SONY®

CINE ALTA™

HDCAM SR™

SRW-5000/5500

HD Digital Videocassette Recorder

www.sonybiz.net/hdcamsr

Front cover photo courtesy of Chicago HD – www.chicagohd.com

CINEALTA™

HDCAM SR™

CINEALTA™ LIBERATING MOVIE-MAKERS

CineAlta – a name that proudly symbolises the bond between cinematography and digital High Definition imaging. It distinguishes a Sony family of products and systems that offer new levels of creativity in the production, post-production and exchange of motion pictures. It also brings together the quality and universality of 24-frame cinematography with the real-time capabilities, efficiency and flexibility of digital High Definition technology. And, it stimulates the convergence of Motion Picture Film and digital High Definition production on a global basis.

CineAlta products, delivering cinema-quality pictures at selectable frame rates, are simplifying International Programme Exchange by minimising the need for standards conversion. They are also opening up entirely new possibilities for international co-production.

Movie-making has been liberated by the creative empowerment of the cinematographer. It is facilitated by real-time HD image evaluation on-set, instant replay of full-colour high-resolution digital "takes", real-time image optimisation while shooting, a 50-minute shooting load, and most importantly, by the significant cost-benefits associated with this digital medium.

CineAlta products provide a seamless bridge between 24-frame film originals and a final 24P digital master, giving each frame of film a one-to-one correspondence with progressive HD frames. The CineAlta environment readily interfaces with the computer graphics world, together with the direct conversion of progressive 24P masters to film, and to a host of other international digital HDTV and SDTV distribution formats.

A NEW APEX IN HIGH-RESOLUTION STORAGE

The arrival of the HDCAM format heralded a new era in movie-making, commercial production and high-end television production applications. A dramatic breakthrough in this field was achieved with the original Sony multi-frame rate camcorder, the HDW-F900 and its companion VTR the HDW-F500. Both products bore the CineAlta name – signifying system elements that uniquely explore new horizons in these application areas – and this is carried forward with the latest model, the HDW-F900R.

CineAlta products are Sony's commitment to the ITU 709 global standard, specifically intended for international High Definition (HD) programme origination. Globally, HD programming is becoming far more mainstream and the HDCAM format has become the most popular format supporting it. The popularity has escalated demand for even higher quality and greater storage capacity – enough to support extremely high-quality digital production, high-resolution film transfer work, sophisticated graphics recording and multi-channel audio mastering.

Responding to the requests for more headroom in digital recordings by many prominent content producers, Sony has introduced a new state-of-the-art format that provides a platform enabling greater storage capacity, higher data-transfer rates and more audio channels than current HDCAM models. This new format is HDCAM SR. It has a capacity several times greater than conventional tape formats and it has been conceived from the very beginning as a format suitable for pristine-quality digital field acquisition.

Built on this HDCAM SR infrastructure, Sony offers two models that expand the CineAlta product line – the SRW-5000 HD Digital Videocassette Recorder, exclusive for HDCAM SR recording and the SRW-5500 which additionally offers HDCAM recording. These VTRs acquire each picture frame according to the industry-standard Common Image Format (CIF), which specifies a sampling structure of 1920 x 1080 active pixels (H x V). The SRW-5000 and SRW-5500 therefore fit perfectly into existing workflows and, as fully-fledged studio machines, they incorporate all of the editing capabilities and features that production teams demand.

In their standard configurations, these VTRs record in the 4:2:2 format, which can be combined with current HDC Series studio cameras to form a system that is ideal for high-end studio/OB production applications. With an optional RGB processor board installed, they can form a full-bandwidth 4:4:4 (RGB) image capturing-system. What's more, the SRW-5000 and SRW-5500 support multi-frame-rate recording on the all-new HDCAM SR format and deliver a host of invaluable features such as integrated up-conversion, down-conversion, 2-3 pull-down and legacy playback of HDCAM and Digital Betacam™ tapes. And, for today's digital content mastering applications and for future content delivery methods, they come with 12 channels of digital sound.

Such creative benefits along with the system's functionality, flexibility, durability and maintainability will alleviate total cost of ownership concerns. The SRW-5000 and SRW-5500 are assets today and will remain so into the future.

SRW-5000

SRW-5500

FEATURES AND BENEFITS

HDCAM SR FORMAT RECORDING

1080 RECORDING AND PLAYBACK

The SRW-5000/5500 records full HD images at an exceptionally high picture quality using 1080 x 1920 active pixels as specified by the ITU Common Image Format (CIF). The entire range of both interlaced and progressive frame rates are available, ranging from 24/25P progressive imaging, to 50/60i for high-end HDTV production applications. The SRW-5000 records top-quality 4:2:2 Y/Cb/Cr component or full-bandwidth 4:4:4 (RGB) 10-bit recordings*, both with very mild compression. The SRW-5000/5500 also offers up to 12 channels of 24-bit audio at 48 kHz, to meet the needs of the most demanding audio recording requirements in digital-content mastering. Each channel is independently editable. The SRW-5000/5500 is the optimal VTR for any movie-making task – from acquisition and editing to telecine transfers and digital mastering.

