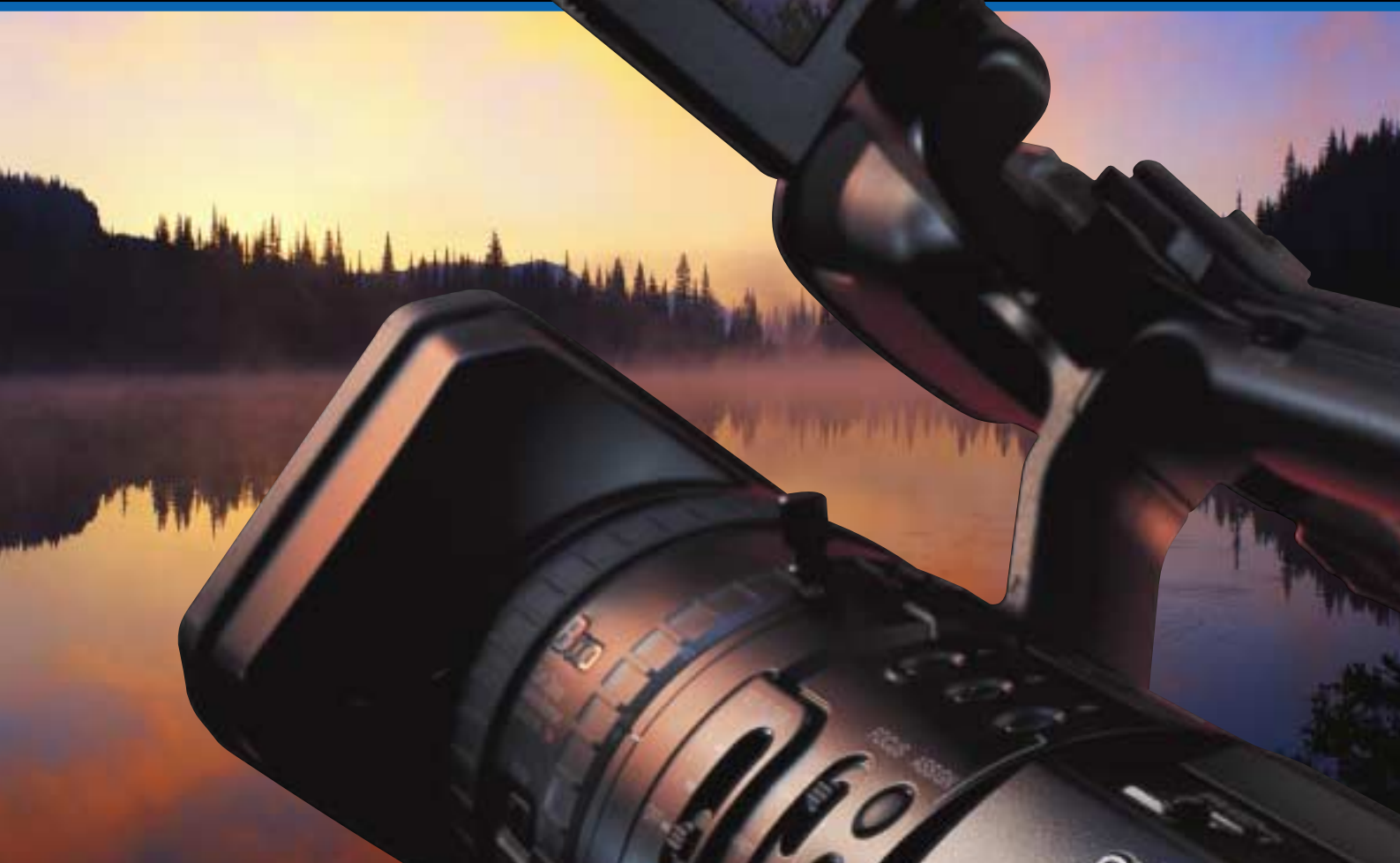# SONY®

Digital HD Video Camera Recorder

HVR-Z1U

HDV™
HDV 1080i

Bringing Compact and Cost-effective HD Acquisition into the Field – the HVR-Z1U HDV 1080i Camcorder

The rapid transition to HD programming in broadcasting and postproduction has introduced a tremendous demand for an entry-level path into the HD world. Sony's response to this demand is the HVR-Z1U Digital HD Video Camera Recorder – a compact and cost-effective HD camcorder that builds on the market-acclaimed DVCAM™ recorders.

