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PMW-EX3

A Semi-Shoulder Full-HD Camcorder With SxS PRO Recording, for an Evolving Era of HD

XDCAM EX - New Generation HD Recording System



The PMW-EX3 follows on from the successful launch of the new PMW-EX1 and offers all the great features of the PMW-EX1 in a new semi-shoulder design. In addition to this new design the camcorder also features an interchangeable lens system, genlock, timecode and remote control capability for real added flexibility, offering a low-cost HD studio solution.

The PMW-EX3 combines a state-of-the-art, non-linear XDCAM workflow with simply the best HD quality yet seen in a semi-shoulder camcorder. It is also the first semi-shoulder camcorder to carry the legendary CineAlta 24P brand with multiple frame rate recording capability such as 59.94i, 50i, and native 23.98P, as well being 1080i/720P switchable.

There is also a choice of a 35Mb/s High Quality mode or a 25Mb/s, HDV 1080i compatible mode. To take advantage of this high performance recording capability, the PMW-EX3 uses the same imaging system as the PMW-EX1, consisting of three 1/2-inch type CMOS sensors, each with an effective pixel count of 1920x1080. In addition, there's a purpose-built interchangeable Fujinon Professional HD 1/2-inch 14x lens and a unique dual focus ring mechanism. Included in the package is a 1/2-inch lens adaptor to allow use of other 1/2-inch lenses, plus the ability to use other optional lens adaptors for 2/3rd-inch, cinema-style and digital SLR lenses.

To maximise recording time, the PMW-EX3 has two memory card slots which means with a pair of 16 GB SxS PRO memory cards, it can record up to 140 minutes of HD footage.

A wide variety of accessories are also available, including a USB Reader/Writer, a wide-conversion lens, battery and charger.

The PMW-EX3 HD compact camcorder is the ideal solution for a wide range of customers from broadcasters through to independent videographers and film makers who want exceptional HD picture quality and state-of-the-art workflow from an affordable semi-shoulder camcorder.

Features

New Nonlinear Recording Media, "SxSPRO" - For Greater Efficiency, Operability, and Reliability

The XDCAM EX series adopts the SxSPRO memory card for its recording media, which Sony and SanDisk Corporation jointly developed specifically for professional content creation applications. The SxS PRO memory card is an ultra-compact nonlinear medium that uses flash memory with a number of key features:

- Compatible with ExpressCard3/4 interface slot which is common on modern Windows PCs and Macs
- Uses PCI Express interface and achieves an extremely high "read" 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-EX3
- Can record up to 70 minutes of HD video and audio (using one 16-GB memory card)
- Compact size: approx. 75 × 34 × 5 mm (excluding the projecting parts) - half the size of the older PC Card standard

- Low power consumption
- Highly reliable: can resist shocks (up to 1500 G) and vibrations (up to 15 G)

*This data-transfer speed is a theoretical value. Actual data-transfer speed depends on the file type and the performance of the PC.

1920 x 1080 HD Recording Using the "MPEG-2 Long GOP" Codec

The PMW-EX3 camcorder records 1920 x 1080 HD images using the "MPEG-2 Long GOP" codec, which conforms to the MPEG-2 MP@HL compression standard. "MPEG-2 Long GOP" is a mature codec - also adopted by the XDCAM HD and HDV 1080i series of products - which enables users to record stunning-quality HD video and audio with highly efficient, reliable data compression.

Selectable Bit Rates

The PMW-EX3 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 this SP mode can be seamlessly integrated into HDV-compatible editing systems by transferring the stream from 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.

Long Recording Time

Utilising a mature and highly efficient compression format together with high performance SxS memory cards, the PMW-EX3 can record superb quality HD images for an exceptional 70 minutes* on a single 16Gb SxS card. As the PMW-EX3 features two memory card slots, this recording time is easily doubled to 140 minutes (with two 16Gb cards) and when recording across two cards, the transition is seamless without any frame loss. This feature makes the PMW-EX3 an ideal camcorder for a wide variety of content production applications, including wedding and event shooting, that require a long recording time.

*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-EX3 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 and 50P progressive recording is available in 1280 x 720 mode. The SxS memory card can simultaneously hold 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.

Genlock and Timecode Interfaces

The PMW-EX3 includes genlock and timecode interfaces, making the PMW-EX3 ideal for multi-camera operation and entry level HD studio use.

High-quality Uncompressed Audio Recording

In addition to HD video recording, high-quality audio is an equally significant feature in the XDCAM EX system. The PMW-EX3 camcorder records and plays back high-quality, two-channel 16-bit, 48-kHz linear PCM uncompressed audio.