*Requires the optional HKSR-5003 RGB Processor Board.

720P RECORDING AND PLAYBACK

In standard configuration, the SRW-5000/5500 also records in 4:2:2 720/59.94P or 720/50P formats. These formats can be used for DTV programming and transmission applications. As with the 1080 format, you still have up to 12 channels of independently editable 24-bit audio available when operating in 720P format. In addition, 720P/1080i and 720P/480i/576i (59.94i, 50i) bi-directional format conversion can be accomplished in this VTR.

HDCAM FORMAT* RECORDING (SRW-5500 only)

In addition to the HDCAM SR format, the SRW-5500 enables HDCAM recording and playback in all frame rates specified by the format, including 1080/23.98, 24, 25, 29.97, 30PsF and 1080/50, 59.94, 60i. It supports full editing capability of HDCAM format recordings including independent editing of the four audio channels.

This HDCAM recording capability offers a cost-effective yet high quality alternative, operating in the full quality of the industry-standard Common Image Format (CIF).

*The HDCAM format does not support 720P recording.

INTERNAL FORMAT CONVERSION

The SRW-5000/5500 is equipped with an internal down-converter that provides SDTV outputs from 1080 and 720 recordings. By adding an optional plug-in board, you can give the SRW-5000/5500 extended format-conversion capabilities such as 2-3 pull-down, conversion from 1080 to 720 and vice versa and 4:2:2 to 4:4:4 and vice versa. (For further details, please refer to the format conversion chart on page 8).

LEGACY PLAYBACK

Not only is the SRW-5000/5500 an affordable VTR for use in digital cinematography and high-end HD production, it also provides a smooth migration path for organisations with legacy systems by retaining current acquisition tools and archives in action. The SRW-5000/5500 can play back HDCAM and Digital Betacam* tapes, making it an ideal and cost-effective solution for facilities involved in demanding high-end film and HD work.

*Requires the optional HKSR-5002 Digital Betacam Processor Board.

LONG RECORDING TIME ON A SINGLE CASSETTE

Utilising the technologically advanced HDCAM SR format's high-density recording capability and compression technology, the SRW-5000/5500 is capable of recording up to 155 minutes at 1080/24PsF and up to 124 minutes at 1080/59.94i or 720/59.94P on a single L-sized cassette. S-sized cassettes can also be used, offering up to 50 minutes of recorded material at 1080/24PsF and up to 40 minutes of 1080/59.94i or 720/59.94P. This flexibility makes the SRW-5000/5500 an ideal recorder for both field and studio applications.

*When the SRW-5500 records in the HDCAM format, it provides the same recording times as the HDCAM SR format.

EASY MAINTENANCE

Drum maintenance is always a concern for VTR users. As with most Sony VTRs, the SRW-5000/5500 drum assembly has been designed with an auto-adjustment function, so that maintenance can be performed in minimal time.

USER-FRIENDLY CONTROLS

The front control panel of the SRW-5000/5500 is extremely user-friendly and has a large 6.4-inch* type LCD display. This provides comprehensive information, including colour thumbnails, for quick location of parameters, which is used in combination with eight menu buttons placed along the side of the display.

*Viewable area measured diagonally.

OPERATIONAL FEATURES

FRAME-ACCURATE INSERT/ ASSEMBLE EDITING

The SRW-5000/5500 recorder is capable of insert or assemble editing with frame accuracy. Each channel of video and audio is independently editable. Executing precise editing on HDCAM SR or HDCAM* tapes in machine-to-machine or A/B roll configurations is possible.

*SRW-5500 only

HIGH-SPEED COLOUR PICTURE SEARCH

Recognisable colour pictures are provided in shuttle mode at speeds up to 42 times normal playback for the HDCAM SR format and at speeds up to 50 times normal playback for HDCAM and Digital Betacam formats.

DYNAMIC TRACKING™ PLAYBACK

A Dynamic Tracking playback capability provides high-quality pictures over the range of -1 to +2 times normal playback speed during the playback of HDCAM SR and HDCAM tapes and -1 to +3 for Digital Betacam tapes.

DIGITAL-JOG SOUND

In Jog mode, all 12 audio digital channels of the HDCAM SR format or all four channels of the HDCAM format can be reproduced with a responsiveness and sound quality reminiscent of analogue audio. This feature is essential to quickly and precisely establish an editing point while monitoring the digital audio signals, which remain synchronised with the pictures.

DYNAMIC MOTION CONTROL (DMC) PLAYBACK

The SRW-5000/5500 also provides a DMC playback capability, memorising the tape-speed trajectory over the dynamic tracking-speed range (-1 to +2 times normal speed).

