

Panasonic

AG-UX180

Memory Card Camera Recorder

*The microphone shown in the photo is an optional accessory.

**4K 60p/50p^{*1} Camcorder featuring the Industry's
Widest Angle 24mm^{*2}, 20x Optical Zoom and 1.0-type^{*3} MOS Sensor**



UX SERIES

FOR PROFESSIONAL 4K SHOOTING



*1: Actual recording is UHD (3840 x 2160) 59.94p/50p. *2: 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 January 2017, according to Panasonic survey.) *3: Effective size



UX SERIES

FOR PROFESSIONAL 4K SHOOTING

Shift Your Video Production to Professional 4K Images. The 4K Premium

Panasonic introduces the 4K camcorder UX series to meet professional 4K video production needs. The AG-UX180 is the premium model with professional functions and specifications for high-end users.

This model is equipped with a newly designed compact lens featuring a wide 24mm angle and 20x optical zoom as well as a 1.0-type (effective size) high-sensitivity MOS sensor. Its evolved Optical Image Stabilizer (O.I.S.) and intelligent AF function suitable for professional camera work.

The AG-UX180 supports 4K 24p, UHD 60p/50p, FHD 60p/50p multi-format recording and HD super slow-motion. Two SD memory card slots*2 are provided to enable relay/simultaneous/backup recording for enhanced reliability, and also support UHD/FHD*3 dual codec recording for a more efficient workflow. The controls of the AG-UX180, such as the manual three rings and user button, as well as interfaces, such as 3G-SDI/HDMI and XLR input, are engineered to meet the needs of professional video recording. Offering the same level of agility and mobility as the conventional HD handheld camcorder, the AG-UX180 provides powerful support for high-image-quality 4K video production.



Newly Developed, Industry's Widest Angle 24mm*1 and 20x Optical Zoom Lens

- The 4-Drive Lens System achieved a up to wide 24mm angle and 20x optical zoom in the handheld camcorder with 1.0-type (effective size) sensor.
- The Optical Image Stabilizer (O.I.S.) with a correction range expansion of approximately 900%*4 enables stable handheld shooting.
- The Micro Drive Focus Unit offers a high-speed auto focus function with excellent tracking performance and improved stability in 4K recording.



Camcorder with Wide-Angle 24mm*¹ and 20x Optical Zoom.



1.0-Type (Effective Size) MOS Sensor for High-Precision, High-Speed 4K 60p/50p*⁵ Recording

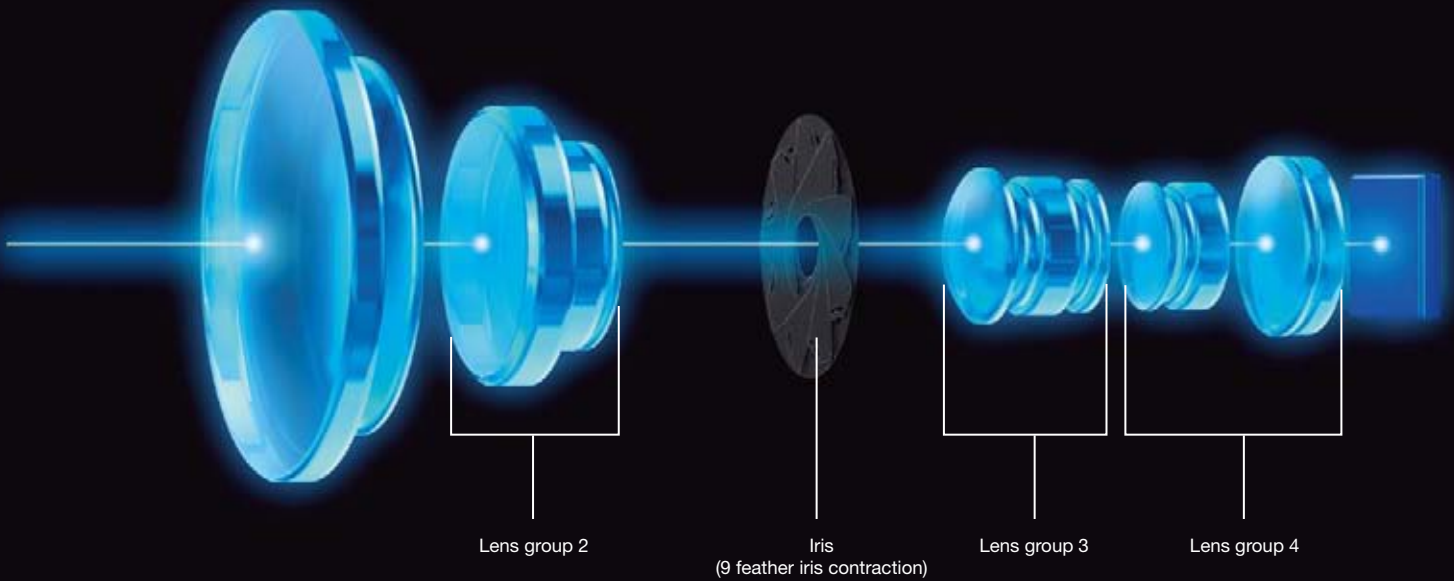
- The 1.0-type (effective size) MOS (approx. 9,460,000 pixels in 4K 24p*⁶, and approx. 8,790,000 pixels in UHD/FHD) offers an outstanding depth of field and excellent balance between image quality and sensitivity.
- 4K 24p, UHD 60p/50p, FHD 60p/50p multi-format and HD 120 fps (59.94 Hz) /100 fps (50 Hz) super slow-motion recording are available.

Professional Functions and Design, Including 3G-SDI and XLR Audio Input

- The manual three rings, user button and other controls are specially designed to satisfy professional users.
- Equipped with professional interfaces such as 3G-SDI output, XLR input, TC synchro input/output and wired remote control.

