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# XDCAM HD

## MPEG HD422



(shown with optional ECM-MS2 external microphone)

### PMW-160

Solid-State Memory Camcorder

**XDCAM** **MPEG HD422** **DVCAM** **SXS** **Exmor**  
FULL HD 3CMOS

# Newly Developed Three 1/3-inch-type Full-HD Exmor® CMOS Sensors Achieve Unrivalled Broadcast Quality in a Compact, Handheld Form Factor

The PMW-160 is compact camcorder with three 1/3-inch-type Full-HD Exmor CMOS sensors. It is because of this new sensor that the camcorders achieve sensitivity of F9 and an S/N ratio of 54 dB. Independent focus, zoom (x 20), and iris rings enable precise shooting in many circumstances. With a high-quality MPEG HD422 (50 Mbps) recording capability, which is widely accepted in broadcast stations and production houses, the PMW-160 helps to boost user creativity in many different applications, including news gathering and documentary production.

Added to this, by using an optional CBK-WA01 Wi-Fi Adaptor, iris, zoom, and focus can be remotely controlled – ideal when using this camcorder at a distance, such as on a jib. Also, the Genlock/Timecode feature simplifies multi-camera configurations.



## CAMERA FEATURES

### » High Picture Quality

The PMW-160 incorporates newly developed 1/3-inch-type Full-HD Exmor CMOS sensors (1920x1080) to achieve high resolution, high sensitivity, low noise, and wide dynamic range. The sensitivity of the PMW-160 is F9 and S/N ratio 54dB. These capabilities are essential to professionals when shooting under severe lighting conditions, and give every user greater freedom of creative expression.

**Exmor**  
FULL HD 3CMOS

### » Manual Control Rings

The PMW-160 incorporates a wide angle of 28.8-57.6 mm (equivalent to a 35-mm lens) with a 20-times zoom lens and SteadyShot® feature. To expand their applications, an optional VCL-HG0872K lens (a 0.8 times wide conversion lens) can be used. Zoom, focus, and iris can be manually controlled with independent control rings, providing operational convenience for professional use.



### » Focus Assist Functions

Various functions are provided to help with precise control of focus. These include Color Peaking, MF (Manual Focus) Assist, One-push Auto Focus, Expanded Focus, and the Auto Focus function.

### » 3.5-inch WVGA (852x480) LCD Monitor

The PMW-160 is equipped with a large, easy-to-read, 3.5-inch\* WVGA color LCD panel. This helps users to achieve precise focusing during critical focus control, especially when shooting in HD. The LCD panel also displays helpful shooting information and guidance. For example, users can see a histogram which visualizes contrast in the shooting image, lens information such as the approximate DoF value in the current lens setting, and picture brightness expressed as a percentage.



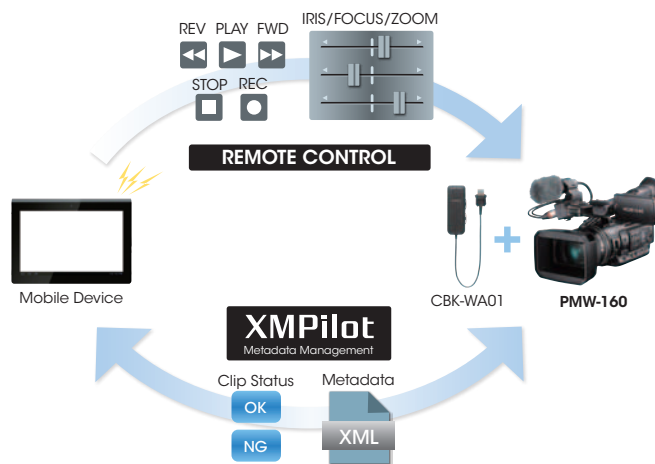
\*Viewable area measured diagonally.

(simulated image)

### » Various Conveniences via a Wi-Fi Adapter

To realize Sony's innovative XMPilot™ metadata workflow, the PMW-160 is designed to support planning metadata. Before shooting starts, users can import the metadata to be used. This type of metadata is called planning metadata. It diminishes the time and effort of inputting metadata at a location, thus achieving a smooth interface with post-production and archiving. With the optional CBK-WA01 Wi-Fi Adapter, users can create a wireless workflow using mobile devices. Also, this

adapter allows users to remotely control zoom, focus, iris, and white balance as well as recording functions such as a recording trigger from mobile devices, which is useful when users need to work at a distance from the camera.



### » Slow & Quick Motion (Visual Effects)

By changing the frame rate, slow- and fast-motion visual effects (Slow & Quick Motion) are available. Up to 60-frames-per-second (fps) recording in 720P or 30-fps recording in 1080P is possible to obtain slow motion effects. Also quick motion effects can be obtained by slowing the frame rate down to 1 fps. Other visual effects include Interval Recording, Frame Recording, and Slow Shutter.

