JVC

HD/SD Memory Card Camera Recorder

GY-HM660RE

ProHD

HDMI AVCHD Progressive

Breaking News, Breathtaking Views.

ProHD

HDMI HIGH-DEFINITION MULTIMEDIA INTERFACE · SDHC · SDXC · AVCHD Progressive · MOV QuickTime™ · MP4 · MXF · ftp · WiFi

Shown with optional microphone.

Live Streaming from Virtually Anywhere in the World.

Newsworthy things are happening all the time, so deliver it as it happens with the IP connectivity and live streaming capability of JVC's GY-HM660RE. And to make sure you can tell it as it is, this high quality camera captures a high quality bright image with F13 (50Hz)/F12 (60Hz) sensitivity.

SMPTE 2022-1 Protocol

Newly supported SMPTE 2022-1 protocol enables simple error correction for high quality streaming.

High Quality Live Streaming up to 12Mbps

Real-time Full HD live streaming via 4G LTE/3G, Wi-Fi, and Ethernet up to 12Mbps.

Advanced IP Connectivity

Support various IP connectivity and IP functions, providing immediate delivery for ENG applications.

F13 (50Hz)/F12 (60Hz) Sensitivity

New 3CMOS sensors enable extreme high sensitivity and low noise which strongly support ENG shooting.

23x Zoom Lens and 3 isolated Manual Rings

High-quality optical 23x Zoom lens and 3 manual rings are tuned up for camera crews.

Quick Footage Transfer via FTP Server

Footage can be transferred from the camera while recording to an FTP server.
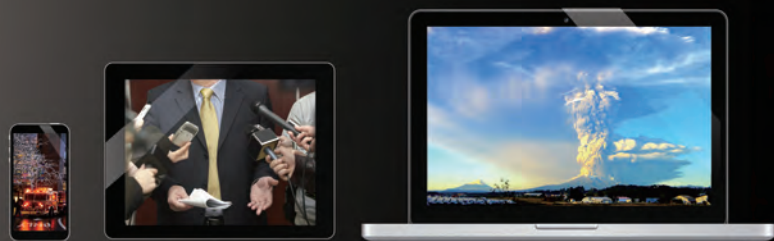
Built-in Zixi Engine

Advanced live streaming with FEC and ARQ over 4G LTE or a standard Internet connection can be achieved with built-in Zixi technology.

IP Remote Control

Remote control via wireless/wired LAN supported from smart devices and PCs to control the GY-HM660RE with screen viewing.

50Mbps H.264 & MPEG2, AVCHD Support

The GY-HM660RE supports various video formats and codecs required for just about any workflow.

IFB Return Audio via IP

With Interruptible FeedBack (IFB) return audio function, the camera crew can listen to audio from remote locations via IP even while live streaming.

Combination Rec with Dual CODEC

Recording to two SDHC/SDXC cards in same/different formats enable reliable backup and flexible utility with IP functions.

Newly developed 1/3-inch 3CMOS Sensor (1920 x 1080) boasts Sensitivity of F13/F12 (50/60Hz)

At the heart of the GY-HM660RE are three, newly developed 1/3-inch CMOS sensors with 2.5M pixels, each capable of capturing full HD 1920 x 1080 resolution images. Featuring 12-bit processing, an excellent sensitivity of F13 (50Hz)/F12 (60Hz) at 2000 lux, and a remarkable signal-to-noise ratio, the devices provide superior precision and color reproduction with minimal aberration. For improved CMOS sensor performance, flash-band compensation is also supported.

Compare the image brightness between sensitivity of F8 (left) of a conventional camera and F13 at 2000 lux on the GY-HM660RE.