*1: 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 January 2017, according to Panasonic survey.) *2: UHS Speed Class 3 (U3) SD memory card is required for a video recording mode of 100 Mbps or higher. *3: For information of available codecs, please see Page 8. *4: Comparison with AG-AC160A. (Excluding the 4K 24p mode.) *5: Actual recording is UHD (3840 x 2160) 59.94p/50p. *6: At 4K 24p (aspect ratio 17:9) * With regard to "24p" and "60p" other than that included in "4K 24p" in the above text, images are actually recorded at 23.98p and 59.94p, respectively.

LEICA DICOMAR 4K Lens with Wide-Angle 24mm*1 and 20x



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

The integrated lens boasts the industry's widest angle of 24 mm*1 at the wide-angle setting. It enables wide-angle and minimal-distortion shooting without the use of a wide conversion lens and also allows video recording/production in a vehicle or room for example.

*1: 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 January 2017, according to Panasonic survey) 4K/24p: 24.0 mm (17:9 aspect ratio), UHD/FHD: 25.4 mm (16:9 aspect ratio).



An image shot on an aircraft using the wide angle.

World's First*2 20x Optical Zoom in a Camcorder with 1.0-type*3 Sensor

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

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

*3: Effective size



20x Optical Zoom

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

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

Optical Zoom, Plus Evolved Built-in Optical Image Stabilizer



Manual Three Rings

The AG-UX180 features manual three rings for Zoom, Focus and Iris control. These manual controls ensures professional operation.

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

The AG-UX180 is equipped with 2x, 5x and 10x digital zoom. Using the 20x optical zoom and i.Zoom together, it gives you super-telephoto magnification equivalent to a 300x zoom without dropping in light intensity.

* The higher the magnification, the greater the image quality degradation.



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.

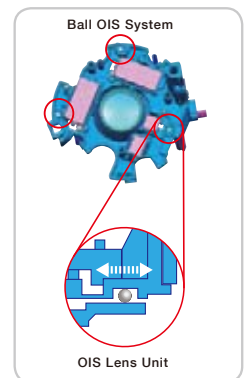
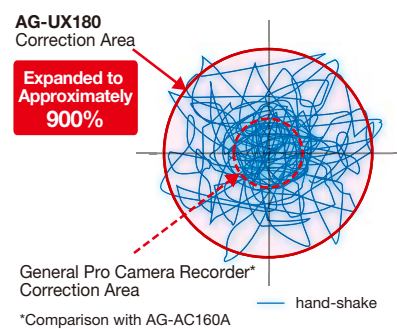
LEICA DICOMAR

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).

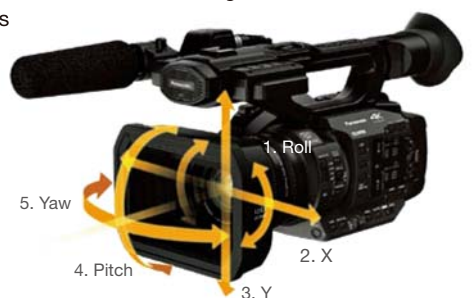
This provides powerful correction even in unstable shooting situations, such as low-angle or high-angle shots. The ball OIS system reduces wear on the drive section, and greatly improves correction for small-amplitude hand-shake.

* Excluding the 4K 24p mode.



5-Axis Hybrid Image Stabilizer [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 rotary direction, is detected and corrected.

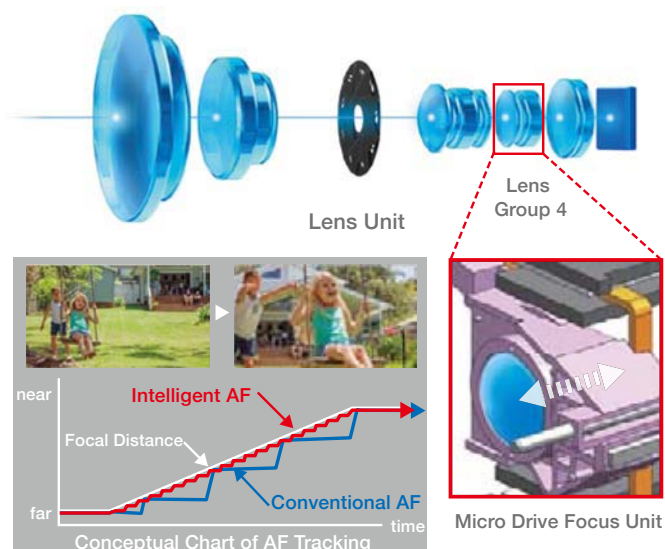




Intelligent Auto Focus Offering High Speed, Excellent Tracking Performance and Stability

- **Top-class* focusing speed in 4K:** The focus status judgment algorithm achieves accurate and quick transition to search operation.
- **Top-class* tracking performance in 4K:** The high-precision, high-speed Micro Drive Focus unit accurately tracks the subject even when a quick change in focal distance occurs.
- **Top-class* stability in 4K:** The AF system accurately judges changes in the subject by actively using minute wobbling motions in the high-resolution 4K image. This contributes to high focusing stability.

* As a camcorder with integrated lens having a 1.0-type sensor. (As of January 2017, according to Panasonic survey.)



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.

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

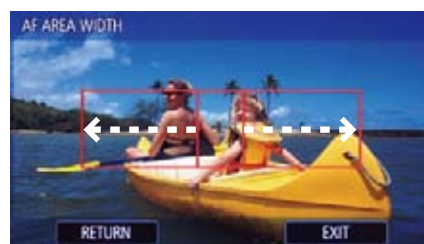
Auto focus operation can be customized by adjusting the AF Speed, AF Sensitivity and AF Area Width.

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 1 to 7. The larger the figure, the faster the AF.
- **AF Sensitivity:** AF sensitivity can be set in 10 steps from 1 to 10. 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 Configuration



Auto Focus Area Width Adjustment

* Pictures simulated.