Remote Control Capability

The PMW-EX3 offers professional remote control of various camera features via standard Sony 8-pin control interface. This allows use of Sony optional RM-B150 and RM-B750 remote control units offering increased flexibility for studio/location use.

IT Friendly

With the XDCAM EX series, 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 an IT-based environment - easily available for copying, transferring, sharing, and archiving. All these operations are accomplished without any "digitizing" process required.

File-based data copying allows for degradation-free 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 memory card into the ExpressCard slot on a PC or Mac, or by linking a PC/Mac to the XDCAM EX unit via a USB2 connection. This works in just the same way as a PC reading files on an external drive. The file-based operation can dramatically improve the efficiency and quality of professional video applications.

New Semi Shoulder Design

With an adjustable shoulder pad, cheek pad and lens grip, the PMW-EX3 offers operators the ability to locate a

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comfortable position for on the shoulder operation. With the viewfinder assembly attached the ergonomics are similar to that of a full size shoulder camcorder.

Immediate Recording Start and No Overwriting Footage

By virtue of recording on flash memory card, the XDCAM EX can start recording virtually the instant the camcorder is turned on. Moreover, the XDCAM EX system automatically records on an empty area of the card - there's no danger of overwriting existing content.

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 XDCAM EX 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.

1/2-inch type Three Exmor™ CMOS Sensors

The PMW-EX3 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, using Sony's advanced accumulated sensor technologies, 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*.

In addition, this large 1/2-inch type image sensor can capture images with a shallower depth of field than smaller-size image sensors, giving users more creative freedom of expression. What's more, the Exmor CMOS sensor is a unique design that deploys an A/D converter to each column of pixels, resulting in a much lower clock speed than conventional CMOS sensors. This makes it possible to greatly reduce power consumption of the camcorder.

*In 1920 x 1080/59.94i mode

Interchangeable Lens System with Wide-angle Fujinon 14x Zoom Lens included

The PMW-EX3 is equipped with a superb interchangeable Fujinon 14x zoom lens specifically designed for the PMW-EX3 to offer optimum picture performance. It offers a wide angle of view of 5.8 mm (equivalent to 31.4 mm on a 35 mm lens). Also supplied is a lens adaptor to allow use of other 1/2-inch lenses. Additional lens adaptors will allow use of 2/3rd -inch, digital cinema and digital stills lenses for wide creative functionality.

Unique Focus Operation - Professional Manual Focus and Auto Focus

The supplied lens adopts a newly developed and unique focus ring mechanism, which offers two types of manual focus, plus an auto focus operation. The PMW-EX3 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 hand-held 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 which professional users are familiar with.

Three Independent Rings

In addition to the unique focus ring, the PMW-EX3 supplied lens is equipped with independent rings for zoom and iris adjustment. These are located adjacent to the focus ring, in the same layout as is common on other interchangeable lenses. This gives users a high level of operational comfort and control.

AF Assist

The AF (Auto Focus) Assist function enables operators to manually change focus positions using the focus ring during AF mode. This means that AF reference focus positions can be shifted to manually changed positions.

MF Assist

The MF (Manual Focus) Assist function helps to precisely focus on the target subject when shooting in MF mode. When the MF Assist is turned on, auto focus is momentarily activated and finely focuses 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 can be magnified to about twice normal size, making it easier to confirm focus settings during manual focusing.

Selectable Peaking on the Viewfinder

The Peaking function can help operators to adjust the camera's focus more accurately by altering the way pictures are displayed on the LCD monitor. It can enhance the outline of the image, which the camera focuses on most, and change its colour to make it more visible. Enhance levels can be selected via the control dial on the rear of the LCD monitor and the outline colour from "RED", "WHITE", "YELLOW", and "BLUE" from the menu.

Optical Image Stabilizer

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

23.98P Native Recording

The PMW-EX3 camcorder is the first semi-shoulder camcorder to be a member of the legendary Sony CineAlta™ family. It offers native 23.98P* recording which, in combination with advanced creative features such as selectable gamma curves, makes this 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-EX3 offers a powerful Slow & Quick Motion function - commonly known as over-cranking and under-cranking in film shooting - that enables users to create unique 'looks' or special effects with slow- and fast-motion images. This can be selected on the control dial on the side of the camcorder.

The PMW-EX3 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 without interpolating the frames. This means the quality of the slow- and fast-motion images is extremely high and incomparable to 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

The PMW-EX3 camcorder offers a Slow Shutter function for capturing clear images in low-light environments. This allows the shutter speed to be extended to a maximum of

64 frames. 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 periods.