Revolutionary FALCONBRID™ Image Processing Engine

FALCONBRID™ is JVC's high-speed processor for advanced video applications. Delivering tremendous processing power on a single chip, the on-board engine is capable of processing large amounts of video data at exceptional speeds. The combination of FALCONBRID™ engine, 2D DNR processing & compensation circuitry, and wide dynamic range achieve superior image quality. The GY-HM660RE is equipped with two FALCONBRID™ engines, which enable parallel processing like recording at two formats (HD + SD and HD + Web) or Live Streaming while Recording.
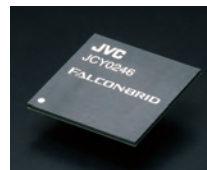
Various Codecs and File Formats including the Original H.264 XHQ (50Mbps) mode

FALCONBRID™ engine is capable of supporting major file formats such as .MXF with rich metadata optimized for asset management, .MOV with Apple Final Cut Pro, .MP4 of XDCAM EX™ cameras, and .MTS for AVCHD compatibility, as well as high-definition images in MPEG-2 35Mbps (HQ) and AVCHD 28Mbs (Progressive) format.

Furthermore, the processor also supports H.264 video format in 50Mbs extreme high quality (XHQ) mode for virtually no block noise and to capture high-speed moving subjects all the way to Web LP (480 x 270) mode (Web <Proxy>) suitable for internet applications. Using the camera's Dual recording capability, different combinations of HD+SD and HD+Web are also supported.

Video format	MPEG-2			AVCHD					H.264				
Mode (Bit rate)	HQ (35Mbps)	SP (25Mbps)	SP (19Mbps)	Progressive (28Mbps)	HQ (24Mbps)	SP (18Mbps)	LP (9Mbps)	EP (5Mbps)	XHQ (50Mbps)	UHQ (35Mbps)	SD (8Mbps)	Web HQ (3Mbps)	Web LP (1.2Mbps)
File format	MOV/MP4/MXF			MTS					MOV				
Audio format	Linear PCM 2ch			AC3 2ch					Linear PCM 2ch			µ-law 2ch	
HD 1920 x 1080	60i/50i/ 30p/25p/24p			60p/50p	60i/50i	60i/50i			60p/60i/ 50p/50i/ 30p/25p/24p	60i/50i/ 30p/25p/24p			
HD 1440 x 1080	60i/50i/	60i/50i					60i/50i	60i/50i					
HD 1280 x 720	60p/50p/ 30p/25p/24p*		60p/50p										
SD 720 x 576											50i		
PROXY 950 x 540												30p/25p/24p	
PROXY 480 x 270													30p/25p/24p

*Only with MOV/M4 file formats

## 23x Fujinon Auto Focus Zoom Lens with Manual Functions

The GY-HM660RE is equipped with the Fujinon wide angle 23x optical zoom lens to offer sufficient magnification for shooting. Delivering superior low-light performance and ensuring brightness at the tele end, the lens offers F1.6-3.0, a focal range of 29mm-667mm (35mm equivalent) and includes servo zoom, manual focus, and iris rings, along with a four-position (clear, 1/4, 1/16 and 1/64) ND filter. Other features include an optical image stabilizer and chromatic aberration correction.

Focus, zoom and iris rings are isolated and ergonomically aligned with buttons offering intuitive, stress-free operations.
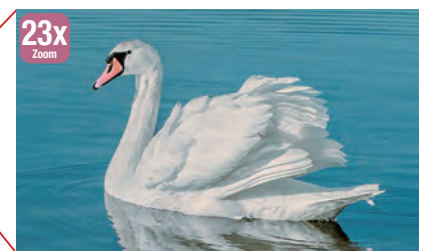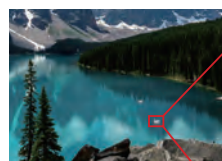
23x zoom lens, sufficient magnification for shooting, at Wide end (left) on to Tele end (right).

Upgraded High-resolution 920K Pixels 3.5-inch LCD Display with Focus Assist and various GUI

The high-resolution 920K pixels 3.5-inch LCD monitor provides a wide aspect ratio of 16:9 with a wide array of monitoring and setup indications. Since the LCD is top-mounted, not only is it ideal for shooting at various angles but also provides ample distance from the cameraman's eyes to the LCD to achieve better visibility in handheld camera applications. It also features a Focus Assist function that highlights the edges of objects shown in the viewfinder in color (red, green or blue) to help the cameraman stay focused on the action.

