SONY

make.believe

HVR-Z5N

Digital HD Video Camera Recorder

Sony Lens G

HDV 1080i

3 ClearVid CMOS sensor

Exmor™

PROGRESSIVE


SONY
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Bringing the HVR-Z5N — Emerging the new World Standard Camcorder in HD Acquisition

Introducing a truly amazing new compact HDV™ camcorder from Sony. The HVR-Z5N camcorder is designed to enhance creativity and deliver the highest standard of optical and audio quality.
Sony's newly designed "G Lens™" is incorporated into the camcorder, boasting excellent resolution, color, and contrast for breathtaking images that rival expensive interchangeable lenses.
This new compact camcorder boasts Sony's 3 ClearVid CMOS Sensor™ system, utilizing the technology of Exmor, to provide excellent low-light sensitivity and making it ideal when high performance in limited light conditions is a requirement. The ergonomically designed body allows flexible shooting under any conditions, while maintaining Sony's worldwide reputation for quality and high performance.

The standard features of the HVR-Z5N include 1080/24p/30p*[1] HDV native progressive recording modes.
Sony's new cutting-edge HYBRID recording system incorporates an optional HVR-DR60 or HVR-MRC1K Memory Recording Unit, which allows simultaneous recording on tape and non-tape media for improved NLE workflow efficiency. The HYBRID recording system is also capable of simultaneous HD and SD recording. Sony is continuously developing and expanding its HDV lineup in response to professional user feedback.

*1 In this brochure, "24p" means "23.98p" video signal and "30p" means "29.97p" video signal.

Advanced Camera Features:

✣ Sony's Exclusive High-performance "G Lens"

Sony Lens G

Discover the exceptional optical performance of Sony's "G Lens". This sophisticated lens incorporates Sony's unique optical technology and unparalleled quality control. Moreover, it's been optimized to perfectly complement the camcorder's advanced image sensor and image-processing technology, thus expanding your shooting possibilities. Express yourself more fully with the utmost precision of Sony's "G Lens".

Major "G Lens" Features on the HVR-Z5N

1. The 29.5mm wide-angle "G Lens" (equivalent to 35mm film) on the HVR-Z5N offers a field of view that's ideal for many shooting situations, ranging from broad landscape shots to conditions where sufficient distance from the subject is difficult to obtain. Its 20x optical zoom capability also enables shooting over a wide zooming range.
2. Two ED (Extra-low Dispersion) glass elements reduce chromatic aberrations caused by differences in light refraction to minimize color fringing. The advanced 10-group, 15-element lens structure also includes compound aspheric lenses for images that are crisp and clear even when shooting movies at high zooming ratio.
3. Advanced optical lens technology makes the most of Sony's 3 ClearVid CMOS Sensor system to realize sharper images with higher resolution and less noise even when shooting in very low light.
4. The six-blade iris diaphragm is nearly circular, enabling the creation of extremely beautiful background blur.

✣ Natural-touch Lens Operation

Newly designed focus, zoom, and iris control functions provide convenient lens operation. The zoom function is variable and can be controlled using the lens barrel ring, the lever at the lens grip, or the lever on the camera handle. Additionally, once you select the high-speed zoom mode, you can zoom from wide to telephoto modes about 1.5x faster than with the HVR-V1U.
The lens barrel ring controls the iris, and a simple menu adjustment allows you to change the direction of rotation to open and close it. Furthermore, you can control overall exposure by changing the function of the iris ring. Exposure control automatically adjusts the optimum iris, gain, and shutter settings. Using exposure control mode, you can also fix the gain and shutter settings. This function is ideal for varied shooting environments that range from very dark to very bright, allowing easy one-handed control using single-ring operation. The ergonomic layout of the zoom, focus, and iris control rings makes operation of these three functions possible with just one hand. Moreover, the built-in digital extender system increases the zoom ratio to approximately 30x.
Sony's Super SteadyShot system (optical) helps you achieve a stable picture even when camera handling is unsteady.
The HVR-Z5N also provides three built-in ND (Neutral Density) filters and accommodates the addition of an optional 0.8x wide conversion lens. These features provide enhanced shooting flexibility to suit your production requirements.

✣ An Ideal Handheld Camcorder Design

Sony has responded to professional user feedback to create the ideal handheld camcorder with ergonomically designed body-weight balance and a well-planned layout of buttons and connectors to reduce camera operator fatigue.

