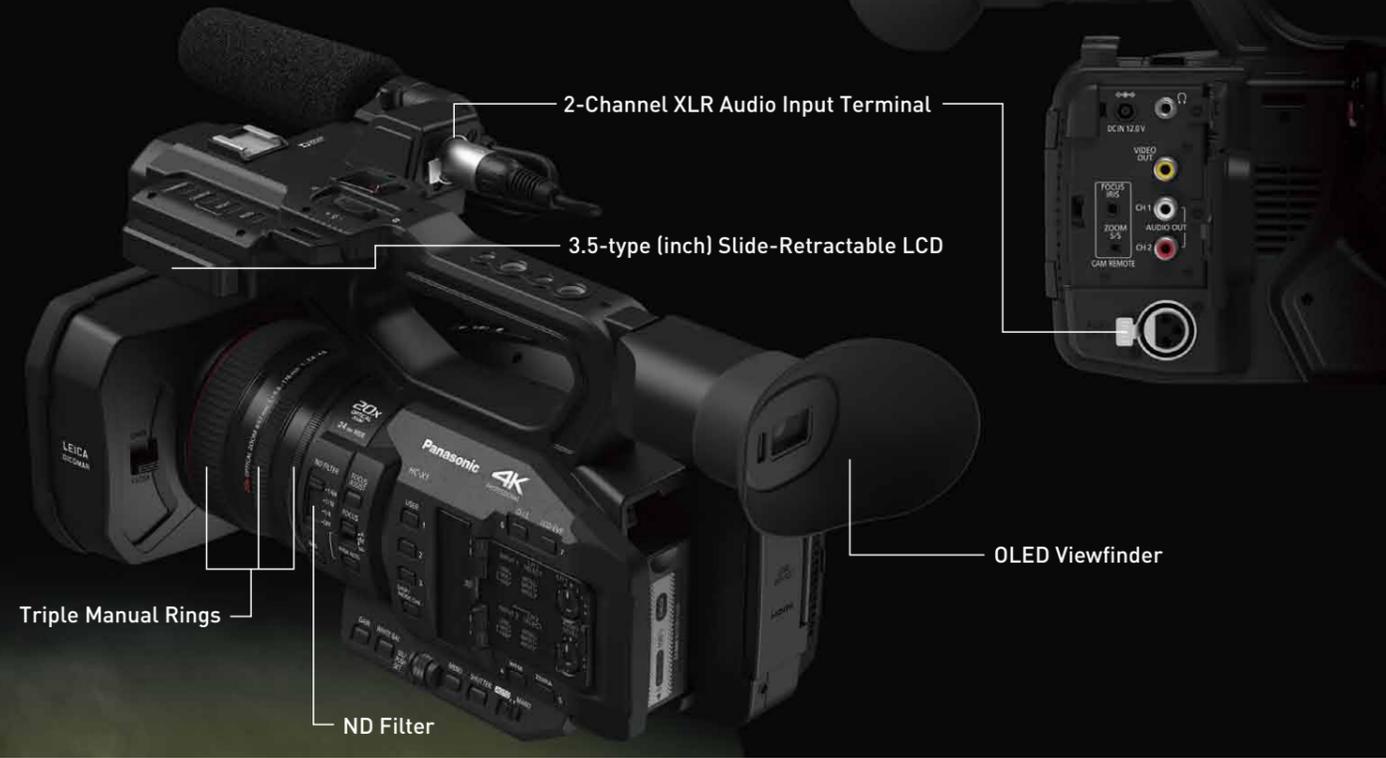
Dual Codec Recording (when FHD 8 Mbps mode)

	File Format	Recording Mode
Main-Recording Side	MOV/MP4	UHD 29.97p/25p/23.98p 100 Mbps FHD 59.94p/50p/29.97p/25p/23.98p 200Mbps FHD 59.94p/50p 100Mbps
Sub-Recording Side	MOV	FHD 59.94p/50p/29.97p/25p/23.98p 8Mbps

Other Recording Functions

- **Pre Rec:** This function constantly caches approximately 4 seconds of video and audio data in MOV/MP4 format, or approximately 3 seconds in AVCHD format, prior to Rec Start, so the data can be recovered in case there is a delay in pressing Rec Start.
- **Interval Rec:** Records intermittently based on a set interval time of 1 sec, 10 sec, 1 minute or 2 minutes.
- **Freeze Frame:** Images can be recorded as still images together with audio. This function is convenient when moving the camera to a different location or when shooting a different scene.
- **Time Stamp:** The date and time can be stamped onto recorded images.

