SONY

HDW-2000

HDCAM recorder/player

Overview

HDCAM studio VTR with 24P-recording/playback
A cost-effective and feature-enhanced HD solution, focused on streamlining the migration process to full DTV operations.

- **A cost-effective entrance to CineAlta operations**

  One of four types of recorder and one type of player available in this range offering producers a wide, yet affordable price range, each offering a different combination of Betacam format playback capabilities. All of these products can operate in multiple modes including 59.94i, 50i, 29.97PsF, 25PsF, 24PsF, and 23.98PsF.

- **Accommodates the ability to record at the frame rates of 23.98PsF and 24PsF**

  Easy exchange of SD and HD programme materials.

Features

- **Low power consumption of approx. 14 W**

  These recorders adopt the proven HDCAM format, recording high-definition component digital signals using the state-of-the-art HDCAM compression technology. This excellent compression scheme maintains a high video bit rate of 140 Mb/s (data rate on tape of 185 Mb/s). The format combines superb picture quality with the high reliability and robustness of 1/2-inch tape integrated into a design approach inherited from the BETACAM Series.

- **Large, clean images**

  High resolution with horizontal resolution of over 650 lines plus a phase-corrected peaking circuit (to aid in focusing) and a two tally system with large up-tally lamp.

- **Built-in up- and down-convertors**

  Playback of a wide variety of legacy SDTV VTR formats in addition to the HDCAM format. Since the HDW-2000 Series can output signals in 1080i, 576i and 480i, each format is reproduced in its corresponding vertical resolution. As an even greater advantage, the HDW-2000 Series has up and down convertors built-in so a program originated for SDTV can be up converted for HDTV transmission, and materials that were made in the HD format can be down converted as "Super-sampled" SD images. This is a distinct advantage of the HDW-2000 Series. The "Super-sampled" HD origination produces standard definition 480 and 576-line NTSC/PAL signals which are superior to those originated in standard definition (their horizontal and vertical MTFs are higher and the associated scanning aliasing is less).

- **Interlace, progressive switchable operation including 24PsF mode**

  Provides recording and playback capability of the HDCAM format in 1080/59.94i, 1080/50i, 1080/29.97PsF, and 1080/25PsF frame rates. This series also allows legacy playback of both 480/59.94i and 576/50i on the same deck. This flexibility makes it an extremely effective tool for international programming. To meet the increasing needs of 24P program creation, 23.98PsF/24PsF recording is now available on all HDW-2000 Series recorders, as well as the ability to convert 23.98PsF/24PsF recordings to a 25PsF signal with the appropriate time-code conversion for 24P program creation. Furthermore, the full HDW-2000 Series lineup can output the converted 720/59.94P signal from the 59.94i or 29.97PsF playback, providing further enhanced flexibility.

- **Long recording time on a single cassette**

  Utilizing the HDCAM format's high-density recording capability and compression technology, the HDW-2000 Series provides a long maximum recording time of 124 minutes at 1080/59.94i, 149 minutes at 1080/50i, and 155 minutes at 1080/24PsF for each L cassette. Small size cassettes can also be used, which provides a maximum of 40 minutes of recording at 1080/59.94i, 48 minutes at 1080/50i, and 50 minutes at 1080/24PsF. This flexibility allows the HDW-2000 Series to cover a wide range of applications including news, sports, and production.

- **Digital audio and Dolby recording**

  The HDCAM format records four channels (two AES/EBU stereo pairs) of non-compressed digital audio (20 bit at 48 kHz). The HDW-2000 Series recorders can also record non-audio data streams within the audio recording area by packaging the data within an AES/EBU wrapper. Furthermore, the HDW-2000 recorders can record Dolby-E and Dolby AC-3 data (non-audio) streams on the audio tracks.

- **Compact design and low power consumption**

  This series features a compact 4RU-size design and weighs only 23 kg (50 lb 11 oz)– 12 kg (26 lb 7 oz) lighter than the HDW-500 HD Video Recorder. It also has low power consumption of 220 W. This compactness and low power consumption are suited to not only studio use but also installation into OB-vans.

- **User friendly control panel**

Control panels are compact, yet comprehensive. There is a minimal learning curve since its design and functionality are inherited from universally used BETACAM SP VTRs. In addition, the control panel has a multi-function display that provides comprehensive information for quick access and easy control of a variety of functions. Dedicated control knobs and meter displays are included for each of the four audio channels. Using the optional control panel HKDW-101, VTRs can be controlled from the same control panel simultaneously.

- **Easy maintenance**

  Most of the circuitry of the HDW-2000 Series is arranged on plug-in boards to allow quick and easy maintenance. The drum assembly has been designed to achieve simple, low-cost maintenance by adopting an upper drum mechanism and an auto adjustment function as used in MPEG IMX VTRs and BETACAM SX recorders. This helps to drastically reduce the time required for periodic drum replacement.

- **Frame accurate editing**

  The series recorders enable insert or assemble editing with frame accuracy. Each channel of video and audio signal is independently editable. It is possible to execute precise editing on HDCAM tapes in machine-to-machine or A/B roll configurations.