✣ Two Screw Holes for Secure Connection

To provide a more secure connection between the camcorder and tripod plate or other accessories, two screw holes have been incorporated into the base plate of the camcorder.

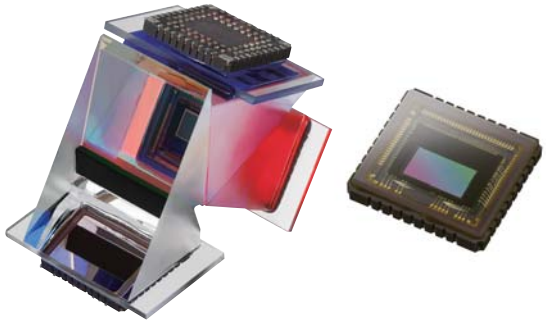
Innovative Technologies:

Cutting-edge Imaging System for New Camcorder

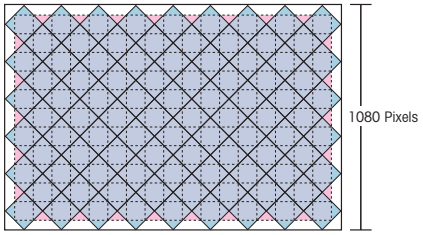
1. 1/3 Inch-type 3 ClearVid CMOS Sensor System

The 1/3 inch-type 3 ClearVid CMOS Sensor system has 45-degree rotated pixels on each chip in order to increase the signal density, while each pixel maintains sufficient surface area. In combination with the Enhanced Imaging Processor™ (EIP), the 3 ClearVid CMOS Sensor system achieves high resolution, high sensitivity, wide dynamic range, and excellent color reproduction.
The pixel shift interpolation technique has been traditionally used in small 3CCD camcorders, however, this normally requires the combination of all three color element (RGB) signals to maximize resolution. If an object lacks one or more color elements, the resolution of the object may be degraded. The 3 ClearVid CMOS Sensor system is different because it can always produce maximum resolution, regardless of the balance between color elements, thanks to its unique and sophisticated interpolation technology.

3 ClearVid CMOS sensor



Pixel Layout



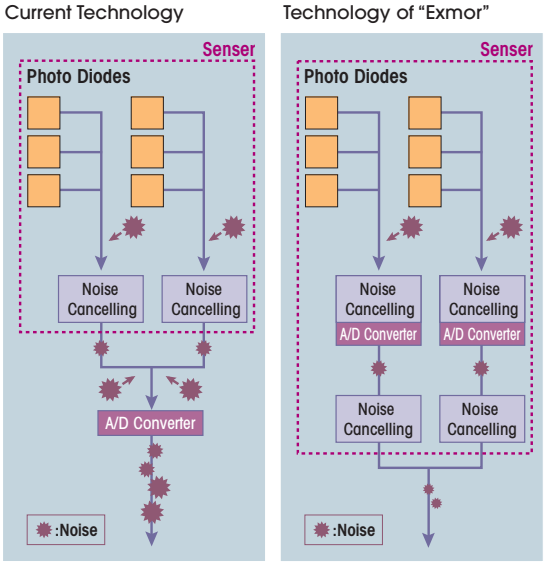
Pixels (Photo Diodes)

Signals after interpolation

2. Enhanced Functionality with the Technology of Exmor

The new HVR-Z5N boasts cutting-edge features such as the technology of Exmor, which utilizes the full potential of the 3 ClearVid CMOS Sensor system. Exmor features the column-parallel A/D conversion technique and the dual noise-cancelling method also used in Sony's top-of-the-line models. Multiple A/D (analog to digital) converters on each pixel row convert analog signals to digital as soon as they are generated, unlike traditional technology that only has one A/D converter on each chip. The technology of Exmor can eliminate the influence of external noise that enters the signal chain during transfer to the A/D converter, resulting in high-quality digital signals with extremely low noise. This significantly enhances shooting in low-light environments. By adopting this groundbreaking technology, the new 1/3 inch-type 3 ClearVid CMOS Sensor system enables the HVR-Z5N to achieve a low light sensitivity of just 1.5 lux*2.

