

SONY[®]

PAL

Digital Videocassette Recorders
MSW-2000P Series

MPEG IMX[™]

MPEG

Preliminary

Realise an end-to-end MPEG environment with MSW-2000P Series MPEG IMX™ Studio Editing Recorders.

As we head toward a digital networked broadcasting environment, broadcasters are becoming increasingly aware of the significant benefits of remaining within the MPEG compression family throughout the entire production chain. This is because MPEG-2 is the chosen standard for DTV and DVB distribution owing to its quality, cost-effectiveness, and efficiency in transmission. Its bit-rate flexibility and upward/downward scalability with a variety of Profiles and Levels make MPEG-2 second to none among the various compression schemes. In addition, broadcasters have identified the need to produce very high quality programs (frequently involving heavy post-production), using systems based on open compression and interfacing standards such as MPEG-2.

To address this customer need, Sony is introducing a range of new MPEG IMX studio editing recorders based on MPEG-2 4:2:2 P@ML and operating at 50 Mbps with I-frame only compression. Very high quality digital post-production is enabled with this compression algorithm.

MSW-2000P Series MPEG IMX recorders have been developed using Sony's extensive expertise in producing world-acclaimed 1/2-inch formats: Betacam®, Betacam SP®, Digital Betacam®, and Betacam SX®. Moreover, to assure compatibility with current Betacam-based tape libraries and facilities, MPEG IMX recorders offer playback compatibility for all these 1/2-inch formats.

With the introduction of MPEG IMX recorders, Sony is providing you with powerful tools to migrate easily to an open MPEG environment in the digital future, while protecting your investment in current 1/2-inch formats.



MPEG World

MPEG

Open the door to the growing MPEG World with the MPEG IMX recorders

The MSW-2000P Series MPEG IMX recorders are not just the perfect VTRs to pursue the ultimate in your MPEG World — far from it. They also play a vital role in migrating your existing tools into an MPEG environment. In addition to the world's first MPEG format, Betacam SX, Betacam, Betacam SP and Digital Betacam formats can be played back on the MPEG IMX recorders*. The output signal can be chosen from MPEG Elementary Stream (ES), conventional base band SDI and analogue. The output MPEG ES signal is interfaced within the MPEG environment via the sophisticated SDTI-CP** I/O. A variety of SDTI-CP I/O equipped products such as servers and nonlinear editors are being produced by Sony and other leading manufacturers.

*Each model has different playback capabilities to suit a variety of customer needs. Please refer to the chart.
** SDTI-CP is defined as SMPTE 326M.



DNW-A225P/A220P/A25P
Betacam SX
Digital Portable Editors



DNW-A28P
Betacam SX
Digital Portable Recorder



DVW-250P
Digital Betacam Portable VTR



DNW-7P/9WSP/90P/90WSP
Betacam SX Camcorders



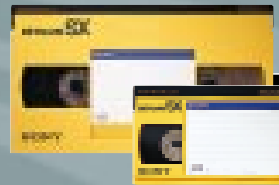
DVW-707P/709WSP/790WSP
Digital Betacam Camcorders



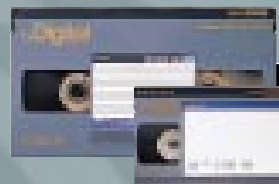
BVW-D600P/400AP/300AP
Betacam SP Camcorders



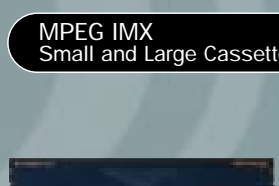
DVCAM Camcorders



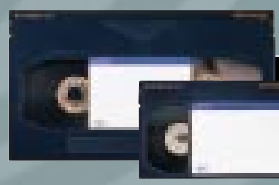
Betacam SX
Small and Large Cassette



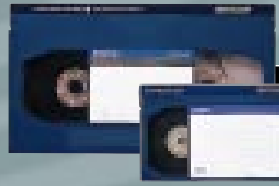
Digital Betacam
Small and Large Cassette