Selectable Gamma Curves

The PMW-EX3 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-EX3 provides four types of CINE Gamma (CINE 1, 2, 3, and 4), which are identical to those of other CineAlta camcorders. Operators can select the best-suited preset gamma curve, depending on scenes.

Interval Recording Function

The PMW-EX3 camcorder offers an Interval Recording function that records signals at pre-determined intervals. This is convenient for shooting over long periods of time, and also when creating pictures with special effects of extremely quick motion.

Frame Recording Function

Frame Recording is a unique feature of the PMW-EX3 camcorder that is especially useful for stop-motion/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 the electronic shutter speed controls, the PMW-EX3 also has a "shutter angle" control - which is familiar to film users. By setting the shutter speed to "angle", the PMW-EX3 automatically operates with the proper exposure time, determined by the selected frame rate and the shutter angle.

Picture Profile™ Feature

The Picture Profile feature 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, colour 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.

Depth-of-field Indicator

A Depth-of-field Indicator can be displayed on the LCD monitor to help camera operators easily recognize the depth-of-field of a scene, and thereby produce their desired images.

Brightness-level Display

The average brightness level of the centre of a frame can be displayed on the LCD monitor as a percentage. This is useful when a waveform monitor is not available for shooting.

Histogram Indicator

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

3.5-inch* Hybrid Colour LCD Screen / Viewfinder

The PMW-EX3 is equipped with a newly developed, large, easy-to-view, colour LCD screen with a high resolution of 1920 x 480 pixels. The LCD screen is located in an easy viewing position on top of the camera and can also be utilised as a high-definition viewfinder with the easily attached monocular viewfinder assembly

The LCD Screen can also be used to instantly review recorded footage, as well as access the camera's set-up menus and view thumbnail display status indications such as audio meters, depth-of-field indicators, and the remaining memory and battery time. What's more, the Hybrid LCD screen - which comprises transmissive and reflective panels - offers clear viewing even in bright sunlight.

*Viewable area measured diagonally.

Four Assignable Buttons

On-handle Zoom Switch and REC Start/Stop Button

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.

Shot Transition™ Function

The Shot Transition function allows for smooth automatic scene transitions. The operator can program start and end settings for zoom, focus, and white balance into the A/B buttons and, by pressing the start button, a smooth transition will take place according to the set time. It works by automatically calculating the intermediate values during the scene transition. The start of this function can be synchronized with the camera's REC start function. The transition progress can be checked using an indicator displayed 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 complex camera

settings are required during the scene transition - for example, when shooting subjects moving from the background to the foreground of a scene.

Long Operating Time

With the supplied BP-U30 battery attached, the PMW-EX3 can record continuously for approximately two hours, while the optional BP-U60 battery extends the operating time to approximately four hours.

Wide Array of Interfaces

The PMW-EX3 camcorder comes equipped with a wide range of interfaces optimized for a variety of operational needs. These include an HD-SDI output, down-converted SD-SDI output, i.LINK (HDV) input/output, USB2 and analogue composite/component output.

Other Features

- ATW (Auto Tracing White Balance)
- Built-in ND filter wheel: 1: Clear, 2: 1/8ND, 3: 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

Benefits

The PMW-EX3 is a further innovation from Sony offering the first solid-state semi-shoulder camcorder. Based on the same outstanding picture performance, creative features and workflow innovation of the PMW-EX1, the new camera offers studio functions such as genlock and remote control, an interchangeable lens system and new ergonomic features which provide camera operators further flexibility in whatever style of production is chosen.

Enhanced Workflow

Innovative solid state recording with SxS PRO ExpressCard memory cards offers the following benefits:

- Compatible with industry-standard ExpressCard interface available on most modern laptops
- No time lost to tape loading
- Robust storage media, impervious to shocks and vibrations
- Small, high capacity recording media offering over 2 hours of continuous HD content across 2 x 16GB cards.