*2 At 1/30 shutter, auto iris, and auto gain



Exmor™

Expanding the HDV Format as a Global Standard

The HDV 1080i specification uses one of the "MPEG2 Long GOP" compression profiles. This highly efficient and robust "MPEG2 Long GOP" codec – which is also used in Sony's XDCAM HD and XDCAM EX series – enables users to record stunning-quality HD video. The HVR-Z5N provides over 60 minutes*3 of recording time using the widely available mini-DV videotape.

*3 When using Sony's recommended Professional HDV tape DigitalMaster™ model PHDVM-63DM, an approximate recording time of 63 minutes is possible.

HDV

HDV 1080i

PHDVM-63DM

PHDV-276DM

Memory Recording Unit (option)*
*CF card is not included.

HVR-DR60 (option)

Switchable Recording and Playback – HDV1080i/DVCAM™/DV

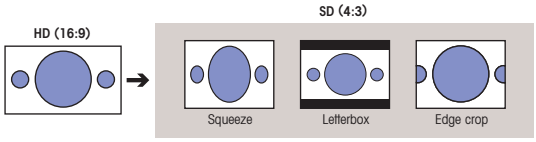
The HVR-Z5N can switch between HDV 1080i, DVCAM, and standard DV recording, providing the ultimate flexibility to suit your production needs. Native editing in the HDV format is now supported by most popular NLE (nonlinear editing) software. Additionally, HDV can be recorded as a memory file on inexpensive computer media.
The optional HVR-MRC1K Memory Recording Unit records to standard CompactFlash® (CF) cards that can be quickly and easily exchanged for nonlinear editing. The optional HVR-DR60 Hard Disk Recording Unit's large-capacity 60GB hard drive provides 4.5 hours of recording time.

DVCAM

DV Digital Video Cassette

Built-in Down-converter for SD Production

The HVR-Z5N can convert material from 1080i down to 480i and output the video signals through its i.LINK interface and other SD output connectors. This allows users to edit recorded material with a compatible nonlinear editing system using current DV editing software, as well as record SD signals to an external VTR.



*4 Letterbox mode is not available from the i.LINK connector. i.LINK is a trademark of Sony 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 service center.

Selectable Progressive Modes

The HVR-Z5N has two types of progressive shooting modes:

1. 24p/30p HDV Native Progressive Recording Mode

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The HVR-Z5N features 24p/30p native progressive recording mode. The 3 ClearVid CMOS Sensor system and EIP create true 1080p images, which can then be recorded as progressive signals by the HVR-Z5N in HDV format. The progressive HDV stream can be output from an i.LINK connector and used for progressive editing with compatible NLE software. Native progressive recording modes are suitable for output to film, CG composition, viewing on a progressive monitor, or as an Internet movie.

Note: interlaced video is output from connectors other than i.LINK.

2. 24p/30p Progressive Scan Mode

In these modes, the 1080p image captured by the 3 ClearVid CMOS Sensor system is also recorded as an interlaced signal by dividing each frame into two fields. This enables compatibility with current editing and monitoring equipment that only accept interlaced signals, while maintaining the quality of the 1080p image. When using the "24p scan" setting, captured images are recorded as 60i through means of 2-3 pull-down conversion. Progressive scan modes are suitable for feature films, documentaries, and music videos, which have to be recorded as interlaced video for viewing on interlaced monitors, but want to offer a "progressive look" to their motion.
It is also possible to edit footage recorded in the "24p scan" mode as progressive material. NLE software that is compatible with the "24p scan" mode can remove the 2-3 pull-down, then edit the footage as 24p material*5. For 30p, most NLE software can output the edited timeline in progressive format by merging odd and even fields. Furthermore, the "24p scan" mode is available in not only HDV recording but also DVCAM/DV recording. It means the HVR-Z5N provides SD-quality 24p footage as well.

*5 When 24p editing is needed with the "24p scan" mode, be sure to select the "24A" setting in the "Scan Type" menu instead of the "24" setting. This setting records the 2-3 pull-down identification data in the HDV stream, so that compatible NLE software knows when to remove the 2-3 pull-down cadences. In the 24A setting, interruptions in time code and video may appear between recordings when viewed on an HDV device. There is no "24A" setting in DVCAM and standard DV modes.

