

# XDCAM EX solid-state shoulder camcorder.

PMW-350 XDCAM EX Camcorder

**SONY**



# The first 2/3-inch sensor memory shoulder camcorder - expanding the XDCAM EX family.

## PMW-350 XDCAM EX Camcorder

The latest addition to the ground breaking XDCAM EX family, the PMW-350 is the first and long-awaited XDCAM shoulder camcorder. Designed to combine the best of the XDCAM EX features and benefits, with enhancements based on user feedback, this highly portable camcorder comes equipped with cutting-edge imaging technology.

This includes three 2/3-inch-type Exmor full-HD CMOS sensors, which give stunningly high-quality images with high sensitivity and a high signal-to-noise ratio. The PMW-350 inherits a rich variety of features for creative shooting from the successful camcorders that precede it - the PMW-EX1 and PMW-EX3.



### Impressive Body Design

Designed to be very compact and ergonomically well balanced, the PMW-350 provides a high level of mobility and comfort in various shooting situations. It originates these qualities from the XDCAM HD 422 camcorders, which are extremely well received by broadcasters.

In addition, it has a low centre of gravity, ensuring outstanding stability on the shoulder. The low-profile design provides a wide space between the main frame of the camera and the handle, and an unobstructed view to the right-hand side of the camera operator. The main body weighs only 3.2 kg (7lb 1 oz), and it is one of the lightest shoulder camcorders with three 2/3-inch full-HD imagers - standard requirements of creative professionals in today's production world.

## Cutting edge technology

### Three 2/3-inch-type Exmor Full-HD CMOS Sensors

The PMW-350 is equipped with three newly developed 2/3-inch-type Exmor CMOS sensors, each with an effective pixel count of 1920 (H) x 1080 (V). These deliver superior picture performance with full-HD resolution and allow the camcorder to provide an excellent sensitivity of F12, a remarkable signal-to-noise ratio of 59 dB, and a high horizontal resolution of 1000 TV lines\*. In addition, the sensors can capture images with a shallower depth of field, giving users more freedom of creative expression.

**Exmor**  
FULL HD 3CMOS

\* In HD-SDI, HQ 1080 mode.

### Low Power Consumption

The 'no fan' motor ventilates the inside of the body, enabling power consumption of only 15W\*.

\* Body only in recording mode.

## Unique lens operation

### Lens Package Choice

There are two different PMW-350 models. One is the PMW-350K, which comes equipped with an HD lens with 16x zoom. The other is the PMW-350L, which comes without a lens. Both models have a standard 2/3-inch bayonet lens interface, and the user can choose from wide variety of optional lenses in the existing 2/3-inch HD lens lineup.

### Unique Focus Operation - Professional Manual Focus and Auto Focus

The PMW-350K lens has a unique focus ring mechanism, offering two types of manual focus, plus auto focus operation.

The lens is equipped with two independent focus wheel mechanisms, which can be switched by sliding the focus ring itself back and forth.

When the focus ring is in the front position, the lens works in the same way as a typical auto focus lens. The operator can select either Manual or Auto Focus mode using the AF/MF switch on the lens. Alternately, when the focus ring is in the back position, the lens has an absolute focus position, which is a familiar feature to professional users.

### AF Assist

The AF (Auto Focus) Assist function of the PMW-350K 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-350K helps to precisely focus on the target subject when shooting in MF mode. When MF Assist is enabled, the auto focus is momentarily activated when the user stops adjusting the focus ring. The camera then finely focuses on the subject that's closest to the focal point of the lens at that time.

### Focus Magnification

At the touch of this button, the centre of the screen on the PMW-350 viewfinder can be magnified to about twice its size, making it easier to confirm focus settings during manual focusing. When the switch is released, the centre of the screen goes back to normal size.

### Selectable Peaking

The Peaking function of the PMW-350 helps operators to quickly and accurately adjust the camera's focus by altering the way pictures are displayed on the viewfinder. It can enhance the outline of images that the camera focuses on most, and can change the colour so that it stands out. The operator can choose from various Peaking settings, for the required levels and outline colours.