Professional Camera Image Adjustment Functions



Triple Manual Rings

The HC-X1 features three manual rings for Zoom, Focus and Iris control. These manual controls offer the professional operation.



2-Channel XLR Audio Input Terminal

Equipped with two channels of XLR audio input (with switchable 48-V phantom power supply, MIC and LINE) and manual audio volume. This enables recording of two high-quality audio channels using either the 16-bit linear PCM system (MOV/MP4) or Dolby Digital system (AVCHD). Other professional features include the OSD level meter, 1-kHz test tone output* and headphone output (3.5-mm-diameter stereo mini-jack).

* This output is produced when the color bar is displayed. When the 50-Hz system frequency is selected, the output is 997 Hz.



High-Resolution OLED EVF

The viewfinder features a high-resolution OLED display (approximately 1,769,000 dots) for excellent color reproduction.



Sliding 3.5-type (inch) Touch-Panel LCD

The 3.5-type (inch) LCD monitor built into the handle section can be pulled out and turned 270 degrees in the vertical direction for use in high-angle, low-angle or selfie shots. The touch panel function can be used for menu setting and area functions.



ND Filters, Gain, White Balance

- **ND Filters:** OFF, 1/4, 1/16, 1/64 ND filters built-in.
- **Gain Selector:** Negative gain is added. Select from -3 dB to 24 dB gain for three-position (L/M/H) allocation.
- **AWB Selector:** Two-value (A/B) memory and presets (3200/5600/VAR) can be selected.
- **ATW (auto-tracking white balance) function**

Slow Shutter Speed



ND Filter 1/64

High-resolution Image



ND Filter 1/16, F2.8

User Buttons

44 functions can be allocated to the User Buttons. There are a total of 13 User Buttons: Nine on the HC-X1 body, and four on the LCD Touch Panel. The AWB button can also be used as a User Button.

LCD/EVF Displays That Assist Shooting

- **Waveform and Vectorscope Display:** WAVE (Waveform) and VECTOR (Vectorscope) can be easily displayed on a subscreen of the LCD monitor. The subscreen display position can be set to any of the four corners.
- **ZEBRA:** Two zebra patterns are built in. The level can be changed from 50% to 105% in 5% steps.
- **Marker (Y Level):** The brightness level in the center of the image is displayed in percentage.
- **Level Gauge:** Horizontal or vertical tilting of the camcorder can be checked on the LCD and viewfinder.
- **A Safety Zone Marker and Center Marker can be displayed.**



WAVE (Waveform)



ZEBRA



Marker



Safety Zone Marker Center Marker Level Gauge

Camera Image Adjustment Functions of Broadcast Grade, such as 16-Axis Color Correction

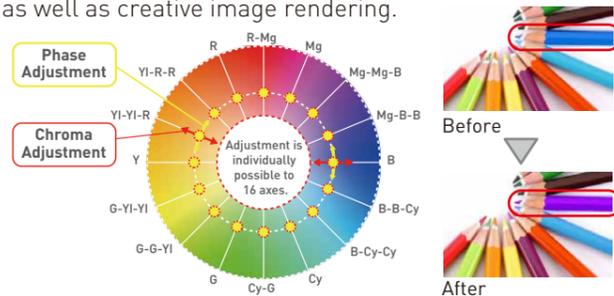
Equipped with Professional Interfaces for Smooth System Operation



* Operation check models: ATOMOS and SHOGUN.

16-Axis Independent Color Correction Function

This function provides an independent effect to each of the 16 phases of video images. It enables color matching of multiple cameras under the same lighting conditions as well as creative image rendering.



Soft Skin

Makes skin colors appear softly and beautifully. Especially effective when recording the person up close.



Master Detail

Adjusts the overall degree of contour enhancement.



Weak

Strong

8-Mode Gamma

The HC-X1 is equipped with eight selectable gamma modes, including two Cine-Like Gammas, drawing on technologies developed for the VariCam.