Ready for HYBRID Solution with HVR-MRC1K (Option)

The HVR-Z5N is ready for HDV/DV HYBRID operation with the optional HVR-MRC1K Memory Recording Unit. In HYBRID operation, you can simultaneously record video footage to tape and to a standard CompactFlash (CF) card. The HVR-Z5N has a special shoe connector*6 for direct attachment of the HVR-MRC1K without the use of a cable. This smart combination never interferes with shooting operations. The ergonomically integrated design provides easier handling in any shooting situation. The HVR-MRC1K automatically synchronizes with the recording commands of the HVR-Z5N. Various recording options are available when using the HVR-MRC1K in HYBRID operation. These include Synchronous recording, Relay recording, or HVR-MRC1K-only recording. Furthermore, the HVR-Z5N can display HVR-MRC1K status information on its LCD for convenient reference. The display data includes Connection status, REC status, and the remaining CF recording time. It is very convenient to be able to monitor the operation of HVR-MRC1K without having to check the rear display panel.

*6 The intelligent shoe connector inputs and outputs an HDV/DV stream and supplies power to the HVR-MRC1K Memory Recording Unit. The i.LINK connector is not available when the unit is attached to the camcorder.

The recording time on a 16-GB CF card*7 in HDV, DVCAM and DV format*8 is approximately 72 minutes.

CF card capacity	Recording time(approximately)
16GB	72 minutes
8GB	36 minutes
4GB	18 minutes
2GB	9 minutes

*7 At least 133x speed and 2-GB capacity is required.
The following CF cards were tested for use in the Memory Recording Unit.(As of July, 2009)

SanDisk
Extreme III Series 8GB/16GB
Extreme IV Series 8GB/16GB

Lexar Media
Lexar Professional Series 8GB
Lexar Professional UDMA Series 8GB/16GB

This does not mean that Sony will guarantee the usage of all CF cards provided by the manufacturers mentioned above. For specified information and latest CF products, please contact the CF card manufacturers.

With commonly-used CF cards, there may be rare occasions when data will not be recorded correctly depending on the products.
If you first use a CF card, it is advisable to test it in advance in the following way.

1) Format the CF card in the Memory Recording Unit.

2) Shoot more than 20 pieces of footage of about 10 seconds each in HDV recording mode.

3) Import the files into your nonlinear editing software to check if it can be edited properly.

*8 The recording time may change according to the CF card type and recording format.

72 min.
16 GB

HDV 1080i DVCAM DV Digital Video Cassette

Operational Versatility:

✣ XtraFine™ LCD Panel

A 3.2 inch-type XtraFine LCD is located on the HVR-Z5N in the same position as on the HVR-Z1U. It has approximately 921,000 pixels (1920x480), which is 4x greater than the LCD of the HVR-Z1U, and this higher resolution allows for easier focus adjustment. The XtraFine LCD displays virtually 100% of the recorded picture area at a color temperature of 6500K approximately.

✣ XtraFine EVF

The 0.45 inch-type XtraFine EVF (Electronic View Finder) has approximately 1,227,000 pixels (852x3 (RGB)x480). This device has three independent LEDs for Red, Green, and Blue colors. This technology allows users to monitor objects with remarkable color reproduction accuracy and high resolution*[9]. The EVF has a selectable display mode between Color or Black and White. The XtraFine EVF displays virtually 100% of the picture area at a color temperature of 6500K approximately.

*9 When the camcorder is panned quickly or when an object on the screen moves quickly, the R/G/B primary colors may momentarily be seen on the object in the EVF.

✣ InfoLITHIUM L Series Battery Compatibility

The HVR-Z5N uses the same batteries as the HVR-Z7U, HVR-Z1U, HVR-V1U, and DSR-PD170, so you can use your existing chargers and batteries.

✣ HDMI Output Connector

Uncompressed digital HD video and audio signals are output from the HDMI connector. You can see stunning HD images on an HDMI-compatible monitor display. During shooting, a pre-compressed 1920x1080i/4:2:2 signal is output from the HDMI connector.

✣ Two Accessory Shoe Connectors

The HVR-Z5N features two accessory shoe connectors. One is a cold shoe on the top of the microphone unit at the front, and the other is a screw-hole type shoe located on the handle. The rear side shoe can be changed to a cold shoe using supplied parts.