Peaking OFF

Peaking ON

### ALAC (Automatic Lens Aberration Compensation)

This feature decreases any chromatic aberration caused by the lens.\* ALAC is activated only with the supplied lens and with certain third-party lenses that incorporate compensation data\*.

\* Please check with other lens manufacturers for ALAC support.

### Optical ND Filters and Electrical CC Filters

The PMW-350 camcorder comes equipped with optical ND (Neutral Density) filters and electrical CC (Colour Correction) filters. The optical ND filters are controlled via a built-in ND filter wheel (Settings: Clear, 1/4ND, 1/16ND, and 1/64ND). With the electrical CC filters, users can easily obtain the desired colour temperature by setting the mode - 3200K/4300K/5600K/6300K - on a camcorder-assignable switch. Users can select the four values cyclically, or choose one preset value. This is useful when a sudden change occurs during shooting, and a quick and direct setting is required.



Creative Recording Modes and Settings

CINEALTA

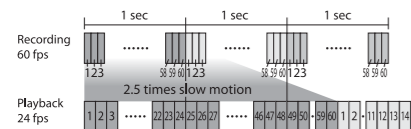
23.98P Native Recording

Like other XDCAM EX camcorders, the PMW-350 offers a native 23.98P\* recording capability. This feature, accompanied by other creative features, makes the camcorder 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

The PMW-350 offers a powerful Slow & Quick Motion function – commonly known as over-cranking and under-cranking by filmmakers – enabling users to create unique 'looks' by slow- and fast-motion special effects. Images can be captured at frame rates from 1 fps (frame per second) to 60 fps in 720P mode and from 1 fps to 30 fps in 1080P mode, in increments of 1 fps.



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 four fps appear six times faster than normal.

With this Slow & Quick Motion function, images are recorded natively with no padded frames and at full resolution. The obtained quality of slow- and fast-motion images is significantly higher than those created in the editing process.

In addition, these slow- and quick-motion images can be played back immediately after shooting, without using any converters or processing on nonlinear editing systems.

Slow Shutter Function

To capture clear images in low-light environments, the PMW-350 offers a Slow Shutter function. This not only increases camera sensitivity but also, for enhanced shooting creativity, produces a special blurring effect when shooting a moving object. The shutter speed is selectable from 2-, 3-, 4-, 5-, 6-, 7-, 8-, 16-, 32-, and 64-frame accumulation periods.

Selectable Gamma Curves

The PMW-350 offers a wide variety of gamma curves to flexibly handle contrast, and give a specific 'look' to an image. In addition to six types of standard gamma curves, there are four types of Hyper Gamma which are identical to those on high-end CineAlta camcorders. Operators can select the best-suited preset gamma curve, depending on scene requirements.

Interval Recording Function

The Interval Recording function of the PMW-350 intermittently 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-350, PMW-EX1R, and PMW-EX3 – 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

In addition to traditional electronic shutter speed controls, adjustable in fractions of a second, the PMW-350 offers shutter angle control, which is familiar to filmmakers.

ATW (Auto Tracing White Balance) & Hold

The Auto Tracing White Balance function of the PMW-350 automatically adjusts the camera's colour temperature according to changes in lighting conditions. This function is useful when recording outside for long periods, and the lighting changes gradually over time. If required, the user can hold auto tracing at a desired colour balance via an assignable switch.

Image Inverter

With a DOF (Depth of Field) adaptor to attach a cinema style or stills lens to the camera, the image is rotated 180 degrees. The Image Inverter function normalises the image by reverse scanning.

Turbo Gain

The Turbo Gain function can boost the camera gain up to +42 dB, which helps reproduce images in very low-light environments.

Operational Versatility

DVCAM Recording and Playback with Optional Hardware Key, CBK-DV01

DVCAM format recording and playback are supported by the CBK-DV01, an optional board which can realise smooth migration from current SD operation to future HD operation.



Picture Cache Recording

With the PMW-350 Picture Cache Recording function, up to ten seconds\* of audio and video signals are buffered into the camcorder's internal memory even before the record start button is pressed. This means that everything that happens ten seconds prior to the record start button being pressed is recorded onto SxS memory card, helping to prevent the loss of any unexpected, yet important, events. The caching period can be adjusted by menu setting.

