

SONY

High-Definition Video Buying Guide

What is "HDV"

- HDV is a new video format for recording High Definition Video on standard DV tape.
- HDV is a cost-effective step up to the benefits of HD for videographers, independent film-makers, corporate and other professional users.
- HDV allows users to begin the move to HD as their workflow allows.
- HDV offers easy connectivity via i.LINK, and fits perfectly in existing DV based Non Linear Editing (NLE) systems available from Sony and other vendors.
- HDV uses industry standard MPEG 2 coding at a data rate of 25 Mb/s, the same rate as DV and DVCAM.

Products Covered in this Guide

Cameras:

HVR-A1U.....	3
HVR-Z1U.....	4

Recorders & Editors:

HVR-M10U.....	5
Vegas.....	6

Resources:

Audio Options for Pro Cams.....	7
What is 1080i?	8
Competitive Comparison	9
Pro vs. Consumer Comparison.....	10

Sony: Creator of the World's First 1080i HDV Camcorder

In 2003, Sony in conjunction with JVC, Canon and Sharp combined their talents to create a system that would finally allow both professionals and consumers access to true High Definition acquisition at Standard Definition prices. Sony's first professional HDV camcorder, the HVRZ1U, entered the market as the first 1080i HDV camcorder available and changed the way the world looked at High Definition forever. This HDV guide was created to make you aware of the significant advantages Sony's HDV equipment has over other competitive models.

Why buy an HDV Camcorder?

High Definition has been available to high-end production users for decades, but for most of that time the costs have been very high with complete systems running from \$80,000 to \$100,000 or more. From advances in imagers and processing to a smooth upgrade path for customers currently doing SD production HD is the next exciting step.

Why Buy a Sony HDV Camcorder?

Take a look at the three main advantages that Sony offers over other brands.

Extremely high quality Zeiss HD optics —Your recorded image can be no better than the lens that produced it. Sony uses Zeiss lenses specifically designed to match the other components of the imaging system.

14 bit A/D converters and Sony Exclusive Digital eXtended Processor (DXP) —The HVRZ1U and HVRA1U both use 14 bit A/D conversion which preserves a large exposure latitude without needing any knee compression. This allows the DXP image processor to intelligently create the best possible HD image.

DV, HDV or DVCAM recording modes — By allowing users to record in multiple formats, including the truly professional DVCAM format, Sony's HDV products maximize the value to the user, regardless of their shooting environment or workflow.



Sony HDV At-A-Glance



HVR-A1U

1/3" 3 MegaPixel CMOS HDV Camcorder

MSRP: \$3,100
MAP: \$2,699

The newest product in the HDV line-up, the HVR-A1U camcorder - an extremely compact and lightweight camcorder, ideal for applications where space is at a premium or extreme mobility is required. This camcorder is equipped with a newly developed 1/3-inch type, 2.97-megapixel (total) CMOS sensor and an all new Enhanced Imaging Processor™ that optimizes the performance of the CMOS sensor and provides outstanding high-definition picture quality.

More Info:
Page: 3



HVR-Z1U

1/3" 3CCD HDV Camcorder

MSRP: \$5,946
MAP: \$4,900

The Sony HVR-Z1U professional camcorder uses 1/3" 3CCD imager technology and advanced 14 bit A/D and DXP image processing to shoot brilliant high definition 1080i pictures with jaw-dropping detail, color and clarity. Comes equipped with a Carl Zeiss Vario-Sonnar® T* 12x zoom lens - the same glass and coatings used in the legendary Zeiss prime lenses. (Shown with optional ECM-678 shotgun microphone).

