

SONY®



XDCAM EX Camcorder

**PMW-EX1**

**XDCAM EX**

# XDCAM EX, PMW-EX1 – A Compact Full-HD Camcorder With Flash Memory Recording, for an Evolving Era of HD

In recent years, viewing high-definition (HD) content has rapidly become commonplace, due to the penetration of consumer HD equipment such as televisions, video recorders, and camcorders. As a result, content providers have naturally encountered an urgent and strong need to create their content in HD. In response to this trend, Sony has offered a wide choice of HD products to meet diverse requirements in picture quality, operational efficiency, and production costs. One member of the Sony HD lineup – the XDCAM™ HD optical disc-based recording system – is well-accepted by video professionals thanks to the high level of production efficiency that it offers through its nonlinear capability as networked HD solution. Another member of the Sony HD lineup is the tape based HDV™ products which warrant tape based DV users a smooth HD migration path at an affordable price. In response to the natural demand of networked HD product at an affordable price, Sony is introducing its newest member, the XDCAM EX™ camcorder PMW-EX1 – a powerful HD handheld camcorder with incredible feature sets including three 1/2-inch CMOS sensors, amazing 1920 x 1080 and 1280 x 720 HD recording capability plus flash memory recording. This technological breakthrough product has been eagerly developed by Sony's comprehensive technical expertise and knowledge that made possible Sony's proud and groundbreaking CineAlta™ family of products. In order to accommodate a rich set of functions and features into the ultra compact handheld body, most of key components such as the 1/2-inch type CMOS sensors, digital signal processor and memory recording mechanism are newly designed specifically for the PMW-EX1 camcorder.

The PMW-EX1 camcorder uses a newly developed "SxS PRO"™ memory card which is based on rapidly-growing ExpressCard industry standard, as its recording media. Combining the moderate bit rate of MPEG-2 Long GOP compression adopted by the PMW-EX1 to the SxS PRO memory card, the PMW-EX1 offers cost effective long form recording coupled to nonlinear capabilities such as instantaneous random access and high speed file-based operation. Equipped with two SxS PRO memory card slots, the camcorder can record up to 140 minutes of HD footage using two 16-GB SxS PRO memory cards.

The imaging devices used in the PMW-EX1 camcorder are three newly designed 1/2-inch type "Exmor"™ CMOS Sensors, each with an effective pixel count of 1920 x 1080, which produce images in 1080P, 720P and 1080i HD resolutions. It is switchable between 1080P, 1080i and 720P with a multiple frame recording capability such as 59.94i, 50i, 29.97P, 25P and native 23.98P\*. What's more, the PMW-EX1 camcorder offers a "Slow & Quick Motion" capability, which is also commonly known as "over-cranking" and "under-cranking", allowing users to create unique looks or slow and fast motion effects.

A wide variety of accessories are also available to support effective HD production, including a USB Reader/Writer, a wide-conversion lens, battery, and charger. The PMW-EX1 camcorder is also compatible with a comprehensive list of third party accessories.

The Sony XDCAM EX series – with its striking HD picture quality, extra mobility, great operational efficiency, and system flexibility – is a powerful full HD solution for boosting the quality and efficiency of a broad range of HD production applications, and electronic cinematography.

\*In 1440 x 1080/23.98P mode, images are handled as 23.98P and recorded as 59.94i signals through means of 2-3 pull-down.



**XDCM EX**

# XDCAM EX – A New Generation of HD Recording System

## New Nonlinear Recording Media, SxS PRO – For Greater Efficiency, Operability, and Reliability

The XDCAM EX series adopts the SxS PRO memory card for its recording media that is developed specifically for professional content-creation applications, and is based on the SxS™ memory card specification. The SxS PRO memory card is an ultra-compact nonlinear medium that uses flash memory with a number of distinguishing features:



- Compatible with ExpressCard/34 standard
- Uses PCI Express interface, and achieves an extremely high data transfer speed of 800 Mb/s\*
- Large storage capacity: SBP-8 (8 GB) and SBP-16 (16 GB) memory cards are available. One SBP-8 (8 GB) memory card is supplied with the PMW-EX1
- Can record up to 70 minutes of HD video and audio (using one 16-GB memory card)
- Most new Macintosh and PCs are equipped with ExpressCard slots
- Compact size: approx. 75 x 34 x 5 mm (3 x 1 3/8 x 7/32 inches) (excluding the projecting parts) – about half the size of a conventional PC card
- Low power consumption
- Highly reliable: can resist shocks (1500 G) and vibrations (15 G)

\*The above data is read speed measured with a benchmark software. Actual data transfer speeds vary by the measurement conditions. Please refer to the "<http://www.sony.net/SxS-Support/>" (available in November, 2007) for information on measuring methods.

## 1920 x 1080 HD Recording Using the “MPEG-2 Long GOP” Codec

The PMW-EX1 camcorder records 1920 x 1080 HD images using the “MPEG-2 Long GOP” codec, which conforms to the MPEG-2 MP@HL compression. This highly efficient “MPEG-2 Long GOP” codec – that is also adopted in the XDCAM HD and HDV 1080i series of products – enables users to record stunning-quality HD video and audio over a long period of time by efficiently compressing the data.