The HVR-Z1U camcorder adopts the all-new, 1/4-inch HD format – the HDV 1080i specification of the HDV™ format. Combined with three high-resolution 1/3-inch type mega pixel CCDs, the HVR-Z1U captures and plays back 1080i HD signals, while maintaining the DVCAM/DV recording and playback capabilities provided on current Sony DVCAM models. What's more, the HVR-Z1U offers a down-conversion capability of its 1080i recordings.
These features allow the HVR-Z1U to be active immediately in current SD systems, while also providing a step-by-step migration to the HD world – operators can continue to acquire in DVCAM or DV, and switch to the HDV as needed, or acquire in HDV 1080i from the start and use the down-conversion capability as required.

In addition to a unique camcorder body design and with its multitude of camera features, the HVR-Z1U offers maximum operability in the field, as well as opening up a new range of opportunities for creative shooting. Combining these features with the HD picture quality that HDV format provides, the HVR-Z1U becomes an exciting acquisition tool for a variety of applications today and tomorrow – from video journalism, wedding and event videography, corporate and training productions, and digital movie-making, up to broadcast newsgathering.

Offered at a price tag comparable to Sony DVCAM camcorders, the HVR-Z1U paves the way into cost-effective but uncompromised HD program production.
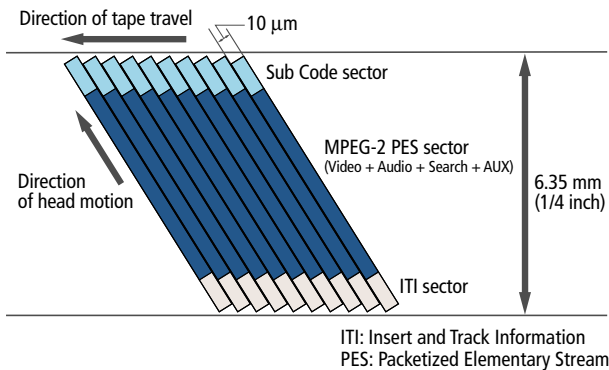
HDV FORMAT

A New Addition to the HD Format that Broadens the Scope of HD Program Production

HDV 1080i Specification[1]

The HDV 1080i specification of the HDV format features 1080 effective scanning lines (interlace scanning system) and 1,440 horizontal pixels. It adopts the MPEG-2 compression format (MP@H-14 for video), which uses 8-bit digital component recording with a sampling rate of 4:2:0. MPEG-1 Audio Layer II is used as the audio compression format, allowing for two-channel recording with a sampling frequency of 48 kHz/16-bit. The HDV 1080i specification provides high picture quality that can be used for HDTV program production.

1 The HDV format also defines the HDV 720p specification, which features 720 effective scanning lines (progressive scanning system) and 1,280 horizontal pixels.

Track Pattern of the HDV 1080i Specification

Direction of tape travel 10 μm
Sub Code sector
Direction of head motion
MPEG-2 PES sector
(Video + Audio + Search + AUX)
6.35 mm (1/4 inch)
ITI sector
ITI: Insert and Track Information
PES: Packetized Elementary Stream

Compatible with Existing and New DV Video Cassette Tape

As a member of the proven DV family of formats, the HDV format has, from the outset, been developed for compatibility with all grades of DV videocassette tape. This allows operators to use high-grade DV videocassette tapes for applications where high robustness is critical, or consumer-grade videocassette tapes for more economical operations. For heavy-duty applications, newly developed high-grade PHDVM-63DM Mini Cassette tape, DigitalMaster™, which is compatible with the HDV, DVCAM and DV formats, is available.

Long Recording Time

The HDV format adopts the same track pitch and tape speed as the DV format, thus offering the same recording time – a maximum of 63 minutes on a mini videocassette such as DigitalMaster tape.

CAMERA FEATURES

New Technologies to Capture High-resolution Images of 1,440 (H) x 1,080 (V)

3CCD Camera System with 1080i HD CCDs

The HVR-Z1U incorporates three 1/3-inch type 1080i HD CCDs, each with a 16:9 aspect ratio, a total pixel number of 1.12 M (1,012 x 1,111), and an effective pixel number of 1.07 M (972 x 1,100). The combined 3CCD system achieves a resolution of 1,440 x 1,080 by adopting the precise spatial offset technology and interlace scanning system.