More Info:
Page: 4

Vario-Sonnar T is a trademark of Carl Zeiss AG



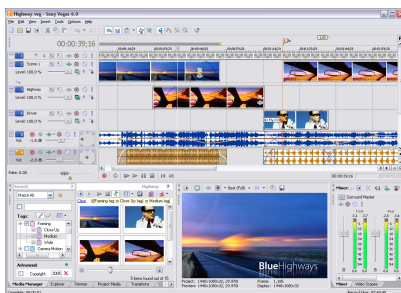
HVR-M10U

Portable HDV / DVCAM / DV VTR

MSRP: \$3,950
MAP: \$3,700

This affordable, portable professional deck runs on AC or DC and takes up minimal desk space even when you turn it on its side. The HVR-M10U records and plays HDV at all the same frame rates as the HVR-Z1U camcorder. And the deck records and plays DVCAM and mini DV tapes, making it a terrific bridge from SD to HD. Plays back both 1080i and 720p mode HDV tapes.

More Info:
Page: 5



Vegas 6.0

Sony® Vegas® software combines state-of-the-art HD video editing with leading-edge audio production and DVD authoring technology.

More Info:
Page: 6



Sony HVR-A1U Up Close



SUPPLIED ACCESSORIES
ACL15 AC Adapter
Power Cord
NPFM50 InfoLITHIUM battery
Lens Hood with built-in lens cap
RMT-831 IR Remote Commander
A/V connecting cable
Component video cable
USB cable
16MB Memory Stick Duo w/ adapter
ECM-NV1 Electret Condenser Shotgun Microphone
XLR Audio Adapter
Shoulder strap
Operations Manual

Key Features of the HVR-A1U

Newly developed 1/3" CMOS Imager - 3 Mega-pixel resolution imager provides for both video and still image recording. Unique pixel design combines high sensitivity and low noise levels and a nearly complete absence of vertical smear.

10x Optical Zoom Zeiss Vario-Sonnar T Lens – Custom designed to work with the new imager, this lens uses the same glass and coatings as Zeiss prime lenses and produces sharp, high contrast images with virtually no chromatic aberration or flare. Manual or servo zoom, manual or auto focus, and a Tele Macro function give the operator complete control over his shots.

Enhanced Imaging Processor – This high speed image processor was developed to handle the large amounts of image data provided by the HD CMOS imager. The EIP employs a unique algorithm to process detail and brightness data independently, allowing high details in black and bright areas of the image and exceptionally wide dynamic range.

Still Picture Recording to Memory Stick Duo Media - Still pictures at full resolution can be captured to Memory Stick even while HD video recording is underway simply by pushing the "Photo" button.

2 Channel XLR Audio Input – Two XLR inputs with switchable 48v phantom power are provided. The camera includes a built-in stereo microphone and an external directional microphone. Audio levels can be viewed on the LCD screen, and adjusted independently with level controls for each channel.

Compact and Lightweight Design - The camcorder weighs only 2 lb. 14 oz. in operation and is extremely compact, providing a high level of mobility.

Dual monitoring with LCD panel and Electronic View Finder - The HVR-A1U provides both a side mounted, fold out, high resolution LCD screen and rear mounted EVF for operator convenience. The touch screen LCD is also used to access and control the menus and other settings in the camera.

OPTIONS (NOT INCLUDED)	See more audio options on page 7
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NP-QM71D/QM91D Battery Packs	VMC-30VC 3m Component Video Cable
RM-1BP LANC Remote Controller	VMC-30FS 3m Multi AV Cable (w/S-video)
VCL-HG2037Y 2.0x Tele-conversion lens	UWP-C1 UHF Synthesized Wireless Microphone Package
VCL-HG0737Y 0.7x Wide Conversion Lens	
LC-A1TH Hard Carrying Case	
LC-ZA1BP Soft Carrying Case	

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Sony HVR-Z1U Up Close



- SUPPLIED ACCESSORIES**
- AC-VQ850 AC adaptor/charger
 - Power Cord
 - Camera Power Cable
 - Lens Hood with built-in lens cap
 - Large Eyecup
 - RMT-841 IR Remote Controller
 - A/V Connecting Cable
 - Component Video Cable
 - Shoe Adapter
 - NP-F570 InfoLITHIUM Battery Pack
 - Cleaning Cassette
 - Shoulder Strap
 - Operation Manual

Key Features of the HVR-Z1U

1/3" 3CCD Super PowerHAD Imager - Developed specifically for the HVRZ1U, this imager uses three 1.12 Megapixel 16:9 CCDs in a unique spatial offset configuration to create the specified HDV resolution of 1440 x 1080.