### » Picture Profile

The Picture Profile feature allows users to easily call up customized picture-tonal settings to suit particular shooting conditions, rather than having to readjust the camera each time. Picture Profile data can be saved on SxS™ memory cards, and shared with multiple PMW-160 units.

### » Selectable Gamma Curves

Users can select the best-suited preset gamma curve to handle contrast and give a specific 'look' to an image. There are six types of standard gamma curve, and four types of HyperGamma which are identical to those on CineAlta™ cameras.

## RECORDING SECTION

### » MXF and FAT File Format

The PMW-160 can be used as handheld camcorder for various types of file-based operation because employ both industry-standard file formats: the MXF file format (UDF) and MP4 file format (FAT).

## » MPEG HD422 Codec

Users can record Full-HD video (1920x1080) at up to 50 Mbps using MPEG HD422 compression technology. Common operation with other XDCAM HD422 camcorders such as the PMW-500, PMW-200, and PMW-100 enhances operational convenience, which is proven worldwide and delivers high-speed, intuitive XDCAM HD422 workflows. With the PMW-160, users can also record video in MPEG HD or DVCAM™ formats compatible with XDCAM EXT™ camcorders. (Note: Proxy video is not recorded with the PMW-160.)



## » Cache Recording

Once activated, the PMW-160 continuously streams audio and video into internal memory. When the REC START button is pressed, the content buffered in each camcorder's memory is recorded onto the memory media at the start of the recording clip. The caching period can be set at up to 15 seconds. This function is useful when shooting a developing situation, such as in news gathering, so as not to miss a critical moment.

## » Continuous Recording

By activating the Continuous Recording function, multiple clips can be recorded as a single clip, which makes it easy to ingest a file to a non-linear editing (NLE) system.

## » Reliable, High-speed Recording Media

The XDCAM Series uses high-speed SxS PRO™ and SxS-1 memory cards for its recording media, developed specifically for professional video creation applications. These memory cards boast high-speed data transfer, which accelerates the post-production workflow. SxS memory cards are also resistant to shock and vibration. Furthermore, Memory Stick®, SD Card, and XQD media can be used as emergency backup media with the appropriate optional adaptors.

**SxS**



## » 4-hour Continuous Recording

By combining the BP-U60 battery with two optional SBS-64G1A SxS Memory Cards (64-GB SxS-1 cards), users can record continuously for up to four hours. With the high capacity BP-U90 Lithium-Ion battery, users can achieve six hours of continuous operation when the camera is used on a tripod.

## AUDIO

### » High-quality Audio

The PMW-160 is equipped with two XLR connectors, which are for professional microphones such as the ECM-680S/MS2/678/674/673/VG1 and wireless microphone systems such as the UWP-V1/V2. By combining the built-in stereo microphone with an external microphone input, users can record up to four channels of 24-bit 48-kHz high-quality audio in MPEG HD422 mode.

## INTERFACES

### » HD/SD-SDI, HDMI®, and i.LINK® Interface

The SDI connector allows the camcorder to interface with other professional products, and supports down-conversion from HD to SD signals. The PMW-160 can be connected via HDMI to residential HD displays to perform monitoring. The i.LINK® connector can be used for HDV when SP 1440 (FAT) mode is selected, and for DV when DVCAM (FAT) mode is selected.



### » Timecode IN/OUT, and Genlock

This camcorder comes equipped with Timecode Input/Output and Genlock Input connectors. With these, users can synchronize the timecode and video with other cameras, enabling easier multi-camera productions.

### » PC Interface

The PMW-160 can be connected directly with a PC using the USB interface. Even without a memory card reader/writer, users can easily ingest shot files from the camcorder to a PC.

## OPTIONAL ACCESSORIES

<b>SBP-64A/32</b> SxS Pro Memory Card	<b>SBS-64G1A/SBS-32G1A</b> SxS-1 Memory Card	<b>MEAD-MS01</b> Memory Stick Adaptor	<b>MEAD-SD01</b> SD Card Adaptor	<b>QDA-EX1</b> XQD Adaptor	<b>SBAC-US10</b> SxS Memory USB Reader/ Writer
<b>CBK-WA01</b> Wi-Fi Adaptor	<b>BP-U90/U60/U30</b> Li-Ion Battery Pack	<b>BC-U1</b> Battery Charger (1-slot)	<b>BC-U2</b> Battery Charger (2-slot)	<b>ECM-680S</b> Stereo Microphone	<b>ECM-MS2</b> Stereo Microphone
<b>ECM-678/674/673</b> Monaural Microphone	<b>UWP-V1/V2</b> Wireless Microphone System	<b>VCL-HG0872K</b> Wide Conversion Lens	<b>HVR-MRC1K</b> Memory Recording Unit	<b>PHU-220R</b> Professional Hard Disk Unit	

\*i.LINK is a Sony trademark used only to designate that a product is equipped with an IEEE1394 connector. Not all products with an i.LINK connector may communicate with each other. Please refer to the documentation that comes with any device having an i.LINK connector for information on compatibility, operating conditions and proper connection.