14-bit HD DXP

The HVR-Z1U incorporates a high-integrity 14-bit HD DXP (Digital eXtended Processor), which features a 14-bit A/D converter and advanced camera processing. This 14-bit HD DXP can process the high-quality images captured by the 1080i HD CCDs with greater precision than conventional 10-bit A/D LSIs. In particular, this higher bit resolution allows the contrast to be reproduced more faithfully in mid-tone areas of the picture. The 14-bit HD DXP also enables highly sophisticated image controls, such as Cinematone Gamma, and Color Correction functions.

Optical 12x Carl Zeiss Vario-Sonnar T*™ Zoom Lens

The HVR-Z1U is equipped with a new Carl Zeiss Vario-Sonnar T* high definition lens with a 12x zoom function. Its fully coated glass is the same as used on Carl Zeiss prime lenses, producing sharp, high-contrast images, with virtually no chromatic aberration. This lens is designed with a wide viewing angle, and a focal length ranging from 32.5 mm to 390 mm in 16:9 mode[2], and from 40 mm to 480 mm in 4:3 mode[2], thanks to a large filter diameter of 72 mm.

2 These values are calculated to be equivalent to the 35 mm film.

Optical Super SteadyShot™ System

The HVR-Z1U employs the Super SteadyShot system, whereby horizontal and vertical movements can be detected independently by the sensors. The prism system located behind the lens adjusts and optically compensates for unsteady camera handling, and a choice of SteadyShot function types – "HARD", "STANDARD", "SOFT" or "WIDE CONV"[3] – can easily be selected.

3 Select "HARD" to activate the SteadyShot functionality with stronger effect than "STANDARD".
Select "SOFT" to activate the SteadyShot functionality with softer effect than "STANDARD".
Select "WIDE CONV" for the most effective SteadyShot functionality when the optional VCL-HG0872 wide conversion lens is attached.

RECORDER FEATURES

Multi-format Recording and Playback Capabilities, Supporting HDV 1080i, DVCAM and DV

Switchable Recording and Playback – HDV 1080i/DVCAM/DV[4] and 60i/50i

The HVR-Z1U can switch between HDV 1080i, DVCAM and DV recording, providing full flexibility to record in either Standard or High Definition depending on production needs. In addition, it can be switched between 60i and 50i modes (NTSC and PAL), allowing for flexible productions without the need for two separate camcorders with each standard.

4 The HVR-Z1U supports DV SP mode only; no support for DV LP mode.

Down-conversion Playback Capabilities

The HVR-Z1U can convert material from 1080i down to 480i and 576i, and output these video signals through its i.LINK interface. In addition, these signals can also be output via either analog component, composite, or S-video connectors. This allows editing of recorded material with a nonlinear editing system using current DV editing software[5] as well as recording SD signals to an external VTR, while simultaneously recording HDV signals with the HVR-Z1U. The HVR-Z1U can also down-convert to 480p and 576p and output these signals through its analog component video connectors.

When down-converting these signals, the aspect ratio displayed can be converted from 16:9 to 4:3. Display modes can be selected from Squeeze, Letterbox or Edge crop.

5 When using the HVR-Z1U down conversion capabilities with your current DV editing software, please contact your nearest Sony office to confirm compatibility.

HDV 1080i (16:9) → DVCAM/DV (4:3)
Squeeze Letterbox Edge crop
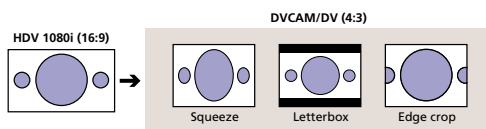
Recording, Playback and Down-conversion Formats

60i Mode

Recording Format	Playback/ Down Conversion Format	i.LINK	Input Analog Composite	Input S-Video	Output Analog Component	Output Analog Composite	Output S-Video
1080/60i	1080/60i	○	–	–	○	–	–
	480/60p (16:9/4:3)	–	–	–	○	–	–
	480/60i (16:9/4:3)	○	–	–	△1	△2	
480/60i (16:9)	480/60i (16:9/4:3)	○	△2	△1	△1	△2	
480/60i (4:3)	480/60i (4:3)	○	△2	△1	△1	△2	

50i Mode

Recording Format	Playback/ Down Conversion Format	i.LINK	Input Analog Composite	Input S-Video	Output Analog Component	Output Analog Composite	Output S-Video
1080/50i	1080/50i	○	–	–	○	–	–
	576/50p (16:9/4:3)	–	–	–	○	–	–
	576/50i (16:9/4:3)	○	–	–	△1	△2	
576/50i (16:9)	576/50i (16:9/4:3)	○	△2	△1	△1	△2	
576/50i (4:3)	576/50i (4:3)	○	△2	△1	△1	△2	

○: Available
△: Either △1 or △2 connection is available. When both are connected to cables, the △1 connection has a priority.

