Full HD solid-state camcorder.

PMW-EX1R XDCAM EX Camcorder

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XDCAM EX

Full HD solid-state camcorder for superior HD Picture performance and more creative freedom.

PMW-EX1R Camcorder

The PMW-EX1R is the successor to the multiple award-winning EX1 and further extends the capabilities of the XDCAM EX family with great new features such as DVCAM recording, Cache Recording, Picture Inversion and a host of additional refinements. The EX1R is the ideal solution for customers such as broadcasters, independent videographers and film makers who need exceptional HD picture quality and state-of-the-art workflow from a compact and affordable handheld camcorder.

The XDCAM EX professional product range from Sony is designed to exploit the ultimate high performance of SxS memory cards. It combines a proven, non-linear XDCAM workflow with the only Full HD resolution sensor system available in a compact camcorder. This advanced imaging system consists of three1/2-inch-type Exmor™ CMOS sensors, each with an effective pixel count of 1920x1080, to produce images in full HD resolution. In addition, there's a purpose-built Fujinon Professional HD 14x zoom lens and a unique dual focus ring mechanism.

Cutting-edge Camera Technology
The PMW-EX1R is equipped with three 1/2-inch-type Exmor CMOS sensors, each with an effective pixel count of 1920 (H) x 1080 (V). This technology delivers superior picture performance with full-HD resolution. Furthermore, this type of sensor allows the camcorder to provide an excellent sensitivity of F10, a remarkable signal-to-noise ratio of 54 dB, and a high horizontal resolution of 1000 TV lines.

Exmor
FULL HD 3CMOS

Other benefits include greatly reduced power consumption and associated heat dissipation in the PMW-EX1R, qualities which made possible the unique use of 1/2-inch-type sensors on these compact camcorders. In addition, this type of sensor can capture images with a shallower depth of field, giving users more freedom of creative expression.

Unique Lens Operation

Supplied Wide-angle Fujinon 14x Zoom Lens
The PMW-EX1R is equipped with a high-quality, high-definition Fujinon 14x zoom lens specifically designed to offer optimum picture performance and unprecedented functionality.

The lens offers a wide viewing angle of 5.8 mm (equivalent to 31.4 mm on a 35-mm lens), and many convenient features for diverse shooting situations.

Unique Focus Ring Mechanism - Professional Manual Focus and Auto Focus
The lens adopts a unique focus ring mechanism, offering two types of Manual focus and Auto focus.The lens has two independent focus wheel mechanisms, which can be switched by sliding the focus ring back and forth.

AF/MF Mode	Full MF Mode
• Full AF • One-push AF • MF • AF/MF Assist	• Full MF (absolute focus position)

When the focus ring is in the front position, the lens works as an auto focus lens. Either Manual or Auto Focus mode can then be selected using the AF/MF switch on the lens. When the focus ring is set to the back position, the lens has an absolute focus position.

The lens is also equipped with independent rings for zoom and iris adjustment with stops and markings for precise adjustments. The location, rotational range, and feel are identical to other manual high-end HD lenses. This gives users a high level of familiarity and operational comfort.

AF Assist
The AF (Auto Focus) Assist function of the PMW-EX1R enables operators to manually change focus positions using the focus ring in AF mode. This means that AF reference focus positions can be shifted manually to a new position.

MF Assist
The MF (Manual Focus) Assist function of the PMW-EX1R helps to precisely focus on the target subject when shooting in MF mode. When MF Assist is enabled, auto focus is momentarily activated when the user stops adjusting the focus ring. The camera then finely focuses on the subject closest to the focal point of the lens at that time.

One-push Auto Iris
A One-push Auto Iris button on the lens of the PMW-EX1R, allows the user to go into Auto Iris mode only when the button is pushed.

Optical Image Stabiliser
Incorporated in the lens, this minimises the blurring effect caused by a shaking hand.

Expanded Focus
At the touch of a button, the centre of the screen on the LCD monitor and viewfinder of the PMW-EX1R can be magnified to about twice normal size, making it easier to confirm focus settings during manual focusing.

Selectable Peaking
The Peaking function of the PMW-EX1R can help operators to quickly and accurately adjust the camera's focus by altering the way pictures are displayed on the LCD monitor and viewfinder. It can enhance the outline of the image which the camera focuses on most, and change its colour to make it stand out. Enhance levels can be selected from three levels, and the outline colour from four colours.