- Common interoperability with HDV and XDCAM so ready to use immediately with most existing NLE.
- No need to worry about accidentally overwriting precious content
- Write and Re-Writable media with no degradation in picture quality
- Thumbnail images representing key scenes can be browsed and instantly accessed using on-camera colour screen
- 'Essence Mark' key scenes at the touch of a button
- No frantic fast-forward/rewinding to find the clips you want to review
- Non-proprietary media manufacture
- Supplied with Clip Browser Software for viewing and copying clips to HDD, DVD or Blu-ray Disc.
- Unique focus operation offering full manual focus with absolute focus or manual/auto focus operation.
- AutoFocus Assist ensuring focus position can be altered
- Manual Focus Assist to ensure optimum focus at all times

Exciting and Creative Recording Modes

The PMW-EX3 is the first semi-shoulder camcorder to carry the legendary CineAlta brand, which represents optimisation for feature film production and specifically support for 23.98P recording capability - the standard frame rate for feature film production. Alongside this, there are a myriad of creative recording modes available including:

- Slow and Quick motion offers a range of frame rates produced within the camera and available for instant review in the field. Now available via direct control on the camcorder body.
- New shutter setting emulates filmic operation
- Cine Gamma curves offer further filmic options for production
- Frame and Interval recording offers further creative scope for animation and extremely quick motion effects
- Slow Shutter for clear images in low-light environments

Superior Picture Performance

Newly developed Exmor™ CMOS processors offer true 1080 x 1920 resolution:

- Large ½ inch sensors for excellent sensitivity and depth of field characteristics
- Full 1080 x 1920 effective pixels
- Low power consumption compared to CCD technology
- 1080 / 720 switchable for international programme production

Interchangeable Professional 1/2inch HD Lens

The PMW-EX3 features an exceptional interchangeable ½ inch Fujinon lens, which offers the ability with the supplied lens adaptor to utilise current ½ -inch lenses.

- Interchangeable 14x Fujinon Professional HD lens
- Can be used with other 2/3rd inch, Cinema and D-SLR lenses with optional lens adaptors.

New features for Multi-camera operation

The PMW-EX3 includes genlock and timecode interfaces, plus remote control functionality through Sony professional remote control units, making the PMW-EX3 ideal for multi-camera operation and entry level HD studio use.

- Genlock and timecode interfaces allow multi-camera operation with other camcorders.
- Remote control via Sony RM-B150 or RM-B750 is available via the 8-pin remote control connector for easy set-up and control.

Technical Specifications

--General--

Mass	Approx. 1.9 kg (4 lb 2 oz) (without lens) Approx. 3.6 kg (7 lb 9 oz) (with lens, lens hood, eye piece, BP-U30 battery, one SxS PRO memory card)
Dimensions (W x H x D)	250 x 210 x 400 mm (9 7/8 x 8 2/8 x 15 6/8 inches)(with lens) without projection
Power requirements	DC 12 V
Power consumption	Approx. 13.5 W (while recording, LCD viewfinder On)
Operating temperature	0 to +40°C (+32 to +104°F)
Storage temperature	-20 to +60°C (-4 to +140°F)
Continuous operating time	Approx. 210 min. with BP-U60 battery Approx. 100 min. 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--

Lens mount	1/2-inch type EX mount
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 8 (MACRO OFF), 50 mm to 8 (MACRO ON, Wide), 735 to 8 (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 Full HD 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

--Signal inputs/outputs--

Audio input	XLR-3-pin (female) (x 2), line/mic/mic +48 V selectable
Composite output	BNC (x1), 1.0 Vp-p, 75 ohms
S-Video output	Y: 1.0 Vp-p, 75 Ω unbalanced, sync negative
Audio output	RCA type (CH-1,CH-2), -10 dBu (reference level), 47 kΩ
Component output	Mini D (x 1) Y: 1.0 Vp-p, 75 ohms, Pb/Pr: 0.7 Vp-p, 75 ohms
SDI output	BNC (x 1), HD-SDI/SD-SDI selectable
i.LINK input/output	IEEE1394, 4-pin (x 1), HDV stream input/output, S400
Timecode input	BNC (x1), 0.5 to 18 Vp-p, 10 ohms
Timecode output	BNC (x1), 1.0 Vp-p, 75 ohms
Genlock input	BNC (x1), 1.0 Vp-p, 75 ohms
USB	Mini-B (x 1), USB 2.0 High-speed
Headphone output	Stereo mini-jack (x 1), -20.5 dBu (reference level output, 16 ohms load)
DC input	DC jack
Battery input	5-pin
Remote	8-pin

--Built-in microphone--

Capsule type	Omni-directional stereo electret condenser microphone
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--Media slot--

Type	ExpressCard/34 (x 2)
Interface	ExpressCard compatible

--Built-in LCD monitor--

Accessories**Batteries and Power Supplies****BP-U30**

Lithium-ion Battery*

BP-U60

Lithium-ion Battery*

Lapel (ECM-series)**ECM-673**Short Shotgun Electret Condenser
Microphone.