3.5 inch

When the Focus Assist function is set to ON, objects that are in focus appear with colored edges (selectable from red, green or blue) as seen here.
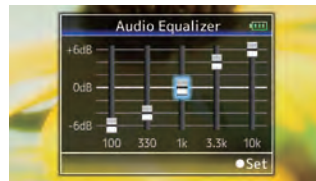
Audio equalizer

Color matrix adjustment

Dual SDHC/SDXC Card Slots for Maximum Versatility

Dual SDHC/SDXC card slots make the GY-HM660RE a truly versatile camcorder, offering such benefits as series recording, dual recording, and backup recording modes using reliable and cost-effective media.

- **Series (relay) recording mode:** Shoot continuously and seamlessly over multiple cards. When one card is full, the camcorder switches seamlessly and automatically to the other card. And because cards are hot swappable, there is in effect no limit to the continuous shooting time in any mode, even with lower capacity cards. It is possible to start editing footage from one card while still shooting to the other.
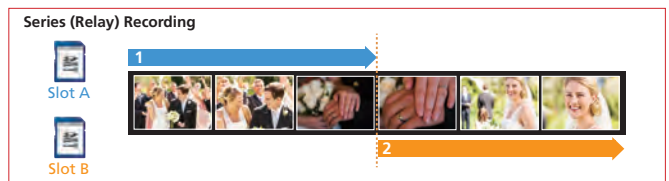
- **Dual (simultaneous) recording mode** (HD/HD, HD/SD or HD/Web)**:** Easily create duplicate backup files as you shoot—either to divide editing tasks or simply for peace of mind. With the new dual codec, it is now possible to record full HD files on one memory card while simultaneously creating smaller SD or proxy files on the other, providing the flexibility for a range of workflow possibilities.
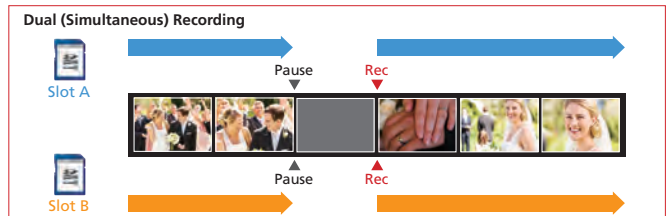
- **Backup recording mode:** While the Rec trigger is used to REC and STOP recording on one card, the other card can act as a continuous backup that overrides the pause function.* This is a unique mode highly demanded by theatrical and bridal camera crews.
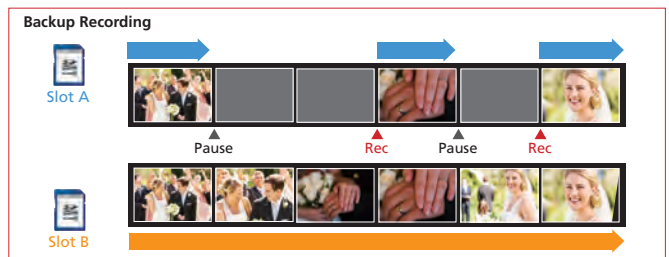
  *During simultaneous backup recording in HD mode, the duplicate file records in the same file format and bit rate as the original.

Series (Relay) Recording

Slot A
Slot B

Dual (Simultaneous) Recording

Slot A
Pause Rec
Pause Rec
Slot B

Backup Recording

Slot A
Pause Rec Pause Rec
Slot B

Cutting-edge Connectivity including SDI (HD/SD) Out

Equipped with leading edge connections, the GY-HM660RE offers versatility while meeting the needs of professional applications. For easy monitoring of footage, you can monitor from the digital SDI and HDMI outputs simultaneously, easily switching between output in HD or SD.

- SDI (HD/SD) out
- HDMI (HD/SD) out (60p/50p support)
- TC Sync in/out
- AV out
- USB (Host x1, Device x1)
- XLR 3-pin x2 (MIC, +48V <phantom power>, LINE)
- Aux in for Wireless Receiver
- ø2.5mm Remote Control
- ø3.5mm Stereo Headphone out

IP Network & Live Streaming

Live Streaming up to 12Mbps of High Bit Rate Streaming

If your task involves mission-critical ENG applications, turn to the GY-HM660RE as it is capable of streaming LIVE HD/SD and proxy video/audio files via network up to 12Mbps. Coupled with the superior mobility of the camera, this wireless capability allows you to stream backhaul live to the newsroom or to a reliable cloud service such as Zixi, as well as content delivery networks such as USTREAM and YouTube using Wi-Fi or 4G-LTE network. All you need to do is press a button and you're streaming HD to the world.

