

SONY®



HD Portable Digital Video Recorder

**SRW-1**

HD Video Processor

**SRPC-1**

**HDCAM SR**™

**CINEALTA**™



# RGB Field Production

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CineAlta™ products are Sony's response and commitment to the ITU 709 global standard, specifically intended for international high-definition (HD) program origination. Globally, HD programming is becoming far more mainstream, and the HDCAM™ format has become a very popular format supporting it. This popularity has escalated the demand for even greater picture quality and storage capacity to support extremely high-integrity digital production and multi-channel audio mastering.

Responding to these demands, Sony has introduced a new state-of-the-art format that provides a platform with greater storage capacity, higher data-transfer rates, and more audio channels than current HDCAM models. This format is HDCAM-SR™.



The Sony SRW-1 HD Portable Digital Video Recorder and SRPC-1 HD Video Processor in combination form a full-bandwidth 4:4:4 (RGB) portable VTR system that adopts this HDCAM-SR format. It offers visually lossless 1080-line high-definition recordings at multiple frame rates on HDCAM-SR tape media, and greatly enhances shooting operations in field production applications due to its stunning picture quality and portable size.



The SRW-1/SRPC-1 portable VTR system can connect to a variety of cameras including the F35 and the F23 film-style digital cinematography cameras, HDC1500 Series and the HDW-F900R CineAlta camcorder. When used with the F35/F23 camera, the SRW-1 can be directly docked onto this camera, establishing a cable-free and portable full-bandwidth 4:4:4 capturing system.



The SRPC-1 processor unit, specially designed for the SRW-1, provides a variety of video-processing functions and houses an array of input and output connectors, including HD/SD signals, 12 channels of digital audio, and 4 channels of analog audio. Its processing functions include the easy handling of 2-3 pull-down insertions, down conversion, and RGB 4:4:4 to Y/Cb/Cr 4:2:2 color-space conversion. Furthermore, with the addition of the optional HKSr-102 board, the SRW-1/SRPC-1 provides a powerful new feature called SR Motion™, which includes various distinctive recording modes such as Select FPS and Interval Frames. Another powerful option for the SRW-1 is HKSr-103 board, which further adds RGB 4:4:4, 1 to 60 frames per second (fps) recording to the Select FPS function.



Offering unprecedented HD image quality, excellent operability, and powerful interfacing capabilities, the SRW-1/SRPC-1 is an ideal HD portable VTR system for movie-making, commercial production, and high-end television production applications.



# Features and Benefits



## High-quality HD Field Recording

Connecting with its companion cameras, the SRW-1/SRPC-1 creates the highest-quality and most faithful portable HD image-capturing system ever seen. With full-bandwidth HD RGB 4:4:4 and top-quality 4:2:2 Y/Cb/Cr 10-bit

recording capabilities, achieved by the new HDCAM-SR format, the SRW-1/SRPC-1 offers unprecedented picture quality - meeting the needs of even the most demanding customers in movie-making, commercial production, and high-end television production industries, as well as the requirements of digital-content mastering. In addition, the SRW-1/SRPC-1 offers up to 12 channels of 24-bit audio at 48 kHz.

## Double-data-rate Recording

The SRW-1/SRPC-1 is equipped with a unique double-data-rate recording capability, which doubles the drum rotation and tape speed and thus achieves an amazing data transfer rate of 880 Mbps (standard quality is 440 Mbps)\*. This extremely high-speed data transfer rate provides three selectable recording modes for different purposes. The High-Quality (HQ) mode\*\* is used to record highest-quality RGB 4:4:4 HD images. This is the ideal mode for applications where the highest possible picture quality is a top priority. The 1080/60P recording mode provides recording capability in 1080/50P or 59.94P format. It is also used to achieve a slow-motion effect when playing back recordings in 1080/30P format. The Dual Stream mode enhances flexibility and creative versatility. This mode allows the SRW-1/SRPC-1 to record the images of two cameras simultaneously - making it possible for users to shoot two different scenes simultaneously or achieve 3D stereo shooting.