PRE-READ EDITING

The SRW-5000/5500 is equipped with advanced playback heads that allow pre-read editing, making functions such as titling with a single VTR and A/B-roll editing with two VTRs possible.

CONFIDENCE PLAYBACK

Separate dedicated playback heads immediately follow the recording heads so that actual audio and video recorded to the tape can be monitored while recording. Confidence playback can be used to verify the quality of a recording without interrupting production. This feature can also be used during pre-read editing to verify that the edit has been properly performed to tape.

PROGRAMME PLAY FUNCTION WITH AUDIO PITCH CORRECTION

The SRW-5000/5500 has a Programme Play function* that allows video recordings to be played back at up to ±5% normal speed, with appropriate audio pitch correction. These VTRs also perform audio pitch correction when playing back a tape that was recorded at a different frequency than that set for system playback in the VTR**, up to ±5%.

* The Programme Play function requires the optional HKSR-5001 board and is available when the VTR is set to 4:2:2/1080/59.94i or 4:2:2/720/59.94P mode.

** Available only when the difference of these frequencies is within 5% (23.98 frames <—> 24 frames, 23.98/24 frames <—> 25 frames or 29.97 frames <—> 30 frames.)

AUDIO-OUTPUT CHANNEL SELECTION

The SRW-5000/5500 is equipped with a unique internal audio-output router, which enables flexible audio-output channel routing without the use of an external audio-routing device. Any channel from the 12* available on HDCAM SR tape can be assigned to the HD-SDI (Ch 1-12) and SDI (Ch 1-8) embedded audio-output channels. This feature provides the flexibility needed when recording audio to different tape formats.

* Four channels on HDCAM tape

DUAL-SYNC OPERATION

A unique feature of the SRW-5000/5500 allows you to seamlessly integrate the VTR into a 59.94 editing environment. In doing so, you can directly perform insert editing from a 23.98PsF master tape, either to a 1080/59.94i or to a 525/59.94i recording, without having to first dub the master to the 59.94 format. This is achieved by supplying dual reference signals, one to lock the servo of the SRW-5000/5500 to a 23.98Hz signal and one to lock the playout circuitry to a 59.94Hz reference signal.

OFF-SPEED PLAY-BACK CAPABILITY

In order to play back material at different speeds for applications such as slow-motion or fast-motion, the SRW-5000/5500 is equipped with a built-in off-speed play-back capability.

○ Normal play-back
● 0.1% off-speed play-back
▲ Video and audio off-speed play-back with converted timecode
◆ HDCAM SR: Video and audio off-speed play-back
HDCAM: Video off-speed play-back (without audio)

Playback Tape \ Machine Setup		HD-SDI output					
		1080					720
		23.98PsF	24PsF	25PsF /50i*	29.97PsF /59.94i*	30PsF /60i*	59.94P**
1080	23.98PsF	○	●	▲	◆	◆	
	24PsF	●	○	▲	◆	◆	
	25PsF/50i*	▲	▲	○	◆	◆	
	29.97PsF/59.94i*	◆	◆	◆	○	●	
	30PsF/60i*	◆	◆	◆	●	○	
720	59.94P**						○

* When scanning modes (interlace or PsF) of the VTR setup and playback tape are different, the output signal is provided in the playback tape's scanning mode.
** HDCAM SR only

ETHERNET-BASED BANK MEMORY SELECTION

An Ethernet interface is provided on the SRW-5000/5500 VTR, enabling operators to remotely set up VTRs using a standard web browser on a PC. The VTR automatically generates "SRW.html" files that indicate the bank settings currently saved on the VTR. By accessing the VTR via the Ethernet, operators can see the parameters in each of the listed bank memories and select a bank they want to use.

PLAYBACK OF TAPES RECORDED BY SRW-1

The SRW-5000/5500 VTR can play back tapes recorded by the SRW-1 recorder in the following unique recording modes*.

Dual Stream mode
The SRW-5000/5500 can play back either channel A or channel B of a dual stream stereo 4:2:2 recording recorded in the SRW-1. The stream to be played back is selected by the user via the menu.

1080/60P mode**
The SRW-5000/5500 can play back a 1080/60P tape in 24P, 25P and 30P mode, producing the desired slow-motion effect in playback at normal speeds. It is also possible to play 60P recordings in normal speed by playing back every other frame, so only 30 frames in total are played back.

Select FPS mode**
The SRW-5000/5500 can play back a tape recorded with the Select FPS function at 24P, 25P and 30P mode, producing the desired slow- and fast-motion effect in play-back at normal speeds.

* Not compatible with recordings in 444HQ mode
** For material recorded in this mode, play-back of audio is not available.