IP Connection Realized with a Variety of USB Host Adapters

Full HD video footage recorded on the GY-HM660RE can stream backhaul live to the target location using an adapter such as 4G LTE/3G modem, Wi-Fi LAN, or Ethernet, whichever is more stable and cost-effective. Such use of an adapter enables uploading video clips to and receiving Metadata (in XML) from the FTP server, remote controlling web server content, viewing and editing Metadata, and most of all for live streaming footage from anywhere in the world immediately after it is recorded.

Advanced IP Functions for FTP Uploading

Video clips recorded on an SDHC/SDXC card can be transferred from the GY-HM660RE via FTP server. Clips can be trimmed right on the camera, which is useful for selecting only vital scenes before uploading to an FTP server. What's more, if an upload is interrupted by a weak connection, the FTP Resume function is smart enough to restart from where it left off. This will help to save time for uploading.

Supports SMPTE 2022-1 Protocol for HQ Streaming

Stable, high-quality live streaming over IP is made possible thanks to support for the new SMPTE 2022-1 protocol. Since its introduction in 2007, the SMPTE 2022-1 standard has added sections to cover more types of IP video transport. Of the standard, the GY-HM660RE supports the first protocol, which is forward error correction (FEC) for real-time video/audio transport over IP networks.

● Latency reduced for MPEG2-TS

On the field/Studio

WAN/LAN

Wi-Fi adapter

4G LTE or 3G modem

Ethernet adapter

XXOO!

INTERNET

Advanced Live Streaming with Built-in Zixi Engine

For advanced live streaming solutions, JVC has tagged with Zixi. The GY-HM660RE features the Zixi engine, installed directly into the camera to provide high-quality delivery over 4G LTE or standard Internet connection. The powerful Zixi engine applies forward error correction (FEC) and adaptive bit rate control with the new "high reliable mode" to correct packet loss by over 40%*, delivering a robust, reliable HD stream. In the camera's FTP setting, the new Zixi protocol has been added for transferring clips while recording from the camera via Zixi server.

*Quality of live streaming depends on network conditions including packet loss.

IP Remote Control with Viewing

When the camera is IP connected to a server console, vital camera operations can be remotely controlled via wireless or wired LAN from smart devices and computers. Remote control functions include lens and camera settings as well as registering zoom presets. Best of all, recording and live streaming may also be triggered remotely—invaluable for minor adjustments when a single reporter is operating the camera or shooting with a 2-camera setup.