\* Recording time will be half that of the standard recording mode.  
\*\* The content recorded by the high-quality mode cannot be played back by the SRW-5000/5500 VTR.

## Multi-frame-rate 1080 HD Recording and Playback

The SRW-1/SRPC-1 supports both multi-frame-rate recording and playback using 1920 (H) x 1080 (V) active pixels as specified by the industry-standard ITU Common Image Format (CIF). This fulfills a wide range of needs such as digital cinematography, commercial, and high-end television program productions. The following range of both progressive and interlaced frame rates can either be recorded or played back:

- Progressive: 23.98PsF, 24PsF, 25PsF, 29.97PsF, 50P, 59.94P
- Interlace: 50i, 59.94i

## 720P Recording and Playback

In standard configuration, the SRW-1 also records in 4:2:2 720/59.94P format. This format can be used for North American DTV programming and transmission applications. As with the 1080 format, users still have up to 12 channels of 24-bit audio available when operating in 720P format.

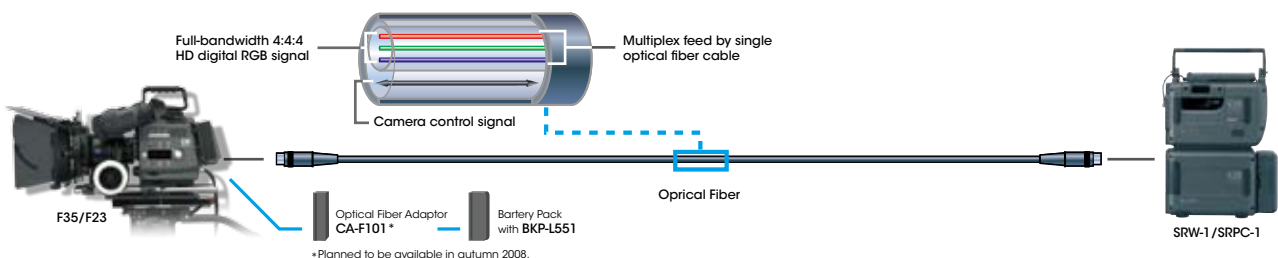
## Long Recording Time

The SRW-1/SRPC-1 is capable of recording up to 50 minutes at 1080/23.98P and up to 40 minutes at 1080/59.94i or 720/59.94P on a single S-sized HDCAM-SR cassette. For even longer recording time, two SRW-1/SRPC-1 units can be cascaded to double the recording capacity.

## Single Fiber Connection

Despite its outstanding HD image-capturing capability, the cable connections of the SRW-1/SRPC-1 remain extremely simple and clean. This is due to the implementation of an all-digital transmission system incorporating the latest optical technology. The result is a 'single-cable' transmission system that carries all required lossless RGB signals from the F35/F23\* camera to the SRPC-1 processor and then records them to the docked SRW-1 VTR\*\*.

\* The optional CA-F101 Optical Fiber Adaptor (planned to be available in autumn 2008) required for the F35/F23.  
\*\* The optional HKSR-101 Optical Interface Board required.



# Operational and Creative Versatilities

## RS-422 Interface for Server Connection

The industry-standard RS-422 Sony 9-pin interface allows editors to control the SRW-1/SRPC-1 remotely. Connecting to the server via a HD-SDI dual-link connection, the SRW-1/SRPC-1 acts as an on-line feeder, smoothly transferring the recorded material to the subsequent post-production operation.

## Detachable Control Panel

A detachable control panel provides operators with a comfortable VTR operating environment. When the control panel is detached, the supplied extension cable allows operators to control the SRW-1/SRPC-1 remotely.