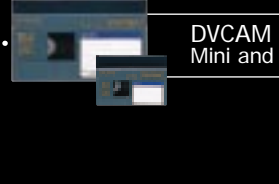
MPEG IMX
Small and Large Cassette



Betacam SP
Small and Large Cassette



Betacam
Small and Large Cassette



DVCAM
Mini and Standard Cassette



MSW-A2000P
MPEG 50 Mbps over SDTI-CP I/O
• MPEG IMX Recording and Playback
• Betacam SX Playback
• Betacam SP Playback
• Betacam Playback



MSW-M2000P
MPEG 50 Mbps over SDTI-CP I/O
• MPEG IMX Recording and Playback
• Digital Betacam Playback
• Betacam SX Playback
• Betacam SP Playback
• Betacam Playback



MSW-2000P
MPEG 50 Mbps over SDTI-CP I/O
• MPEG IMX Recording and Playback
• Betacam SX Playback



DNW-A75P/A65P/A65P + Optional BKNW-124 SDTI-CP Output Board
SDTI-CP output for following:
• Betacam SX Playback
• Betacam SP Playback (A75P/A65P)
• Betacam Playback (A75P/A65P)



DSR-2000P + Optional DSBK-210 SDTI-CP Output Board
SDTI-CP output for following:
• DVCAM Playback
• Consumer DV Playback
• Consumer DV LP Playback
• DVCPRO Playback



MAV-555
Multi Access Video Disk
Recorder



MAV-2000
Multi Access Video and
Audio Server



Other manufacturers'
servers with SDTI-CP I/O



DNE-2000
Nonlinear Editor



MSW-2000P Series
MPEG IMX Studio Editing Recorders



MPEG Transcoder



Other manufacturers'
NLE with SDTI-CP I/O



MAV-70XGI
Transmission Server



BDV-2300
BDV Interface Unit



BDV-N1000
Network Interface Unit

Main Features of MPEG IMX Recorders

■ MPEG-2 4:2:2P@ML 50 Mbps, I-frame compression

The MSW-2000P Series employs 8-bit 4:2:2 component video sampling and MPEG-2 4:2:2P@ML data compression at 50 Mbps, I-frame.

■ MPEG bit stream data over SDTI-CP

MSW-2000P Series recorders can input and output an MPEG Elementary Stream over SDTI-CP (SMPTE 326M), enabling the transfer of data to other MPEG devices, such as nonlinear editors and servers.

■ Compact body design

The Series features a compact 4U-size design* and weighs only 23 kg (50 lb 11 oz) — 12 kg (approx. 26 lb) lighter than the DVW-A500P.

*427 x 174 x 544 mm (16 7/8 x 6 7/8 x 21 1/2 inches) [W x H x D]

■ Elegant front panel design

MSW-2000P Series recorders offer two major innovations in front-panel design, while keeping the knobs and buttons in their usual positions. The clear multi-function display provides comprehensive information, allowing quick access and easy control of a variety of functions. Additionally, dedicated control knobs are included for each of the eight, independently editable audio channels.

■ High-quality digital audio

MSW-2000P Series recorders provide eight, independently editable, 16-bit channels as standard. They can also be switched to provide four channels of 24-bit digital audio.

- 16-bit – 8 ch
- 24-bit – 4 ch

■ Long recording and playback times

MSW-2000P Series recorders provide long recording and playback times.

- 220 (625)/184 (525) minutes – L-cassette
- 71 (625)/60 (525) minutes – S-cassette

■ Future HDTV migration

An optional plug-in format converter will handle 1080i, 720p, and 480p outputs. This up-converter enables smooth migration to future HDTV operations, while providing backward compatibility for current 1/2-inch formats: Betacam, Betacam SP, Betacam SX, and Digital Betacam.

■ 625/50, 525/60 switchable operation

MSW-2000P Series recorders offer 625/525 switchable operation for all playback-compatible 1/2-inch formats.

For playback of 525-line Betacam and Betacam SP tape in 625 machines and vice versa, the video outputs are for monitoring purposes only.