16:9 Widescreen Acquisition in DVCAM and DV formats

The HVR-Z1U is capable of native 16:9 widescreen image capturing, with a high resolution of 720 x 480 pixels (NTSC) and 720 x 576 pixels (PAL) in DVCAM and DV formats, and providing true 16:9 images in SD format.

HD Codec Engine™

The HVR-Z1U employs the highly advanced HD Codec Engine, which efficiently compresses base band HD signal data at approx. 25 Mb/s with MPEG-2 compression, while maintaining optimal HD quality. Designed for reduced energy consumption, this powerful digital signal processor fits perfectly inside the compact and streamlined body of the HVR-Z1U.

i.LINK™[6] Interface

The HVR-Z1U is equipped with a 4-pin i.LINK interface. This allows for on-cable digital transfer[7] of audio, video, and command signals to a connected VTR or nonlinear editing system in the HDV, DVCAM and DV formats.

6 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.

7 Insert and assemble editing using HDV material is not recommended with the HVR-Z1U. When video programs in the HDV format are transferred via the i.LINK interface and edited, transitions from cut to cut may not be smooth.

Built-in Stereo Microphone and 2-channel XLR Audio Input

The HVR-Z1U provides a high-quality, built-in stereo microphone as well as two XLR audio input connectors for connecting professional microphones or feeding an external-line audio source. Phantom power of approx. 40 V[8] can be supplied for the external condenser microphone. INPUT 1 audio can be recorded on CH1 only, or on both CH1 and CH2 audio tracks, with easy selection via a switch.

8 When using the phantom power for an external microphone, the specification of the input power supply must be checked.

2-channel Independent Audio Record Level Control with Audio Level Meter

Each input level for CH1 and CH2 can be independently adjusted using two audio level dials on the camera body and viewed with an audio level meter on the LCD monitor. The audio level meter can be recalled quickly and easily by a Status Check function.

Advanced Features for Professional Results

ECM-678
Electret Condenser
Microphone (optional)

Built-in Microphone

Large, 16:9 Widescreen Color Viewfinder

The 0.44-inch type color LCD viewfinder displays high-resolution color pictures of approx. 250,000 pixels in a widescreen aspect ratio of 16:9. Operators can also select to display pictures in black and white. The size of the eyepiece has been increased to allow viewing of images even while wearing glasses. The supplied large-size eye cap provides superior light-excluding capability, and allows easy focusing and comfortable use of the viewfinder.

Large, 16:9 Widescreen Hybrid LCD Monitor

The HVR-Z1U includes a 3.5-inch type color LCD monitor with a high resolution of approx. 250,000 pixels, which allows for viewing of the input source during recording, or checking the playback picture on location in a widescreen aspect ratio of 16:9. This large screen is also helpful in setting menus or audio recording levels, as well as monitoring the camera and audio status while mounted on a tripod. The hybrid LCD monitor combines the characteristics of both transmissive and reflective LCD panels. The transmissive LCD panel is well suited to dark conditions, such as those found in the studio, while the reflective LCD panel provides clear viewing in bright conditions, such as under strong sunlight.

4:3 Marker

Zoom Ring

Assign Buttons

Iris Dial

Simultaneous Operation of LCD Monitor and Viewfinder

The LCD monitor and viewfinder can be used simultaneously. The LCD monitor is located above and in front of the handle, which places it on the same level as the viewfinder. This allows operators to perform focus adjustments on the subject with the LCD viewfinder, while adjusting the color balance with the LCD monitor.

Long Operating Time

With the optional NP-F970 InfoLITHIUM™ Rechargeable Battery Pack attached, the HVR-Z1U can continuously record in HDV mode for up to 360 minutes, or up to 380 minutes in DVCAM/DV mode.