## Built-in Tele-File Read/Write Capability

The SRW-1/SRPC-1 has a built-in Tele-File read/write capability. Because this VTR accommodates a wide range of recording formats, the Tele-File feature – which allows auxiliary information to be stored on a tape label containing an IC chip – is utilized to verify the proper format. Tele-File labels come as a standard feature on all HDCAM-SR tapes.

## SR Motion

The SRW-1 offers a variety of recording features that deliver impressive motion effects and allow users to be more creative when shooting.

Sony SR Motion feature offers two powerful functionalities – namely, Select FPS and Interval Frames – each of which leverages the advanced processing capabilities of the SRW-1 and the internal memory of the optional HKSR-102 board.

What makes this SR Motion feature so useful is that only the desired frames are recorded to tape, eliminating the need for post-production processes to create the desired effect, and allowing immediate review of the end result. It is a powerful and compact tool that creates instant and spectacular results on set.

### Select FPS – 4:2:2 and 4:4:4, recording up to 60 fps

The Select FPS recording function, which is commonly known as “over-crank” and “under-crank”, allows users to create very smooth and elegant slow-motion and quick-motion images. When directly docked with the Sony F35/F23 Cinematography camera, the SRW-1 with the optional HKSR-102 board provides 1 to 60 fps\* recording for 4:2:2 signals, or 1 to 30 fps recording for 4:4:4 signals, in increments of one frame per second. Using the

F35/F23 in this mode, the camera’s variable frame rate capability allows for both camera and recorder to operate at the same frame rate to provide the same motion effect and exposure capabilities as in film cameras. When recording in Select FPS mode, time code commensurate with the target playback speed is recoded to the variable frame rate recording at 24, 25 or 30 fps, yielding a comprehensive recording that is ready for post-production. In addition, a Speed Ramp function is supported which enables users to change frame rates while recording. This function allows for a preset ramp to be triggered at will, to smoothly and precisely affect frame rate changes in real time from one frame rate to another over a set period of time.

The Select FPS function is further enhanced when the optional new HKSR-103 RGB 60P Processor board is added to the system. This makes it possible to record the full range of 1 to 60 fps\* in RGB 4:4:4 – a powerful capability that has never before been possible with any VTR.

\*Up to 50 fps with the F35.

## Interval Frames

This mode can also be used to create over-cranking or under-cranking effects with any progressive camera. The Interval Frames function intermittently records signals onto a tape at intervals predetermined by the user. To achieve this, the SRW-1/SRPC-1 holds all the frames captured by the camera in the optional HKSR-102 frame buffer memory, and then records only those frames that occur at each interval to tape at standard frame rates with commensurate time code. The Speed Ramp function is also supported in this mode while camera frame rates remain constant (i.e. 30 or 60 fps). Control over interval recordings is possible in MANUAL, AUTO and USER PROGRAM modes, allowing frame-rate setting changes during recording. The Timer Rec function enables time-lapse recording over longer periods by manual take or at predetermined intervals from 1 second up to 30 hours.

## Internal Format Conversion Capability

In addition to RGB 4:4:4 to Y/Cb/Cr 4:2:2 conversion, the SRW-1/SRPC-1 possesses a wide variety of format-conversion (including 2-3 pull-down) capabilities ranging from HD to HD and HD to SD, offering solutions for high-quality material monitoring and work-tape creation.

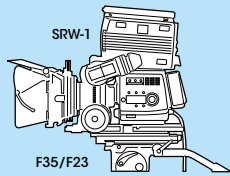
### SRW-1 Internal Format-Conversion Capability

SYSTEM (HD-SDI IN/OUT)	HD MONITOR OUT	SD MONITOR OUT
1080/4:2:2	23.98PsF	23.98PsF 59.94i*
	24PsF	24PsF
	25PsF	25PsF
	29.97PsF	29.97PsF
	50i	50i
	59.94i	59.94i
1080/4:2:2	50P	50i
	59.94P	59.94i
1080/4:4:4 SQ or HQ	23.98PsF	23.98PsF 59.94i*
	24PsF	24PsF
	25PsF	25PsF
	29.97PsF	29.97PsF
	50i	50i
	59.94i	59.94i
720/4:2:2	59.94P	59.94P
	50P	50P