## SPECIFICATIONS

General	
Weight	Approx. 4 lb 14 oz (body) Approx. 2.2 kg (body) Approx. 5 lb 12 oz (with lens hood, eyecup, BP-U30 battery, a SxS memory card) Approx. 2.6 kg (with lens hood, eyecup, BP-U30 battery, a SxS memory card)
Dimensions (W x H x D)**	6 7/8 x 6 1/2 x 12 7/8 inches (172 x 164 x 326 mm) (without protrusions)
Power Requirements	DC 12 V
Power Consumption	Approx. 13 W (while recording, EVF On, LCD monitor Off, IO Select Off) Approx. 19 W (while recording, EVF On, LCD monitor On, IO Select HD SDI & HD HDMI)
Operating Temperature	32°F to 104°F (0°C to 40°C)
Storage Temperature	-4°F to +140°F (-20°C to +60°C)
Battery Operating Time	Approx. 1 hr 50 mins with BP-U30 battery (while recording, EVF On, LCD monitor Off, I/O Select Off) Approx. 3 hrs 40mins with BP-U60 battery (while recording, EVF On, LCD monitor Off, I/O Select Off) Approx. 5 hrs 30 mins with BP-U90 battery (while recording, EVF On, LCD monitor Off, I/O Select Off)
Recording Format (Video)	<UDF> - HD422 mode: CBR, maximum bit rate: 50 Mbps, MPEG-2 422P@HL - HD420 mode: VBR, 35 Mbps, MPEG-2 MP@HL - DVCAM mode: DVCAM <FAT> - HQ 1920 mode: VBR, 35 Mbps, MPEG-2 MP@HL - HQ 1440 mode: VBR, 35 Mbps, MPEG-2 MP@HL - HQ 1280 mode: VBR, 35 Mbps, MPEG-2 MP@HL - SP 1440 mode: CBR, 25 Mbps, MPEG-2 MP@H-14 - DVCAM mode: DVCAM
Recording Format (Audio)	<UDF> - HD422 mode: LPCM 24 bits, 48 kHz, 4 channels - Other mode: LPCM 16 bits, 48 kHz, 4 channels <FAT> - HD mode: LPCM 16 bits, 48 kHz, 4 channels - SD mode: LPCM 16 bits, 48 kHz, 2 channels
Recording Frame Rate	<UDF> HD422 Mode: MPEG-2 422P@HL, 50Mbps/ CBR - 1920x1080/ 59.94i, 50i, 29.97p, 25p, 23.98p - 1280x720/ 59.94p, 50p, 29.97p, 25p, 23.98p HD420 Mode: MPEG-2 MP@HL, 35Mbps/ VBR - 1440x1080/ 59.94i, 50i, 29.97p, 25p, 23.98p - 1280x720/ 59.94p, 50p, 23.98p DVCAM Mode - 720x486/ 59.94i, 29.97PsF - 720x576/ 50i, 25PsF <FAT> HQ 1920 Mode: MPEG-2 MP@HL, 35Mbps/ VBR - 1920x1080/ 59.94i, 50i, 29.97p, 25p, 23.98p HQ 1440 Mode: MPEG-2 MP@HL, 35Mbps/ VBR - 1440x1080/ 59.94i, 50i, 29.97p, 25p, 23.98p HQ 1280 Mode: MPEG-2 MP@HL, 35Mbps/ VBR - 1280x720/ 59.94p, 50p, 29.97p, 25p, 23.98p SP 1440 Mode: MPEG-2 MP@H-14, 25Mbps/ CBR - 1440x1080/ 59.94i, 50i, 23.98p (2-3 pull down) DVCAM Mode - 720x480/ 59.94i, 29.97PsF - 720x576/ 50i, 25PsF
Recording/Playback Time	<UDF> HD 422 mode Approx. 120 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 60 min with SBP-32/SBS-32G1A (32 GB) memory card HD 420 mode: Approx. 180 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 90 min with SBP-32/SBS-32G1A (32 GB) memory card DVCAM mode: Approx. 220 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 110 min with SBP-32/SBS-32G1A (32 GB) memory card <FAT> HQ 1920/HQ 1440 mode/HQ 1280 mode: Approx. 200 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 100 min with SBP-32/SBS-32G1A (32 GB) memory card SP 1440 mode: Approx. 280 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 140 min with SBP-32/SBS-32G1A (32 GB) memory card DVCAM mode Approx. 260 min with SBP-64A/SBS-64G1A (64 GB) memory card Approx. 130 min with SBP-32/SBS-32G1A (32 GB) memory card

