

SONY®



HDCAM HD Camcorder
HDW-650F

HDCAM™

Power HAD™ **FX**

Since its introduction, the Sony HDW Series of HDCAM™ camcorders has been widely adopted for high-definition (HD) content creation applications – such as prime-time TV, commercials, natural history and ENG. – thanks to its striking picture quality, high operability, and reliability.

Sony now is proud to offer the HDW-650F, which offers the producer many enhanced features over previous models

The HDW-650F incorporates three newly developed 2/3-inch type Power HAD™ FX CCDs, a 14-bit A/D converter, and a state-of-the-art DSP LSI. These devices provide the extremely wide tonal reproduction as well as a high sensitivity of F11 at 59.94 Hz or F12 at 50 Hz. In addition, the HDW-650F can achieve a signal-to-noise ratio up to 59dB by activating the newly added noise-suppression function.

The HDW-650F is also equipped with many beneficial devices and functions – such as the 3.5-inch color LCD screen located on the inside panel – which are packaged into a well-balanced, reliable chassis that enables customers to perform highly creative shooting.

In addition, a series of useful features are provided as standard – such as two HD-SDI outputs, a down-conversion output, selectable gamma curves (HyperGamma™), interval recording, picture cache recording, and a slow shutter function – which further enhance the versatility of the camcorder.

The HDW-650F also provides flexible HD recording capability in 1080/59.94i, 50i, and 23.98P.



FEATURES

Choice of HD Recording Formats, Including 1080/23.98P

The HDW-650F offers a choice of video formats for both frame rates and scanning mode.

In addition to 1080/50i and 59.94i, it also supports 1080/23.98P,

Three 2/3-inch HD Power HAD FX CCDs

The HDW-650F is equipped with three 2/3-inch type 2.2-megapixel HD CCDs, which are also used in Sony's well-proven HDC-1500 Multi-format HD Camera.

Based on Sony's Power HAD FX sensor technology and the latest on-chip lens structure, the HDW-650F offers a high sensitivity of F11 at 59.94 Hz or F12 at 50 Hz.

Superb Signal-to-noise Ratio of 59dB

An excellent signal-to-noise ratio of 59dB can be achieved by activating the Noise Suppression (NS) mode of the HDW-650F, which helps to reduce the high-frequency noise elements of video signals using Sony's advanced digital processing technology.

14-bit A/D Conversion

The HDW-650F incorporates a high-performance 14-bit A/D converter that enables images captured by the high-performance CCDs to be processed with maximum precision.

In particular, this high-resolution A/D conversion allows the gradation in mid- to dark-tone areas of the picture to be faithfully reproduced.

Thanks to the 14-bit A/D converter, pre-knee signal compression in highlighted areas can be eliminated, and the camera can clearly reproduce a high-luminance subject at a 600% dynamic range*¹.

*¹ In 1080/50i and 59.94i mode.

3.5-inch*² LCD

A large, easy-to-view, color LCD screen on the HDW-650F camcorder's side panel enables operators to instantly review recorded footage – as well as access the camera's set-up menus, and view status indications such as four-channel audio meters and the remaining time available in the tape and battery.

*² Viewable area measured diagonally.

New Audio Capability: Digital Wireless Microphone Receiver

The HDW-650F is compatible with a range of microphones. It is equipped with a slot to accommodate the DWR-S01D digital wireless microphone receiver, which provides two-channel audio with stable and secure transmission tolerant to interference waves*³.

The WRR-855S wireless microphone receiver can also be utilized by installing it to the slot.

Shotgun-type microphones, such as the ECM-680S/678/674, are also available as options.

Moreover, the status of the digital wireless microphone system can be monitored through both the camcorder's viewfinder and the LCD display.

*³ Requires a software upgrade, planned to be available in spring 2009.

Well-balanced Compact Body

The ergonomic design of the HDW-650F has been updated from its predecessor. As a result, the body of the HDW-650F provides even better weight balance, allowing users to enjoy comfortable hand-held operation. Because its center of gravity is located roughly at the center point of the shoulder pad, operating the camera for long periods on the shoulder causes less operator fatigue.