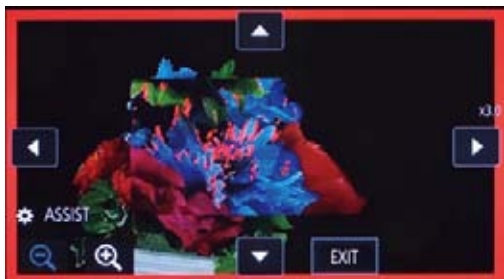
and Comprehensive Manual Focus Assist



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.

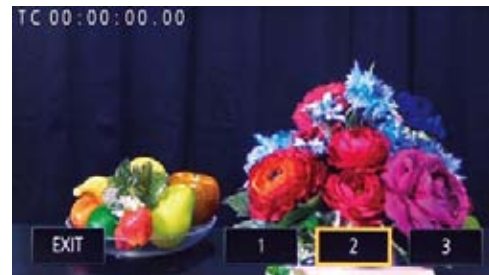


Expand and Peaking

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

One-Push AF

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



PUSH AUTO Button

Manual Focus Assist

Focus is automatically adjusted 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).

Area Function

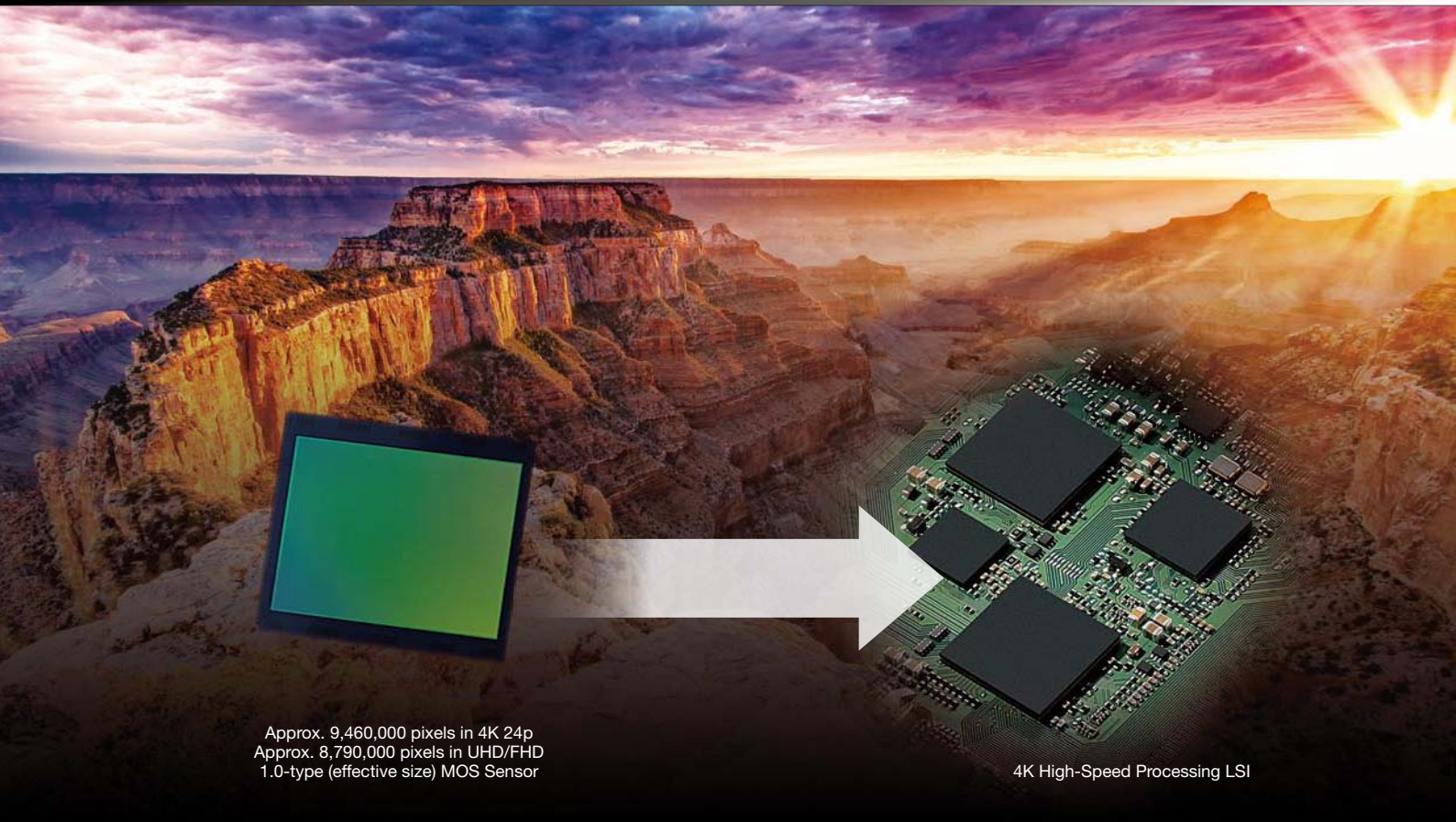
Auto Focus is easily possible with just a touch on the LCD panel. You can also change this to Auto Iris and Brightness of the Display on the screen.



Area Function

* Pictures simulated.

Equipped with a 1.0-type*¹ MOS Image Sensor for High



Approx. 9,460,000 pixels in 4K 24p
 Approx. 8,790,000 pixels in UHD/FHD
 1.0-type (effective size) MOS Sensor

4K High-Speed Processing LSI

High-Image-Quality, High-Sensitivity 1.0-type*¹ 4K Sensor

The 1.0-type (effective size) MOS sensor (approx. 9,460,000 pixels in 4K 24p*³, approx. 8,790,000 pixels in UHD/FHD) provides an appropriate depth of field and excellent balance between image quality and sensitivity.

