SONY

CINE ALTA™

HDCAM™

Sony Digital Recorder

HDW-D1800/HDW-1800

HDW-D1800/1800 HDCAM Studio Recorders – Cost-effective Solutions for an Even Broader Spectrum of HD Opportunities

Since their introduction in 1997, a huge number of Sony HDCAM™ products have been adopted worldwide in a broad range of production areas such as dramas, documentaries, commercials, news gathering, and digital cinematography. Its stunning picture performance, comprehensive range of products, and bullet-proof reliability have made the HDCAM format the clear choice for these uses. Sony's commitment to continuous product development has now led to the creation of more affordable HDCAM equipment in the form of the new HDW-D1800 and HDW-1800 studio recorders.

Despite their affordable prices, they provide high picture performance, multi-format recording capability including 24P, frame-accurate editing capability, and high reliability – all inherited from the well-known HDW-2000 series VTRs. The HDW-1800 model is a studio edit recorder with HDCAM recording/playback capability, while the HDW-D1800 model also offers legacy playback of Digital Betacam™ and MPEG IMX™ format tapes with an internal up-conversion capability. Both recorders have a built-in down-converter as standard, enabling SD/HD mixed operations as well as easy integration into existing SD-based editing environments. To accommodate the requirement for emerging HD formats, two types of powerful options are available: HKDW-104 for 720P and 2-3 pull-down output capability, and HKDW-105 for i.LINK™ HDV™ 1080i input. The front panel of both recorders features a jog/shuttle dial, and also a large color LCD screen that displays both playback pictures and various information such as timecode, audio level meters, and operational menus, offering great operational efficiency.

With the new HDW-D1800 and HDW-1800 studio recorders, the solid quality of the HDCAM format can now be easily used in more HD programming opportunities than ever before.

Features

High-Definition Picture Quality with the HDCAM Format

The HDW-D1800 and HDW-1800 recorders adopt the proven HDCAM format to record 1920 x 1080 resolution, high-definition component digital signals. The HDCAM format uses an extremely intelligent compression scheme with a high video bit rate of 140 Mb/s (data rate on tape of 185 Mb/s.) This allows the format to provide superb picture quality onto a highly robust and cost-effective 1/2-inch tape, with a design inherited from the Betacam series.

Interlace/Progressive Switchable Recording and Playback

An important element that makes the HDW-D1800 and HDW-1800 recorders so versatile is their ability to record and play back material recorded in multiple signal formats. They support both interlace and progressive recording modes with the following selectable frame rates: 1080/59.94i, 1080/50i, 1080/29.97PsF, 1080/25PsF, 1080/24PsF, and 1080/23.98PsF.

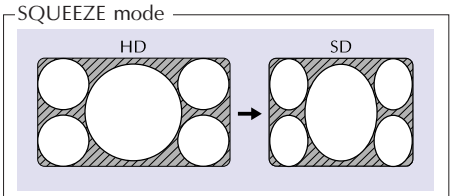
Up- and Down-conversion Capabilities with Selectable Picture Modes

The HDW-D1800 and HDW-1800 recorders can output 525/59.94i and 625/50i signals in SD-SDI or analog composite from HDCAM playback. The HDW-D1800 can also output 1080i signals in HD-SDI from SD legacy playback. These up- and down-conversion capabilities provide unlimited operational flexibility. When monitoring such converted signals, the picture display mode can be selected from the following, depending on the type of application.

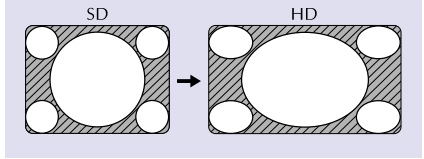
Powerful Legacy Playback Capability (HDW-D1800 only)

The HDW-D1800 recorder offers a powerful legacy playback capability for Digital Betacam and MPEG IMX format tapes. This allows flexible use of acquisition tools in the field, and easy integration into existing editing environments.