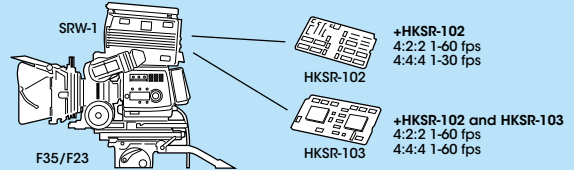
HD-SDI Dual Link Alternative  
 \* 2:3 pull-down SQ: Standard Quality 440Mbps HQ: High Quality 880Mbps

# System Configuration

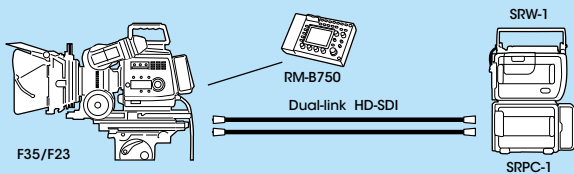
## RGB 4:4:4 Recording (Direct Docking)



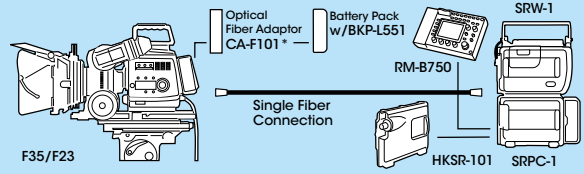
## Select FPS Recording (Direct Docking)



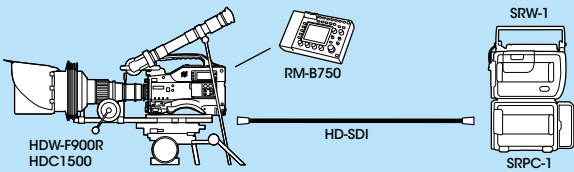
## RGB 4:4:4 Recording (HD-SDI Dual-link)



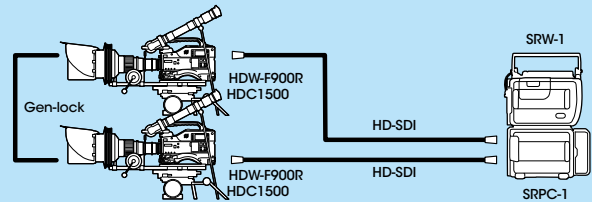
## RGB 4:4:4 Recording (Direct Fiber Connection)



## 4:2:2 Recording

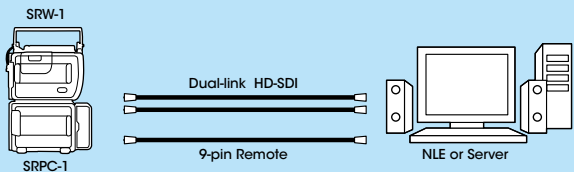


## Two-camera Operation (3D Application)



\*Planned to be available in autumn 2008.