12x Optical Zoom Zeiss Vario-Sonnar T Lens – Coated HD elements, integral Optical SteadyShot technology which uses a servo driven lens element to correct for unsteady handling when used in a handheld configuration.

14 bit A/D Conversion - Allows the camera to process very large contrast-range scenes. Includes image processing such as color correction and Cinematone Gamma functions.

HDV 1080i, DVCAM and DV Recording and Playback - 50i or 60i – The HVR-Z1U will operate in both 50i and 60i by menu selection regardless of the format. For projects needing more of a film look, the camera can also operate in Cineframe modes to provide 24, 25 or 30 frame recordings.

On-board HD - SD Downconverters - Converts material from 1080i down to 480i (and 576i) and output these signals through via iLink/Firewire, analog component,

composite or S-Video simultaneously. Aspect ratio modes: Squeeze, Letterbox or Edge Crop.

2 Channel XLR Audio Inputs – Professional audio connections with 48v phantom power and full independent control over level and routing for external signals, plus a high quality built-in stereo microphone for ambient sound.

High Resolution LCD Display and Electronic View Finder – 3.5" 16:9 LCD panel is mounted on the front of the camera handle. This unique placement allows the panel to be used in a variety of positions, including facing the on-camera talent, and works simultaneously with the EVF.

- OPTIONS**
(NOT INCLUDED)
- See more audio options on page 7
- NP-F970/F770/F570 InfoLITHIUM Battery Packs
 - VCL-HG0872 0.8x Wide Conversion Lens
 - VCT-FXA Shoulder Brace
 - LC-Z1BP Soft Carrying Case
 - LC-Z1TH Hard Carrying Case
 - VMC-IL4408A/IL4415/IL4435 iLink Cables (4pin to 4 pin)
 - VMC-IL4615/IL4635 iLink Cables (4pin to 6 pin)
 - UWP-C1 UHF Synthesized Wireless Microphone Package
 - ECM-678 Electret Condenser Shotgun Microphone

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Sony HVR-M10U Up Close

Built-in 3.5" 16:9 High Resolution LCD monitor

Switchable HDV/DVCAM/DV Recording and Playback (50i/60i)

HDV 720/30p Playback

Compact, Portable Configuration

Audio L/R level controls



Component (HD/SD) Output

Composite and S-Video Input/Output

Optional battery power



LANC connection

iLink/Firewire Connection

SUPPLIED ACCESSORIES	
IR Remote Control	
AC Adapter	
Power Cord	
Vertical Stand	
Cleaning Cassette	
Operating Instructions	

Key Features of the HVR-M10U

HDV 1080i / DVCAM / DV Record and Playback (50i/60i) – The HVRM10U can switch between HDV 1080i, DVCAM and DV (SP) record modes and like the HVRZ1U operates in both 50i and 60i. It will also play back 720p/30 HDV tapes.

Built-In Down Converters – While operating in HDV mode, the unit can provide down-converted Composite and S-Video outputs as well as Standard Definition DV through the iLink connector. HD or SD Component Video is also available. Various Aspect Ratio conversions are available to suit all operating needs.

Compact, Unique Design – The HVR-M10U is compact and lightweight and will fit in any work environment. The front mounted LCD screen also acts as a field monitor. Once a tape is loaded and the front panel closed, the tape transport is sealed and protected from the environment. Since the unit needs no cooling fan, dust cannot be circulated through it either and the unit is noise free.

Professional SMPTE Timecode – Drop Frame and non Drop Frame modes, RECORD RUN and FREE RUN, Timecode Preset and User Bits can all be set as desired.