✣ Versatile Audio Input Selection

The HVR-Z5N features versatile audio input selection with a newly designed high-quality built-in stereo microphone, as well as two XLR audio input channels for professional microphones or connecting to an external-line audio source. Additionally, the ECM-XM1 high-sensitivity, low-noise monaural microphone is supplied. This microphone has an S/N ratio of 78dB and a sensitivity increase of 14dB over its predecessor, the ECM-NV1*[10].
By adjusting the INPUT ASSIGN switch located on the side panel of the HVR-Z5N, you can easily assign the two audio input channels to the built-in stereo microphone, external-line audio, or dedicate one channel to each and record them separately or mixed. When assigned to one channel, the built-in stereo microphone acts as a wide-directional monaural microphone.

*10 The ECM-NV1 is a supplied microphone with the DSR-PD170, DSR-250, HVR-A1U, and HVR-V1U.

✣ One-touch Clip-type Microphone Holder

A one-touch clip-type microphone holder makes it easy to attach and remove the microphone for quick storage.

Creative Versatility:

Smooth WB (White Balance)

The Smooth WB feature is a smooth transition white balance system that avoids unnaturally sudden color temperature changes between preset white balance settings. This function is useful when you move from an artificial, low-light environment inside a building, to bright natural sunlight outside.

Smooth Gain

The Smooth Gain function is a smooth transition gain system that avoids sudden brightness changes caused by manual gain-level adjustment. With this function, the brightness changes gradually when the gain-level position is switched and avoids any sudden, unwanted iris adjustment.

Minus Gain

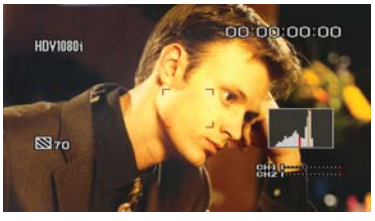
Minus gain settings of -6 and -3dB have also been added to help reduce sensitivity under bright lighting conditions. When the iris needs to be opened to create a short depth of field, a suitable brightness level can be achieved with this function.

AGC Range Configuration

The range of the AGC (Automatic Gain Control) function can be set by assigning its upper and lower limits. The use of minus gain can be achieved by setting the lower limit of the AGC. Once minus AGC is set to ON, the minimum AGC parameter is set to approximately -3dB. If you set it to OFF, the minimum AGC parameter is set to 0dB.

Advanced Histogram

The Histogram Indicator for brightness can be displayed on the LCD monitor and viewfinder, allowing operators to easily evaluate the brightness of captured images. A target window appears in the center of the screen and the brightness level is indicated by a vertical red line in the histogram. The zebra indicator level appears as a yellow vertical line in the histogram as a reference for proper exposure.



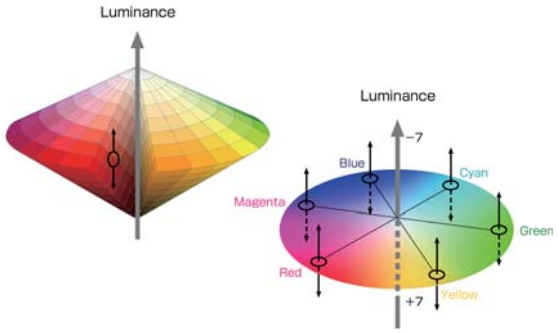
Picture Profile™

Up to six different picture-quality settings, including gamma and color settings, can be registered in the memory as Picture Profile. This labor-saving function allows operators to easily recall customized picture-quality settings for various shooting conditions. It is also useful for matching footage shot at different times or for multi-camera setups. The Picture Profile functions of the HVR-Z5N are the same as those of the high-end HVR-Z7U model, which include enhanced versions of the HVR-Z1U and HVR-V1U functions, plus a selection of new ones.

Color Depth

Generally, the brightness of a video image increases as the color level becomes more vivid. In the HVR-Z5N, the brightness and color level are processed independently so that more flexible tone – for instance, a dark image with vivid color – is realized by 3D-LUT*[11] color processing.

*11 3D-LUT = three-dimensional look-up table.



Color Correction

The Color Correction function of the HVR-Z1U has been improved in the HVR-Z5N. Color Correction provides two functions for creative shooting. The Color Extraction function can retain up to two desired colors of monitored pictures on the screen, while making all other colors black and white. The advanced function allows users to select the color simply by pressing a button to memorize the center color of the captured image.