Battery Life

Continuous Recording Time*	With LCD Viewfinder On		With LCD Monitor On**		With LCD Viewfinder and Monitor On	
	HDV	DVCAM/DV	HDV	DVCAM/DV	HDV	DVCAM/DV
NP-F570 (supplied)	115 min	120 min	105 min	110 min	100 min	105 min
NP-F770 (optional)	235 min	250 min	220 min	235 min	210 min	220 min
NP-F970 (optional)	360 min	380 min	335 min	355 min	315 min	335 min

* Continuous recording time, indoors at 25C°.
**With LCD backlight on

On-handle Zoom Lever and Rec Start/Stop Button

In order to facilitate zoom control and recording operation during low-angle shooting, an additional zoom lever and a rec start/stop button have been added to the carrying handle. Zoom speed can be selected from H, L or OFF via the three-position slide switch located on the side of the handle. The H and L settings can be selected from values of 1 to 8 via menu.

Variety of Zoom Operations

In addition to two zoom levers on the carrying handle and on the side of the camera body, a motorized zoom ring, equipped with stops and barrel marking, is located on the lens body. Turning this zoom ring allows for fine adjustments in zoom position settings, providing operability and feeling comparable to manual zoom operations. Furthermore, the supplied wireless Remote Commander™ can be used for external control. These various zoom control functions enable operators to deploy various shooting styles.

Shot Transition Buttons

Zoom Levers

Audio Level Dials

Six Assign Buttons

Functions frequently used in the field can be assigned to six Assign Buttons (push buttons), allowing operators to make rapid changes under field conditions. The assignable functions include AE Override, Hyper Gain, All Scan Mode, White Balance Outdoor Level (+), White Balance Outdoor Level (–), Marker, Back Light, Spot Light, Rec Review, Fader (white fader/black fader), Steady Shot, Index Mark (index recording), Audio Dubbing (DVCAM only), Display, and Color Bars (two types).

AE Override

The AE (Auto Exposure) Override function allows operators to manually change exposure settings during the AE mode via an iris dial. This allows operators to set the desired exposure settings immediately, with no need to set all exposure settings modes to manual. This function can easily be recalled at the touch of an Assign Button.

Hyper Gain

The Hyper Gain function can automatically boost the gain level up to approx. +36 dB at the touch of an Assign Button. This makes it possible to shoot in extremely low-light conditions.

Marker

Three types of markers can be displayed on the LCD monitor and viewfinder simply by pressing an Assign Button:

CENTER: Displays a marker at the center of the screen
4:3: Displays a marker in the shape of 4:3 when using a widescreen monitor
SAFETY ZONE: Displays a marker indicating the range that can be displayed on a standard TV (4:3 and 16:9) for home use (80%)

All Scan Mode

The All Scan Mode is similar to the Under Scan Mode of other camcorders, displaying all effective scanning lines in the screen. It is useful to check pictures for web applications. This function can easily be recalled at the touch of an Assign Button.

OPERATIONAL VERSATILITY

Advanced Features for Professional Results

AF Assist

The AF (Auto Focus) Assist function allows operators to focus on desired subjects when using the AF mode. Operators can manually change focus positions using a focus ring during AF mode, allowing AF reference focus positions to be shifted to manually changed positions. This is useful, for example, when operators want to focus on subjects far away through a window.

Expanded Focus

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

Expanded Focus ON LCD & VF

Expanded Focus OFF

LCD & VF
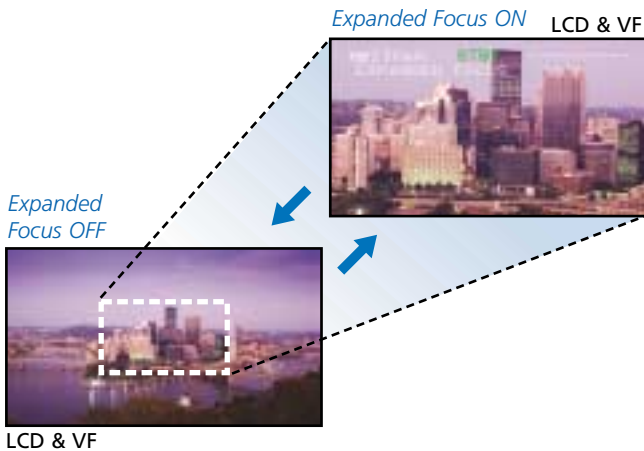
Peaking

The Peaking function can perform an effect on pictures displayed in the LCD monitor and viewfinder that allows operators to easily adjust focus positions. It enhances the outline of the image, which the camera focuses on most, and colors the outline to make it more visible. Enhance levels can be selected from a choice of "HIGH", "MIDDLE", and "LOW", and the outline color from "RED", "WHITE", and "YELLOW".