		HQ Mode	SP Mode
<b>Video Codec</b>	Compression	MPEG-2 Long GOP MPEG-2 MP@HL	MPEG-2 Long GOP MPEG-2 MP@H14
	Sampling	4:2:0	4:2:0
	Bit Rate	35 Mb/s VBR	25 Mb/s CBR
<b>Image Resolution</b>		1920 x 1080	1440 x 1080
		1270 x 1080	

## Selectable Bit Rates

The PMW-EX1 camcorder offers a choice of bit rates – either 35 Mb/s (HQ mode) or 25 Mb/s (SP mode) – depending on the desired picture quality and recording time. The HQ mode supports both 1920 x 1080 and 1280 x 720 resolutions. The SP mode supports 1440 x 1080 resolution at 25 Mb/s, which provides compatibility with HDV 1080i products. Footage recorded in the SP mode can be seamlessly integrated into HDV-compatible editing systems by connecting the camcorder via the i.LINK™\* (HDV) interface. It can also be recorded on XDCAM HD's optical disc through the use of the supplied Clip Browser software.

\*i.LINK is a trademark of Sony Corporation used only to designate that a product contains an IEEE 1394 connector. Not all products with an i.LINK connector will necessarily communicate with each other. For information on compatibility, operating conditions and proper connection, please refer to the documentation supplied with any device with an i.LINK connector. For information on devices that include an i.LINK connection, please contact your nearest Sony office or authorized dealer.

## Long Recording Time

Combining the moderate bit rates produced by the efficient MPEG-2 Long GOP compression to large-capacity SxS PRO memory card, the PMW-EX1 records high-quality HD images for a long recording time of 70 minutes on a single 16-GB SxS PRO memory card. Equipped with two SxS PRO memory card slots, the PMW-EX1 achieves up to 140 minutes of recording using two 16-GB memory cards in the SP mode and a minimum of up to 100 minutes in the HQ mode. When a clip spans across two cards, the transition is seamless without any artifacts or frame loss. The SxS PRO memory card can be hot-swapped while shooting without interrupting the recording. This feature makes the PMW-EX1 an ideal camcorder for a wide variety of long form content-production applications.

Recording Time (approx.)*	HQ, 35 Mb/s VBR	50 minutes
	SP, 25 Mb/s CBR	70 minutes

\*When recording in HQ (35 Mb/s) mode, recording time may be more than the above specified figure depending on the actual bit rate that is adopted during VBR encoding.



## Multiple-format Recording – 1080/720 and Interlace/Progressive Switchable Operation

The PMW-EX1 camcorder offers a wide array of recording formats for multiple content creation applications. Scanning mode is switchable between 1920 x 1080, 1280 x 720, and 1440 x 1080 resolutions. Frame rate is also selectable from interlace and progressive – 59.94i, 50i, 29.97P, 25P, and native 23.98P\*. In addition, 59.94P, 50P, 25P, and native 23.98P progressive recording is available in 1280 x 720 mode. The SxS PRO memory card can simultaneously hold a mix of multiple files of any of these recording formats, allowing for flexible use of the memory card.

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

## High-quality Uncompressed Audio Recording

In addition to HD video recording, high-quality audio is an equally significant feature in the PMW-EX1 camcorder. The PMW-EX1 camcorder records and plays back high-quality, two-channel 16-bit, 48-kHz linear PCM uncompressed audio.

<b>Compression</b>	None (Linear PCM)
<b>Number of Channels</b>	2 channels
<b>Sampling Frequency</b>	48 kHz
<b>Quantization</b>	16 bits/sample

## IT Friendly

With the PMW-EX1 camcorder, recordings are made as data files in the "MP4" format, which is widely used in a number of recent electronic portable devices and has been standardized by ISO.

The file-based recording allows material to be handled with great flexibility in a commonly available IT-based environment for copying, transferring, sharing, and archiving. All these operations are accomplished lossless without any "re-digitizing" process required.

File-based data copying allows lossless dubbing of AV content, which can be performed easily on a PC. The file-based recording system also allows for material to be viewed directly on a PC – simply by inserting the SxS PRO memory card into the ExpressCard slot on a PC, or by linking a PC to the XDCAM EX unit via a USB connection. This works in just the same way as a PC reads files on an internal or external drives. The high speed file-based operation and SxS PRO memory card can dramatically improve the efficiency and quality of professional video applications.



## No Accidental Overwriting of Footage, Immediate Recording Start

By virtue of recording on flash memory card, the PMW-EX1 camcorder makes each new recording on an empty area of the card. This is extremely convenient, as camera operators do not have to worry about accidentally recording over good takes, and they don't have to search through footage for the correct position to start the next recording. In short, it means the camera is always ready for the next shot!

## Instant-access Thumbnail Search With "Expand" Function

Each time a recording is started and stopped on the PMW-EX1 camcorder, the video and audio signals are recorded as one clip. During playback, users can cue-up to the next or previous clip simply by pressing the 'Next' or 'Previous' button, as you would do on a CD or DVD player. Furthermore, thumbnails are automatically generated for each clip as a visual reference, allowing operators to cue-up to a desired scene simply by guiding the cursor to a thumbnail and pressing the 'Play' button. For further convenience, the 'Expand' function allows one selected clip in the Thumbnail display to be divided into 12 even-time intervals, each with their own thumbnail identifier. This is useful if you want to quickly search for a particular scene within a lengthy clip.