STORAGE OF SETUP/SYSTEM MENUS IN VTR MEMORY BANKS

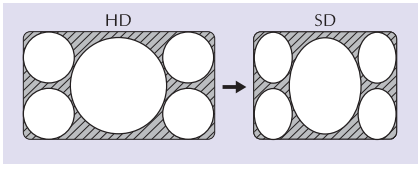
The SRW-5000/5500 VTR allows operators to effectively manage its "System Menu" using VTR memory banks. Up to eight groups of parameters in the "System Menu" and "Setup Menu" can be individually saved onto the internal memory of the VTR as bank memory. They can also be saved onto "Memory Stick™" media, enabling them to be copied onto other SRW-5000/5500 VTRs for quick and consistent setup of multiple VTRs. Each bank memory can be named as required by the operator.

SELECTABLE PICTURE MODES

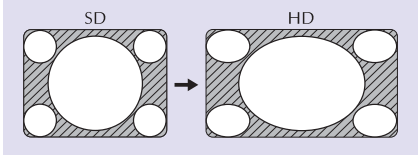
Three modes of operation – SQUEEZE, LETTER BOX and EDGE CROP – are available to provide the correct presentation for the application type.

SELECTABLE PICTURE MODES

SQUEEZE mode

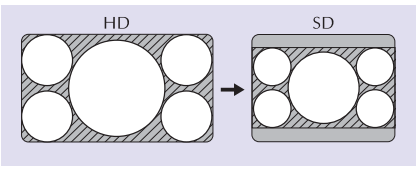


HD to SD, 16:9 HD picture is down-converted and output as a 4:3 SD picture.

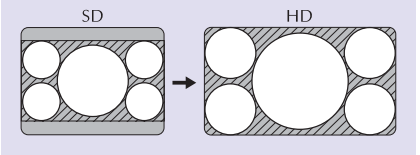


SD to HD, 4:3 SD picture is up-converted, then output as a 16:9 HD picture.

LETTER BOX mode

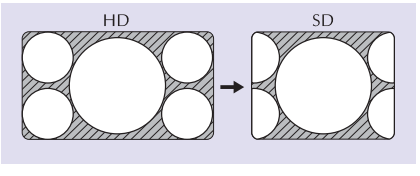


HD to SD, 16:9 HD picture down-converted to SD and output is presented in Letter-box on a 4:3 monitor.

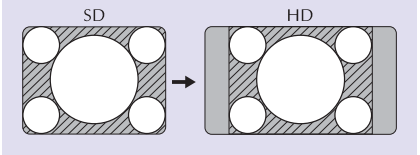


SD to HD, 4:3 SD picture is cropped and presented as a 16:9 picture.

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.

INTERNAL FORMAT – CONVERSION CAPABILITY

REC/PLAY Tape Format			HD-SDI OUT		SD-SDI OUT	HD-SDI (format conv. out) (requires optional HKSR-5001)
HDCAM SR	1080/4:4:4**	23.98PsF	1080/4:4:4	23.98PsF	525/59.94i*	1080/4:2:2/23.98PsF
						1080/4:2:2/59.94i
						720/4:2:2/59.94P
		24PsF		24PsF	–	1080/4:2:2/24PsF
						1080/4:2:2/60i
		25PsF		25PsF	625/50i*	1080/4:2:2/25PsF
						720/4:2:2/50P
		29.97PsF		29.97PsF	525/59.94i*	1080/4:2:2/29.97PsF
		30PsF		30PsF	–	1080/4:2:2/30PsF
		50i		50i	625/50i*	1080/4:2:2/50i
						720/4:2:2/50P
		59.94i		59.94i	525/59.94i*	1080/4:2:2/59.94i
						720/4:4:4/59.94P
		60i		60i	–	1080/4:2:2/60i
	720/4:2:2	50P	720/4:2:2	50P	625/50i	1080/4:2:2/50i
		59.94P		59.94P	525/59.94i	1080/4:2:2/59.94i
HDCAM or HDCAM SR	1080/4:2:2	23.98PsF	1080/4:2:2	23.98PsF	525/59.94i*	1080/4:2:2/59.94i
						720/4:2:2/59.94P
					–	1080/4:4:4/23.98PsF
		24PsF		24PsF	–	1080/4:2:2/60i
						1080/4:4:4/24PsF
		25PsF		25PsF	625/50i	720/4:2:2/50P
						1080/4:4:4/25PsF
		29.97PsF		29.97PsF	525/59.94i	720/4:2:2/59.94P
						1080/4:4:4/29.97PsF
		30PsF		30PsF	–	1080/4:4:4/30PsF
		50i		50i	625/50i	720/4:2:2/50P
						1080/4:4:4/50i
		59.94i		59.94i	525/59.94i	720/4:2:2/59.94P
						1080/4:4:4/59.94i
		60i		60i	–	1080/4:4:4/60i
Digital Betacam***	625	50i	1080/4:2:2	50i	625/50i	720/4:2:2/50P
						1080/4:4:4/50i
			720/4:2:2	50P		1080/4:2:2/50i
	525	59.94i	1080/4:2:2	59.94i	525/59.94i	720/4:2:2/59.94P
						1080/4:4:4/59.94i
			720/4:2:2	59.94P		1080/4:2:2/59.94i