HD	Gamma setting suitable for HD (High Definition).
SD	Increased gain in darker areas more than HD (High Definition).
FILMLIKE 1	Reproduces more highlight areas compared to HD.
FILMLIKE 2	Reproduces more highlight areas compared to FILMLIKE 1.
FILMLIKE 3	Reproduces more highlight areas compared to FILMLIKE 2.
CINE-LIKE D	Gamma setting designed to create cinema-like images.
CINE-LIKE V	Gamma setting designed to create cinema-like images with enhanced contrast.
STILL-LIKE	Gamma setting to simulate images captured with still cameras.

Scene Files

Six files preset with picture quality settings are provided as Scene Files (Standard, Shooting under fluorescent lights, Spark, STILL-LIKE, CINE-LIKE contrast, and CINE-LIKE dynamic range). You can change any of the settings as desired and store one set as a Custom File in the HC-X1, and up to eight sets on an SD memory card.

Scene File Setting Items

- Synchro Scan • Master Detail • Detail Coring • Soft Skin
- V Detail Level • RB Gain Control Setting • Chroma Level
- Chroma Phase • Matrix • Color Correction Setting
- Master Pedestal • Gamma Mode • Black Gamma • Knee Mode
- Knee Master Point • Knee Master Slope • DRS • DRS Effect
- Auto Iris Level • Auto Iris Level Effect • NR Control

Other Professional Picture Quality Settings

- Selectable matrix tables including CINE-LIKE mode
- V detail, detail coring
- Chroma level, chroma phase, color temperature, master pedestal
- Knee point setting

Wireless Remote Control from an iPad

The AG ROP for iPad*1 is available free of charge from the Apple App Store. It enables wireless remote control of the HC-X1, with installation of a wireless module (optional AJ-WM50/AJ-WM30).

In addition to a multitude of control functions, such as camera settings, picture quality adjustment, REC start/stop and menu setting, the AG ROP allows control of the HC-X1's internal lens for remote operation of the Intelligent Zoom, zoom and focus.

It also displays a thumbnail view and preview*2, so recorded clips can be checked on an iPad.

*1 iOS 7.1, iOS 8.1, and iOS 9 are supported.

*2 Only sub-recording (8 Mbps) of dual codec recording is supported with preview.

• App Store is a service mark of Apple Inc. Apple, the Apple logo, and iPad are trademarks of Apple Inc., registered in the U.S. and other countries.



HDMI Output and Video/Audio Output

- HDMI OUT: Outputs images up to 4K 24p and UHD 60p/50p.*
- VIDEO/AUDIO OUT: Outputs analog signals for video and audio monitoring.

* Images output during UHD 60p/50p recording are FHD.

Wired Remote

Equipped with a REMOTE terminal for remote operation of iris, focus, zoom and REC start/stop.