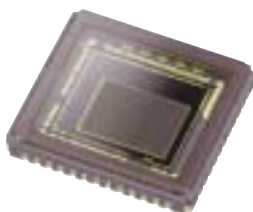
# Cutting-edge Camera Technologies

## 1/2-inch type Three “Exmor” CMOS Sensors

The PMW-EX1 camcorder is equipped with three newly developed 1/2-inch type “Exmor” CMOS Sensors, each with an effective pixel count of 1920 (H) x 1080 (V), which delivers excellent picture performance with full HD resolution. This 1/2-inch type image sensor, with Sony's accumulated sensor technologies, allows the camcorder to provide an excellent sensitivity of F10, a remarkable signal-to-noise ratio of 54 dB, and high horizontal resolution of 1000 TV lines\*. It also greatly reduced power consumption and associated heat dissipation of the PMW-EX1 camcorder, which made possible the unique use of 1/2-inch type sensors on the handheld camcorder. In addition, this large 1/2-inch type image sensor can capture images with a shallower depth of field than all other handheld camcorder's smaller-size image sensors, giving users more creative freedom of expression.

\*In 1920 x 1080/59.94i mode

**Exmor**<sup>™</sup>  
CMOS Sensor



## Wide-angle Fujinon 14x Zoom Lens

The PMW-EX1 camcorder is equipped with a high-quality, high-definition Fujinon 14x zoom lens specifically designed for the PMW-EX1 to offer optimum picture performance and unprecedented functionality. It offers a wide angle of view of 5.8 mm (equivalent to 31.4 mm on a 35 mm lens), and many convenient features for diverse shooting situations.

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

The lens adopts a newly developed and unique focus ring mechanism, which offers two types of manual focus, plus an auto focus operation. The PMW-EX1 camcorder 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 on a handheld camcorder. In this case, either manual or auto focus mode can be selected by the AF/MF switch on the lens. On the other hand, when the focus ring is set to the back position, the lens has an absolute focus position, and works in the same way as interchangeable-lens, which professional users are familiar with.



### AF/MF Mode

- Full AF
- One-push AF
- MF
- AF/MF

### Full MF Mode

- Full MF (absolute focus position)

### Three Independent Rings

In addition to the unique focus ring, the PMW-EX1 camcorder is equipped with independent rings for zoom and iris adjustment; all have physical stops and absolute markings permitting 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.



### Optical Image Stabilizer

To minimize the blurring effect caused by hand-shake, the new lens of the PMW-EX1 camcorder incorporates an optical image stabilizer function that provides highly stable images.

### AF Assist

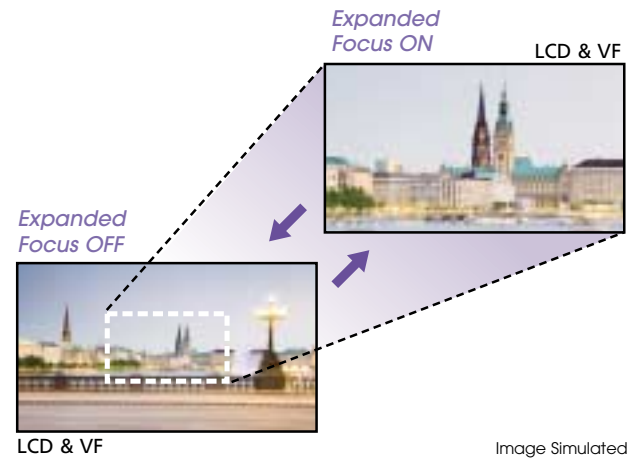
The AF (Auto Focus) Assist function of the PMW-EX1 camcorder enables operators to manually change focus positions using the focus ring during AF mode. This means that AF reference focus positions can be positively shifted manually to a new position.

### MF Assist

The MF (Manual Focus) Assist function of the PMW-EX1 camcorder helps to precisely focus on the target subject when shooting in MF mode. When the MF Assist is enabled, the auto focus is momentarily activated by pressing the corresponding button, the camera will then finely focus on the subject closest to the focal point of the lens at that time.

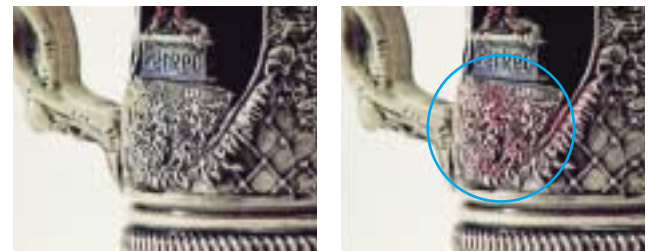
### Expanded Focus

At the touch of a button, the center of the screen on the LCD monitor and viewfinder of the PMW-EX1 camcorder can be magnified to about twice the size, making it easier to confirm focus settings during manual focusing.



### Selectable Peaking

The Peaking function of the PMW-EX1 camcorder 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 changes its color to make it stand out. Enhance levels can be selected from a choice of "HIGH", "MIDDLE", and "LOW", and the outline color from "RED", "WHITE", "YELLOW", and "BLUE".



Peaking OFF

Peaking ON

# Creative Recording Modes and Settings

## 23.98P Native Recording



The PMW-EX1 camcorder, a new member of Sony's legendary CineAlta family, offers the long-awaited native 23.98P\* recording capability on its handy body. This feature, accompanied with 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 through means of 2-3 pull-down.