Peaking OFF


Peaking ON

Features

Creative Recording Modes and Settings

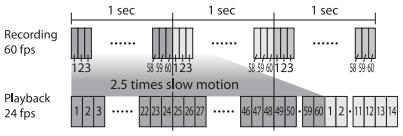
CINEALTA

23.98P Native Recording
The compact PMW-EX1R offer a native 23.98P* recording capability. This makes these camcorders ideal for cinema production.

*In 1440 x 1080/23.98P (SP) mode, images are handled as 23.98P and recorded as 59.94i signals via 2-3 pull-down.

Slow & Quick Motion Function
Commonly known by filmmakers as over-cranking and under-cranking – this enables users to create unique 'looks' as well as slow- and fast-motion special effects.

Image capture can be at frame rates selectable from 1 fps (frame per second) to 60 fps in 720P mode, and from 1 fps to 30 fps in 1080P mode, in 1 fps increments.



Example of slow motion mechanism

For example, when viewed at 23.98P, images captured at 60 fps appear two and a half times slower than normal. Conversely, images captured at 4 fps appear six times faster than normal.

With this Slow & Quick Motion function, images are recorded natively and at full resolution. The obtained quality of slow- and fast-motion images is significantly higher than those created in the editing process.

One-push S&Q Switch
For the PMW-EX1R, a new S&Q (Slow & Quick Motion) button has been added to the inside panel. It allows the user to switch quickly between Normal mode and S&Q mode. In S&Q mode, a blue LED on the button lights up.

When the switch is pressed, S&Q mode is activated, and the recording format and frame rate are instantly changed to the conditions previously set via the menu.

Shot transition function
The PMW-EX1R offers a Slow Shutter function for capturing clear images in low-light environments. This not only increases camera sensitivity but also produces a special blurring effect when shooting a moving object, enhancing shooting creativity.
The shutter speed is selectable from 2-, 3-, 4-, 5-, 6-, 7-, 8-, 16-, 32-, and 64-frame accumulation periods.

Interval Recording Function
An Interval Recording function records one frame at pre-determined intervals. This is convenient for shooting over long periods of time, and also when creating special effects with extremely rapid motion.

Frame Recording Function
Frame Recording is unique to the PMW-EX1R – a function that is especially useful for clay animation shooting. Using this function, images for pre-determined frames are recorded every time the record button is pressed.

Shutter Angle Settings
As well as traditional electronic shutter speed controls, adjustable in fractions of a second, the PMW-EX1R also offers shutter angle control, which is familiar to filmmakers.

Shot transition function

Operational Versatility

DVCAM Recording
A newly added feature in the PMW-EX1R – SD recording in DVCAM mode – offers those currently using SD systems a smooth migration path to HD production. By introducing the PMW-EX1R as a DVCAM acquisition camcorder, the conventional ingesting process to non-linear systems becomes dramatically more efficient. Once the requirement is migrated to HD delivery, the PMW-EX1R can continue to be deployed for HD acquisition.

Picture Profile Feature
This allows camera operators to easily call up customised picture-tonal settings to suit particular shooting conditions, rather than having to readjust the camera each time, giving users greater operational efficiency. Up to six different pictures – tonal settings such as the parameters of matrix, colour correction, detail, one of eight gamma curves, and knee – can be saved on SxS memory card. These settings are displayed on the LCD monitor at the touch of a button.

Shot Transition Function
With a simple push of a button, this enables smooth, precise and repeatable automatic scene transitions. The operator can program the duration and select from three transition profiles: Linear, Soft Stop, and Soft Transition.

Many lens parameters such as the start and end settings for zoom, focus, and/or camera parameters such as white balance and gain can be programmed to transition in unison. It works by automatically calculating the intermediate values during scene transition.

ATW & Hold
The ATW (Auto Tracing White Balance) function automatically adjusts the camera's colour temperature according to changes in the lighting conditions. This function is useful when recording outside for long periods, and the lighting changes gradually over time. The PMW-EX1R also has an ATW Hold function, which allows the operator to hold auto tracing at a desired colour balance via an assignable switch.

Cache Recording Function
A Cache Recording function is newly added in the PMW-EX1R. This buffers audio and video signals to the camcorder's internal memory before the record button is pressed. Once the record button is pushed, the cached portion is recorded onto memory media. This portion is added in front of the clip. The caching period can be adjusted by menu setting up to 15 seconds. When in Cache Recording mode, an indicator on the inside panel lights up.

Image Inversion Function
When the cinema lens or still-camera lens is attached to the camera with a DOF (Depth of Field) adaptor, the image is rotated 180 degrees. Image Inversion is the function that normalises the image.

IR Remote Control On Rear
Situated on the rear of the handle, this allows the user to control the PMW-EX1R with a remote commander both from the front and rear of the camcorder.