Long Operational Time with Battery Power- With the optional NP-F970 Battery Pack, the VTR gives you up to 545 minutes of operation in HDV mode and up to 630 minutes in DVCAM or DV mode (LCD off). For convenience, it uses the same batteries as the HVR-Z1U camera.

OPTIONS (NOT INCLUDED)

- VMC-IL4408A/IL4415/IL4435
iLink Cables (4pin to 4pin)
- VMC-IL4615/IL4635 iLink
Cables (4pin to 6pin)
- NP-F570/F770/F970 InfoLITHIUM
Battery Packs

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Sony Vegas 6.0 Up Close

Sony Vegas is the perfect, PC based non-linear editing system to add to any camcorder: Vegas combines state-of-the-art DV and HDV video editing with leading edge audio production and Standard Definition DVD authoring technology. Vegas provides a complete, all-in-one media creation environment. DVD Architect™ 3 software now features dual-layer authoring, burning and mastering to multiple formats. The Vegas+DVD Production Suite also includes: Boris® Graffiti™ Ltd, Boris FX Ltd for Vegas, and Magic Bullet™ Movie Looks™ HD50.

Unlimited tracks: Edit SD, DV, HDV video, audio and more on unlimited tracks

Tape-style scrubbing

Drop markers in real time

Change the speed (velocity) or each clip independently

Easy to use Windows Based. Uses common Windows® commands such as Cut, Copy, Paste, and Delete

Mix SD and HD on same track

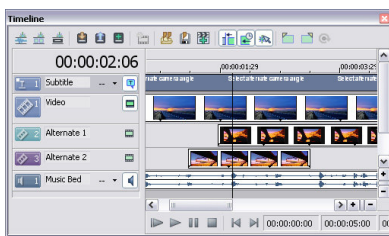
Customize 2D/3D transitions or create with script center

VST-plugin support

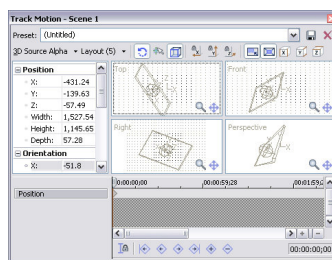
5.1 surround mixing

Easy drag-and-drop functionality

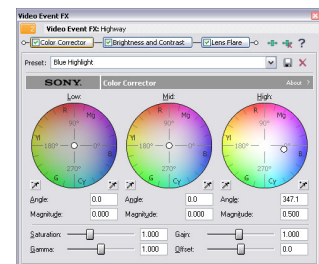
Import, edit, and export high-quality 24-bit/192 kHz audio files and ACID loop files



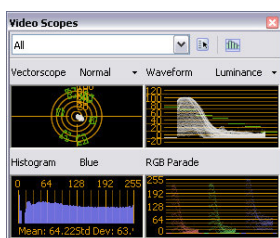
DVD Architect Multiple Camera Angles



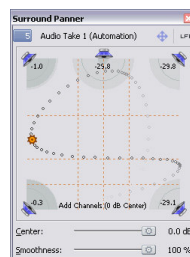
Vegas 6 3D Track Motion



Vegas 6 Color Corrector



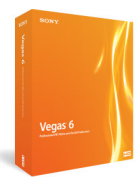
Vegas 6 Scopes



Vegas 6 Surround Panner



Vegas 6+DVD



Vegas 6

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Audio Options for HDV Camcorders

ECM-674 - Dual-power Electret Condenser Shotgun Microphone

List \$395



Designed specifically for use with HDV and DVCAM Camcorders this microphone is the newest addition to Sony's shotgun microphone line. It offers good sensitivity (-36dB), low self noise (19dB SPL) and wide frequency response (60Hz - 18kHz) in a lower cost microphone. It will work with either 48v phantom power or internal AA battery, making it a great match for a wide range of camcorders and field uses. Includes windscreen, mic holder, sizing spacer and short XLR cable.