Peaking OFF

Peaking ON

Time Code Preset

The time code[9] can be preset using any number in H/M/S/F (hours/minutes/seconds/frames) to record desired tape-position information.
The time-code mode can be selected between "REC RUN" and "FREE RUN". In addition to the time code, user bits can also be set.

9 When recording video clips, which are transferred from other devices through an i.LINK interface, the time code should be preset because the time code is not copied.

External Record Control

By connecting the HVR-Z1U to an HDV 1080i, DVCAM or DV compatible device such as a camcorder, VTR or HDD recorder with an i.LINK interface, operators can control the HVR-Z1U and its connected device externally, to perform simultaneous recording and sequential recording.

Quick Rec.[10]

When operators do not want to miss a single recording opportunity, the time until the recording restarts from stop mode[11] can easily be shortened.

10 The transition from the last recorded scene may not be smooth.
11 When standby mode continues for more than three minutes, it is automatically switched to stop mode.

Status Check

With the touch of a button, operators can display settings menus for audio, output signal and camera, as well as Assign Button and Picture Profile functions, superimposed over the video on the LCD monitor, allowing for easy status or settings checks during recording, playback and feeding.

Picture Profile™

Up to six different picture-quality settings can be registered in the memory as picture profiles and displayed on the LCD monitor at the touch of a button. This function allows operators to easily call up customized picture-quality settings to the camera to suit various shooting conditions, save on the labor needed to reset the camera each time for the same conditions. At the default setting, six picture profiles are registered, with recommended settings for typical shooting conditions.
The setting items include Color Level, Color Phase, Sharpness, Skintone Detail, Skintone Level, AE Shift, AGC Limit, Auto Iris Limit, White Balance Shift, ATW Sensitivity, Black Stretch, Cinematone Gamma, and Cineframe.
The default picture profiles include "For recording in HDV", "For recording in DV", "For recording people's pictures", "For recording film-like pictures", "For recording sunset pictures", and " For recording in black and white".

Personal Menu

The Personal Menu function allows operators to make a customized settings menu with frequently used menu items, and to easily recall it at the touch of a button. Up to 28 menu items each for the camera and VTR settings can be added to the Personal Menu, and their order can be arranged in the menu.

Zebra/Peaking Switch

Picture Profile

Personal Menu

Status Check

Battery Info

Battery Info

Information on the compatible battery pack attached to the camera can be displayed on the LCD monitor with the touch of a button. The battery's current charge level and its current remaining recording time can be checked when the power is turned off. The remaining recording time available for the selected recording format also appears.

Optimum Weight Distribution and Balance

The optimum weight distribution and balance of its body make the HVR-Z1U particularly suitable for hand-held shots, and also allows operators to easily carry the camera without causing fatigue. In addition, the camcorder can sit comfortably on the shoulder simply by attaching the optional VCT-FXA Shoulder Brace.

Unique Features for Creative Shooting

Shot Transition™

The Shot Transition function allows for smooth automatic scene transitions. The operator can program start and end settings for zoom, focus, iris, gain, shutter speed and white balance into the camera's A /B buttons and, by pressing the start button, a smooth transition will take place according to the set time, because the camera automatically calculates the intermediate values during the scene transition. The transition progress can be checked using an indicator displayed on the LCD monitor. This 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. In addition, a start timer function is also available for the Shot Transition function, preventing operators from missing a shot. Transition types can be selected from a choice of "LINEAR", "SOFT STOP", and "SOFT TRANS", transition time can be set from 2 to 15 seconds, and the start delay time can be selected from 5, 10 and 20 seconds.

Shot A   Shot B

LINEAR
Makes the transition linearly.

SOFT STOP
Makes the transition slowly at the end.

SOFT TRANSITION
Makes the transition slowly at the beginning and end, and linearly in between.