Additional Aspect Markers For Cinema Operation
Several new aspect markers such as 1.66:1, 1.85:1, 2.35:1, and 2.4:1 are added for more convenient cinema operation.

Operational Versatility

Built-in Stereo Microphone and Two-channel Audio Input

The PMW-EX1R has a built-in stereo microphone and two XLR audio input connectors for connecting professional microphones or feeding an external-line audio source. These allow high-quality, two-channel 16-bit, 48-kHz linear PCM uncompressed audio to be recorded.

Rotary Grip

The hand grip of PMW-EX1R can rotate approximately 120 degrees, which allows operators to flexibly adjust the angle of the grip. This gives greater control and comfort when holding the camera in any shooting position. The grip for the PMW-EX1R has a new, enhanced shape that better fits the user's hand.

One-push Auto Iris

A One-push Auto Iris button on the lens of the PMW-EX1R, allows the user to go into Auto Iris mode only when the button is pushed.

3.5-inch* Colour LCD

The PMW-EX1R is equipped with a large, easy-to-view, colour LCD with a high resolution of 1920 x 480 pixels. This screen can be flexibly rotated for accessible viewing from any shooting angle.

The ease of focusing and adjustability offered by this high-resolution panel, adjustability, enable it to be used as a viewfinder or camera assistant operator panel. It can also be used to instantly review recorded footage, access the camera's set-up menus, view thumbnails, and display status indications.

* Viewable area measured diagonally.

On-handle Zoom Switch and Record Start/Stop Button

To facilitate zoom control and recording operation during low-angle shooting, an additional zoom switch and record start/stop button are located on the carrying handle. In addition, the PMW-EX1R has a new zoom transition menu which ensures smooth transitions – the user simply selects "Soft" to enable the on-handle zoom to start and stop more smoothly.

0.54-inch* Colour LCD Viewfinder

The PMW-EX1R comes equipped with a new colour LCD viewfinder, which displays high-resolution colour pictures of approximately 1,226,000 pixels in a wide-screen aspect ratio of 16:9, to simplify focusing. Operators can switch between Colour and Monochrome Display modes, according to their preference.

* Viewable area measured diagonally.

One-push S&Q Switch

For the PMW-EX1R, a new S&Q (Slow & Quick Motion) button has been added to the inside panel. It allows the user to switch quickly between Normal mode and S&Q mode. In S&Q mode, a blue LED on the button lights up.

Four Assignable Buttons

Frequently used functions can be programmed to four assignable buttons allowing operators to make rapid changes when working in the field.

HD-SDI and Other Versatile Interfaces
The PMW-EX1R has a wide range of interfaces optimised for a variety of operational needs, wide interoperability, and flexible workflow. These include an HD-SDI output and, in E-to-E mode, 10 bits of 4:2:2 signal can be output from the connector. For versatile usage, there is also a down-converted SD-SDI output, i.LINK (HDV) input/output, and analogue composite/component output.

HDMI Output
The standard HDMI connector (Type A) allows the use of a consumer display or professional monitor equipped with an HDMI input. Non-compressed video and two channels of audio can be output.

Other Features

- Built-in ND filter wheel: OFF: Clear, 1: 1/8ND, 2: 1/64ND
- Selectable gain: -3, 0, 3, 6, 9, 12, 18 dB
- High-speed picture search: x4, x15
- Freeze Mix function
- Skin-tone detail control
- Low-key saturation

PMW-EX1R Specifications

General	
Mass	2.4 kg (5 lb 4 oz) (body), 2.8 kg (6 lb 2 oz) (with lens hood, large eye cup, BP-U30 battery, one SxS PRO memory card)
Dimension (W x H x D)	179 x 199 x 308 mm (7 1/8 x 7 7/8 x 12 1/4 inches) without projection
Power requirements	DC 12 V
Power consumption	Approx. 12.5 W (while recording, EVF On, LCD monitor Off)
Operating temperature	0 °C to +40 °C (+32 °F to +104 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to +140 °F)
Battery operating time	Approx. 240 min with BP-U60 battery Approx. 120 min with BP-U30 battery
Recording format	**Video:** MPEG-2 Long GOP HD HQ mode: VBR, maximum bit rate: 35 Mb/s, MPEG-2 MP@HL HD SP mode: CBR, 25 Mb/s, MPEG-2 MP@H-14 SD mode: DVCAM **Audio:** Linear PCM (2ch, 16-bit, 48-kHz)
Recording frame rate	**PAL area:** HD HQ mode: 1920 x 1080/50I, 25p, 1440 x 1080/50i, 25p, 1280 x 720/50p, 25p HD SP mode: 1440 x 1080/50i SD mode: 720 x 576/50I, 25PsF **NTSC area:** HD HQ mode: 1920 x 1080/59.94i, 29.97p, 23.98p, 1440 x 1080/59.94i, 29.97p, 23.98p, 1280 x 720/59.94p, 29.97p, 23.98p. HD SP mode: 1440 x 1080/59.94i, 23.98p (pull down) SD mode: 720 x 480/59.94i, 29.97PsF
Recording/Playback time	HQ Mode: Approx. 100 min with SBP-32 (32 GB) memory card** Approx. 50 min with SBP-16 (16 GB) memory card Approx. 25 min with SBP-8 (8 GB) memory card SP/SD Mode: Approx. 140 min with SBP-32 (32 GB) memory card** Approx. 70 min with SBP-16 (16 GB) memory card Approx. 35 min with SBP-8 (8 GB) memory card