ECM-678 - Electret Condenser Shotgun Microphone

List \$750

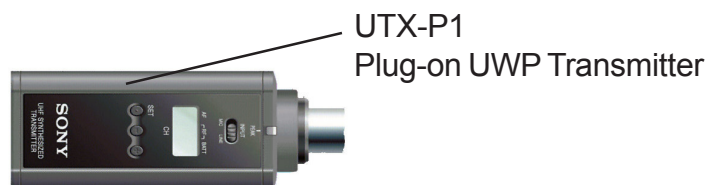
This high performance super-cardioid microphone is an excellent match for the Sony HVRZ1U, which includes only an ambient sound stereo microphone as standard. It's newly designed capsule delivers excellent sensitivity (-28dB), very low self noise (16dB SPL) and a very wide and flat frequency response (40Hz - 20kHz). A dual setting low cut filter will tailor the response to eliminate undesirable ambient noise. The ECM-678 comes supplied with a windscreen, mic holder, sizing spacer and carrying case. Requires 48v phantom power.



UWP-C Series Wireless Microphone Systems

List \$699

Sony's low-cost UWP-C series wireless microphone systems include a camera mountable diversity receiver, and a choice of transmitters, including lav mic / bodypack (UWP-C1), handheld microphone (UWP-C2) and plug-on types (UWP-C3). These systems are frequency-agile (188 available channels in 24MHz bands) and provide high-end features, such as channel scan and tone squelch, at very low cost.



UTX-P1 Plug-on UWP Transmitter



What is HDV 1080i?

Sony developed the HDV2 format which features 1,080 effective scanning lines, using the interlaced scanning system, and 1,440 horizontal pixels. By using industry standard MPEG-2 compression (MP@H-14 for video), High Definition image data is processed into an 8 bit, 4:2:0 data stream at a data rate of 25 Mb/s. The HDV standard uses MPEG-1 Audio Layer II as an audio compression format at a sample rate of 48kHz and 16 bit resolution. The other HDV standard, (HDV1) is 1280 x 720 at 30 progressive frames / sec, which sacrifices overall static resolution to increase dynamic resolution.

The data rate of HDV matches that of the Intraframe coded DV or DVCAM signal, so standard DV tape mechanisms and processing can be used. This is a prime factor in keeping the costs of HDV equipment extremely low, and provides the flexibility to operate in both Standard Definition and High Definition with the same transport. Selecting this data rate also allows the complete compatibility of HDV equipment to existing DV equipment and workflows. In general, upgrades to existing PC based DV Non Linear Editing Systems, for instance, only require a simple software change to accommodate HDV, instead of expensive hardware upgrades.

Sony has long been the leader in 1080i production systems through their HDCAM and new HDCAM SR equipment. HDCAM has been used for feature film production and episodic TV programming for years, and is a world standard for high end production. Operating at a data rate of over 140 Mb/s, HDCAM certainly puts a lot more data on tape than HDV, but that doesn't mean that there is a huge difference in recorded image quality. HDV, at 25 Mb/s, uses an efficient interframe MPEG 2 coding process that preserves high image quality by reducing the redundant or unchanging image data from frame to frame.

While it seems that 25 Mb/s is a low rate for High Definition video, keep in mind that terrestrial DTV HD broadcast is running at a maximum of 19 Mb/s. Satellite and cable HD channels and the proposed HD-DVD standards all use data rates between 6 and 20 Mb/s. The old mindset that compression is always a bad thing, or that less compression always means higher quality simply isn't true.

MPEG is what is referred to as an asymmetrical compression system, which simply means that all of the expensive work of processing occurs on the encoder end of the system. MPEG decoders simply adhere to a standard and process what they are fed according to that standard. The encoding process can be fine tuned by the encoder manufacturer, and can take advantage of any science or art they can develop. Over the years, Sony has provided some of the most respected MPEG encoding systems ever built, simply because they have developed the art of image processing to a high degree. Sony's engineers are among the best in the world at keeping what's most important in any image, discarding what isn't and getting the highest possible quality out of whatever bit rate is available. The HVR series of HDV camcorders provide high-definition images that prove that everyday.