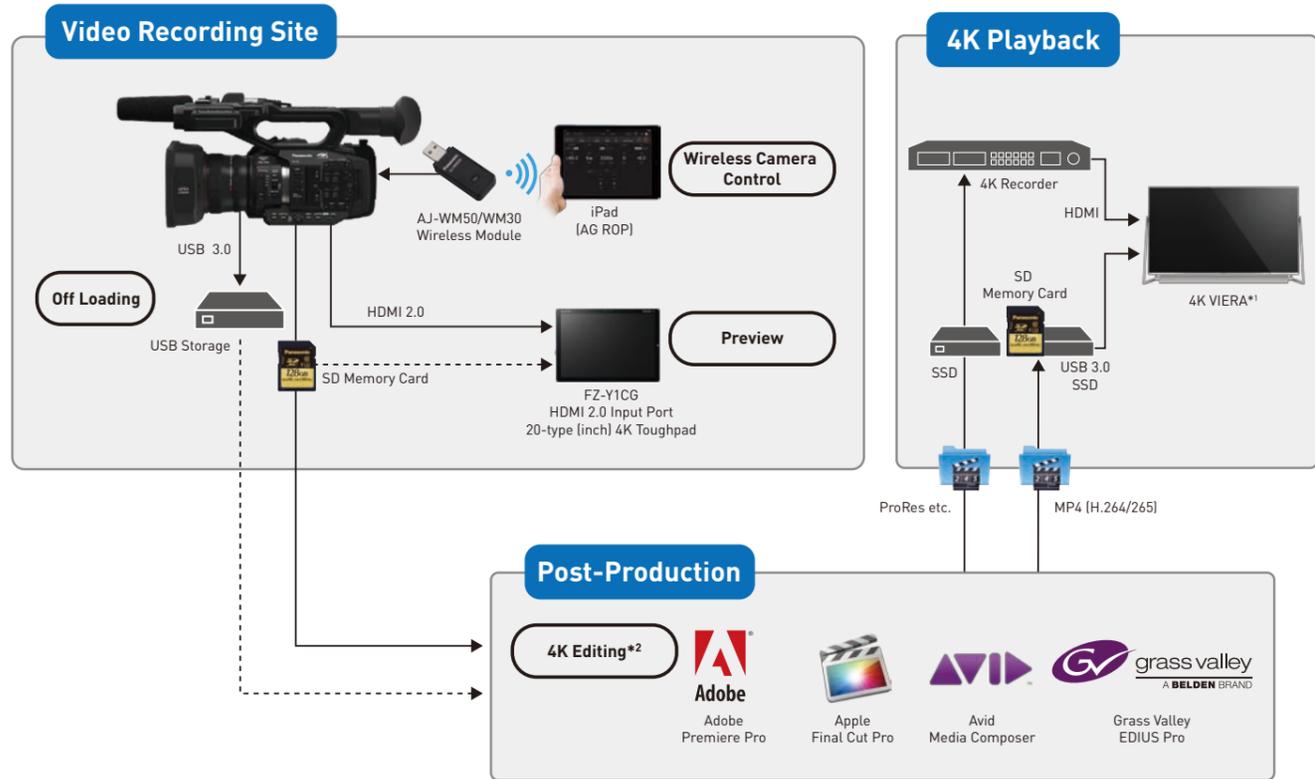
* A wired remote controller (commercially available) is required.

Large-Capacity Battery Options

The HC-X1 is compatible with the new, large-capacity AG-VBR118G, AG-VBR89G and AG-VBR59 battery packs. Using the enclosed AG-BRD50 battery charger, these batteries can be quick-charged in about half the conventional time.



4K Workflow Example



*1 As for the model supporting 4K video playback.
 *2 It is equipment and software that schedules confirming the operation.

Optional Accessories

High Capacity Battery Pack		Battery Charger	
AG-VBR118G (11,800 mAh)	AG-VBR89G (included with HC-X1) (8,850 mAh)	AG-VBR59 (5,900 mAh)	VW-VBD58 (5,800 mAh)
		AG-BRD50 (included with HC-X1) Quick-charge for the AG-VBR118G/89G/59 	AG-B23
XLR Microphone	LED Video Light	Wireless LAN Module	SD Memory Card
AG-MC200G 	VW-LED1 	AJ-WM30* 	AJ-WM50*
			RP-SDUD128AK
			RP-SDUD64GAK
			* An SD memory card with a capacity of UHS Speed Class 3 (U3) is required to shoot videos with a bit rate of 100 Mbps or higher. An SDXC memory card with a capacity of 64 GB or more and UHS Speed Class 3 (U3) is required to shoot UHD 2160/59.94p/50.00p videos with a bit rate of 150 Mbps or higher.