■ Versatile interfaces

- Analogue composite I/O
 - Analogue component I/O
 - SDI I/O
 - SDTI-CP I/O
 - Analogue audio (4 ch)
 - AES/EBU audio (16 bit – 8 ch/24 bit – 4 ch)
 - Audio monitor (2 ch)
- All equipped as standard.

■ Easy maintenance

Most of the circuitry of MSW-2000P Series recorders 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 Betacam SX recorders. This helps to drastically reduce the time required for periodic scanner replacement.

■ Frame-accurate insert/assemble editing

■ Multi-segment recorder in the Flexicart and LMS system



MPEG IMX Format

General	Tape width	12.65 mm (1/2-inch)
	Tape material	Metal particle tape
	Recording/Playback time	Max. 220 (625)/184 (525) min with L-cassette
	Tape speed	53.776 (625)/64.467 (525) mm/s
Video	Track pitch	21.7 µm
	Tracks per frame	8 tracks/frame
	Longitudinal tracks	Time code/Control
	Playback compatibility	Betacam, Betacam SP, Betacam SX, Digital Betacam
	MSW-M2000P	Betacam, Betacam SP, Betacam SX
	MSW-A2000P	Betacam SX
	MSW-2000P	Betacam SX
	Compression	MPEG-2 4:2:2P@ML, Intra frame coding (ISO/IEC 13818-2000)
	Video bit rate	50 Mbps
	Active lines per frame	608 (625)/512 (525)
Audio	Sampling frequency	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz
	Quantization	8 bits/sample
	Channels	Reed-Solomon
	Error correction	
Audio	Compression	None
	Sampling frequency	48 kHz
	Quantization	16 or 24 bits/sample (selectable)
	Channels	8 or 4
	Data recording capability	Yes
Error correction	Reed-Solomon	



Functions of MPEG IMX Recorders

Variable speed control

- MPEG IMX tape: -1 to +3 times
- Digital Betacam tape: -1 to +3 times
- Betacam SX tape: -1 to +2 times
- Betacam SP tape: -1 to +3 times
- Betacam tape: -1 to +3 times

With noiseless image and digital jog sound.

High-speed picture search

Shuttle search speed

- MPEG IMX tape: ±78 times normal play speed
- Digital Betacam tape: ±50 times normal play speed
- Betacam SX tape: ±78 times normal play speed
- Betacam SP tape: ±42 (625)/±35 (525) times normal play speed
- Betacam tape: ±42 (625)/±35 (525) times normal play speed

Shot Marks

MSW-2000P Series recorders can scan tapes with Shot Marks and automatically detect their positions. After scanning, a list of all the marks is displayed on the monitor, allowing easy cueing to any mark.

Preread editing capability

Dynamic Motion Control (DMC)

Optional remote control panel



Optional accessories

- Format converter
- Remote control panel
- RCC-5G Remote cable
- Rack mount kit
- Maintenance manual
- MPEG IMX Videocassette
BCT-6MX/12MX/22MX/32MX/60MX (Small)
BCT-64MXL/94MXL/124MXL/184MXL (Large)