Images can be recorded with a resolution of 4K (4096 x 2160) /24p, UHD (3840 x 2160) /60p/50p or FHD (1920 x 1080) /60p/50p.

*1: Effective size

*2: Actual recording is UHD (3840 x 2160) 59.94p/50p.

*3: At 4K 24p (aspect ratio 17:9)

* With regard to "24p" and "60p" other than that included in "4K 24p" in the above text, images are actually recorded at 23.98p and 59.94p, respectively.

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

• **FHD VFR (variable frame rate) Recording:** VFR recording can be set in 10 steps*⁴ from 2 fps to 60 fps (60Hz) /9 steps from 2 fps to 50 fps (50Hz).

• **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).

*4: When 1080/23.98p recording mode is selected.



An image shot using the slow motion effect

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, IR lights (commercially available) can be used for shooting in dark places.

* IR lights are optional (waveform length of 850 nm is recommended).

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



Infrared Shooting Function

* Image captured from actual footage shot on AG-UX180 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 Format Supported by AG-UX180

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

- Image - Quality, High-Sensitivity 4K 60p/50p*2 Recording

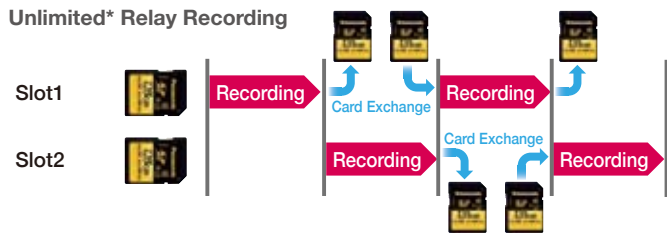


Double SD Memory Card Slots

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



Automatically records continuously 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 dual recording mode.

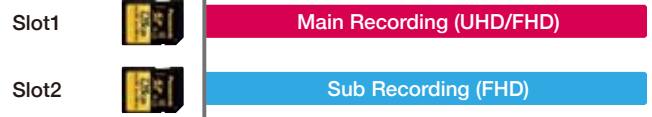
Background Recording



Records ordinary Rec Start/Stop-controlled data in Slot 1, and records all data, even when Slot 1 is stopped, in Slot 2.

UHD/FHD Dual Codec Recording

This function records images simultaneously into two different formats, Main and Sub (see the table below). 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)

	Recording Mode	Recording Format
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 recording mode selected in the main-recording side.

Dual Codec Recording (when FHD 8 Mbps mode)

	Recording Mode	Recording Format
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

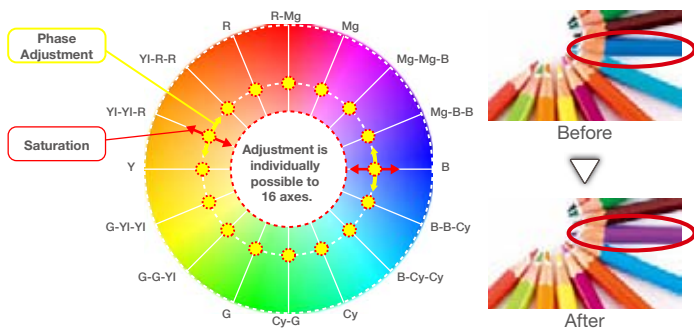
- **Pre Rec:** This function constantly caches approximately 4 seconds of video and audio data in MOV/MP4 format, or approximately 3 seconds in AVCHD format, prior to Rec Start, so the data can be recovered in case there is a delay in pressing Rec Start.
- **Interval Rec:** Records intermittently based on a set interval time of 1 sec, 10 sec, 30 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.

Camera Image Adjustment Functions of Broadcast Quality Level,



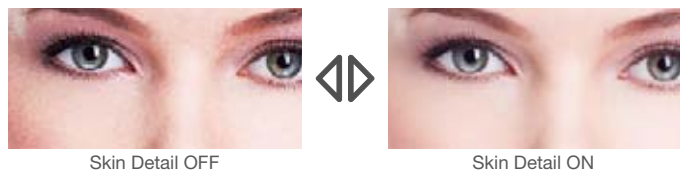
16-Axis Independent Color Correction Function

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.



Skin Detail

Makes skin colors appear soft and beautiful. Especially effective when recording the person up close.



Master Detail

Adjusts the overall degree of contour enhancement.



8-Mode Gamma

The AG-UX180 is equipped with eight selectable gamma modes, including two Cine-Like Gammas, drawing on technologies developed for the VariCam.

HD NORM	Suitable for standard HD recording.
SD NORM	Increased gain in darker areas more than HD (High Definition).
FILMLIKE 1	Reproduces more gradation in highlight areas than when shooting in HD.
FILMLIKE 2	Reproduces more gradation in highlight areas than when shooting in FILMLIKE 1.
FILMLIKE 3	Reproduces more gradation in highlight areas than when shooting in FILMLIKE 2.
CINE-LIKE D	The Cine-Like mode shifted to prioritize dynamic range.
CINE-LIKE V	The Cine-Like mode shifted to prioritize contrast.
STILL-LIKE	Setting to match 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 AG-UX180, and up to eight sets on an SD memory card.

Scene File Setting Items

Synchro Scan, Master Detail, Detail Coring, Skin Detail, 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

Functions and Designs to Support Professional Camera Work



User Buttons

Any of the 44 functions can be allocated to the User Buttons. There are a total of 13 User Buttons: Nine on the AG-UX180 body, and four on the LCD Touch Panel.

Sliding 3.5-type Touch-panel LCD

The 3.5-type monitor LCD 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.

High-Resolution OLED EVF

The viewfinder features a high-resolution OLED display (approximately 1,770,000 dots) for excellent color reproduction.

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 3-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.

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 one of the four corners.

- **ZEBRA:** Two zebra patterns are integrated, from 50% to 105% in 5% steps.
- **Marker (Y Level):** The brightness level in the center of the screen 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.