The Color Revision function can change the hue of the color specifically designated by the Color Extraction function. This function is good not only for creating impressive images, but also for blue or green screen shooting in order to normalize uneven color. The color data is stored in each Picture Profile so that users can select the most suitable color setting for each shooting situation.

Color Correction Images Simulated

Normal | Color Extraction | Color Revision

✣ WB (White Balance) Shift

The WB Shift function allows users to create a custom color or to adjust the color temperature of the camcorder. There are two WB Shift options to choose from:

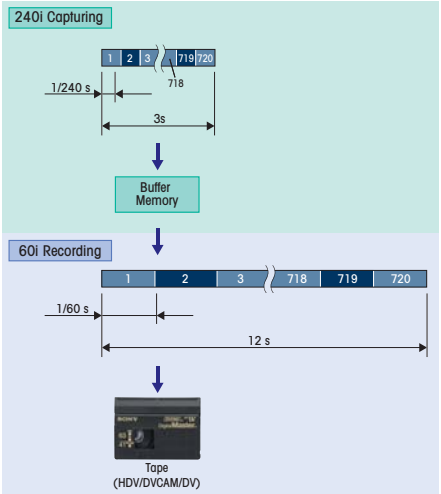
- LB-CC type: adjusting the LB axis (color temperature) and CC filter effect.
- R-B level type: adjusting the red and blue levels

✣ Skintone Detail

This function allows users to change the sharpness of an object with a specific color, and is particularly good for making skin tones look more natural. The target color can be specified by controlling the Phase/Range/Saturation/Y Level/Y Range parameters or by pressing a button to specify the color of an object with a color picker. If the sharpness of the background object is decreased, the blur looks more natural.

✣ Smooth Slow Rec

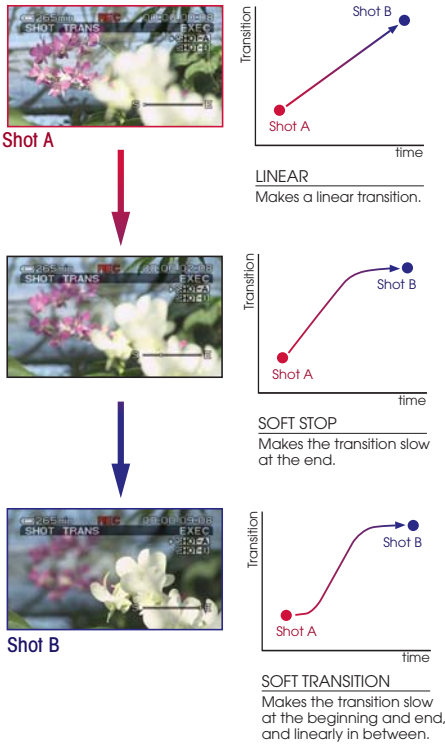
The Smooth Slow Rec function of the HVR-Z5N enables smooth slow-motion playback by capturing images 4x faster than normal (240 fields/s). In this mode, for example, quad-speed images are captured for three seconds, stored in the built-in buffer memory, and then recorded to tape (in either HDV, DVCAM, or DV format) as slow-motion pictures lasting 12 seconds*12. This allows recorded images to be checked immediately in the field. Recoding durations are available in three, six, and 12 seconds depended on the picture quality. Picture quality is slightly degraded, but this quad-speed imaging capture is the fastest speed available in compact HD camcorders. Smooth Slow Rec is ideal for sports or nature photography, where the action can be viewed more easily in slow motion, and opens up many creative possibilities.



*12 Audio cannot be recorded while shooting in this mode.

✣ Shot Transition™ Function

The Shot Transition function allows for smooth automatic scene transitions. After you have programmed a shot's START and END point settings (e.g., for zoom, focus, iris, gain, shutter speed, and white balance) and pressed the start button, a smooth picture transition takes place over the duration of the shot by automatically calculating intermediate setting values. This is very useful when complex camera settings are required during the scene transition – for example, when panning the camcorder from a distant object to a close object. Transition types can be selected from a choice of "LINEAR", "SOFT STOP", and "SOFT TRANS", transition time can be set from 2 to 90 seconds, and start delay time can be selected from 5, 10, and 20 seconds.