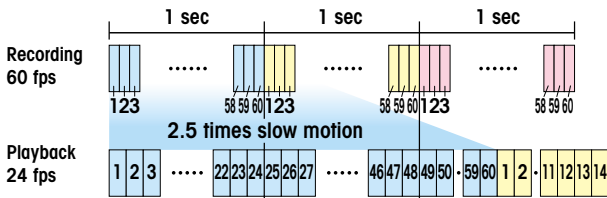
## Slow & Quick Motion Function

The PMW-EX1 camcorder offers a powerful Slow & Quick Motion function – commonly known as over-cranking and under-cranking by filmmakers – that enables users to create unique 'looks' or slow and fast-motion special effects. The PMW-EX1 can capture images 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 increments of 1 fps. For example, when viewed at 23.98P, images captured at 60 fps will appear 2.5 times slower than normal. Conversely, images captured at four fps will appear six times faster than normal.

With the Slow & Quick Motion function of this camcorder, images are recorded natively with no padded frames and at full resolution. The obtained quality of the slow- and fast-motion images is extremely high and incomparable from 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 Motion Mechanism



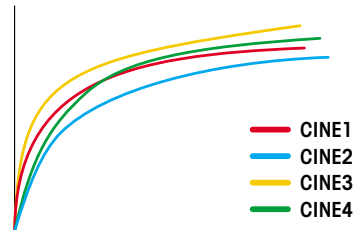
## Slow Shutter Function

The PMW-EX1 camcorder offers a Slow Shutter function for capturing clear images in low-light environments. The Slow Shutter function not only increases camera sensitivity but also produces a special blurring effect when shooting a moving object, for enhanced shooting creativity. 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-EX1 camcorder offers a wide variety of gamma curves to flexibly handle contrast, and give a specific 'look' to an image. In addition to four types of standard gamma curves, the PMW-EX1 provides four types of CINE Gamma (CINE 1, 2, 3, and 4), which are identical to those on high-end CineAlta camcorders. Operators can select the best-suited preset gamma curve depending on scenes.

### CINE Gamma Curves



## Interval Recording Function

The PMW-EX1 camcorder offers an Interval Recording function that records one frame at pre-determined intervals. This is convenient for shooting over long periods of time, and also when creating special effects of extremely quick motion.

## Frame Recording Function

Frame Recording is a unique feature of the PMW-EX1 camcorder 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-EX1 also has a "shutter angle" control – which is familiar to filmmakers. By setting the shutter adjustment mode to "angle", the PMW-EX1 automatically sets the proper exposure time, based on the selected frame rate and shutter angle.





# Operational Versatility

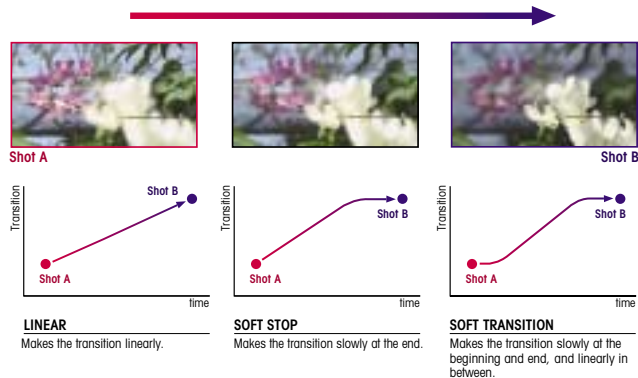
## Picture Profile™ Feature

The Picture Profile feature of the PMW-EX1 camcorder allows camera operators to easily call up customized 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 picture-tonal settings such as the parameters of matrix, color correction, detail, gamma, and knee can be saved in the memory. These settings are displayed on the LCD monitor at the touch of a button.

## Shot Transition™ function

The Shot Transition function of the PMW-EX1 camcorder, with a simple push of a button, allows for smooth, precise and repeatable automatic scene transitions to occur. The operator can program the duration and select from three transition profiles: Linear, Soft Stop, or Soft Transition. Many lens parameter 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 the scene transition. The Shot Transition function can be triggered manually or synchronized with the camera's REC start function. The transition progress can be checked on a bar graph on the LCD monitor. In addition, a start timer function is also available for the Shot Transition function, helping to prevent operators from missing a shot. This function is very useful when precise, simple or complex changes to the lens or camera settings are required during the scene – for example, when changing the focus from the background to the foreground of a scene.



## 1 Depth-of-field Indicator

A Depth-of-field graphic can be displayed on the LCD monitor and viewfinder of the PMW-EX1 camcorder to help camera operators easily read the actual depth-of-field of a scene, and assist setting up the lens and exposure for optimum depth-of-field control.

### Sharrow Depth of Field



### Deep Depth of Field



## 2 Brightness-level Display

The average brightness level of the center of a frame can be displayed on the LCD monitor and viewfinder of the PMW-EX1 camcorder as a percentage. This is useful when a waveform monitor is not available for shooting.



## 3 Histogram Indicator

The Histogram Indicator can be displayed on the LCD monitor and viewfinder of the PMW-EX1 camcorder, allowing operators to easily evaluate the distribution of brightness of the currently captured images. This enables proper exposure control of iris, gain, and gamma.



### 3.5-inch\* Color LCD Screen

The PMW-EX1 camcorder is equipped with a newly developed, large, easy-to-view, color LCD screen with a high resolution of 1920 x 480 pixels, which conveniently pivots under the built-in stereo microphone for storage. The LCD screen is located in the front, and can be flexibly rotated for accessible viewing from any shooting angle. The ease of focusing offered by this high resolution panel, location and adjustability permits using it as a viewfinder or camera assistant operator panel. It can also be used to instantly review recorded footage, as well as access the camera's set-up menus and view thumbnails, display status indications such as audio meters, depth-of-field indicators, remaining memory capacity and battery time. What's more, the use of the hybrid LCD screen – which comprises transmissive and reflective panels – offers clear viewing in both studio and "full sun" field shooting conditions.