Lens	
Zoom ratio	14x (optical), servo/manual
Focal length	f = 5.8 mm to 81.2 mm (equivalent to 31.4 mm to 439 mm on 35 mm lens)
Iris	F1.9 to F16 and Close, auto/manual selectable
Focus	AF/MF/Full MF selectable, 800 mm to ∞ (MACRO OFF), 50 mm to ∞ (MACRO ON, Wide), 735 mm to ∞ (MACRO ON, Tele)
Image stabiliser	ON/OFF selectable, shift lens
Filter diameter	77 mm, pitch 0.75 mm (on lens)

Camera Section	
Imaging device	3-chip 1/2-inch type Exmor Full HD CMOS
Effective picture elements	1920 (H) x 1080 (V)
Optical system	F1.6 prism system
Built-in optical filters	OFF: Clear, 1: 1/8ND, 2: 1/64ND
Sensitivity (2000 lx, 89.9% reflectance)	F10 (typical) (1920 x 1080/59.94i mode)

Camera Section	
Minimum illumination	0.14 lx (typical) (1920 x 1080/59.94i mode, F1.9, +18 dB gain, with 64-frame accumulation)
S/N ratio	54 dB (Y) (typical)
Horizontal resolution	1,000 TV lines or more (1920 x 1080i mode)
Shutter speed	1/60 sec to 1/2,000 sec + ECS
Slow Shutter (SLS)	2, 3, 4, 5, 6, 7, 8, 16, 32, and 64-frame accumulation
Slow & Quick Motion function	720p: Selectable from 1fps to 60 fps as recording frame rate
	1080p: Selectable from 1fps to 30 fps as recording frame rate
White balance	Preset (3,200 K), Memory A, Memory B/ATW
Gain	-3, 0, 3, 6, 9, 12, 18 dB, AGC

Inputs/Outputs	
Audio input	XLR-type 3-pin (female) (x2), line/mic/mic +48 V selectable
Composite output	Phono jack (x1) via A/V multi connector, PAL or NTSC
Audio output	Phono jack (CH-1,CH-2) via A/V multi connector
Comonent output	Mini D (x1) via A/V multi connector
SDI output	BNC (x1), HD-SDI/SD-SDI selectable
i.LINK	IEEEE 1394, 4-pin (x1), HDV (HDV 1080i) / DVCAM stream input/output***, S400
USB	USB device, Mini-B (x1)
Headphone output	Stereo mini-jack (x1)
Speaker output	Monaural
DC input	DC jack
Lens remote	12-pin
HDMI output	A Type (x1)

Monitoring	
Viewfinder	0.45-inch**** type colour LCD: 852 (H) x 480 (V), 16:9
Built-in LCD monitor	3.5-inch** type colour LCD monitor: approx. 921,000 effective pixels, 640 (H) x 3 (RGB) x 480 (V), 16:9, hybrid type

Built-in Microphone	
	Omni-directional stereo electret condenser microphone.

Media	
Type	ExpressCard/34 slot (x2)

Supplied Accessories	
	Lens hood (1), Large eye cup (1), IR remote commander unit (1), USB cable (1), A/V connecting cable (1), Component video cable (1), Shoulder strap (1), Operation Manual (1), XDCAM EX Clip Browsing software (1), SxS device driver software (1), BP-U30 battery (1), BC-U1 charger (1), SBP-16 memory card

* The specifications are measured with supplied lens.
** When recording in HQ (35 Mbps) mode, actual recording times may vary according to the bit rate adopted during VBR encoding.
*** DVCAM I-Link input is for monitoring use only.
**** Viewable area measured diagonally.

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