✣ Assignable Features

HVR-Z5N provides up to seven ASSIGN buttons for quick access to frequently used functions suitable for variable shooting conditions. Some default functions are pre-assigned by name. The assignable functions are AE Shift, Back Light, Color Bars, Digital Extender, End Search, Expanded Focus, Fader, Focus Macro, Hyper Gain, Index Mark, Last Scene Review, Marker, Peaking, Photo, Picture Profile, Push AT Iris, REC Review, Ring Rotate, Shot Transition, Smooth Slow REC, Spot Light, Steady Shot, TC Reset, TC Count Up, and Zebra.

Accessories

New **RM-1000BP**
Remote Commander

- Multifunction LANC remote commander
- Controls main camcorder functions
- Better Human User Interface (HUI) for professional applications

New **VCL-HG0872K**
Wide Conversion Lens

- Equivalent to 0.8 magnification
- High-resolution wide conversion lens for the HVR-Z5
- Bayonet mount for quick and easy attachment
- Supports large French Flag and 4x5.65inch filter holder
- Quick and convenient integrated lens shutter

New **LCS-BP1BP**
Soft Carrying Case

- Custom backpack carrying case with shoulder and waist straps
- Supplied storage for accessories in protective pouches
- Optional "VCT-SP1BP Camcorder Support" can be attached

New **LCH-GT1BP**
Hard Carrying Case

- Hard shell carrying case, custom-designed for Sony's handheld camcorders and accessories
- Integrated wheels for easy transport

New **HVL-LBPA**
LED Battery Video Light

- LED reliability and low power consumption of 16W
- Battery power from NP-F770/F970
- Wide compatibility for flexible installation (Cold shoe/Screw bolt/ Screw hole)
- Ideal for Wide-angle shooting and interviews Spot (600lx@1m) or flood-lighting (300lx@1m) with attached condensing lens ON or Off
- Light diffuser attached to soften shadows and reduce contrast
- Long Operating time: approximately 3 hours with the NP-F970 (at maximum brightness)
- Supplied indoor/outdoor filter kit (5,500K to 3,200K)

VCT-SP1BP
Camcorder Support

- Weight support for stable/ comfortable shooting
- Support for several shooting styles (e.g., high-angle shooting)
- Quick-release function from harness for excellent mobility
- Perfect design for camcorder Monopod
- Carbon shaft for light weight and rigid design
- RM-1BP Remote Controller supplied as standard

AC-VQL1BP
AC Adaptor / Charger

- 4 slots battery charger (A pair of parallel charge)
- 2 charge mode selectable (Normal/ Full)
- Charging information Remaining time to charge complete Current available time for shooting
- Battery Log information Total charge time Total charge cycle last operation date

SH-L32WBP
LCD Hood

- LCD Hood for 3.2" LCD monitor
- Adjustable shade (360° shade)
- Folding structure realize transfer with camcorder

HVR-DR60
Hard Disk Recording Unit

An external Hard Disk Recording Unit with a 60GB capacity and 4.5 hours of recording time for HDV, DVCAM and DV. (battery is not supplied)

HVR-MRC1K
Memory Recording Unit

A memory recording unit kit which consists of the HVR-MRC1 memory recording unit,HVRA-CR1 cradle, cold-shoe adaptors and an i.LINK (IEEE1394) cable.
The widely available standard CompactFlash (CF) card is used for HDV, DVCAM,and DV file recording.

VCT-PG11RMB
Tripod with RM-1BP Remote Controller

2NP-F970/B
InfoLITHIUM Rechargeable Battery Pack (2 pack)

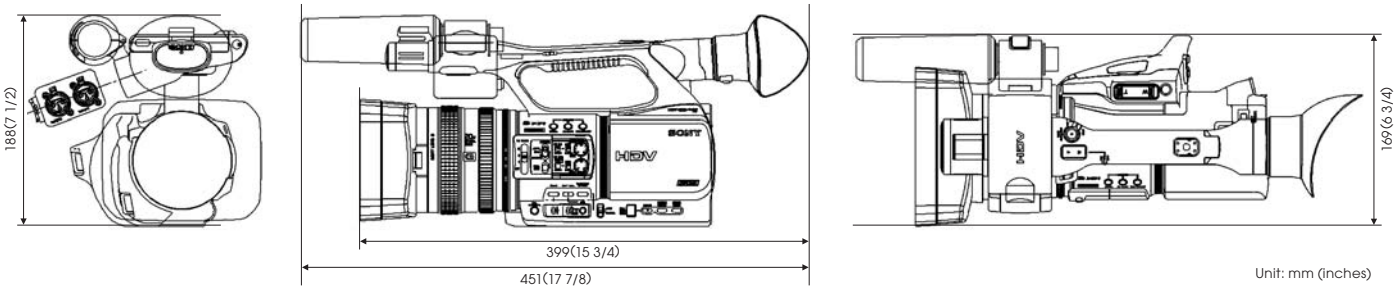
NP-F970/F770/F570
InfoLITHIUM Rechargeable Battery Pack