\*Viewable area measured diagonally.



### On-handle Zoom Switch and REC Start/Stop Button

In order 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.



### Four Assignable Buttons

Frequently used functions can be programmed onto four assignable buttons, allowing operators to make rapid changes when working in the field. These can be functions such as ATW, Freeze Mix, Rec Review, Expanded Focus, Depth-of-field indicator, and more.



### Rotary Grip

The hand grip of the PMW-EX1 camcorder can rotate approximately 120 degrees, which allows camera operators to flexibly adjust the angle of the grip. This gives users greater control and comfort when holding the camera from any shooting position.



### i.LINK (HDV)

### Long Battery Operating Time

With the supplied BP-U30 battery attached, the PMW-EX1 camcorder can record continuously for approximately two hours, while the optional BP-U60 battery extends the operating time to approximately four hours.

### SDI OUT



## Easy-to-see Color LCD Viewfinder

The 0.54-inch color LCD viewfinder of the PMW-EX1 camcorder displays high-resolution color pictures of approximately 250,000 pixels in a wide-screen aspect ratio of 16:9. Operators can switch the display mode between color and monochrome according to their preference.



## Built-in Stereo Microphone and Two-channel Audio Input

The PMW-EX1 camcorder comes equipped with 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 on the PMW-EX1 camcorder.



A/V OUT, COMPONENT OUT, USB

## Wide Array of Interfaces

The PMW-EX1 camcorder comes equipped with a wide range of interfaces optimized for a variety of operational needs, wide interoperability and flexible workflow. These include an HD-SDI output, down-converted SD-SDI output, i.LINK (HDV) input/output, and analog composite/component output.

### Interfaces

Input	External MIC/LINE (XLR)
Output	HD-SDI* or SD-SDI
	HD or SD analog component
	SD analog composite
	S-Video
	Audio (AV multi)
Others	i.LINK (HDV)
	USB

\*1080/23.98P recordings are output as 1080/59.94i signals via 2-3 pull-down conversion.



## Other Features

- ATW (Auto Tracing White Balance)
- 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
- IR Remote Commander™ unit



# XDCAM EX Application Software

The PMW-EX1 camcorder comes with three application software packages that provide powerful and intuitive management of recorded contents in an easy way. Included are two versions of Clip Browser, one for Macintosh and PC respectively as well as the XDCAM Transfer application software for Apple Final Cut Pro nonlinear editing systems.



## Clip Browser

The Clip Browser software for the PMW-EX1 camcorder is a simple-to-use PC application software that allows users to easily browse and copy video clips recorded by the PMW-EX1 camcorder to other devices such as hard disk drives. The Clip Browser software is compatible with both Windows-based PCs and Macintosh computers.

### Features

- Browse video clips recorded by the PMW-EX1 camcorder
- Copy clip files from the SxS PRO memory card
- Play back video clips on a PC
- Combine segmented clips recorded across two SxS PRO memory cards
- Convert MP4 files to the MXF format for export to nonlinear editing systems

### System Requirements

#### Windows OS (32-bit version):

Windows XP Home Edition (Service Pack 2 or later)  
Windows XP Professional (Service Pack 2 or later)  
Windows Vista Ultimate  
Windows Vista Business  
Windows Vista Home Premium  
Windows Vista Home Basic

#### CPU:

Intel Pentium III Processor 1 GHz or higher (minimum)  
Intel Pentium D Processor 3 GHz or higher (recommended)

#### RAM:

Windows XP: 512 MB (minimum)  
Windows Vista: 1 GB (minimum)  
1 GB (recommended)

#### Mac OS:

Mac OS X version 10.4.10 or later

#### CPU:

Intel Processor Core 2 Duo 2 GHz or higher (recommended)

#### RAM:

1 GB (recommended)



Clip Browser GUI (Windows)



Clip Browser GUI (Macintosh)

## PDZK-P1 \* Ver. 2.0 XDCAM Transfer for Apple Final Cut Pro Nonlinear Editing System

The PDZK-P1 XDCAM Transfer is plug-in software for Apple Final Cut Pro nonlinear editing systems that provides support for MP4 files recorded by XDCAM EX systems. With this software installed on a Macintosh computer, the PMW-EX1 camcorder or SxS PRO memory card can be mounted on Mac Finder directly, and users can seamlessly import and edit recorded material.

\*The latest version of this software can be downloaded from Sony websites. Please contact your nearest Sony office or authorized dealers for further information.



### System requirements

#### OS:

Mac OS X 10.4.10 or later

#### CPU:

Intel Core 2 Duo 2 GHz or higher  
Intel Xeon 2 GHz or higher

#### RAM:

1 GB or more

# Interoperability with Nonlinear Editing Systems

The PMW-EX1 camcorder has been developed from the outset with the aim of optimizing the efficiency of professional video workflows. This has been achieved through the adoption of IT-friendly SxS PRO memory cards, but also through close collaboration with third-party

manufacturers to make PMW-EX1 camcorder compatible with a variety of nonlinear editing systems.\*

\*Please contact your nearest Sony office or authorized dealer for information on compatible nonlinear editors.

## Optional Accessories

### SBAC-US10 SxS Memory Card USB Reader/Writer

The SBAC-US10 is an SxS PRO memory card reader/writer that works on both Windows-based PCs and Macintosh computers via a USB 2.0 interface. This compact and portable device comes in handy in many situations in location, desktop browsing and full-fledged editing.