* Requires optional HKSR-5001 Format Converter Board
** Requires optional HKSR-5003 RGB Processor Board
*** Requires optional HKSR-5002 Digital Betacam Processor Board

VERSATILE INTERFACES

The SRW-5000/5500 features a wide range of interfaces including:

- HD-SDI I/O
- HD-SDI (format conversion) out
- SD-SDI out
- SD composite out
- AES/EBU digital audio I/O
- Analogue audio out
- Analogue audio in (cue)*
- Ethernet port
- RS-422 9-pin and 50-pin control interfaces
- Video control

*SRW-5500 only

SRW-5500 Rear Panel

HDCAM SR TECHNOLOGY

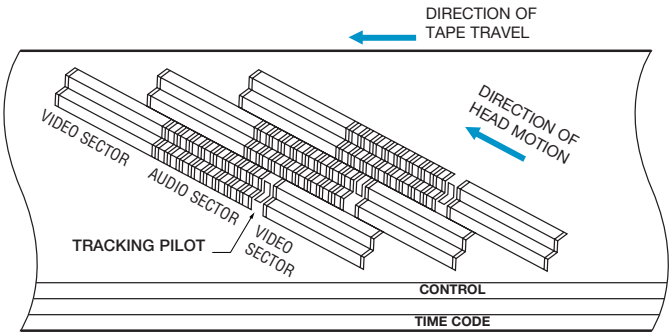
The HDCAM SR format is based on cutting-edge technology. It is not a rehashed and repackaged technology solution developed in previous decades. The HDCAM SR format has been designed to maximise the data-transfer rate without sacrificing any operational features. It's a design you'd expect from a Sony 1/2" tape format, with all the useful playback and editing features common to existing Sony tape formats. And, although the SRW-5000/5500 features and capabilities have seen great improvements, the physical size and power consumption of the VTR remain modest enough to achieve easy portability for field use. And, in order to meet the format's mission-critical requirements, every aspect of magnetic tape-recording engineering and digital-signal processing technology has been carefully reassessed and integrated. Even with these great technological improvements, the expected operating costs of this system are reasonable.

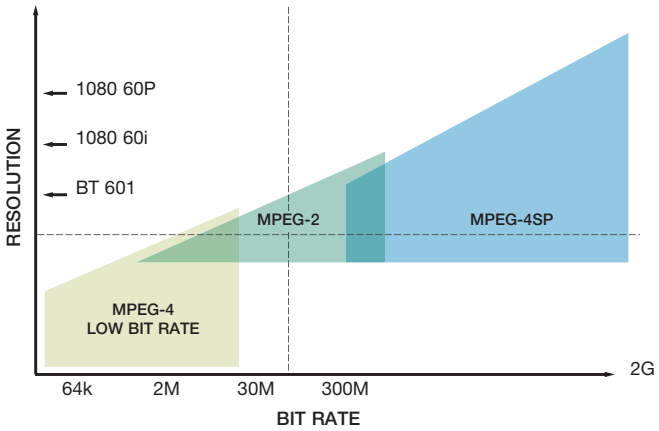
CREATING VIRTUALLY LOSSLESS IMAGES: THE MPEG-4 STUDIO PROFILE (SP)

Yet another industry first from Sony is an integrated video encoding/decoding chipset that conforms to the MPEG-4 SP (Studio Profile: ISO/IEC 14496-2:2001-1). The Studio Profile was created to specifically address the requirements of high-resolution image-production applications. It is free from GOP (Group Of Pictures) structures and is scalable in its pixel count (SDTV, HDTV, Film-resolution data), bit depth (10- or 12-bit) and colour resolution (component or RGB). In order to achieve maximum compression efficiency, the HDCAM SR format resorts to intra-frame compression for progressive images. Intra-field compression is used for interlaced images. Special attention has been paid to multi-generation dubbing performance and, in common with industry-standard Digital Betacam VTRs, the SRW-5000 is capable of consistent dubbing without using a separate interface for a native stream. This is only possible thanks to the high performance of the MPEG-4 SP, which offers reproduction of virtually lossless images.