Cinematone Gamma™

The HVR-Z1U provides a special gamma feature – the Cinematone Gamma – which allows operators to quickly setup and load a gamma curve with similar contrast characteristics to a film gamma curve. Three gamma curves can be selected from "OFF" (normal gamma), "TYPE1", or "TYPE2".

Gamma characteristics

— Normal Gamma
— Cinamatone Gamma Type1
— Cinamatone Gamma Type2
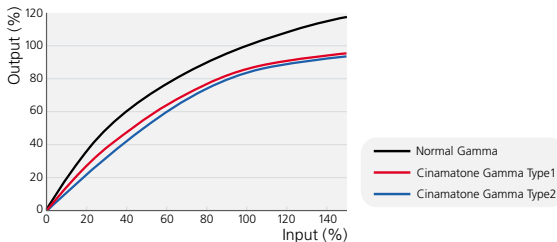
Cineframe™

The Cineframe allows picture movement to be reproduced like a film. Combined with the use of Cinematone Gamma, this allows a cinematic and film-like look to be achieved. Three types of Cineframe modes can be selected.

Cineframe 24 and 30
Cineframe 24 and Cineframe 30 are used in 60i mode and can reproduce the picture movement like films of 24 or 30 frames/second[12] in HDV, DVCAM and DV formats.

Cineframe 25
Cineframe 25 is used in 50i mode and can reproduce the picture movement like films of 25 frames/second in HDV, DVCAM and DV formats.

12 Using Cineframe 24 or Cineframe 30 respectively.

Color Correction

The Color Correction feature provides two functions for creative shooting. The Color Extraction function can retain up to two desired colors of monitored pictures in the screen by designating color hue, saturation and range, while making the other colors black and white. This provides interesting in-camera color effects that can emphasize particular colors in the screen. In addition, the Color Revision function can change the hue of only the colors designated by Color Extraction, while retaining the hue of the other colors. This also provides interesting in-camera effects.

Normal

Color Extraction

Color Revision

OTHER CONVENIENT FUNCTIONS

In order to provide the flexibility required for professional shooting,
the HVR-Z1U offers a variety of convenient functions:

- AE Response
- Flicker Reduce (by AGC)
- Zebra Patterns (100% or 70 to 100% (adjustable by 5%))

- Date Stamping
- Audio Lock (DVCAM/ DV mode only)
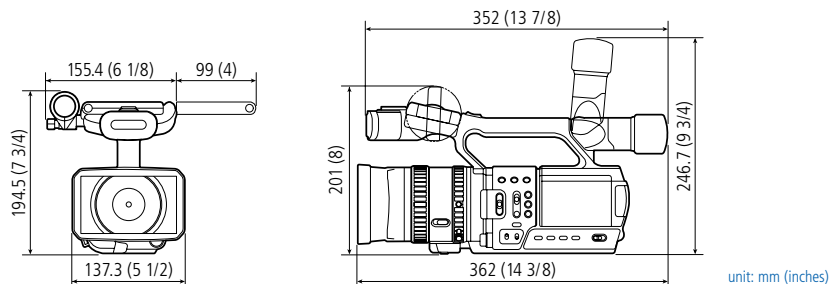- Audio Limiter

OPTIONAL ACCESSORIES

Some of the following accessories may not be available in certain countries. For details, please contact your nearest Sony office.

NP-F570/F770/F970
InfoLITHIUM Rechargeable Battery Pack

2NP-F970
InfoLITHIUM Rechargeable Battery Pack

VCL-HG0872
Wide Conversion Lens

VF-72CPK
PL Filter Kit

HVL-20DW2
Battery Video Light

VCT-FXA
Shoulder Brace

VCT-1170RM
Video Tripod with Remote Control

LCS-VCB
Soft Carrying Case

LCR-FXA
Rain Jacket

LCH-FXA
Hard Carrying Case

VMC-IL4408A/IL4415/IL4435
i.LINK Cable (4-pin to 4-pin)

VMC-IL4615/IL4635
i.LINK Cable (4-pin to 6-pin)