The HDW-650F's light body weighs just 4.2 kg (9 lb 4 oz).

Down-conversion Capability

The HDW-650F is equipped with a built-in down-conversion system as standard.

Conversion can be done via SD-SDI output.

This function provides powerful operational flexibility.

Picture Cache Recording

The HDW-650F offers a picture cache recording function that is especially useful for various tape saving applications. Up to eight seconds of audio and video signals are buffered in the camcorder's memory before the Rec. start button is even pressed (when in Standby mode).

This means that everything that happened eight seconds before the Rec. start button was pressed will still be recorded in the tape. What's more, this function works even before the tape is inserted into the drive – thereby helping to prevent the loss of any unexpected, yet important events.

Slow Shutter*4

The shutter speed of the HDW-650F is selectable down to a 16-frame period (in 2-, 3-, 4-, 5-, 6-, 7-, 8-, and 16-frame periods). During such a long frame period, electrical charges accumulate on the CCDs, which dramatically increases sensitivity. This helps camera operators to shoot in extremely dark environments.

The Slow Shutter function also allows operators to use shutter speeds longer than the frame rate, for enhanced shooting creativity. For example, when shooting a moving object, it will create intentional blurring of the images.

*4 Requires a software upgrade, planned to be available in spring 2009.

Other Features

- Provides four types of HyperGamma curve: HyperGamma 1, 2, 3, and 4.
Operators can select the best-suited preset gamma curve depending on the scene being shot and their desired 'look' for the image.
- A wide variety of video and audio inputs and outputs, including two HD-SDI outputs.
- Supports AES/EBU Digital Audio signal input, in addition to microphone input, +48 V microphone input, and line input.
- Trigger REC function (HD-SDI Remote Function: REC Command).



SPECIFICATIONS

General	
Mass	4.2 kg (9 lb 4 oz) (without options) 5.9 kg (with VF, Mic, BCT-40HD cassette tape, BP-GL95 battery) (13 lb)
Power requirements	12 V DC +5.0/-1.0 V
Power Consumption	35 W (with 12 V DC supply, when recording, LCD monitor off)
Operating temperature	0 to 40 °C (+32 to 104 °F)
Storage temperature	-20 to +60 °C (-4 to 140 °F)
Operating humidity	25 to 85% (relative humidity)
Continuous operating time	Approx. 120 min. with BP-GL95 battery
Input/output connectors	
GEN LOCK IN	BNC type x1, 1.0 Vp-p, 75 Ω, unbalanced
TC IN	BNC type x1, 0.5 V to 18 Vp-p, 10 kΩ
AUDIO IN CH1/CH2	XLR type 3-pin (Female) x2, -60 dBu/+4 dBu/AES/EBU (0 dBu = 0.775 Vrms)
MIC IN	XLR type 5-pin (Female) x1, -50 dBu (LPF ON)
TEST OUT	BNC type x1, VBS/Y (component): 1.0 Vp-p, 75 Ω, unbalanced
HDSDI OUT	BNC type x1, HD-SDI: 0.8 Vp-p, unbalanced
HD/SD SDI OUT	BNC type x1, HDSDI/SDSDI: 0.8 Vp-p, unbalanced
AUDIO OUT	XLR type 5-pin (Male) x1, 0 dBm
TC OUT	BNC type x1, 1.0 Vp-p, 75 Ω
EARPHONE	Mini-jack x2, 8 Ω, -∞ to -18 dBs variable
DC IN	XLR type 4-pin (Male) x1, 11 to 17 V DC
DC OUT	4-pin x1, 11 to 17 V DC, maximum rated current 0.5 A
LENS	12-pin x1, 11 to 17 V DC, maximum rated current 0.7 A
REMOTE	8-pin x1
LIGHT	2-pin x1
VTR section	
Recording format	HDCAM 59.94i/50i/23.98PsF
Tape speed	Approx. 96.7 mm/s (for 59.94i format) Approx. 80.7 mm/s (for 50i format) Approx. 77.4 mm/s (for 23.98PsF format)
Recording/Playback time	For 59.94i format: 40 minutes (using BCT-40HD) For 50i format: 48 minutes (using BCT-40HD) For 23.98PsF format: 50 minutes (using BCT-40HD)
Fast forward/Rewind time	Approx. 5 minutes (using BCT-40HD video cassette)
Recommended tape	Sony HDCAM cassette BCT-6HD/12HD/22HD/32HD/40HD
Sampling frequency	Y: 74.176 MHz (59.94i), 74.25 MHz (50i) Pb/Pr: 37.088 MHz (59.94i), 37.125 MHz (50i)
Quantization	10 bits/sample (8 bits sample for compression processing)
Channel coding	S-NRZI PR-IV
Compression	Coefficient recording system
Error correction	Reed-Solomon code
Error concealment	Adaptive three dimensional
Audio performance (with standard playback machine)	
Frequency response	20 Hz to 20 kHz, +0.5 dB/-1.0 dB
Dynamic range	More than 85 dB (emphasis ON)
Distortion	Less than 0.08% (at 1 kHz, reference level)
Cross talk	Less than -70 dB (at 1 kHz)
Wow & flutter	Below measurable limit