MORE DATA, SAME LONG RUNNING TIME: THE NEW FOOTPRINT

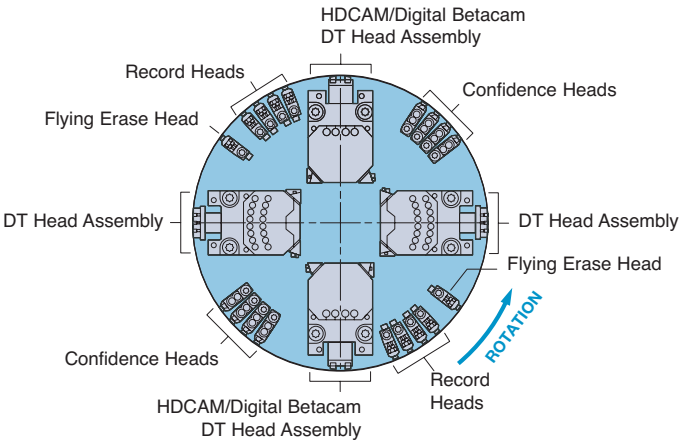
Each picture frame consists of 24 helical tracks (or 12 tracks per segment/field), in which data is shuffled to protect the recording from occasional burst errors. Recordings are further protected by highly robust error-correction and concealment techniques perfected through years of Sony digital VTR development. Thanks to the finer track pitch and shorter minimum recording wavelength, the data-packing density of the HDCAM SR format is 3.5 times that of the HDCAM format. Frame-accurate editing is guaranteed by the intelligent allocation of pilot signals for precise head-to-tape tracking.



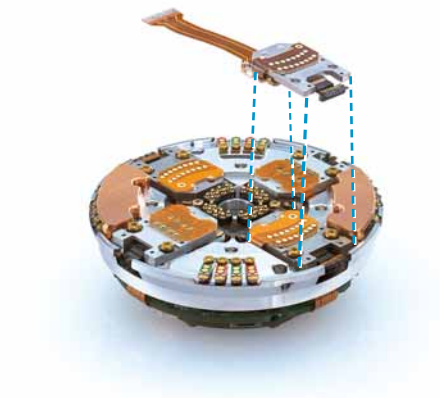


RETAINING THE VIRTUES OF SONY 1/2” FORMATS: THE NEW DRUM ASSEMBLY

The new drum assembly has 8 channels each of recording and confidence-playback heads, plus a pair of flying-erase heads. As with all recent Sony high-end VTRs, the SRW-5000/5500 uses DT heads for normal playback as well as variable speed and jog playback. Precise tracking of the HDCAM SR format tape is reliably secured by utilising the newly designed 4-tip, 8-gap DT head assembly. Each tip has two gaps, which are slightly offset from each other. During playback, both gaps simultaneously trace the same video track. The off-tape data from the gap that produces a higher output signal is used for the actual image playback. In comparison to conventional systems, this unique mechanism allows a wider tolerance in head-to-track tracing. A dedicated pair of DT head assemblies performs legacy playback of HDCAM and Digital Betacam tapes. Remarkably, despite the complexity of this new recording drum, durability and lifetime are expected to be equal to that of existing Sony 1/2” tape formats.



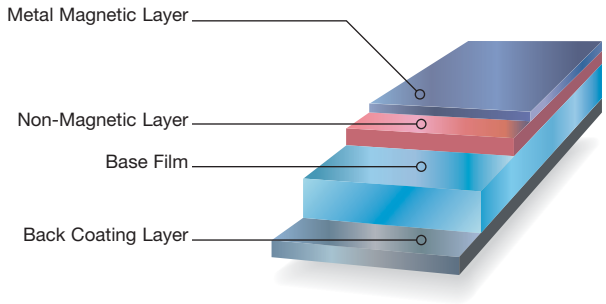
SRW-5000 DRUM HEAD

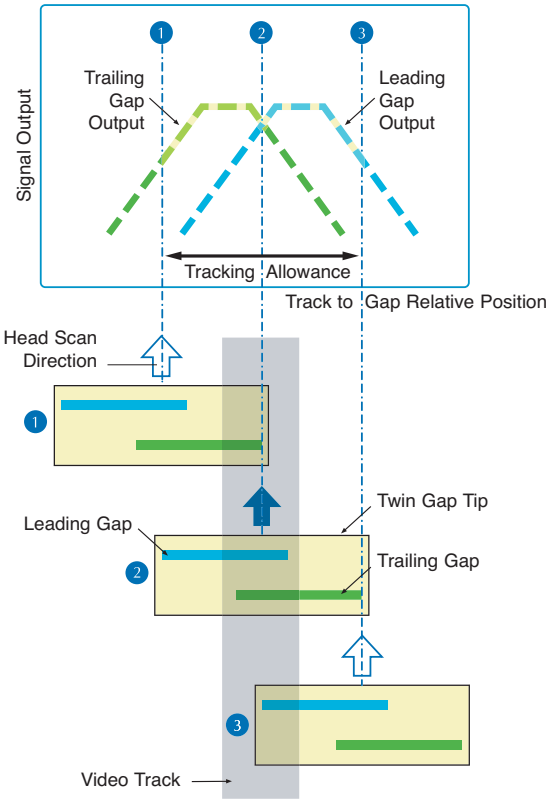


MORE POWER, MORE STABILITY: THE NEW TAPE FORMULA

A newly-developed, ultra-fine grain magnetic particle used on HDCAM SR tapes creates the very thin magnetic layer required to achieve the minimum recording wavelength of 0.29µ. This minimum wavelength allows the tape to hold more data and increases the tape transfer rate, resulting in increased performance. Not only that, but stable and consistent playback results are provided through a new proprietary manufacturing process that minimises tape deformation. What’s more, because the tape medium is designed with a highly rigid new base film material treated with antioxidants, HDCAM SR tape is also ideal for archiving purposes.