SQUEEZE mode

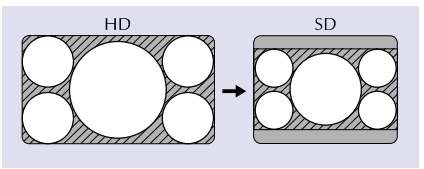


HD to SD, 16:9 HD picture is down-converted and output as a 4:3 SD picture.

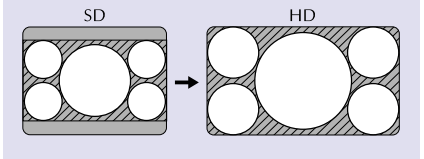


SD to HD, 4:3 SD picture is up-converted, then output as a 16:9 HD picture.

LETTER BOX mode

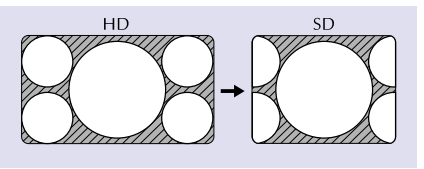


HD to SD, 16:9 HD picture down-converted to SD and output is presented in Letter-box on a 4:3 monitor.

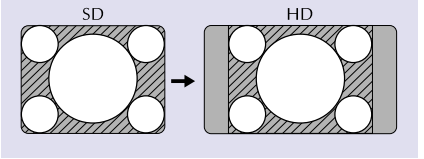


SD to HD, 4:3 SD picture is cropped and presented as a 16:9 picture.

EDGE CROP mode



HD to SD, edges of a 16:9 HD picture are cropped in the down-converted 4:3 SD picture.



SD to HD, 4:3 SD picture up-converted as a 16:9 HD picture, however the sides are cropped.

720P Conversion and 2-3 Pull-down Output

For further enhanced flexibility, the HDW-D1800 and HDW-1800 recorders provide the ability to output converted 720P signals when playing back 1080i material by use of the optional HKDW-104 board.
This board also provides 2-3 pull-down capability, enabling 23.98PsF/24PsF* material to be output as 59.94i/60i signals.

* For 24PsF material, 2-3 pull-down output is available only when it is played back at the system frequency of 23.98 Hz. (In this case, its playback speed is reduced by 0.1%.)

Converted 720P Output

1080/59.94i, 1080/29.97P, 1080/23.98P, 525*	720/59.94P
1080/50i, 1080/25P, 625*	720/50P

* Conversion from SD material is available on the HDW-D1800 only.

HDV 1080i Stream Recording

Responding to the strong demand for a better, more cost-effective process of HDCAM/HDV mixed-format editing, the new HDW-D1800 and HDW-1800 recorders are equipped with a powerful HDV 1080i stream recording capability. With the addition of the HKDW-105 board, the HDW-D1800 and HDW-1800 recorders can accept an HDV 1080i compatible stream via a single i.LINK cable connection, without any conversion. This is an extremely powerful feature for users who want to shoot in HDV format and post in HDCAM format, or who want to use both HDCAM and HDV material at the same time.

HDV
HDV 1080i

Supported Frame Rates

Input	Record
HDV 1080/59.94i	HDCAM 59.94i or 29.97PsF
HDV 1080/50i	HDCAM 50i or 25PsF

Search Functions – Jog and Shuttle Mode

The HDW-D1800 and HDW-1800 recorders deliver recognizable color pictures in shuttle mode at speeds of up to 50 times normal playback. Jog operation is also possible, at -1 to +2 times normal speed. High-quality jog audio is achieved, providing a responsiveness and sound quality reminiscent of Betacam SP machines.

4.3-inch Color LCD Screen

The control panels of these VTRs are simple and easy to use. They are equipped with a 4.3-inch (viewable area, measured diagonally) 16:9 color LCD screen, allowing users to view playback material and VTR setup menus. It is also possible to monitor output signals via 2-3 pull-down or converted 720P signals.

Video Monitor View

System Status View

Frame Accurate Editing

Insert and assemble editing with frame accuracy is possible on the HDW-D1800 and HDW-1800 recorders. Each video and audio channel can be edited independently.