## Source Feeding to NLE or Server



SRW-1/SRPC-1 Rear Panel

## Dimensions



# Optional Accessories



**HKSR-101**  
Optical Interface Board



**HKSR-102**  
Picture Cache Board



**HKSR-103**  
RGB 60P Processor Board



**AC-DN10**  
AC Adaptor



**AC-DN2B**  
AC Adaptor



**BP-GL95**  
Info Li-Ion Battery



**BC-L70**  
Battery Charger



**BC-L500**  
Battery Charger



**RM-B150**  
Remote Control Unit



**RM-B750**  
Remote Control Unit



**BCT-6/33/40SR**  
HDCAM-SR Video Cassette  
Tapes



**BCT-HD12CL**  
Video Head Cleaning  
Cassette

## SRW-1/SRPC-1 Specifications

General	
Power requirements	DC +12 V (DC +11 to +17 V)
Operating temperature	0 °C to +40 °C
Storage temperature	-20 °C to +60 °C
Humidity	25 % to 80 % (relative humidity)
Mass	8.5 kg (18 lb, 12 oz)
Dimensions (W x H x D)	279 x 399 x 139 mm (11 x 15 3/4 x 5 5/8 inches)
Recording format	HDCAM-SR
Recording/Playback time	Normal speed recording: 50 min. with BCT-40SR cassette (24P mode) Double speed recording: 25 min. with BCT-40SR cassette (24P mode)
Fast forward/rewind time	5 min.
Fast forward/rewind speed	±11 times
Search speed (Shuttle mode)	±11 times
Input/Output signals	
HD serial V/A input	BNC x 2, Serial Digital (1.485 Gbps), SMPTE-292M/SMPTE-372M/BTA-S004/ITU-R.BT709
HD reference video input	BNC x 1, Tri Level Sync, 0.6 Vp-p, 75 Ω, sync negative
SD reference video input	BNC x 1, Black Burst, 0.286 Vp-p, 75 Ω, sync negative
Digital audio input	BNC x 2 (AES/EBU)
Analog audio input	XLR-3pin x 4 (female)
Time code Input	BNC x 1, 0.5 to 18 Vp-p, 10 kΩ
HD serial V/A output	BNC x 2, serial digital (1.485 Gbps), SMPTE-292M/SMPTE-372M/BTA-S004/ITU-R.BT709
HD serial V/A monitor output	BNC x 1 (with character out), serial digital (1.485 Gbps), SMPTE-292M/BTA-S004/ITU-R.BT709
SD serial V/A monitor output	BNC x 1 (with character out), D1 serial digital (270 Mbps), SMPTE-259M
Digital audio output (ch1 to ch12)	D-sub multi connector
Analog audio monitor output	XLR-3pin x 2 (male)
Time-code output	BNC x 1, 1.0 Vp-p (75 kΩ), 2.2 Vp-p (10 kΩ)
Phones	Stereo mini jack x 2 -17 dBu
Remote input	D-sub 9-pin (female), Sony 9-pin remote interface

Digital video performance	
Sampling frequency	Y: 74.25 MHz, Cb/Cr: 37.125 MHz G: 74.25 MHz, B: 74.25 MHz, R: 74.25 MHz
Quantization	10 bits/sample
Compression	MPEG-4 Studio Profile
Channel coding	S-NRZ
Error correction	Reed-Solomon code
Digital audio performance	
Sampling frequency	48 kHz (synchronized with video)
Quantization	24 bits/sample
Wow & flutter	Below measurable level
Analog audio performance (Playback with the SRW-5000 VTR)	
Sampling frequency	24 bits/sample
Frequency response	20 Hz to 20 kHz, +0.5 dB/-1.0 dB (reference level)
Dynamic range	More than 100 dB (1 kHz)
Distortion	Less than 0.05 % (at 1 kHz, reference level)
Crosstalk	Less than -80 dB (at 1 kHz, between any two channels)
Accessories	
Supplied accessories	Operational manual (1)
Optional accessories	HKSR-101, Optical Interface Board HKSR-102, Picture Cache Board HKSR-103, RGB 60P Processor Board AC-DN10, AC Adaptor AC-DN2B, AC Adaptor BP-GL95, Info Li-Ion Battery BC-L70, Battery Charger BC-L500, Battery Charger RM-B150, Remote Control Unit RM-B750, Remote Control Unit BCT-6/33/40SR, HDCAM-SR Video Cassette Tapes BCT-HD12CL, Video Head Cleaning Cassette

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23.98P, 24P, 25P, and 29.97P are used as generic names in this literature  
for the industry standard 23.98PsF, 24PsF, 25PsF,  
and 29.97PsF (Progressive Segmented Frames), respectively.  
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