TAPE STRUCTURE



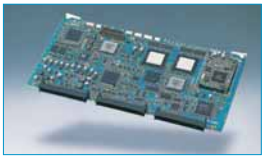


SRW-5000/5500 SPECIFICATIONS

	SRW-5000	SRW-5500
General		
Power requirements	100 to 240 V AC (±10%, 50/60 Hz)	
Power consumption	260 W (without options)/320 W (with all option boards installed)	
Operating temperature	+5 °C to +40 °C (+41 °F to +104 °F)	
Storage temperature	-20 °C to +60 °C (-4 °F to +140 °F)	
Operating humidity	25% to 80% (relative humidity)	
Mass (approx.)	30 kg (66 lb 2 oz)	
Dimensions (W x H x D excluding protrusions)	427 x 218 x 544 mm (16 ¾ x 8 ⅝ x 21 ½ inches)	
Tape speed	HDCAM SR: 94.2 mm/s (24 Hz) HDCAM: 77.4 mm/s (24 Hz) Digital Betacam: 96.7 mm/s	
HDCAM SR/HDCAM* recording/ Playback time	155 min with BCT-124SR cassette (24 Hz) with BCT-124SRL or BCT-124HDL tape	
Digital Betacam playback time	124 minutes with BCT-D124L tape	
Fast-forward/rewind time	Approx. 4 min with BCT-124SR cassette	
Search speed range — Shuttle mode	HDCAM SR: Still to ±50 times normal playback speed (24 Hz) HDCAM: Still to ±58 times normal playback speed (25 Hz) Digital Betacam: Still to ±50 times normal playback speed	
Search speed range — Variable mode	HDCAM SR: -1 to 2 times normal playback speed HDCAM: -1 to 2 times normal playback speed Digital Betacam: -1 to 3 times normal playback speed	
Search speed range — Jog Mode	HDCAM SR: Still to ±2 times normal playback speed HDCAM: Still to ±3 times normal playback speed Digital Betacam: Still to ±3 times normal playback speed	
Dynamic Tracking Range	-1 to +2 times normal playback speed	
Servo-lock time	1.0 sec or less (from standby on)	
Load/unload time	7.0 sec or less	
Input/Output		
HD-SDI input A	BNC (1+ 1 for monitoring loop-through), Serial digital (1.485 Gb/s), SMPTE 292M/BTA S-004/ITU-R.BT 709	
HD-SDI input B (optional HKSR-5003 required)	BNC (1+ 1 for monitoring loop-through), Serial digital (1.485 Gb/s), SMPTE 292M/BTA S-004/ITU-R.BT 709	
HD/SD reference video input 1	BNC (1 + 1 for loop-through), Tri Level sync, 0.6 Vp-p, 75 Ω , sync negative or Black Burst, 0.286 Vp-p, 75 Ω , sync negative	
HD/SD reference video input 2 (optional HKSR-5001 required)	BNC (1 + 1 for loop-through), Tri Level sync, 0.6 Vp-p, 75 Ω , sync negative or Black Burst, 0.286 Vp-p, 75 Ω , sync negative	
Digital-audio input (CH1/2, CH3/4, CH5/6, CH7/8, CH9/10, CH11/12)	BNC (x6, AES/EBU), unbalanced	
Analogue audio input (Cue)	—	XLR-3-pin, female x1
Time-code input	XLR-3-pin type, (female x1), 0.5 to 18 Vp-p, 10 kΩ , balanced	
HD-SDI output	BNC (2 + 1, with character out), Serial digital (1.485 Gb/s), SMPTE 292M/BTA S004/ITU-R.BT 709	
Format-converter output (optional HKSR-5001 required)	BNC (x2), with character out	
SD-SDI output	BNC (2 + 1 with character out), D1 serial digital (270 Mb/s), SMPTE 259M	
Analogue down-converted output	Composite: BNC (x1 with character out) 1.0 Vp-p, 75 Ω , sync negative) SD sync: BNC (x1, Black Burst, 0.286 Vp-p, 75 Ω , sync negative) output	
Analogue reference output	1125 Sync: BNC (x2), Tri Level sync, 0.6 Vp-p, 75 Ω , sync negative	
Digital-audio output (CH1/2 CH3/4 CH5/6 CH7/8 CH9/10 CH11/12)	BNC (x6), AES/EBU, unbalanced	
Analogue-audio output (CH1/2/3/4/Cue**)	XLR-3-pin type, (male x5), +4 dBm, (with a 600 Ω load), low impedance, balanced	
Monitor output (L/R)	XLR-3-pin type, (male x2), +4 dBm, (with a 600 Ω load), low impedance, balanced	
Time-code output	XLR-3-pin type, (male x1), 2.2 Vp-p low impedance, balanced	
Phones	JM-60 stereo phone jack, -∞to 12 dBu (with an 8 Ω load), unbalanced	
Remote 1 input	D-sub 9-pin, (female), Sony 9-pin remote interface	
Remote 1 input/output	D-sub 9-pin, (female), Sony 9-pin remote interface	
Video control	D-sub 9-pin, (female), (for optional HKDV-900)	
Parallel remote	D-sub 50-pin, (female)	
Ethernet	10Base-T modular jack	
Digital-Video Performance		
Sampling frequency	HDCAM SR: Y: 74.25 MHz, Cb/Cr: 37.125 MHz, G/B/R: 74.25 MHz HDCAM*: Y: 74.25 MHz, Cb/Cr: 37.125 MHz	
Quantisation	10 bits/sample	
Compression	HDCAM SR: MPEG-4 Studio Profile HDCAM*: Coefficient Recording System	
Channel coding	S-NRZ	
Error correction	Reed-Solomon code	
Error concealment	Adaptive three-dimensional	
Analogue Composite-Output Performance		
Bandwidth	Y: 0 to 5.75 MHz +0.5 dB/-3.0 dB	
S/N ratio	56 dB or more	
Y/C delay	15 ns or less	
K Factor (2T Pulse)	1% or less	
Output SCH phase	Based upon RS-170A/CCIR R.624-3	
Digital-Audio Performance		
Sampling frequency	48 kHz (synchronised with video)	
Quantisation	HDCAM SR: 24 bits/sample HDCAM*: 20 bits/sample	
Wow & flutter	Below measurable level	
Headroom	20/18/16/12 dB selectable	
Analogue Audio-Output Performance		
D/A quantisation	24 bits/sample	
Frequency response	20 Hz to 20 kHz, +0.5 dB/-1.0 dB (0 dB at 1 kHz)	
Dynamic range	More than 100 dB (At 1dB at 1 kHz)	
Distortion	Less than 0.05% (At 1 kHz, reference level)	
Crosstalk	Less than -80 dB (At 1 kHz, between any two channels)	
De-emphasis	T1 = 50 µs, T2 = 15 µs (auto on/off)	
Supplied Accessories		
	Operation manual, installation manual	