The camera on the stage can be remote controlled from a smart device. Controls include REC/STOP, Zoom, Focus, Iris and more detailed settings while viewing live images from the smart device screen.
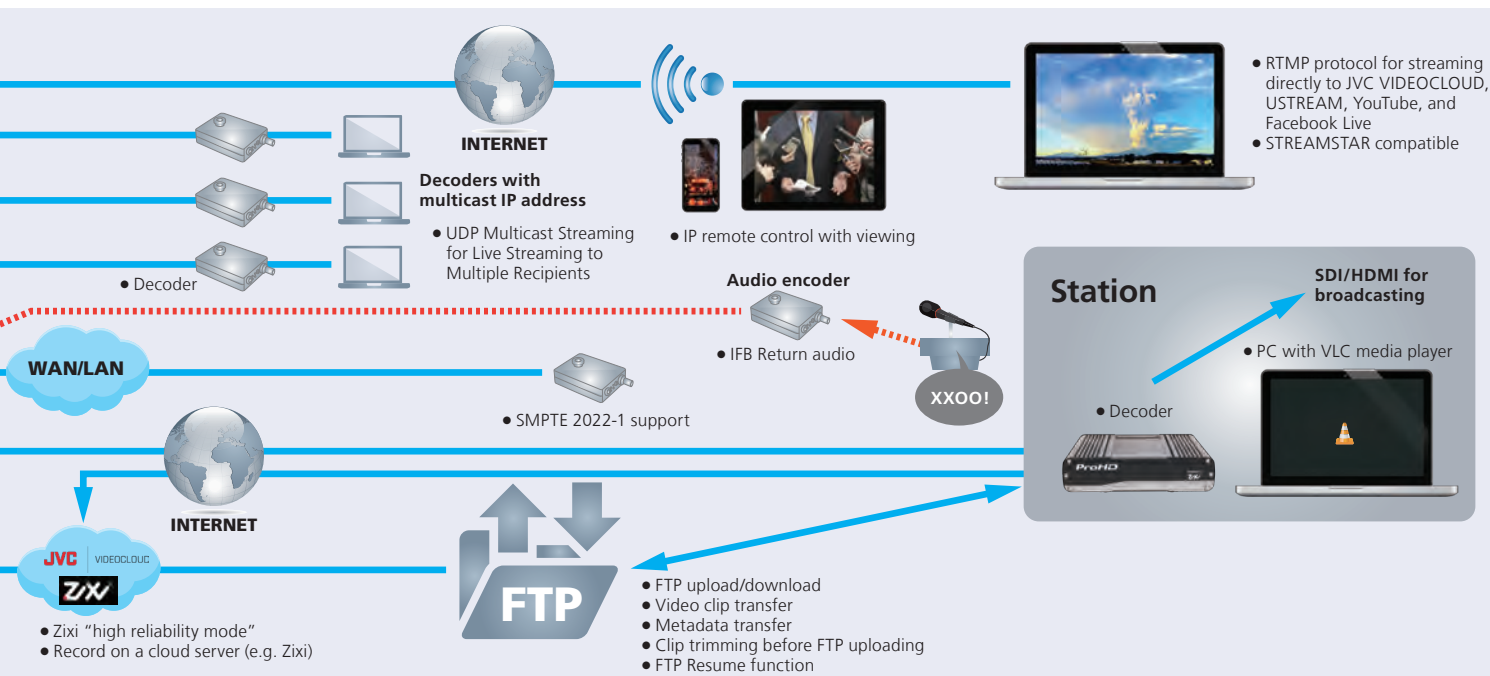
IFB Return Audio via IP

With Interruptible FeedBack (IFB) return audio function*, the camera crew can listen to audio from remote locations via IP even while live streaming. The same audio can be heard from multiple GY-HM660RE cameras simultaneously.

*Requires other devices

JVC VIDEOCLOUD Support

GY-HM660RE has JVC VIDEOCLOUD simple setting function. GY-HM660RE can easily connect with JVC VIDEOCLOUD by using IP remote controller.

- RTMP protocol for streaming directly to JVC VIDEOCLOUD, USTREAM, YouTube, and Facebook Live
- STREAMSTAR compatible

INTERNET

Decoders with multicast IP address
- UDP Multicast Streaming for Live Streaming to Multiple Recipients
- Decoder

- IP remote control with viewing

Audio encoder
- IFB Return audio

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Station

SDI/HDMI for broadcasting

- PC with VLC media player
- Decoder

WAN/LAN

- SMPTE 2022-1 support

INTERNET

JVC VIDEOCLOUD

- Zixi "high reliability mode"
- Record on a cloud server (e.g. Zixi)

FTP
- FTP upload/download
- Video clip transfer
- Metadata transfer
- Clip trimming before FTP uploading
- FTP Resume function

RM-LP100

Remote Camera Controller via LAN
(Firmware update is planned in Autumn 2017)

SDHC Class 4/6/10, SDXC recording time (approx.)

A recording file is automatically split when the size exceeds 4GB. SDXC card users can select "Splits a file when it exceeds 4GB or 30 minutes" or "Splits a file when it exceeds 64GB or 4 hours" at MOV/MXF recording mode.