SBAC-US10	
<b>Interface</b>	High-speed USB (USB 2.0 compliant)
<b>Power supply</b>	DC IN: 12 V (for supplied MPA-AC1 AC adaptor)
<b>Power consumption</b>	3 W
<b>Dimensions (W x H x D)</b>	Approx. 104.5 x 30 x 132 mm (4 1/8 x 1 3/16 x 5 1/4 inches) with projection
<b>Mass</b>	Approx. 200 g (7 oz)
<b>Operating temperature</b>	+5 to +40 °C (+41 to +104 °F)
<b>Storage temperature</b>	-20 to +60 °C (-4 to +140 °F)
<b>Humidity</b>	20 to 80% (no condensation)
<b>Input/output</b>	DC in: EIAJ x 1 USB mini (B) x 1 ExpressCard/34 slot x 1
<b>Access indicator</b>	Red LED x 1
<b>Data-transfer speed*</b>	160 Mb/s (Write), 240 Mb/s (Read)
<b>Supplied accessories</b>	USB cable x 1, AC adaptor x 1, Power cord x 1
<b>Recommended OS</b>	Windows XP Home Edition (Service Pack 2 or later), Windows XP Professional (Service Pack 2 or later), Windows Vista Ultimate, Windows Vista Business, Windows Vista Home Premium, Windows Vista Home Basic, Mac OS X (version 10.4 or later)




\*The above data transfer speeds were measured by using a benchmark software. Actual data transfer speeds vary by the measurement conditions. Please refer to the "<http://www.sony.net/SxS-Support/>" (available in November, 2007) for information on measuring methods.



**BP-U30 and BP-U60 Lithium-ion Batteries\*  
BC-U1 Battery Charger**

Two types of compact batteries – the BP-U30 (28 Wh) and BP-U60 (56 Wh) – and the BC-U1 battery charger effectively support professional video shootings in both the field and the studio. The batteries are equipped with the professional INFO function that intelligently communicates battery status data to the PMW-EX1 camcorder. The remaining capacity of the battery is displayed on the LCD monitor and viewfinder when the camcorder is powered on. This intelligent battery-management function allows operators to monitor the battery status easily and accurately.

\*The BP-U30 and BP-U60 batteries are only compatible with the PMW-EX1 camcorder.

	BP-U30 Battery	BP-U60 Battery	BC-U1 Battery Charger
			
<b>Dimensions (W x H x D)</b>	41.5 x 45.1 x 69.7 mm (1 11/16 x 1 13/16 x 2 3/4 inches)	41.5 x 82.5 x 69.7 mm (1 11/16 x 3 1/4 x 2 3/4 inches)	128 x 45 x 98 mm (5 1/8 x 1 13/16 x 3 7/9 inches)
<b>Mass</b>	220 g ( 8 oz)	350 g (15 oz)	330 g (12 oz)
<b>Input</b>	-		100 to 240 V AC, 50/60 Hz
<b>Maximum/nominal voltage</b>	16.4 V DC/14.4 V DC		-
<b>Capacity</b>	28 Wh	56 Wh	-
<b>Charging time (using the BC-U1)</b>	Approx. 130 min.	Approx. 170 min.	-
<b>Operating temperature</b>	-20 to +45 °C (-4 to +113 °F)		
<b>Remaining capacity display</b>	Four LED (20, 40, 60, and 80%)		-

**SBP-16 SxS PRO Memory Card (16 GB)**



**SBP-8 SxS PRO Memory Card (8 GB)**



**ECM-673 Shotgun-type Electret  
Condenser Microphone**



**UWP-C1 UHF Synthesized Wireless  
Microphone Package**



**VMC-IL4408B/IL4415B/IL4435B  
i.LINK Cable (4-pin to 4-pin)**



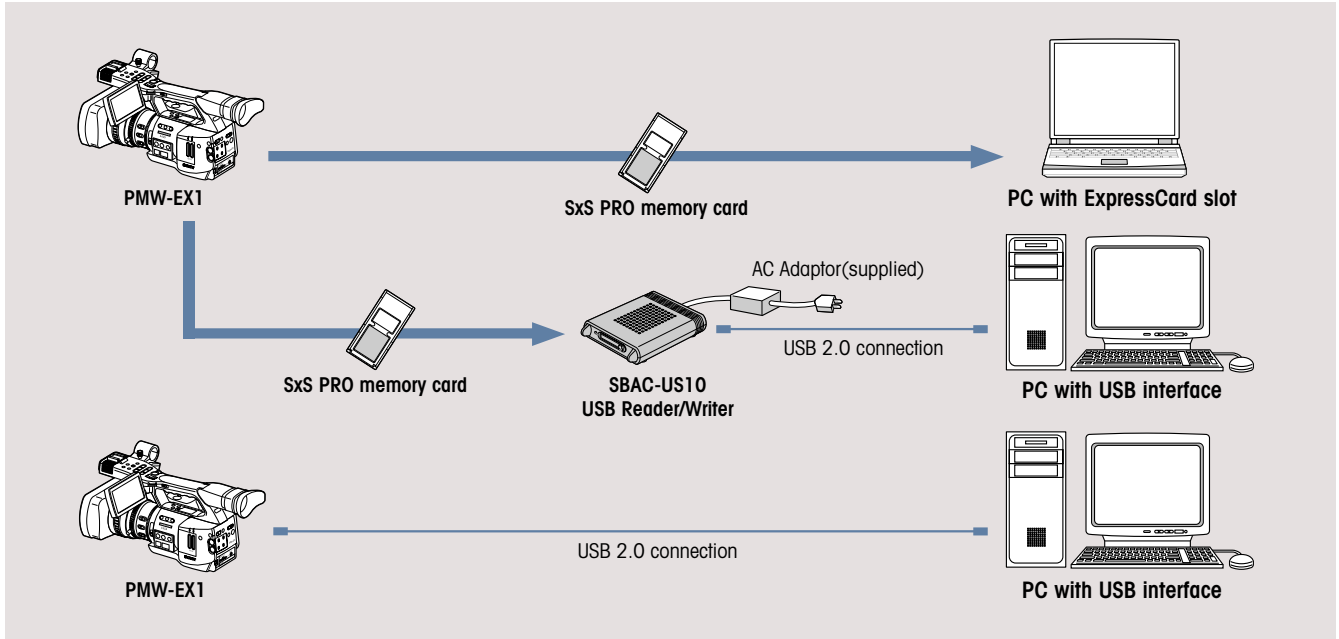
**VMC-IL4615B/IL4635B  
i.LINK Cable (4-pin to 6-pin)**