* The SRW-5000 does not support HDCAM recording.
** HDCAM and Digital Betacam playback only.

OPTIONAL ACCESSORIES



HKSR-5001
Format-Converter Board

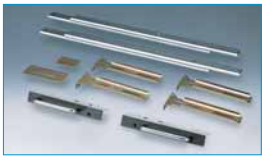
BCT-6SR/33SR/40SR, BCT-64SRL/94SRL/124SRL
HDCAM SR Video Cassette Tapes

HKSR-5002
Digital Betacam Processor Board

BCT-6HD/12HD/22HD/40HD, BCT-34HDL/64HDL/94HDL/ 124HDL
HDCAM Cassette Tapes
(For SRW-5500)

HKSR-5003
RGB Processor Boards

BCT-HD12CL
Video Head Cleaning Cassette



RMM-110
Rack-Mount Kit

HKDV-900
HD Digital Video Controller

RM-280
Editing Controller

SERVICES FROM SONY

Recognising that every company and every challenge is unique, we offer a complete and comprehensive range of services all the way through consulting, planning, financing, implementation, training, servicing, maintenance and support. Choose exactly what's right for you, when and where you need it.

- Sony Professional Services: Tailor-made design, installation and project management of audio-visual and IT (AV/IT) systems using skills developed over 25 years of systems integration.
- Sony Financial Services: Innovative and flexible finance solutions designed to meet budgetary and financial requirements and constraints, enabling businesses to always have the most current technology.
- Sony Training Services: A range of off-the-shelf or customised training services from basic operation through to high-level technical maintenance.
- Sony Prime Support Services: Fully integrated and customised support for products and systems throughout their operational life, combining proactive and reactive technical services.

Not all services are available in all countries. If you'd like to find out more about what we do, who we do it for and how we do it, visit www.sonybiz.net or contact your local Sony office.

SONY

Specialist Dealer

Sony Specialist Dealers receive extensive training on all our products and services. They combine this with an in-depth knowledge of the market, ensuring you get advice that meets your needs before and after purchase. To find your nearest Sony Specialist Dealer visit our "dealer locator" at:

www.sonybiz.net/dealer

CA SRW-5000/5500/GB-25/09/2006