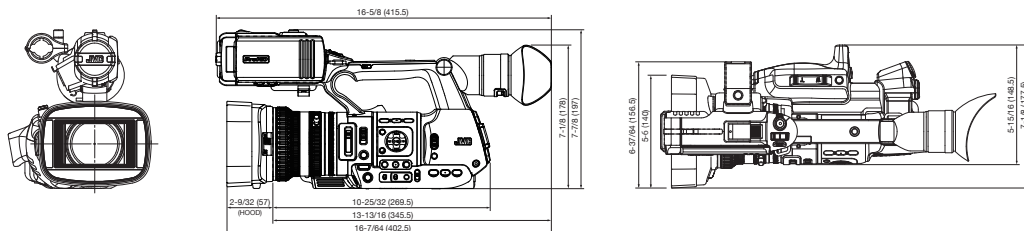|	MOV/MP4/MXF			MTS				MOV					
	MPEG-2/HD			AVCHD				H.264/HD		H.264/SD	H.264/Proxy		
	HQ	SP		HQ Progressive	HQ	SP	LP	EP	XHQ	UHQ	SD	HQ	LP
	720p/1080i	1080i	720p	1080p	1080i				1080i/1080p		480i/576i	540p	270p
4GB	12m	17m	22m	16m	19m	25m	46m	1h 22m	9m	12m	47m	2h 10m	4h 45m
8GB	25m	35m	45m	33m	38m	50m	1h 35m	2h 48m	18m	25m	1h 35m	4h 30m	9h 40m
16GB	50m	1h 10m	1h 30m	1h 7m	1h 18m	1h 40m	3h 10m	5h 36m	36m	50m	3h 10m	9h	19h 20m
32GB	1h 40m	2h 20m	3h	2h 15m	2h 36m	3h 20m	6h 20m	11h 12m	1h 12m	1h 40m	6h 20m	18h	19h 20m
64GB	3h 20m	4h 40m	6h	4h 30m	5h 12m	6h 40m	12h 40m	22h 24m	2h 25m	3h 20m	12h 40m	36h	78h 40m
128GB	6h 40m	9h 20m	12h	9h	10h 32m	13h 20m	25h 20m	44h 48m	4h 50m	6h 40m	25h 20m	72h	157h 20m

Notes: ● Recording times are estimate. ● Recommended SDHC/SDXC memory card brands: Panasonic, Toshiba, and SanDisk
● SDHC Class 10 enabled only in XHQ mode; SDHC Class 4 enabled in AVCHD mode.

GENERAL SPECIFICATIONS

Power	DC12V (AC adapter), DC7.4V (battery)
Power consumption	Approx. 12 W (with VF in REC mode, default setting)
Dimensions	177.5 mm (W) x 197 mm (H) x 415.5 mm (D)
Weight	approx. 2.5 kg (including battery)
Operation temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-20°C to 50°C (14°F to 122°F)
Operating humidity	30% to 80%
Storage humidity	under 85%

CAMERA

Image sensor	1/3 " CMOS 2.5M pixels
Synchronizing	Internal synchronization
Stabilizer	Optical image stabilizer
Lens	F1.6 (wide) to F3.0 (Tele) f=4.1mm to 94.3mm (f=29 mm to 667mm (35mm equivalent))
Filter diameter	72mm
Shutter speed	1/6 ~ 1/10000, EEI
Gain	(-6, -3: Extended mode only), 0, 3, 6, 9, 12, 15, 18,21,24 dB, Lolux (30,36 dB), AGC
ND filter	none, 1/4, 1/16, 1/64
LCD display	3.5-inch 920 k pixels, 16:9
Viewfinder	0.45-inch 1.22 M pixel, 16:9