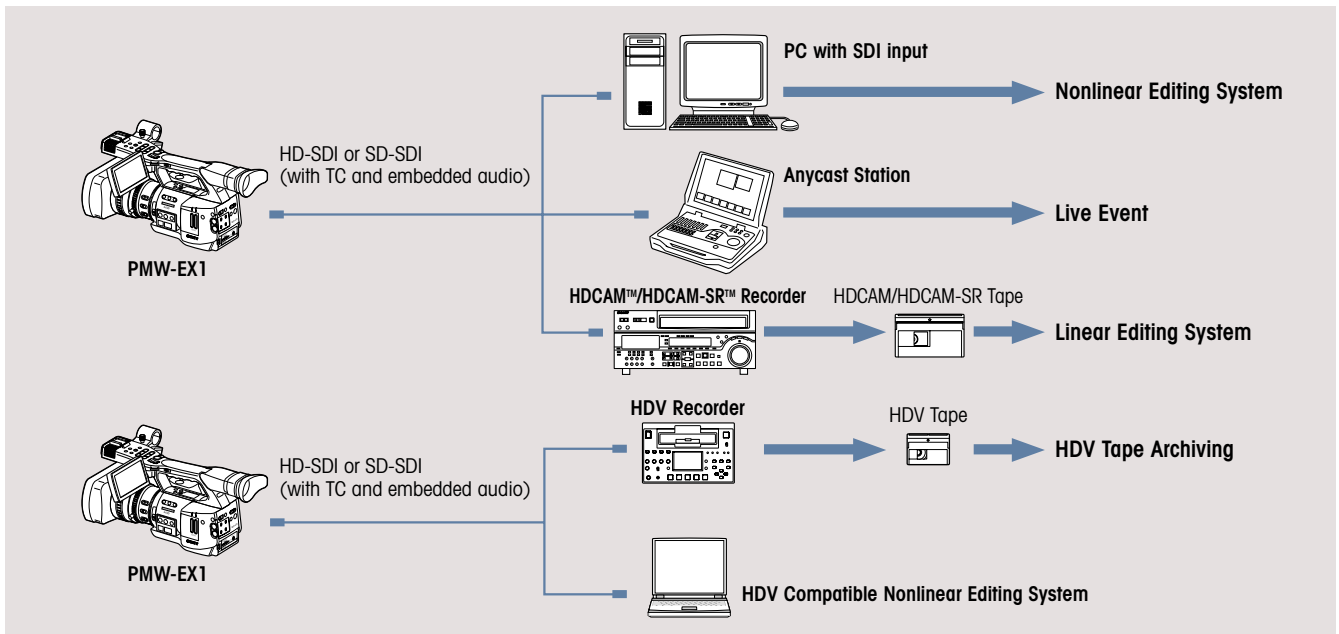
**VCL-EX0877 0.8x Wide Conversion Lens**