Lens	
Lens Mount	Fixed
Zoom Ratio	20x (optical), servo/manual
Focal Length	f = 4.1 - 82.0 mm (equivalent to 28.8-576 mm on 35 mm lens)
Iris	F1.6 - F11 auto/manual selectable
Focus	AF/MF selectable, 800 mm to ∞ (MACRO OFF), 10 mm to ∞ (MACRO ON, Wide), 800 mm to ∞ (MACRO ON, Tele)
Image Stabilizer	ON/OFF selectable, shift lens
Filter Diameter	M72 mm, pitch 0.75mm
Camera Section	
Imaging Device (Type)	3-chip 1/3-inch type "Exmor" Full HD CMOS
Effective Picture Elements	1920 (H) x 1080 (V)
Built-in Optical Filters	OFF: Clear, 1: 1/4ND, 2: 1/16ND, 3: 1/64ND
Sensitivity (2000 lx, 89.9% reflectance)	F9 (typical) (1920 x 1080/59.94i mode)
Minimum Illumination	0.12 lx (typical) (1920 x 1080/59.94i mode, F1.6, +18 dB gain, with 64-frame accumulation, Gamma off, 100%) 0.02 lx (typical) (1920 x 1080/59.94i mode, F1.6, +18 dB gain, with 64-frame accumulation, Gamma on, 50% video level)
S/N Ratio	54 dB (V) (typical)
Horizontal Resolution	1,000 TV lines or more (1920 x 1080i mode)
Shutter Speed	1/32 sec to 1/2,000 sec
Slow Shutter (SLS)	2, 3, 4, 5, 6, 7, 8, 16, 32, and 64-frame accumulation
Slow & Quick Motion Function	720p: Frame rate selectable from 1 fps to 60 fps (from 1 fps to 50 fps in PAL area setting in UDF mode) 1080p: Frame rate selectable from 1 fps to 30 fps (from 1 fps to 25 fps in PAL area setting in UDF mode)
White Balance	Preset (3200K), Memory A, Memory B/ATW
Gain	-3, 0, 3, 6, 9, 12, 18 dB, AGC
Gamma Curve	Selectable
Input/Output	
Audio Input	XLR-type 3-pin (female) (x2), line/mic/mic +48 V selectable Line: +4dBu Mic: -70dBu to -30dBu
Composite Output	AV multi connector, NTSC or PAL
Video Output	BNC (x1), HD-Y/Composite 1.0Vp-p, 75Ω (switchable to Genlock in)
Audio Output	A/V multi connector -10dBu (Reference Level), 47kΩ
SDI Output	BNC (x1), HD/SD selectable SMPTE 292M/259M standards
i.LINK	IEEE 1394, 4-pin (x1), HDV (HDV 1080i) input/output, DV output, S400
Timecode Input	BNC (x1) (switchable to TC out) SMPTE 12M-2-2008 standard 0.5V-1.8Vp-p, 10kΩ
Timecode Output	BNC (x1) (switchable to TC in) SMPTE 12M-2-2008 standard 1.0Vp-p, 10kΩ
Genlock Input	BNC (x1) (switchable to Video out) 1.0 Vp-p, 75Ω
USB	USB device, mini-B (x1)
Headphone Output	Stereo mini jack (x1) -18dBu 16Ω
Speaker Output	Monaural, 250mW
DC Input	DC jack
Lens Remote	8-pin, round
HDMI Output	Type A (x1)
Option	4-pin, Type A (x1)
Monitoring	
Viewfinder	0.45-inch type color LCD: 852 (H) x 480 (V), 16:9
Built-in LCD Monitor	3.5-inch type color LCD monitor: 852 (H) x 3 (RGB) x 480 (V), 16:9
Built-in Microphone	
Built-in Microphone	Omni-directional stereo electret condenser microphone.
Media	
Type	ExpressCard/34 slot (x2)
Supplied Accessories	
Supplied Accessories	Lens hood (1) (attached to lens), Infrared Remote Commander (1), EVF eyecup (1), USB cable (1), AV connecting cable (1), BP-U30 battery pack (1), BC-U1 battery charger (1), Shoulder strap (1), Wi-Fi Adaptor Bracket (1), Lithium battery (CR2032 for data backup) (1) (pre-installed in the camcorder), Lithium battery (CR2025 for the IR Remote Commander) (1) (pre-installed in the IR Remote Commander), Operating instructions (1) CD-ROM (Operating instructions) (1)

\*1 The values for dimensions are approximate.