Specifications

SENSOR SECTION	
Image Sensor	1-type (inch) MOS Sensor
Effective Pixels	UHD/FHD 59.94p/29.97p/23.98p : 8.79 megapixels 4K 24.00p : 9.46 megapixels
LENS SECTION	
F Value	F2.8 — F4.5
Optical Zoom	20x
Focal Length	8.8 — 176 mm
35 mm Film Camera Equivalent	25.4 — 508.0 mm [UHD/FHD 59.94p/29.97p/23.98p], 24.0 — 480.0 mm [4K24.00p]
Filter Diameter	67 mm
Lens Brand	Leica Dicomar Lens
CAMERA SECTION	
Minimum Illumination	0.2 lx (F2.8, Gain 18dB, Manual Slow Shutter 1/2, HIGH SENS mode)
Focus	Auto / Manual
Zoom	Intelligent Zoom OFF: 20x Intelligent Zoom ON: 30x Digital Zoom: 2x / 5x / 10x
ND Filter	1/4, 1/16, 1/64, OFF
IR Filter	Incorporates the ON/OFF control function
White Balance	Auto / ATW LOCK / 3200K / 5600K / VAR (2000K—15000K) / Ach Fixed / Bch Fixed
Shutter Speed	59.94 Hz mode 60i/60p: 1/60, 1/100, 1/120, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 sec 30p: 1/30, 1/60, 1/100, 1/120, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 sec 24p: 1/24, 1/48, 1/60, 1/100, 1/120, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 sec 50.00 Hz mode 50i/50p: 1/50, 1/60, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 sec 25p: 1/25, 1/50, 1/60, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/750, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/8000 sec
Slow Shutter Speed	59.94 Hz mode 60i/60p: 1/2, 1/4, 1/8, 1/15, 1/30 sec 30p: 1/2, 1/4, 1/8, 1/15 sec 24p: 1/2, 1/3, 1/6, 1/12 sec 50.00 Hz mode 50i/50p: 1/2, 1/3, 1/6, 1/12, 1/25 sec 25p: 1/2, 1/3, 1/6, 1/12 sec
Synchro Scan	59.94 Hz mode 59.94i/59.94p: 1/60.0 — 1/249.7 sec 29.97p: 1/30.0 — 1/249.7 sec 23.98p: 1/24.0 — 1/249.6 sec, 24.00p: 1/24.0 — 1/249.9 sec 50.00 Hz mode 50i/50p: 1/50.0 — 1/250.0 sec 25p: 1/25.0 — 1/250.0 sec
VFR Recording Frame Rate	59.94 Hz mode 30p: 2, 15, 26, 28, 30, 32, 34, 45, 60 fps 24p: 2, 12, 20, 22, 24, 26, 28, 36, 48, 60 fps 50.00 Hz mode 25p: 2, 12, 21, 23, 25, 27, 30, 37, 50 fps
Sensitivity	HIGH SENS mode F11 (2,000 lx, 3,200 K, 89.9% reflect, 1080/59.94i) / F12 (2,000 lx, 3,200 K, 89.9% reflect, 1080/50i) NORMAL mode F8 (2,000 lx, 3,200 K, 89.9% reflect, 1080/59.94i) / F9 (2,000 lx, 3,200 K, 89.9% reflect, 1080/50i)
Iris	Auto / Manual
Image Stabilizer	4K24.00p / UHD: Optical image stabilizer FHD or lower: 5-Axis Hybrid Image Stabilizer
RECORDING SECTION	
Recording Media	SDHC/SDXC Memory Card
Recording Format	MOV, MP4, AVCHD
Video Compression Method	MPEG-4 AVC/H.264 High Profile (MOV/MP4/AVCHD)
Audio Compression Method	MOV / MP4: LPCM (2ch) AVCHD: Dolby Digital (2ch)
System Frequency	59.94Hz / 50.00Hz
Recording/Playback Mode	MP4 / MOV
	4K 4096x2160 24.00p 100M: Average 100Mbps (VBR) UHD 3840x2160 59.94p/50.00p 150M: Average 150Mbps (VBR) UHD 3840x2160 29.97p/25.00p/23.98p 100M: Average 100Mbps (VBR) FHD 1920x1080 59.94p/50.00p/ 29.97p/25.00p/23.98p 200M (ALL-Intra): Average 200Mbps (VBR) FHD 1920x1080 59.94p/50.00p 100M: Average 100Mbps (VBR) FHD 1920x1080 59.94p/50.00p/ 29.97p/25.00p/23.98p/59.94i/50.00i: 50M: Average 50Mbps (VBR) AVCHD PS 1920x1080 59.94p/50.00p: Average 25Mbps (VBR) PH 1920x1080 59.94i/50.00i/23.98p: Average 21Mbps (VBR) HA 1920x1080 59.94i/50.00i: Average 17Mbps (VBR) HE 1440x1080 59.94i/50.00i: Average 5Mbps (VBR) PM 1280x720 59.94p/50.00p: Average 8Mbps (VBR) SA 720x480/720x576 59.94i/50.00i (SIDE CROP/LETTERBOX/SQUEEZE): Average 9Mbps (VBR)