Digital Audio Crossfade Function

The HDW-D1800 and HDW-1800 recorders feature Digital Audio Crossfade to achieve smooth audio transitions at audio insert edit points. Previously recorded audio signals are read in advance using pre-read heads and then re-recorded onto the same track after being mixed with the input signal. The crossfade duration can be selected from a range of values.

Dynamic Motion Control (DMC) Playback

The HDW-D1800 and HDW-1800 recorders also provide a DMC playback capability, which memorizes the tape speed trajectory over the DT (Dynamic Tracking) speed range.

Pre-read Editing

Equipped with advanced playback heads, these recorders offer a pre-read editing capability. This provides various application functionality, such as tiling with a signal VTR, A/B-roll with two VTRs, audio mix, and channel swap.

Versatile Interfaces

These recorders feature a wide range of interfaces including:

- HD-SDI input and output
- SD-SDI output
- Analog composite output
- Digital audio input and output
- Analog audio input and output
- Timecode input and output
- Reference input
- RS-422 9-pin remote interface
- Analog audio monitor output
- Video control interface
- Remote parallel 50-pin interface
- RS-232C remote interface

Easy Setup Using "Memory Stick" Media

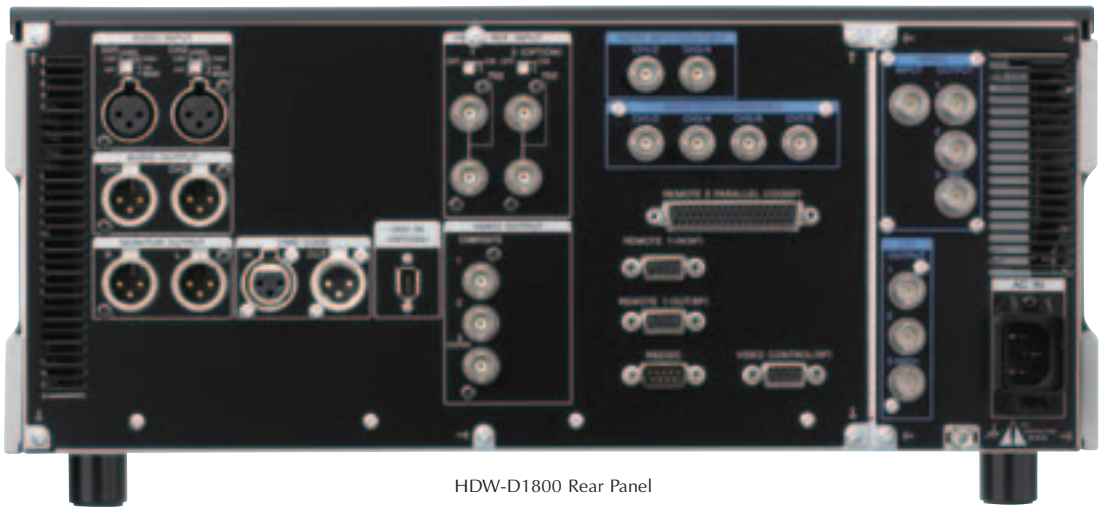
With these recorders, users can store and recall VTR setup parameters onto optional Memory Stick™ media, enabling quick and consistent setup of multiple VTRs.