Technical Specifications

General	
Power Requirements	AC 100 V to 240 V, 50/60 Hz
Power Consumption	220 W
Operating Temperature	5°C to 40°C 41°F to 104°F
Storage Temperature	-20°C to +60°C -4°F to +140°F
Humidity	20% to 90% (relative humidity)
Mass	23 kg 50 lb 11 oz
Dimensions (W x H x D) *1	427 x 174 x 544 mm (excluding protrusions) 16 7/8 x 6 7/8 x 21 1/2 inches (excluding projections)
Tape Speed	HDCAM: 96.7 mm/s (59.94i/29.97PsF), 80.6 mm/s (50i/25PsF), 77.4 mm/s (24PsF/23.98PsF)
Recording/Playback Time	HDCAM: 124 min (59.94i/29.97PsF, with BCT-124HDL cassette) 149 min (50i/25PsF, with BCT-124HDL cassette) 155 min (24PsF/23.98PsF, with BCT-124HDL cassette) 40 min (59.94i/29.97PsF, with BCT-40HD cassette) 48 min (50i/25PsF, with BCT-40HD cassette) 50 min (24PsF/23.98PsF, with BCT-40HD cassette)
Fast Forward/Rewind Time	HDCAM: Approx. 3 min with BCT-124HDL cassette
Search Speed Range (Shuttle Mode)	HDCAM: -50 times to +50 times normal speed playback
Search Speed Range (Variable Mode)	HDCAM: -1 time to +2 times normal speed playback
Search Speed Range (Jog Mode)	-1 time to +1 time normal speed playback
Servo Lock Time	0.6 sec or less (from standby on)
Load/Unload Time	6 sec or less (both L and S cassette)

Input/Output	
HD-SDI Input	BNC (x1) SMPTE 292M
Reference Input	BNC (x2), (with a loop-through) Tri-level sync, 0.6 Vp-p, 75 Ω, sync negative or black burst
Digital Audio Input (AES/EBU)	BNC (x2) 4 ch (2 ch each, 1/2 ch and 3/4 ch), AES-3id-1995
Analog Audio Input	XLR-type 3-pin, female (x5), (CH 1/2/3/4/Cue) Low off: -60 dBu, high impedance, balanced High off: +4 dBu, high impedance, balanced High on: +4 dBm, 600 Ω termination, balanced
Timecode Input	XLR-type 3-pin, female (x1) 0.5 Vp-p to 18 Vp-p, 10 kΩ, balanced
HD-SDI Output	BNC (x3) (SMPTE 292M including one character out)
SD-SDI Output	BNC (x3) (SMPTE 259M including one character out)
Analog Composite Output	BNC (x3) (RS-170A, including one character out) 1.0 Vp-p, 75 Ω, sync negative
Analog Component Output	BNC (x3) for 1 set, including one character out Y: 1.0 Vp-p, sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
Digital Audio Output (AES/EBU)	BNC (x2) 4 ch (2 ch each, 1/2 ch, 3/4 ch), AES-3id-1995
Analog Audio Output	XLR-type 3-pin, (x5), (male), (CH1/2/3/4) +4 dBm (600 Ω load), low impedance, balanced

Timecode Output	XLR-type 3-pin, male (x1) 2.2 Vp-p, low impedance balanced
Analog Audio Monitor	XLR-type 3-pin, (male), (x2), L/R, +4 dBm at 600 Ω load, low impedance, balanced
Headphones	JM-60 stereo phone jack -∞ dBu to -12 dBu at 8 Ω load, unbalanced
Remote Input	D-sub 9-pin (female) (x1) RS-422A
Remote Output	D-sub 9-pin (female) (x1) RS-422A
RS-232C	D-sub 9-pin (male) (x1)
Parallel Remote	D-sub 50-pin (female) (x1)
Video Control	D-sub 9-pin (female) (x1) EIA RS-423 D-sub 15-pin (male) (x1)
Control Panel	D-sub 10-pin control panel I/O
Memory Stick	(x1)
AC Input	(x1), 100 V to 240 V, 50/60Hz

Processor Adjustment Range	
Video Level	±3 dB/∞ dB to +3 dB, selectable
Chroma Level	±3 dB/∞ 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 bits/sample (compression 8 bits/sample)
Compression	Coefficient recording system
Channel Coding	S-I-NRZI PR-IV
Error Correction	Reed-Solomon code

Digital Audio Performance	
Sampling Frequency	48 kHz (synchronized with video)
Quantization	20 bits/sample
Wow and Flutter	Below measurable level
Headrooms	20 dB (or 18 dB selectable)
Emphasis	T1 = 50 µs, T2 = 15 µs (on/off selectable in REC mode)

Analog Audio Output Performance	
A/D Quantization	20 bits/sample

D/A Quantization	20 bits/sample
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% (T.H.D at 1 kHz reference level)
Wow and Flutter	Less than 0.2% rms

Supplied Accessories

Supplied Accessories	PSW 4 x 16 screws for rack mounting (4) Installation manual (1) CD-ROM manual (1) Operation guide (1) Filter cramp - ferrite core (6)

Notes

Note	*[1] The values for dimensions are approximate.

Accessories

Option Boards and Modules

HKDW-102

SDTI Interface Board

RMM-131

RACK MOUNT KIT FOR UVW,DSR AND MSW VTR

Remote Controls and Panels

BKMW-102

Control panel case for remote VTR control panel

BKMW-103

Control panel extension kit

HKDW-101

Remote Control Panel