Sony vs. the competition

Just like in the traditional High Definition world of HDCAM and DVCPRO HD, there are two competing standards, 1080i and 720p present in HDV. There has been a large amount of discussion concerning the merits and drawbacks of each, and each standard has its vocal and steadfast supporters, but there are a couple of things to keep in mind when applying this to the new HDV world.

First, disregarding the frame rates and scan types for a moment, when you point a 1080i camera at a mostly static shot, like a landscape for instance, the image you see is composed of slightly over 1,550,000 pixels. This same picture in the 720p camera uses around 921,000 pixels, or about 40% less information. While it is true that the total resolution of 1080i drops in areas of fast motion, the interlace scan system is designed to take advantage of the way the human eye works and provide pleasing and realistic motion while maintaining high resolution on stationary parts of the picture.

Second, the 720p referred to in the HDV world is not the 60p variety used by sports broadcasters. For fast motion events, where you intend to slow-mo or still frame, 720p60 can be very useful. The HDV variety is 720p30 which is a very low frame rate and it causes a strobing effect on objects in motion, much like film does. Tricks, such as interpolating two 60p frames into one 30p HDV frame are needed to create a pleasing picture.

Most importantly, it is a mistake to consider HDV cameras, or any audio or video gear for that matter, by the numbers and specs. The picture quality is dependent on everything in the camera being compatible and technically balanced, from the lens to the tape mechanism and the "usability" of the camera comes from its physical design and user interface.

There are currently HDV cameras available from 3 manufacturers, Sony, JVC and Canon, and the available offerings fall into several groups.

JVC's current HDV camera, the GY-HD100U, at a list price of \$6,295, is a 720p30 camera, using a 1/3" 3CCD 1280 x 720 imager. It doesn't have any 1080i modes, and does not produce the fluid, realistic images that 1080i does. To get around the low frame rate, the JVC camera can integrate two 60p frames into one 30p frame to introduce some motion blur and make the images smoother. It does feature interchangeable lenses, but few lenses are actually available and true HD lenses are expensive. It is implied that you can use SD lenses with the camera, but this would result in a great loss of quality.

Canon has also introduced a 1/3" 3CCD 1080i HDV camcorder, the XL-H1, at a list price of \$9,200. It also offers interchangeable lenses and adds what they call a Professional Jack Pack which includes SDI/HDSDI output, genlock capability and Timecode In and Out. Without CCU capability, these additions only go part of the way toward making a camera that can be "systemized" effectively for multi-camera use.