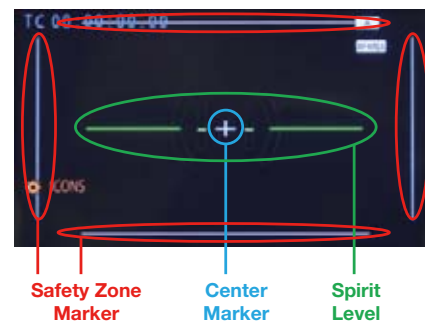
WAVE (Waveform)



Zebra



Marker



Safety Zone Marker Center Marker Spirit Level

* Pictures simulated.



3G-SDI for connecting to an External 1080/60p, 1080/50p Recorder

The 3G-SDI output terminal (BNC connector, 5CFV) can be used to transmit FHD 1080/60p, 1080/50p signals through a coaxial cable over a distance of up to 100 m. Panasonic recorders equipped with SDI input can be linked to the Rec Start/Stop function of the AG-UX180.



HDMI Output and Video/Audio Output

- **HDMI OUT*1**: Outputs images up to 4K 24p, UHD 60p and UHD 50p*2.
- **VIDEO/AUDIO OUT**: Outputs analog signals for video and audio monitoring.

*1: HDMI and SDI signals cannot be output simultaneously.

*2: Images output during UHD 60p and UHD 50p recording are FHD.

16-Bit PCM for High-Sound-Quality*3 Professional Audio Recording

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*4 and headphone output (3.5 mm-diameter stereo mini-jack).



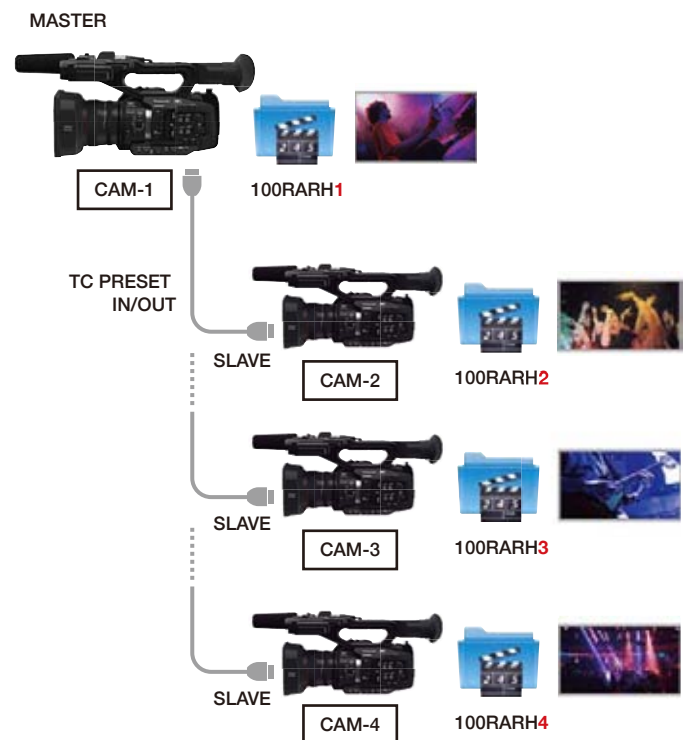
*3: When the MOV/MP4 recording mode is selected

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

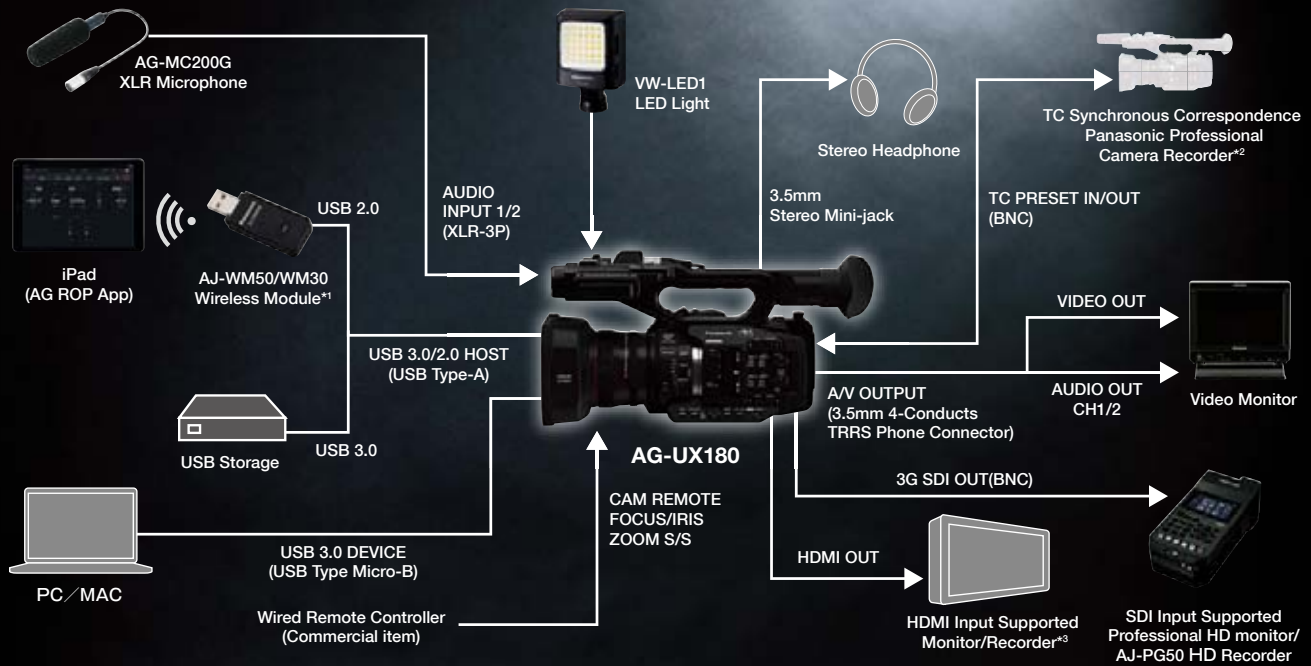
TC Synchro Multi-Camera Recording Supported

The TC PRESET IN/OUT terminal (BNC) allows synchronization of the initial value for the time code in multi-camera shooting. The camera number (0 to 16) can be added*5 to the name of the recording folder to facilitate editing.