VIDEO/AUDIO RECORDING

Recording media		2x SDHC/SDXC memory card (HD: Class 6/10 AVCHD/SD/Web: Class4)
Video recording	Video codec	MPEG-4 AVC/H.264 (HD/SD), MPEG-2 Long GOP VBR (HD) MPEG-2 Long GOP CBR (HD), AVCHD (HD/SD)
	File format	MOV, MP4, MTS (AVCHD), MXF
	HD (MPEG-2 Long GOP VBR)	NTSC setting: HQ mode:1920 x 1080/59.94i, 29.97p, 23.98p, 1440 x 1080/59.94i
		1280 x 720/59.94p, 29.97p, 23.98p (Max 35Mbps)
		PAL setting: HQ mode: 1920 x 1080/50i, 25p, 1440x1080/50i
		1280 x 720/50i, 25p (Max 35Mbps)
	HD (MPEG-2 Long GOP CBR)	NTSC setting: SP mode: 1440x1080/59.94i, 1280x720/59.94p (18.3Mbps)
		PAL setting: SP mode: 1440x1080/50i, 1280x720/50p (18.3Mbps)
	HD (H.264)	NTSC setting: XHQ mode: 1920x1080/59.94p, 59.94i, 29.97p, 23.98p (Max 50Mbps)
		1920x1080/59.94i, 29.97p, 23.98p (Max 35Mbps)
		PAL setting: XHQ mode: 1920 x 1080/50p, 50i, 25p (Max 50Mbps)
		1920 x 1080/50i, 25p (Max 35Mbps)
	AVCHD	NTSC setting: Progressive mode (Max 28Mbps): 1920 x 1080/59.94p
		HQ mode (Max 24Mbps): 1920 x 1080/59.94i, SP mode (Max 18Mbps): 1920 x1080/59.94i
		LP mode (9Mbps): 1440 x 1080/59.94i, EP mode (5Mbps): 1440 x1080/59.94i
		PAL setting: Progressive mode (Max 28Mbps): 1920 x 1080/50p
		HQ mode (Max 24Mbps): 1920 x 1080/50i, SP mode (Max 18Mbps): 1920 x1080/50i
		LP mode (9Mbps): 1440 x 1080/50i, EP mode (5Mbps): 1440 x1080/50i
	SD (H.264)	PAL setting: 720 x 576/50i
	Proxy (H.264)	NTSC setting: HQ mode (3Mbps): 960 x 540/29.97p, 23.98p, LP mode (1.2Mbps)
		480 x 270/29.97p, 23.98p
		PAL setting: HQ mode (3Mbps): 960 x 540/25p, LP mode (1.2Mbps): 480 x 270/25p
Audio recording		LPCM 2ch, 48kHz/16-bit (MOV/MP4), Dolby Digital, 2ch (AVCHD), μLaw 2ch (Proxy)

LIVE VIDEO STREAMING

Protocol	RTMP, MPEG2-TS/UDP, MPEG2-TS/RTP, RTSP/RTP, ZIXI
Resolution and bit rate	1920 x 1080 (59.94i/50i) Audio AAC 128 k 12/8/5/3 Mbps 1280 x 720 (59.94p/50p) Audio AAC 128 k 12/8/5/3 Mbps 1280 x 720 (29.97p/25p) Audio AAC 128 k 8/5/3/1.5 Mbps 720 x 480 (59.94i) 720 x 576 (50i) Audio AAC 128 k/64 k 8/5/3/1.5/0.8/0.3 Mbps 640 x 360 (59.94p/50p) Audio AAC 128 k 3/1. 5Mbps 640 x 360 (29.97p/25p) Audio AAC 128 k/64k 3/1.5/0.8/0.3 Mbps

INTERFACE

Video output	AV output (ø3.5mm mini jack x1)
	SDI output (BNC x1)
	HDMI output x1
Audio input	XLR x2 (MIC,+48V/LINE), ø3.5mm mini jack x1
Audio output	AV output (ø3.5mm mini jack x1)
Headphone	ø3.5mm mini jack x1
Remote	ø2.5mm mini jack x1
Time code link input/output	RCA x1
USB	HOST x1 (network connection), DEVICE x1 (mass storage)

PROVIDED ACCESSORIES

Battery (SSL-JVC50) x1, AC adapter x1	

Dimensions

Unit: inches (mm)

16-5/8 (415.5)
7-1/8 (178)
7-7/8 (197)
2-9/32 (57) (HOOD)
10-25/32 (269.5)
13-13/16 (345.5)
16-7/64 (402.5)
6-37/64 (156.5)
5-6 (140)
5-15/16 (148.5)
7-1/8 (177.5)

Simulated pictures.
The values for weight and dimensions are approximate.
E.&O.E. Design and specifications subject to change without notice.

JVCKENWOOD

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