Metadata Recording

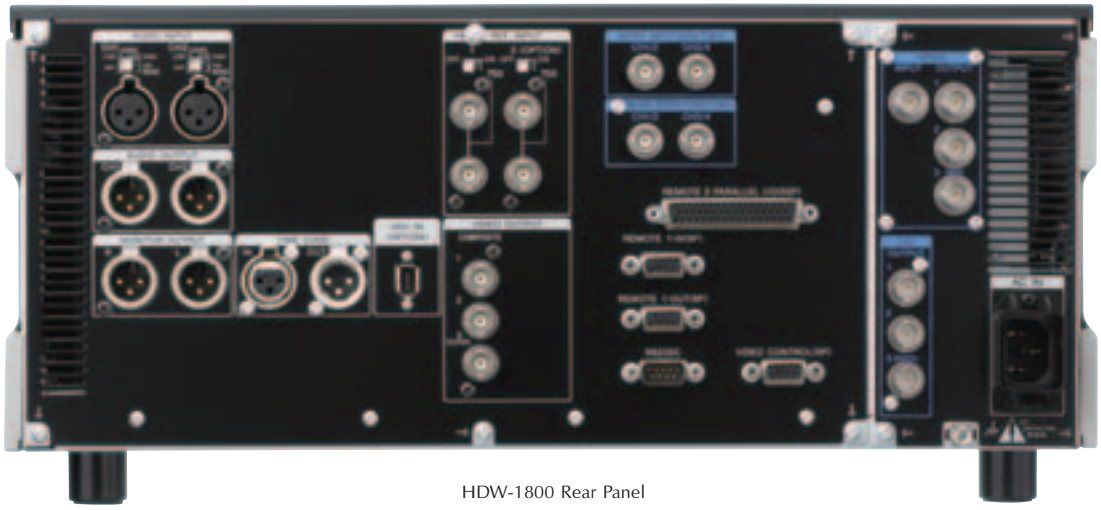
The HDW-D1800 and HDW-1800 recorders are capable of recording metadata including UMID (Unique Material IDentifier) and shot marks, which are used for quick cue-up to scenes of interest. This metadata capability improves overall efficiency across the production process.

HDW-D1800 Front Panel

Rear Panels

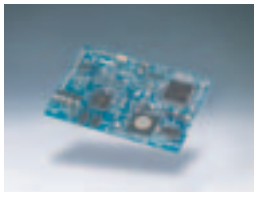


HDW-D1800 Rear Panel

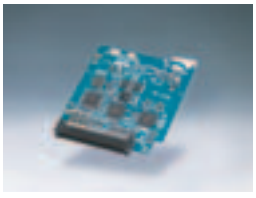


HDW-1800 Rear Panel

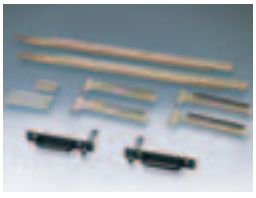
Optional Accessories



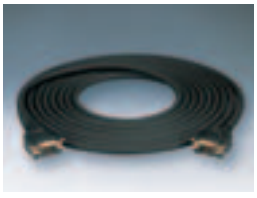
HKDW-104,
Pull-down/720P Board



HKDW-105,
i.LINK (HDV) Input Board



RMM-131,
Rack Mount Kit



RCC-5G,
9-pin Remote Cable

RM-280,
Editing Controller*1

HKDV-900,
HD Digital Video Controller*2

BCT-124HDL/64HDL/22HD,
HDCAM Tape Cassette

BCT-HD12CL,
Cleaning Cassette

*1 Supplied with a 9-pin to 4-pin remote cable (2 meters) for connection to the HDW-D1800/HDW-1800. For longer cable runs, a 10-meter cable is available as an option (1-832-104-11.)
*2 To connect the HKDV-900 with the HDW-D1800/1800 VTR, the optional video controller cable, RCC-1505H/1510H/1530H is required.