*5: Only when the MOV/MP4 codec is used for recording. Setting must be made in each camera.



for Smooth System Operation



*1: Not available in some areas.

*2: Models supporting TC synchronization: AG-DVX200/UX180 and UX170. AG-160A/AC160/AC130A/AC130 can be connected and synchronized via BNC-RCA pin converter.

*3: Operation check models: ATOMOS SHOGUN.

Wireless Remote Control from an iPad

The AG ROP app for iPad*1 is available free of charge from the Apple App Store. It enables wireless remote control of the AG-UX180, 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 app allows control of the AG-UX180's internal lens for remote operation of the i.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.

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

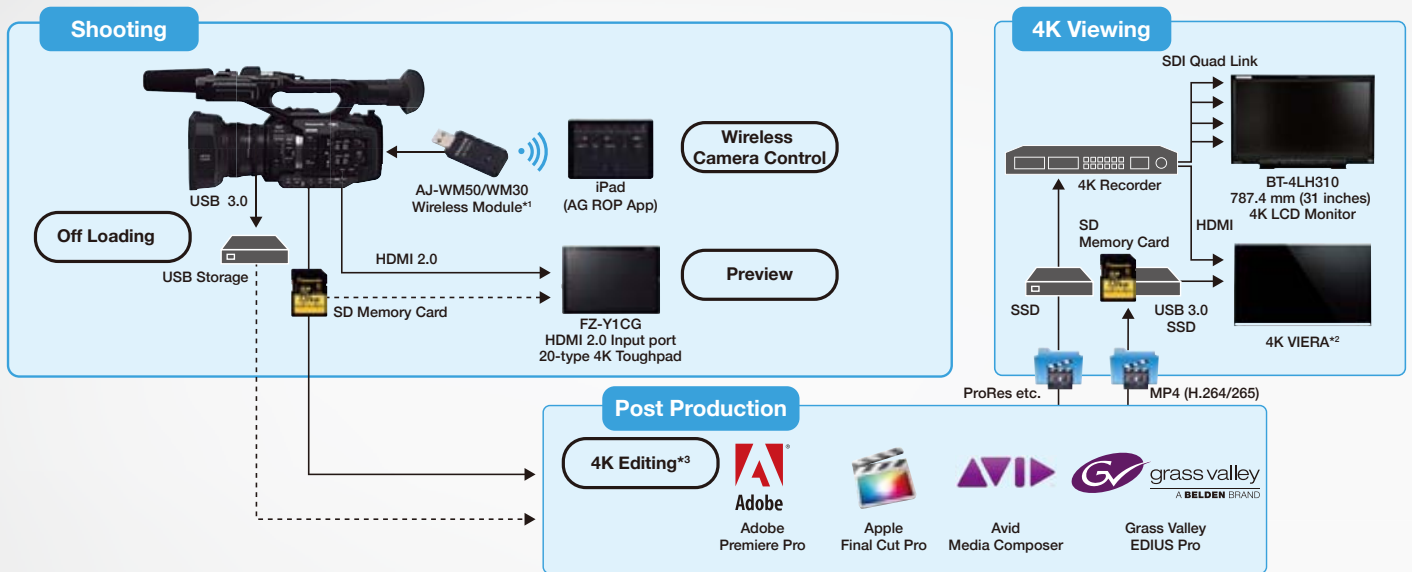
The AG-UX180 is compatible with the AG-VBR118G, AG-VBR89G and AG-VBR59 battery packs which offer large capacity and quick charge.*

* Quick charge is possible only when the AG-BRD50 battery charger is used.



Workflow

Example of 4K workflow



*1: Not available in some areas.

*2: As for the model supporting 4K video playback.

*3: Software planned to be tested by Panasonic.

Options

As of January, 2017

Optional Accessories



AG-VBR118G (11,800 mAh)
 AG-VBR89G (8,850 mAh)
 AG-VBR59 (5,900 mAh)
 Battery Pack



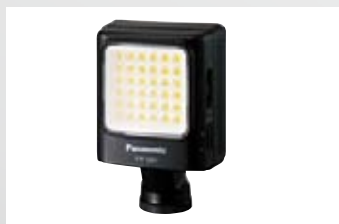
AG-BRD50
 Battery Charger



AG-B23
 Battery Charger
 VW-VBD58 (5,800 mAh)
 Battery Pack



AG-MC200G
 XLR Microphone



VW-LED1
 LED Video Light



AJ-WM50
 AJ-WM30
 Wireless Module

*Not available in some areas



FZ-Y1CG
 20-type 4K Business Rugged Toughpad



BT-4LH310
 787.4 mm (31 inches) 4K LCD Monitor



AJ-PG50
 Memory Card Recorder



SD/SDHC/SDXC Memory Card
 * UHS Speed Class 3 (U3) SD memory card is necessary for video recording of 100 Mbps or more. UHS Speed Class 3 (U3) SDXC memory card of 64 GB or more is necessary for video recording of UHD2160/59.94p/50.00p 150 M.



UX STANDARD MODEL
 AG-UX90

4K (UHD) /FHD Camcorder featuring Wide Angle 24.5mm* Zoom Lens and 1.0-type MOS Sensor
 *35mm film camera equivalent in FHD mode. 35.4mm in UHD mode.