PHDVM-63DM
Mini Cassette

UWP-C1
UHF Synthesized Wireless Microphone Package

ECM-678
Electret Condenser Microphone

SPECIFICATIONS

Camera section		
Lens		Carl Zeiss Vario-Sonnar T* zoom lens, 12x (optical), f = 4. 5 to 54 mm (3/16 to 2 1/4 inches), f = 32.5 to 390 mm (1 5/16 to 15 3/8 inches)* at 16:9 mode, f = 40 to 480 mm (1 5/8 to 19 inches)* at 4:3 mode, F = 1.6 to 2.8, filter diameter: 72 mm (2 7/8 inches)
Built-in filter		1/6 ND, 1/32 ND
Focus		Auto, manual (focus ring/infinity position), one push auto
Imaging device		3-chip 1/3-inch type CCDs
Picture elements		Approx. 1,070,000 pixels (effective), approx. 1,120,000 pixels (total)
White balance		Auto, one-push auto, indoor (3200 K), outdoor (5800 K ±7 steps)
Shutter speed	60i/NTSC mode	1/4, 1/8, 1/15, 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 s
	50i/PAL mode	1/3, 1/6, 1/12, 1/25, 1/50, 1/60, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2500, 1/3500, 1/6000, 1/10000 s
Exposure		Auto, manual
Gain		0, 3, 6, 9, 12, 15, 18 dB (adjustable for H, M and L gain positions)
Minimum illumination		3 lx with F1.6 at 18 dB
VTR section		
Recording format		1080/60i, 1080/50i, 480/60i (NTSC), 576/50i (PAL)
Play out/Down conversion format		1080/60i, 1080/50i, 480/60i (NTSC), 576/50i (PAL), 480/60p, 576/50p
Tape speed	HDV/DV SP	Max. 18.812 mm/s with PHDVM-63DM cassette
	DVCAM	Max. 28.218 mm/s with PHDVM-63DM cassette
Playback/Recording time	HDV/DV SP	Max. 63 min with PHDVM-63DM cassette
	DVCAM	Max. 41 min with PHDVM-63DM cassette
Fast forward/Rewind time		Approx. 2 min 40 s with PHDVM-63DM cassette
Input/Output connectors		
Audio/Video input/output		AUDIO/VIDEO jack x1 Video signal: 1 Vp-p, 75 Ω unbalanced, sync negative Audio signal: 327 mV (at load impedance 47 kΩ), input impedance more than 47 kΩ, output impedance less than 2.2 kΩ
S-video input/output		Mini-DIN 4-pin x 1 Y: 1 Vp-p, 75 Ω unbalanced, sync negative C: 0.286 Vp-p (NTSC), 0.3 Vp-p (PAL), 75 Ω unbalanced
Component video output		COMPONENT OUTPUT jack Y: 1 Vp-p (0.3 V, sync negative) Pr/Pb (Cr/Cb): 525 mVp-p (75% color bar), input impedance 75 Ω
i.LINK		4-pin
XLR audio input		XLR 3-pin female x 2, 327 mV, -60 dBu: 3 kΩ, +40 dBu: 10.8 kΩ, power supply: approx. 40 V
Headphone		Stereo minijack (Φ3.5 mm)
LANC		Stereo mini-minijack (Φ2.5 mm)
Built-in input/output devices		
LCD viewfinder		0.44-inch type, approx. 252,000 pixels (1120 x 225), hybrid type
LCD monitor		3.5-inch type, approx. 250,000 pixels (1120 x 224), hybrid type
Microphone		Stereo type, noise reduction on/off
General		
Mass		Approx. 2.1 kg (4 lb 10 oz) (camcorder only)
Power requirements		DC 7.2 V (battery pack)
Power consumption	HDV	Approx. 8.0 W (recording mode with LCD viewfinder on)
	DVCAM/DV	Approx. 7.6 W (recording mode with LCD viewfinder on)
Operating temperature		0 to 40 °C (32 to 104 °K)
Storage temperature		–20 to +60 °C (–4 to 140 °K)
Supplied accessories		**AC-VQ850** AC adaptor/charger, power cord, connecting cord, lens hood, large eyecup, **RMT-841** wireless Remote Commander, A/V connecting cable, component video cable, shoe adaptor, **NP-F570** InfoLITHIUM rechargeable battery pack, size AA (R6) batteries (2), cleaning cassette, shoulder strap, operating instructions

* These values are calculated to be equivalent to the 35 mm film.

155.4 (6 1/8)   99 (4)
194.5 (7 3/4)
137.3 (5 1/2)

352 (13 7/8)
201 (8)
246.7 (9 3/4)
362 (14 3/8)

unit: mm (inches)