STILL IMAGE SECTION	
Recording Format	JPEG (DCF/Exif2.2)
Recording Image Size	[17.9] 8.8megapixels (4096 x 2160) [16.9] 8.3megapixels (3840 x 2160), 2.1 megapixels (1920 x 1080), 0.9 megapixels (1280 x 720)
GENERAL SECTION	
Power Supply	7.28V (Battery) / 12V (AC Adaptor)
Power Consumption	19.7W (LCD Monitor)
Dimensions (W x H x D)	Approx. 173 x 195 x 346 mm (6.81 x 7.68 x 13.6 inch)
Weight (w/o Battery and SD Card)	Approx. 2000g (4.41 lb)
LCD Monitor	8.88 cm (3.5-inch) Wide LCD monitor (1,152,000 dots) (For Europe) 3.5-inch Wide LCD monitor (1,152,000 dots) (For North America / Asia)
Viewfinder	0.99 cm (0.39-inch) OLED (1,769,000 dots) (For Europe) 0.39-inch OLED (1,769,000 dots) (For North America / Asia)
Manual Ring	Focus / Zoom / Iris
Accessory Shoe	Yes
INTERFACE SECTION	
Video	VIDEO OUT: Video OUT x 1 HDMI: Type A x 1 (Not compatible with VIERA Link) Output format: 2160/59.94p/50.00p/29.97p/25.00p/24.00p/23.98p, 1080/59.94p/50.00p/29.97p/25.00p/24.00p/23.98p/59.94i/50.00i, 720/59.94p/50.00p, 480/59.94p, 576/50.00p
Audio Input	Built-in Microphone: Stereo microphone XLR Input: XLR (3 pins) x 2 Input high impedance, LINE/MIC/MIC+48 V (switchable SW) LINE: +4dBu/0dBu (switchable menu) MIC: -40dBu/-50dBu/-60dBu (switchable menu)
Audio Output	HDMI: 2 ch (LPCM) Audio OUT: Audio OUT x 2 Headphone: 3.5 mm diameter stereo mini jack x 1 Speaker: 20 mm diameter, round x 1
Other Input/Output	Camera Remote: 2.5mm super mini jack x 1 (ZOOM S/S) 3.5mm mini jack x 1 (FOCUS/IRIS) USB 3.0 HOST: Standard-A connector, 9-pin, for external media device connection,* bus power supply * External media device with a capacity of 32 GB or below or a capacity above 2 TB cannot be used. USB 3.0 DEVICE: Micro-B connector, 10-pin, mass storage function (read only) DC IN: DC 12V (11.4V — 12.6V) EIAJ Type4
STANDARD ACCESSORY	
AC Adaptor	Yes
AC Cable	Yes
Rechargeable Battery Pack	Yes (5,900mAh)
Battery Charger	Yes
Microphone Holder	Yes
Microphone Holder Screws	Yes
Input Terminal Cap	Yes
Eye Cup	Yes
Lens Hood	Yes

• Weight and dimensions shown are approximate. • Design, functions, and specifications are subject to change without notice. • All monitor and TV pictures are simulated. • 1 GB = 1 billion bytes. Usable capacity will be less. • You are not allowed to reproduce (copy), or transfer to a network, any part of the software applications supplied with this product for commercial purposes without written authorization. • Panasonic will in no way be liable for any damages sustained directly or indirectly from the use of this product or from any trouble occurring therein. • Panasonic will also in no way be liable for any losses of data caused by this product. • SDXC Logo is a trademark. • SDHC Logo is a trademark. • SD Logo is a trademark. • Leica is a registered trademark of Leica Microsystems IR GmbH. • Dicomar is a registered trademark of Leica Camera AG. • The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing, LLC in the United States and other countries. • Adobe, the Adobe logo and Adobe Premiere are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries. • Apple, the Apple logo, and Final Cut Pro are trademarks of Apple Inc., registered in the U.S. and other countries. • Avid is a trademark or registered trademark of Avid Technology, Inc. or its subsidiaries in the United States and/or other countries. • Grass Valley and EDIUS are trademarks or registered trademarks of Grass Valley. • Other names of systems and products mentioned in this brochure are generally the registered trademarks or trademarks of the manufacturers who developed the system or product concerned. • All other company and product names are trademarks of their respective corporations.