Specifications

As of January, 2017

General

Power:	DC 7.28 V (when the battery is used) DC 12 V (when the AC adaptor is used)
Power Consumption:	19.7 W (when the LCD monitor is used)
Operating Temperature:	0 °C to 40 °C (32 °F to 104 °F)
Operating Humidity:	10 % to 80 % (no condensation)
Weight:	Body: Approx. 2.0 kg (4.41 lb) (body only, excluding lens hood, battery, and accessories) Shooting: Approx. 2.4 kg (5.29 lb) (including lens hood, battery, and eye cup)
Dimensions:	173 mm (W) x 195 mm (H) x 346 mm (D) (6-13/16 inches x 7-11/16 inches x 13-5/8 inches) (excluding protrusion and eye cup) 173 mm (W) x 195 mm (H) x 392 mm (D) (6-13/16 inches x 7-11/16 inches x 15-7/16 inches) (including eye cup, excluding protrusion)

Camera Unit

Pickup Device:	1.0-type (effective size) MOS solid state image sensor
Effective Pixels:	8.79 megapixel: UHD/FHD 59.94p/29.97p/23.98p 9.46 megapixel: 4K 24p
Lens:	Optical image stabilizer lens, optical 20x motorized zoom F2.8 to F4.5 (f=8.8 mm to 176 mm) 35 mm equivalent: f=25.4 mm to 508.0 mm: UHD/FHD 59.94p/29.97p/23.98p f=24.0 mm to 480.0 mm: 4K24.00p Filter Diameter: 67 mm ND Filter: 4 Positions (OFF, 1/4, 1/16, 1/64) IR Filter: Incorporates the ON/OFF control function Shortest Shooting Distance (M.O.D.): Approx. 1.0 m from the front lens
Gain Setting:	L/M/H selector switch Standard mode: 0 dB to 24 dB (Adjustable in 1 dB steps) (Automatic setting can be assigned to L/M/H) Extended ON: -3 dB to 24 dB (Adjustable in 1 dB steps) (Automatic setting can be assigned to L/M/H) 30 dB and 36 dB switched (when assigning [S. GAIN] to the USER button)
Color Temperature Setting:	ATW, ATW LOCK, Ach, Bch, preset 3200 K/preset 5600 K/VAR (2000 K to 15000 K)
Shutter Speed:	When [SYSTEM MODE] = 59.94 Hz 60i/60p mode: 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. 30p mode: 1/30 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. 24p mode: 1/24 sec., 1/48 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. When [SYSTEM MODE] = 50.00 Hz 50i/50p mode: 1/50 sec., 1/60 sec., 1/100 sec., 1/125 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. 25p mode: 1/25 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/125 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec.
Shutter Speed: (Slow Shutter)	When [SYSTEM MODE] = 59.94 Hz 60i/60p mode: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec., 1/30 sec., 30p mode: 1/2 sec., 1/4 sec., 1/8 sec., 1/15 sec. 24p mode: 1/2 sec., 1/3 sec., 1/3 sec., 1/6 sec., 1/12 sec. When [SYSTEM MODE] = 50.00 Hz 50i/50p mode: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec., 1/25 sec. 25p mode: 1/2 sec., 1/3 sec., 1/6 sec., 1/12 sec.
Shutter Speed: (Synchro Scan)	When [SYSTEM MODE] = 59.94 Hz 59.94i/59.94p mode: 1/60.0 sec. to 1/249.7 sec. 29.97p mode: 1/30.0 sec. to 1/249.7 sec. 23.98p mode: 1/24.0 sec. to 1/249.6 sec. 24.00p mode: 1/24.0 sec. to 1/249.9 sec. When [SYSTEM MODE] = 50.00 Hz 50i/50p mode: 1/50.0 sec. to 1/250.0 sec. 25p mode: 1/25.0 sec. to 1/250.0 sec.
VFR Recording Frame Rate:	When [SYSTEM MODE] = 59.94 Hz 30p mode: 2, 15, 26, 28, 30, 32, 34, 45, 60 (fps) 24p mode: 2, 12, 20, 22, 24, 26, 28, 36, 48, 60 (fps) SYSTEM MODE = 50.00, Hz 25p mode: 2, 12, 21, 23, 25, 27, 30, 37, 50 (fps)
Super-Slow Motion Recording:	When [SYSTEM MODE] = 59.94 Hz Shooting frame rate FHD 120 fps, Slow motion effect 1/4 speed (when 30p mode), 1/5 speed (when 24p mode) When [SYSTEM MODE] = 50.00 Hz Shooting frame rate FHD 100fps, Slow motion effect 1/4 speed (when 25p mode)
Sensitivity:	When [HIGH SENS.] mode F11 (2000 lx, 3200 K, 89.9 % reflect, 1080/59.94i) F12 (2000 lx, 3200 K, 89.9 % reflect, 1080/50i)
Minimum Subject Illumination:	0.2 lx (F2.8, gain 18 dB, Manual slow shutter 1/2S, When [HIGH SENS.] mode)
Digital Zoom:	2x/5x/10x, i.Zoom (max. 30x)
Lens Hood:	Hood with lens cover

Memory Card Recorder

Recording Media: ^{*1}	SDHC memory card (4 GB to 32 GB), SDXC memory card (48 GB to 128 GB), UHS-I supported
Recording Slot:	Slot x 2
System Format:	59.94 Hz/50 Hz
Motion Picture Recording:	Recording Format: MOV, MP4, AVCHD
Recording Mode:	Please see page 07 for the Recording Format table.
Recording Time:	Please see back cover for the Recording Time table.
2 Slot Functions:	Relay, Simultaneous, Background ^{*2} , Dual codec
Still Picture Recording Mode:	JPEG (DCF/Exif2.2)
Still Picture Recording:	Motion Picture Playback: 8.8M: 4096 x 2160 (17:9), 8.3M: 3840 x 2160 (16:9), 2.1M: 1920 x 1080 (16:9), 0.9M: 1280 x 720 (16:9)