Specifications

		MSW-M2000P/A2000P/2000P
General	Power requirements	AC 100 to 240 V, 50/60 Hz
	Power consumption	2A (200 W) / AC 240 V
	Operating temperature	+5° to +40°C (+41° to +104°F)
	Storage temperature	-20° to +60°C (-4° to +140°F)
	Humidity	20 % to 90 % (relative humidity)
	Mass	Approx. 23 kg (50 lb 11 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	MPEG IMX 53.776 (625)/64.467 (525) mm/s Betacam SX 59.575 (625)/59.515 (525) mm/s Betacam/Betacam SP 101.51 (625)/118.6 (525) mm/s
	Digital playback time	Max. 220 (625)/184 (525) min with BCT-184MXL cassette
	Fast forward/rewind time	Approx. 3 min with BCT-184MXL cassette
Inputs/Outputs signal	Search speed range	MPEG IMX ±78 times normal playback speed Betacam SX ±78 times normal playback speed Betacam/Betacam SP ±42 (625)/±35 (525) times normal playback speed
	Servo lock time	0.7 (PAL)/0.5 (NTSC) s or less (from standby on)
	Load/unload time	4.5 (S-cassette)/5.5 (L-cassette) s or less
	Analogue composite input	BNC (x 2), 1.0 Vp-p, 75 Ω, sync negative
	Analogue composite output	BNC (x 3, including one character out), 1.0 Vp-p, 75 Ω, sync negative
	Analogue component input	BNC (x 3, for 1 set, Y/R-Y/B-Y), Y: 1.0 Vp-p, 75 Ω, sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
	Analogue component output	BNC (x 3, for 1 set, Y/R-Y/B-Y), Y: 1.0 Vp-p, 75 Ω, sync negative, R-Y/B-Y: 0.7 Vp-p, 75 Ω
	SDI input	BNC (x 2, including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s
	SDI output	BNC (x 3, including one character out), SMPTE 259M (ITU-R BT.656-3), 270 Mbit/s
	SDTI-CP input	BNC (x 1), SMPTE 305M (SDTI), 326M (SDTI-CP)
SDTI-CP output	BNC (x 2), SMPTE 305M (SDTI), 326M (SDTI-CP)	
Processor adjustment range	Analogue audio input	XLR (x 4) (4CH: channel selectable)
	Analogue audio output	XLR (x 4) (4CH: channel selectable)
	Digital audio input (CH 1/2, 3/4, 5/6, 7/8), AES/EBU	BNC (x 4), default 48 kHz (32 to 48 kHz with sample rate converter)
	Digital audio output (CH 1/2, 3/4, 5/6, 7/8), AES/EBU	BNC (x 4), 48 kHz fixed
	Remote control	Remote (RS-422A) D-sub 9-pin (x 2), Sony 9-pin remote interface RS-232C (ISR*) D-sub 9-pin (x 1), RS-232C interface Parallel remote D-sub 50-pin (x 1), female Video control (1) D-sub 15-pin (x 1), female Control panel Circular connector 10-pin, female
	Reference input	BNC (x 2) (VBS or VS) (including one through out)
	Time code input	XLR (x 1), female
	Time code output	XLR (x 1), male
	Memory card insertion slot	PCMCIA (x1)
	Monitor output L/R	XLR (x 2) (channel selectable)
Digital video performance	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
	Y/C delay	±100 ns (Betacam/Betacam SP playback only)
	Composite input level	±3 dB
	Sampling frequency	Y: 13.5 MHz R-Y/B-Y: 6.75 MHz
	Quantization	8 bits/sample
Error correction	Reed-Solomon code	
Digital input to analogue component output	K-factor (2T pulse): 1 % or less	
Analogue component input to analogue component output	A/D and D/A quantization: 10 bits/sample Bandwidth: Y: 0 to 5.75 MHz +0.5/-2.0 dB, R-Y/B-Y: 0 to 2.75 MHz +0.5/-2.0 dB S/N ratio: 56 dB or more K-factor (2T pulse): 1 % or less LF non-linearity: 3.0 % or less	
Analogue composite input to analogue composite output	A/D and D/A quantization: 10 bits/sample Bandwidth: 0 to 5.75 MHz +0.5/-2.0 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	
Digital audio performance	Sampling frequency	48 kHz (synchronised with video)
	Quantization	16 or 24 bits/sample (selectable)
	Analogue input to output A/D and D/A quantization	20 bits/sample
	Frequency response (0 dB at 1 kHz)	20 Hz to 20 kHz +0.5 dB/-1.0 dB
	Dynamic range (at 1 kHz, emphasis ON)	More than 90 dB
	Distortion (at 1 kHz, emphasis ON, reference level)	Less than 0.05%
Cross talk (at 1 kHz, between any two channels)	Less than -80 dB	
Wow & flutter	Below measurable level	
Head room	20 dB (18 dB selectable)	
Emphasis (ON/OFF selectable in REC mode)	T1=50 μs, T2=15 μs	
Supplied accessories	Remote cable (RCC-5G)	x 1
	PSW 4 x 16 Rack mount screws	x 4
	Operation manual	x 1
	Installation manual	x 1

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