\* In HD mode. In SD mode, 15 seconds of audio and video signals are buffered.

Four-channel Audio\*

The PMW-350 is the first XDCAM EX camcorder to record four channels of 16-bit, 48-kHz, linear PCM uncompressed audio. Each channel level can be controlled by an independent individual level controller. \*When an SxS memory card with four-channel audio is replayed by the PMW-EX1, PMW-EX1R, PMW-EX3, or PMW-EX30, only CH-1/2 or CH-3/4 can be replayed.

Total Level Control System (TLCS)

By activating TLCS, the correct exposure is automatically set for normal, dark, and very bright shooting environments by controlling the lens iris, electronic shutter, and Auto Gain Control.

Scene File System

The Scene File feature of the PMW-350 allows camera operators to easily call up customised picture-tonal settings – such as the parameters of matrix, colour correction, detail, gamma, and knee – to suit particular shooting conditions, rather than having to readjust the camera each time. This gives users greater operational efficiency. SxS memory cards can be used for storing and loading scene files.

Camera Metadata (HD Format Only)

The camera setting data such as iris, focus, zoom, macro, capture fps, shutter, gain, white balance, and gamma are recorded as acquisition metadata for future utilities.

Camera Remote Control

A Sony 8-pin remote interface is supplied with the PMW-350. Various camera settings can be remotely controlled using an optional RM-B150 RM-B750, RCP-750, RCP-751, RCP-920, or RCP-921 Remote Control Unit via its 8-pin remote connector\*. Composite output is always available for monitoring purposes, regardless of HD/SD output selection. \*Some controls on the remote control unit are not supported by the PMW-350.

Digital Extender function

For future expandability, the PMW-350 has a 50-pin interface option\*, which offers Digital Extender function digitally doubling images in size. Unlike lens extenders, the Digital Extender function performs this doubling without any loss of image sensitivity, often referred to as the F-drop phenomenon. \*The 50-pin interface option will be available in autumn 2010.

Affordable MPEG TS Option for Field and Satellite Transmission

The HDCA-702 MPEG TS adaptor, which can be directly docked onto the PMW-350, transmits an MPEG Transport Stream (TS) of MPEG via a DVB-ASI output. This can be done simultaneously as the PMW-350 records onto SxS memory card. This function is also available using the 50-pin interface option\*. \*The 50-pin interface option will be available in autumn 2010.

Planning Metadata

To realise an innovative metadata workflow, the camcorder will support planning metadata. The built-in PMW-350 USB connector (host) will link to a new Wi-Fi adapter\*, transferring planning metadata, and completing the wireless workflow using mobile devices. \*The new Wi-Fi adapter will be available in April 2010, and subsequently activated for the PMW-350.

**Wide Choice of Optional Microphones**

Although the PMW-350 is equipped with a shotgun microphone, three optional microphones – the ECM-680S, ECM-678, and ECM-673 – are also available. As well as the supplied microphone, the ECM-680S can operate in either Stereo or Monaural (Uni-directional) mode. These modes can be selected from the switch on the microphone or from the PMW-350 itself.

The camcorder is also equipped with a slot to accommodate a DWR-S01D\* digital wireless microphone receiver, which provides two-channel audio with stable and secure transmission that tolerates interference waves. The WRR-855 Series microphone receiver can also be used in this slot.

\* The digital wireless microphone system is not available in countries where prohibited by radio law.



**HDMI**

The PMW-350 is equipped with an HDMI connector for monitoring video output with a consumer display or professional monitor with an HDMI input.

**Viewfinder with 3.5-inch\* Colour LCD**

The PMW-350 is equipped with a large, easy-to-view, colour LCD with a high resolution of 1920 x 480 pixels, which simplifies focusing. The viewfinder can also be used to instantly review recorded footage, as well as access the camera's set-up menus, view thumbnails, and display status indications.

When the elbow block is opened up, the screen can be monitored directly, and menu setting and thumbnails are easily accessed using switches on the inside panel. The PMW-350 also has an interface for the DXF-20W and DXF-51\*\*.