Digital Video

Video Signal for External Output:	8bit 4:2:2 ^{*3}
Recording Video Signal:	8bit 4:2:0
Video Compression Format:	MPEG-4 AVC/H.264 High Profile (MOV/MP4/AVCHD)

Digital Audio

Recording Audio Signal:	48 kHz/16 bit 2CH
Audio Signal Format:	LPCM (MOV/MP4), Dolby Audio (AVCHD)
Headroom:	12 dB

Dual Codec

Recording Method:	MOV, MP4
Video Compression Format:	MPEG-4 AVC/H.264 High Profile
Audio Signal Format:	LPCM
Recording Format:	Please see page 08 for the Dual Codec Recording table.
Recording Time:	FHD 50Mbps FHD 8Mbps 32 GB: Approx. 1 hour 20 min. Approx. 8 hours 30 min. 64 GB: Approx. 2 hour 40 min. Approx. 17 hours 10 min. 128 GB: Approx. 5 hours 20 min. Approx. 35 hours

Video Input/Output

SDI OUT:	BNC x 1, 0.8 V [p-p], 75 Ω, 3 G/1.5 G, HD SDI, SD SDI supported Output format: 1080/59.94p LEVEL-A/50.00p LEVEL-A, 1080/29.97PsF/25.00PsF/24.00PsF/23.98PsF, 1080/59.94i/50.00i, 720/59.94p/50.00p, 480/59.94i, 576/50.00i
VIDEO OUT:	AV connector x 1
HDMI :	Type A connector x 1, VIERA Link not supported 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-pin) x 2 (INPUT1, INPUT2) Input high impedance, LINE/MIC/MIC+48V (switchable SW) LINE: +4 dBu/0 dBu (switchable menu) MIC: -40 dBu/-50 dBu/-60 dBu (switchable menu)

Audio Output

SDI:	2 ch (LPCM) switchable gain: 0 dB/-6 dB/-12 dB
HDMI:	2 ch (LPCM)
AUDIO OUT:	AV connector x 1, Output level: 600 Ω, 251 mV
Headphone:	3.5 mm diameter stereo mini jack x 1
Speaker:	20 mm diameter, round x 1

Other Input/Output

Camera Remote:	2.5 mm diameter super mini jack x1 (ZOOM, S/S) 3.5 mm diameter mini jack x1 (FOCUS, IRIS)
TC PRESET IN/OUT:	BNC x 1, Used as the input and output terminals Input: 1.0 V to 4.0 V [p-p] 10 KΩ Output: 2.0 V ± 0.5 V [p-p] low impedance
USB 3.0 HOST:	Standard-A connector, 9-pin, external media device connection ^{*4} , bus power supported
USB 3.0 DEVICE:	Micro-B connector, 10-pin, Mass storage function (read only)
DC IN 12V:	DC 12V (11.4V to 12.6V) EIAJ Type4

Monitor/Viewfinder

LCD Monitor:	3.5 type LCD color monitor, Approx. 1,150,000 dots
Viewfinder:	0.39 type OLED (organic EL display) Approx. 2,360,000 dots, video display area: approx. 1,770,000 dots

Included Accessories

Battery (AG-VBR59), Battery charger (AG-BRD50), AC adaptor, Microphone holder kit, AC cable, Eye cup, Lens hood, INPUT terminal cap, Operating instructions

^{*1}: 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.

^{*2}: It supports in record mode less than 50 Mbps.

^{*3}: Output of UHD/59.94p/50.00p becomes 8 bit 4:2:0.

^{*4}: External media devices with a capacity of below 32 GB or a capacity above 2 TB cannot be used.

Recording Time

Recording Format		4 GB	8 GB	16 GB	32 GB	64 GB	128 GB
MOV/MP4	4K	100 Mbps	—	—	Approx. 20 min.	Approx. 40 min.	Approx. 1 hour 20 min.
	UHD	150 Mbps	—	—	—	—	Approx. 55 min.
		100 Mbps	—	—	Approx. 20 min.	Approx. 40 min.	Approx. 1 hour 20 min.
	FHD	200 Mbps	—	—	Approx. 10 min.	Approx. 20 min.	Approx. 40 min.
		100 Mbps	—	—	Approx. 20 min.	Approx. 40 min.	Approx. 1 hour 20 min.
	50 Mbps	Approx. 10 min.	Approx. 20 min.	Approx. 40 min.	Approx. 1 hour 20 min.	Approx. 2 hours 40 min.	
AVCHD	PS	25 Mbps	Approx. 19 min.	Approx. 40 min.	Approx. 1 hour 20 min.	Approx. 2 hours 40 min.	Approx. 5 hours 20 min.
	PH	21 Mbps	Approx. 21 min.	Approx. 45 min.	Approx. 1 hour 30 min.	Approx. 3 hours	Approx. 6 hours
	HA	17 Mbps	Approx. 30 min.	Approx. 1 hour	Approx. 2 hours	Approx. 4 hours 10 min.	Approx. 8 hours 30 min.
	HE	5 Mbps	Approx. 1 hour 30 min.	Approx. 3 hours 20 min.	Approx. 6 hours 40 min.	Approx. 13 hours 40 min.	Approx. 27 hours 30 min.
	HE	8 Mbps	Approx. 1 hour	Approx. 2 hours	Approx. 4 hours 15 min.	Approx. 8 hours 30 min.	Approx. 17 hours 10 min.
	SA	9 Mbps	Approx. 1 hour	Approx. 2 hours	Approx. 4 hours	Approx. 8 hours	Approx. 16 hours 30 min.

Please refer to the latest Non-linear Compatibility Information, Download and Service Information, etc. at the following Panasonic website:



<http://pro-av.panasonic.net/>

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*Specifications are subject to change without notice.

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Factories of AVC Networks Company have received ISO14001:2004-the Environmental Management System certification. (Except for 3rd party's peripherals.)