HDV Pro vs. Consumer Camcorder Comparison Chart

✓ Indicates a professional benefit

	HVR-Z1U	HDR-FX1	HVR-A1U	HDR-HC1
Product Class	Professional	Consumer	Professional	Consumer
MSRP/Street Price	\$5946 / \$4800	\$3,700	\$3100 / \$2700	\$2,000
Weight (excl. Battery, Tape)	4 lbs. 10 oz.	4 lbs. 4 oz.	1 lb. 12 oz.	1 lb. 7 oz.
Dimensions (W x H x D):	6" x 7 5/8" x 14 3/8"	6" x 7 1/8" x 14 3/8"	2 7/8" x 3 3/4" x 7 1/2"	2 7/8" x 6 7/8" x 7 1/2"
LENS / IMAGER				
Imager	3- 1/3" 16:9 Advanced HAD™ CCDs	3- 1/3" 16:9 Advanced HAD™ CCDs	1/3" 3 MegaPixel CMOS	1/3" 3 MegaPixel CMOS
Minimum Illumination	3 lux	3 lux	7 lux	7 lux
Carl Zeiss® Vario-Sonnar® T* lens	12x Optical	12x Optical	10x Optical	10x Optical
Filter Diameter:	72mm	72mm	37mm	37mm
ND Filter	Yes	Yes	No	No
Focal Distance	4.5 – 54.0mm	4.5 – 54.0mm	5.1 – 51mm	5.1 – 51mm
Shutter Speed (In AE Mode)	1/4 - 1/10,000 sec.	1/4 - 1/10,000 sec.	1/4 - 1/10,000 sec.	1/4 - 1/10,000 sec.
Super Steadyshot® Stabilization	Optical	Optical	Electronic	Electronic
Tele Macro Function	No	No	Yes	Yes
IMAGE CONTROL / RECORD MODES				
60i/50i Switchable	Yes ✓	No	No	No
DVCAM Record/Play	Yes ✓	No	Yes ✓	No
Digital Downconvert	DVCAM/DV ✓	DV	DVCAM/DV ✓	DV
Black Stretch	Yes ✓	No	Yes ✓	No
Cinematone Gamma Levels	Type 1 & 2 ✓	Type 1	Type 1 & 2 ✓	Type 1
SMPTE Timecode, Incl. REC RUN, FREE RUN, DF/NDF selectable	Yes ✓	No	Yes ✓	No
Still Picture Record	No ✓	No	Yes	Yes
Quick REC Mode	Yes	No	Yes	No
Programmable Shot Transition Time	2-15 seconds ✓	Fixed at 4 seconds	2-15 seconds ✓	Fixed at 4 seconds
Picture Profile™	6 settings	6 settings	None	None
Cineframe Modes	CF24, CF25, CF30	CF24, CF30	CF24, CF30 ✓	CF24
Hyper Gain	Yes ✓	No	NightShot (Infrared)	NightShot (Infrared)
Manual Gain Control	Yes	Yes	No	No
External REC Control	Yes ✓	No	No	No
VIEWFINDER / LCD				
Swivelscreen™ LCD display	3.5" wide (16:9) panel	3.5" wide (16:9) panel	2.7" wide (16:9) touch panel	2.7" wide (16:9) touch panel
Histogram Display	No	No	Yes	Yes
Viewfinder Modes	Color/B&W ✓	Color Only	Color/B&W ✓	Color Only
Focus Assist (image enlargement)	Yes	Yes	Yes	Yes
Auto Focus Override	Yes ✓	No	No	No
All Scan Mode (overscan)	Yes ✓	No	Yes ✓	No
Peaking Level/Color	Yes, White, Red or Yellow ✓	No	Yes, White, Red or Yellow ✓	No
Simultaneous Operation of LCD and Viewfinder	Yes ✓	No	Yes ✓	No
Markers	4:3, Safety, Center ✓	None	4:3, Safety, Center, Grid ✓	None
AUDIO				
Mic Input	XLR Stereo ✓	Stereo Mini	XLR Stereo	Stereo Mini
Shotgun Mic Holder	Yes ✓	No	Yes ✓	No
Built-in Stereo Mic	Yes	Yes	Yes	Yes
Independent Audio Level Control	Yes ✓	No	Yes ✓	No
Audio Monitoring	CH1, CH2, CH1+CH2 ✓	CH1+CH2 Mixed Only	CH1, CH2, CH1+CH2 ✓	CH1+CH2 Mixed Only
CONNECTIVITY				
External Video Input	Yes	Yes	No	No
USB Output	No	No	Yes	Yes
i.LINK I/O	Yes	Yes	Yes	Yes
Component Video Output	480i/480 60p/576i/576p/1080i ✓	480/1080i	480i/480 60p/1080i	480/1080i
CONVENIENCE FEATURES				
Built-in Flash	No	No	No	Yes
Wireless Remote Commander	Yes	Yes	Yes	Yes
Battery Charge on Camcorder	No	Yes	Yes	Yes
Assign Buttons	6 ✓	3	1 ✓	None
Assignable Functions	16 ✓	6	5 ✓	N/A