# Workflow Example

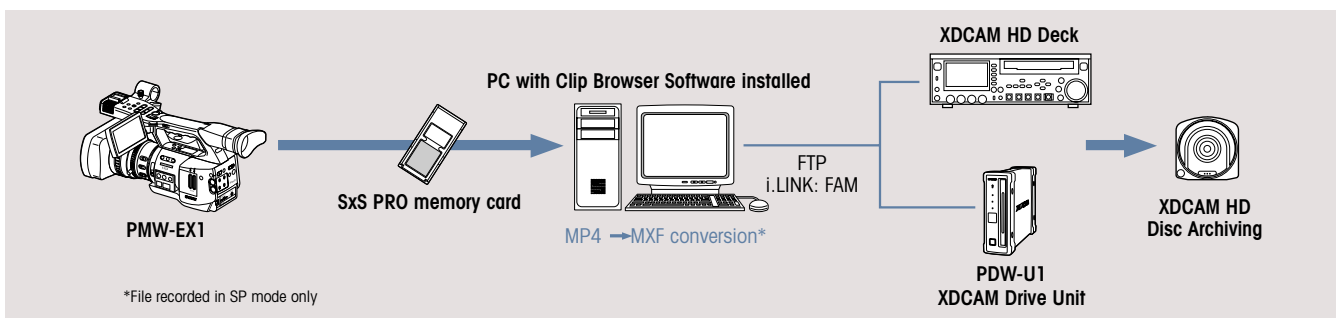
## Asynchronous Connection



## Synchronous Connection



## Back up



# Specifications

General		
Mass		Approx. 2.4 kg (5 lb 4 oz) (body), Approx. 2.8 kg (6 lb 2 oz) (with lens hood, large eye cup, BP-U30 battery, one SxS PRO memory card)
Dimensions (W x H x D)		178 x 176 x 311.5 mm (7 1/8 x 7 x 12 3/8 inches) without projection
Power requirements		DC 12 V
Power consumption		Approx. 13 W (while recording, with color LCD OFF, 1920 x 1080/59.94i mode)
Operating temperature		0 to +40 °C (+32 to +104 °F)
Storage temperature		-20 to +60 °C (-4 to +140 °F)
Continuous operating time		Approx. four hours with BP-U60 battery, Approx. two hours with BP-U30 battery
Recording format	Video	MPEG-2 Long GOP HQ mode: VBR, maximum bit rate: 35 Mb/s, MPEG-2 MP@HL, SP mode: CBR, 25 Mb/s, MPEG-2 MP@H14
	Audio	Linear PCM (2ch, 16-bit, 48-kHz)
Recording frame rate	NTSC setting	HQ mode: 1920 x 1080/59.94i, 29.97P, 23.98P, 1280 x 720/59.94P, 29.97P, 23.98P SP mode: 1440 x 1080/59.94i
	PAL setting	HQ mode: 1920 x 1080/50i, 25P, 1280 x 720/50P, 25P SP mode: 1440 x 1080/50i
Recording/Playback time	HQ mode	Approx. 50 min. with SBP-16 (16 GB) memory card, Approx. 25 min. with SBP-8 (8 GB) memory card
	SP mode	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 selectable
Focal length		f = 5.8 to 81.2 mm (equivalent to 31.4 to 439 mm on 35 mm lens)
Iris		F1.9 to F16 and Close, servo/manual selectable
Maximum relative aperture		1:1.9
Focus		AF/MF/Full MF selectable, 800 mm to ∞ (MACRO OFF), 50 mm to ∞ (MACRO ON, Wide), 735 to ∞ (MACRO ON, Tele)
Image stabilizer		ON/OFF selectable, shift lens
Filter thread		M77 mm, pitch 0.75 mm (on lens)
Camera		
Pickup device		3-chip 1/2-inch type Exmor CMOS
Effective picture elements		1920 (H) x 1080 (V)
Optical system		F1.6 prism system
Built-in filters	ND filter	OFF: Clear, 1: 1/8ND, 2: 1/64ND
Sensitivity (2000 lx, 89.9% reflectance)		F10 (typical) (1920 x 1080/59.94i mode)
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		1000 TV lines or more (1920 x 1080i mode)
Shutter speed		1/33 to 1/2000 sec.
Shutter angle		180, 90, 45, 22.5, 11.25 degrees
Slow Shutter (SLS)		2-, 3-, 4-, 5-, 6-, 7-, 8-, 16-, 32-, and 64-frame accumulation
Slow & Quick Motion function	720P	Selectable from 1 to 60 fps as recording frame rate
	1080P	Selectable from 1 to 30 fps as recording frame rate
Audio performance		
Sampling frequency		48 kHz
Quantization		16 bits
Headroom		20 dB
Frequency response		20 Hz to 20 kHz, +3 dB/-3 dB
Dynamic range		90 dB (typical)
Distortion		Less than 0.1% (with input level of -40 dBu)
Signal inputs/outputs		
Audio input		XLR-3-pin (female) (x 2), line/mic/mic +48 V selectable Mic: -8 dBu to -65 dBu (reference level), Line: +4 dBu
AV output		AV multi (x 1) Audio: -10 dBu (reference level), 47 kΩ, Analog composite: 1.0 Vp-p, 75 Ω unbalanced, S-Video: Y: 1.0 Vp-p, 75 Ω unbalanced, sync negative
Component output		Mini D (x 1), Y: 1.0 Vp-p, 75 Ω, Pb/Pr: 0.7 Vp-p, 75 Ω
SDI output		BNC (x 1), HD-SDI/SD-SDI selectable
i.LINK input/output		IEEE1394, 4-pin (x 1), HDV stream input/output, S400
USB		Mini-B (x 1), USB 2.0 High-speed
Headphone output		Stereo mini-jack (x 1), 16 Ω, 30 mW
Speaker output		Monaural, 300 mW
DC input		DC jack
Battery input		5-pin
Built-in LCD monitor		
		3.5-inch* type color LCD monitor, approx. 921000 effective pixels, 640 (H) x 3 (RGB) x 480 (V), 16:9, hybrid type
Viewfinder		
		0.54-inch* type color LCD, 1120 (H) x 225 (V), 16:9
Built-in microphone		
Capsule type		Omni-directional stereo electret condenser microphone,
Frequency response		50 to 15000 Hz
Media slot		
Type		ExpressCard/34 (x 2)
Interface		ExpressCard compatible
Supplied accessories		
Lens hood (x 1), large eye cup (x 1), IR Remote Commander unit (x 1), USB cable (x 1), AV connecting cable (x 1), component video cable (x 1), shoulder strap (x 1), operation manual (x 1), XDCAM EX Clip Browsing software (x 1), SxS device driver software (x 1), SBP-8 SxS PRO memory card (x 1), BP-U30 battery (x 1), BC-U1 charger (x 1)		

\*Viewable area measured diagonally.

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