HDW-D1800/HDW-1800 Specifications

		HDW-D1800	HDW-1800
General			
Power requirements		100 to 240 V, 50/60 Hz	
Power consumption		150 W	
Operating temperature		+5 to +40 °C (41to 104 °F)	
Storage temperature		-20 to +60 °C (-4 to +140 °F)	
Humidity		20 to 90%	
Mass		22 kg (48 lb 8 oz)	
Dimensions (W x H x D)		427 x 174 x 544 mm (16 7/8 x 6 7/8 x 21 1/2 inches)	
Tape speed			
	HDCAM	96.7 mm/s (59.94i, 29.97PsF), 80.6 mm/s (50i, 25PsF), 77.4 mm/s (24PsF, 23.98PsF)	
	Digital BETACAM	96.7 mm/s	–
	MPEG IMX	64.5 mm/s (525/59.94i), 53.8 mm (625/50i)	–
HDCAM record/playback time		124 minutes (59.94i, 29.97PsF, with BCT-124HDL cassette) 149 minutes (50i, 25PsF, with BCT-124HDL cassette) 155 minutes (24PsF, 23.98PsF, with BCT-124HDL cassette) 40 minutes (59.94i, 29.97PsF, with BCT-40HD cassette) 48 minutes (50i, 25PsF, with BCT-40HD cassette) 50 minutes (24PsF, 23.98PsF, with BCT-40HD cassette)	
Fast forward/rewind time		Approx. 3 minutes (with BCT-124HDL cassette)	
Search speed range			
	Shuttle mode		
	HDCAM	Still to ±50 times normal speed playback (59.94i, 29.97PsF) Still to ±58 times normal speed playback (50i, 25PsF) Still to ±60 times normal speed playback (24PsF, 23.98PsF)	
	Digital BETACAM	Still to ±50 times normal speed playback	–
	MPEG IMX	Still to ±78 times normal speed playback	–
	Variable mode		
	HDCAM	-1 to +2 times normal speed playback	
	Digital BETACAM	-1 to +3 times normal speed playback	–
	MPEG IMX	-1 to +3 times normal speed playback	–
	Jog mode	Still to ±1 time normal speed playback	
Servo lock time		0.6 s or less (59.94i, 29.97PsF, from standby on), 0.7 s or less (50i, 25PsF, 24PsF, 23.98PsF, from standby on)	
Load/unload time		6 s or less (both L and S cassettes)	
Input/output			
HD-SDI input		BNC x 1 (SMPTE 292M), Serial Digital (1.485 Gb/s)	
Reference video input 1		BNC x 2 (with a loop-through), Tri-level sync, 0.6 Vp-p, 75 Ω, sync negative, or Black Burst or composite, 0.3 Vp-p, 75 Ω, sync negative	
Reference video input 2 (option: HKDW-104)		BNC x 2 (with a loop-through), Tri-level sync, 0.6 Vp-p, 75 Ω, sync negative, or Black Burst or composite, 0.3 Vp-p, 75 Ω, sync negative	
Digital audio input (CH 1/2, CH 3/4)		BNC x 2, AES/EBU	
Analog audio input (CH 1/2)		XLR-3-pin type, female, x 2 Low off: -60 dBu, high impedance, balanced High off: +4 dBu, high impedance, balanced High on: -4 dBm, 600 Ω termination, balanced	
Time code input		XLR-3-pin type, female, x 1 (0.5 to 18 Vp-p,10 kΩ, balanced)	
i.LINK (HDV 1080i) input (option: HKDW-105)		IEEE1394, 6-pin x1	
HD-SDI output		BNC x 3 (SMPTE 292M including one character out), Serial Digital (1.485 Gb/s)	
SD-SDI output		BNC x 3 (SMPTE 259M including one character out), Serial Digital (270 Mb/s)	
Analog composite output		BNC x 3 (SMPTE 170M, including one character out), 1.0 Vp-p, sync negative, 75 Ω	
Digital audio output		BNC x 4, AES/EBU (CH 1/2, CH 3/4, CH 5/6, CH 7/8)	BNC x 2, AES/EBU (CH 1/2, CH 3/4)
Analog audio output (CH 1/2)		XLR-3-pin type, x 4, male, +4 dBm (600 Ω load), low impedance, balanced	
Time code output		XLR-3-pin type, male, x 1 (2.2 Vp-p, low impedance, balanced)	
Monitor output L/R		XLR-3-pin type, male, x 2 (+4 dBm at 600 Ω load, low impedance, balanced)	
Headphones		JM-60 Stereo phone jack (-∞ to -12 dBu at 8 Ω load, unbalanced)	
Remote1 In		D-sub 9-pin, Sony 9-pin remote interface	
Remote1 Out		D-sub 9-pin, Sony 9-pin remote interface	
RS-232C		D-sub 9-pin	
Remote2 Parallel I/O		D-sub 50-pin	
Video control		D-sub 9-pin (for connection with the HKDV-900)	
Others		Memory Stick slot	
Processor adjustment range			
Video level		±3 dB/-∞ to +3 dB, selectable	
Chroma level		±3 dB/-∞ to +3 dB, selectable	
Set up/black level		±30 IRE / ±210 mV	
Chroma phase/hue		±30°	
System sync phase		±15 μs	
System SC phase		±200 ns	
Digital video performance			
Sampling frequency		Y: 74.25 MHz, R-Y/B-Y: 37.125 MHz	
Quantization		10 bit/sample (compression: 8 bit/sample)	
Compression		Coefficient recording system	
Channel coding		S-I-NRZI PR-IV	
Error correction		Reed-Solomon code	
Analog composite output			
Bandwidth		0 to 5.75 MHz +0.5 dB/-3.0 dB	
S/N ratio		53 dB or more	
Differential gain		2% or less	
Differential phase		2° or less	
Y/C delay		20 ns or less	
K Factor (2T Pulse)		1% or less	
Output SCH phase		Based upon RS-170A/CCIR R.624-3	