\* Viewable area measured diagonally.

\*\* The supplied viewfinder and DXF viewfinder cannot be used concurrently.



**Assignable Buttons for Quick Access to Desired Functions**

Frequently used functions can be programmed to six assignable buttons on the PMW-350, allowing operators to make rapid changes when working in the field. The colour temperature button and lens RET button also can be utilised as additional assignable buttons.

**Selectable Shoulder Pad**

The position of the shoulder pad can be adjusted – either forwards or backwards – to provide users with optimum weight balance. This is particularly useful when the camera is docked with any type of lens or camera adaptor. In addition, no tools are required for this adjustment. For those who prefer a soft shoulder pad, there is the optional CBK-SP01.

General	
Mass	3.2 kg (7 lb 1 oz) (body) 6.3 kg (13 lb 14 oz) (with LCD VF, AF lens, Mic, BP-GL95A)
Dimension (W x H x D)	124 x 269 x 332 mm (5 x 10 5/8 x 13 1/8 inches) without projection
Power requirements	DC 12 V
Power consumption	Approx. 18 W (with LCD VF, AF lens, mic, while recording) Approx. 15 W (body while recording)
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. 310 min with BP-GL95A battery
Recording format	<b>Video:</b> 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 <b>Audio:</b> HD mode: Linear PCM (4ch, 16-bit, 48-kHz), SD mode (Option): Linear PCM (2ch, 16-bit, 48-kHz)
Recording frame rate	<b>PAL area:</b> 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 (option): 720 x 576/50i, 25PsF  <b>NTSC area:</b> 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 SD mode (Option): Approx. 140 min with SBP-32 (32 GB) memory card** Approx. 70 min with SBP-16 (16 GB) memory card
Lens (PMW-350k only)	
Lens mount	2/3-type SONY bayonet
Zoom ratio	16x (optical), servo/manual (AF lens for PMW-350K)
Focal length	f = 8 mm to 128 mm (equivalent to 31.5 mm to 503 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)
Image stabiliser	-
Filter diameter	M82 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	F1.4 prism system
Built-in optical filters	1: Clear, 2: 1/4ND, 3: 1/16ND, 4: 1/64ND
Sensitivity (2000 lx, 89.9% reflectance)	F12 (typical) (1920 x 1080/59.94i mode), F13 (typical) (1920 x 1080/50i mode)

Camera Section	
Minimum illumination	0.006 lx (typical) (1920 x 1080/59.94i mode, F1.9, +42 dB gain, with 64-frame accumulation)
S/N ratio	59 dB (V) (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, 24, 30, 36, 42 dB
Inputs/Outputs	
Audio input	XLR-type 3-pin (female) (x2), line/mic/mic +48 V selectable
Composite output	BNC (x1), PAL or NTSC, COMPONENT Y
Audio output	XLR-type 5-pin
SDI output	BNC (x1), HD-SDI/SD-SDI selectable
i.LINK	IEEE1394, 4-pin (x1), HDV (HDV 1080i) / DVCAM stream input/output, S400
Timecode input	BNC (x1)
Timecode output	BNC (x1)
Genlock input	BNC (x1)
USB	Device Type B (x1)
Headphone output	Stereo mini-jack (x1)
Speaker output	Monaural
DC input	XLR-type 4-pin
DC output	4-pin
Remote	8-pin
Lens remote	12-pin
MIC	XLR-type 5-pin
HDMI output	19-pin
VF	26-pin (LCD VF), 20-pin (DXF)
Wireless receiver IN	D-Sub 15-pin
Monitoring	
Viewfinder	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 LCD monitor	Black & white LCD (Audio level, TC, battery and media remaining capacity)
Media	
Type	ExpressCard/34 slot (x2)
Supplied Accessories	
	16x zoom lens (1), Lens hood (1) (PMW-350K only), Stereo mic (1), Windscreen (1), Shoulder belt (1), Operation Manual (1), XDCAM EX Clip Browsing software (1), SxS device driver software (1), Flange focal length adjustment test chart (1).

\* 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.

\*\*\* Viewable area measured diagonally.

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