RM-1BP
LANC remote controller

VCT-1BP
Bracket
(for HVR-DR60, HVR-MRC1K attachment)

Specifications

HVR-Z5N		
Camera section		
Lens		Sony G Lens, 20x (optical), f = 4.1 to 82mm, f = 29.5 to 590 mm at 16:9 mode, f = 36.1 to 722 mm at 4:3 mode, filter diameter: 72mm
Built-in filter		Clear, 1/4, 1/16, 1/64
Imaging system		1/3 inch-type, progressive 3 ClearVid CMOS Sensor system with technology of Exmor
Picture elements		Approx. 1,037,000 pixels (effective), approx. 1,120,000 pixels (total)
Focus		Auto, manual (focus ring/one push auto/infinity/AF assist/focus macro)
White balance		Auto, one-push auto (A/B positions), indoor (3200 K), outdoor (selectable level -7 to +7, approx. 500K/step), manual WB Temp (selectable 2300K to 15000K, 100K/step)
Manual shutter speed	Auto	1/60 - 1/2000
	Manual	60i/30p: 1/4 - 1/10000, 24p: 1/3 - 1/10000
Gain		-6, -3, 0, 3, 6, 9, 12, 15, 18, 21 dB
Minimum Illumination		1.5 lux (auto gain, auto iris, 1/30 shutter)
VTR section		
Recording format		HDV1080/60i/30p/24p, DVCAM, DV SP 480/60i (NTSC)
Play out/Down conversion format		HDV1080/60i/30p/24p, DVCAM, DV SP 480/60i (NTSC)
Playback/Recording time	HDV/DV SP	Max. 63 min with PHDVM-63DM cassette
	DVCAM	Max. 41 min with PHDVM-63DM cassette
Input/Output connectors		
Audio/Video output		10-pin connector A/V OUT jack (component, composite and unbalanced audio x2ch with the supplied cables)
HDV/DV input/output		i.LINK interface (IEEE 1394, 4-pin)
XLR audio input		XLR 3-pin female x 2ch
Headphone		Stereo mini jack (ø3.5 mm)
LANC		Stereo mini-mini jack (ø2.5 mm)
Digital video output		HDMI connector
Built-in output devices		
LCD view finder		0.45 inch-type (Viewable area measured diagonally), approx. 1,226,880 dots (852 x 3(RGB) x 480), 16:9 aspect ratio
LCD monitor		3.2 inch-type (Viewable area measured diagonally), XtraFine LCD, approx. 921,600 dots, hybrid type, 16:9 aspect ratio
General		
Mass		Approx. 2.2 kg (4 lb 14 oz) (w/o tape, battery)
Dimension (W x H x D)		Approx. 169 x 188 x 451mm (6 3/4 x 7 1/2 x 17 7/8inch) (with lens hood, microphone and large eye cup)
Power requirements		DC 7.2 V (battery pack), DC 8.4 V (AC adaptor)
Power consumption	HDV	Approx. 7.1 W (with ECM-XM1 / LCD viewfinder ON)
	DVCAM/DV	Approx. 6.8 W (with ECM-XM1 / LCD viewfinder ON)
Battery operating time	HDV	395min(NP-970)
	DVCAM/DV	415min(NP-970)
Operating temperature		0 to 40 °C (32 to 104 °F)
Storage temperature		-20 to 60 °C (-4 to 140 °F)
Supplied accessories		AC-VQ1050 AC adaptor/charger, NP-F770 infoLITHIUM rechargeable battery pack, A/V multi-connecting cable, Component A/V cable, lens hood with lens cover, lithium battery (CR2025), shoe adaptor, large size eye-cup, RMT-831 wireless Remote Commander, ECM-XM1 monaural electret condenser microphone, operating instructions (CD-ROM), printed operating instructions



Unit: mm (inches)

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