		HDW-D1800	HDW-1800
Digital audio performance			
Sampling frequency		48 kHz (Synchronized with video)	
Quantization		20 bits/sample	
Wow & flutter		Below measurable level	
Headrooms		20 dB (or 18 dB selectable)	
Emphasis (ON/OFF selectable in REC mode)		T1=50 μs, T2=15 μs (on/off selectable in recording mode)	
Analog audio output performance			
Frequency response		20 Hz to 20 kHz +0.5 dB/-1.0 dB (0 dB at 1 kHz)	
Dynamic range		More than 95 dB (at 1 kHz, emphasis ON)	
Distortion		Less than 0.05% (at 1 kHz, emphasis ON, reference level)	
Crosstalk		Less than -80 dB (at 1 kHz, between any two channels)	
Cue track			
Sampling frequency		100 Hz to 12 kHz ±3 dB	
S/N ratio		More than 45 dB (at 3% distortion level)	
Distortion		Less than 2% (THD at 1 kHz, reference level)	
Wow & flutter		Less than 0.2% rms	
Digital Betacam playback performance			
Video			
	Bandwidth	Y: 0 to 5.75 MHz +0.5 dB/-0.5 dB R-Y/B-Y: 0 to 2.75 MHz +0.5 dB/-0.5 dB	–
	S/N ratio	62 dB or more	–
	K-factor	1% or less	–
Digital audio (CH 1 to 4)			
	Frequency response	20 Hz to 20 kHz +0.5 dB/-1.0 dB	–
	Dynamic range	95 dB (at 1 kHz, emphasis ON)	–
	Distortion	0.05% or less (at 1 kHz, emphasis ON, reference level (+4 dBm))	–
	Wow & flutter	Below measurable level	–
Analog audio (cue track)			
	Frequency response	100 Hz to 12 kHz +3 dB/-3 dB	–
	S/N ratio	45 dB or more (at 3% distortion level)	–
	Distortion	2% or less (THD at 1 kHz, reference level)	–
	Wow & flutter	Less than 0.2% rms	–
MPEG IMX playback performance			
Video			
	Bandwidth	Y: 0 to 5.75 MHz +0.5 dB/-2.0 dB R-Y/B-Y: 0 to 2.75 MHz +0.5 dB/-2.0 dB	–
	S/N ratio	56 dB or more	–
	K-factor (2T pulse)	1% or less	–
Digital audio (CH 1 to 8)			
	Frequency response	20 Hz to 20 kHz +0.5 dB/-1.0 dB (0 dB at 1 kHz)	–
	Dynamic range	90 dB or more (at 1 kHz, emphasis ON, 16 bits/48 kHz)	–
	Distortion	0.05% or less (at 1 kHz, emphasis ON, reference level (+4 dBm))	–
Others			
Supplied accessories		Operation manual (CD-ROM x1), Installation manual (x1), Operation guide (x1), PSW 4x16 rack mount screw (x4)	

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