Camera section (Performance)	
Pickup device	3-chip 2/3-inch type IT CCD
Effective Picture elements (H x V)	1920 x 1080
Optical system	F1.4 prism (Equipped with Quartz Filter)
Lens mount	2/3-inch 48 bayonet mount
Built-in filters	CC filter (electric) A : Cross filter, B : 3200K, C : 4300K, D : 6300K ND filter (optical) 1: Clear, 2: 1/4 ND, 3: 1/16 ND, 4: 1/64 ND
Sensitivity (2000 lux, 89.9% reflectance)	F11 (system frequency: 59.94i), F12 (system frequency: 50i) (typical)
Minimum illumination	0.26 lx (F1.4 lens, +42 dB turbo gain)
Smear level	-135 dB
S/N ratio	54 dB (Noise suppressor off. 59 dB when noise suppressor is on.)
Modulation depth at 27.5 MHz	45% or more
Horizontal resolution	1000 TV Lines
Shutter speed	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s) (at 59.94i format) 1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s) (at 50i format) 1/32, 1/48, 1/50, 1/60, 1/96, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s) (at 23.98PsF)
Clear Scan	60 Hz to 4300 Hz (at 59.94i format) 50Hz to 4700 Hz (at 50i format) 24Hz to 2200 Hz (at 23.98PsF format)
Programmable Gain	-6dB/-3dB/0dB/3dB/6dB/9dB/12dB/18dB/24dB/30dB/36dB/42dB
Supplied accessories	Shoulder strap (1), Operation manuals, English version (1), CD-ROM manual (1)
Optional accessories	HDVF-20A/200/C35W Viewfinder BKW-401 Viewfinder Rotation Bracket BP-GL65/GL95/L60S/L80S Battery Pack BC-M150/L500/L70 Battery Charger AC-DN10/DN2B AC Adaptor RM-B150/B750 Remote Control Unit ECM-680S Stereo/Monaural Microphone ECM-678/674 Monaural Microphone CAC-12 Microphone Holder WRR-855S UHF Synthesized Tuner Unit WRR-860A/861/862 UHF Synthesized Diversity Tuner WRT-850/860 UHF Synthesized Transmitter DWR-S01D Digital Wireless Dual-channel Receiver* DWT-B01 Digital Wireless Transmitter* DWR-S01D Digital Wireless Dual-channel Receiver DWT-B01 Digital Wireless Transmitter DMX-P02 Portable Digital Mixer WRR Tuner Fitting (service part number: A-8278-057-A) BCT-6HD/12HD/22HD/32HD/40HD HDCAM cassette tapes BCT-HD12CL Cleaning Cassette LC-777 Hard Carrying Case LC-DS300SFT Soft Carrying Case VCT-14 Tripod Adaptor Rain cover (Part No. 3-191-064-02) Maintenance Manual

* Will be available in spring 2009.

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