Enabling
the present,
protecting the past.

MSW-A2000P
MSW-M2000P
Studio Editing Recorders
MSW-M2100P
Studio Player

MPEG IMX

The New MSW-2000P Series Studio Recorders.

this is not a rehearsal.
www.pro.sony-europe.com

SONY

Exploit the full business
MPEG env

MSW-2000P Series

In the digitally based broadcast industry of today and tomorrow, only the fittest enterprises will grow and prosper. In short, those that deliver the quality, flexibility, choice and value - that an ever more demanding audience requires.

Whatever your medium, from satellite or terrestrial to cable; and whether you operate locally, nationally or internationally, networked systems based upon open MPEG-2 compression, can deliver what's required at every step of the programme production chain.

Hence the rapid increase in the popularity of MPEG-2 based systems. The advantages of this technology are felt at every stage of the process. Not only is MPEG-2 the worldwide standard for digital programme delivery via DTV, DVB and DVD, it is also widely used for the contribution and distribution of material between studio centres.

In addition, MPEG-2 4:2:2P@ML is also a firm favourite for programme production. Thus the number of linear and non-linear options based upon this system continues to increase dramatically.

MPEG-2 brings a number of pivotal benefits to your organisation. These range from its versatility - optimising quality and cost for each programme application; interoperability - bringing you an extensive choice of equipment from multiple suppliers and the reassurance of a future-proof investment.

Today as broadcasters begin to reap the full advantages of MPEG-2 technology, they are demanding the resources to produce programmes of the very highest quality using recording systems that are also based upon open compression and interfacing standards.

In anticipation of this requirement, Sony has introduced a new family of MPEG IMX™ Studio Editing Recorders and a Studio Player based upon MPEG-2 4:2:2P@ML data compression at 50Mb/s intra-frame - the MSW-2000P Series.

Developed from Sony's unique experience of, and world renowned reputation for, 1/2" recorders : Betacam, Betacam SP, Digital Betacam and Betacam SX, the MSW-2000P Series ensures compatibility with all Betacam-based tape libraries and facilities.

So not only is this exciting new range the ideal tool for migrating to an open MPEG-2 environment - quickly, simply and cost effectively; it is perfect for protecting your investment in current 1/2" resources.

benefits of an end-to-end
...ironment with

MPEG IMX™

Studio Editing Recorders.

Enter the Open World of MPEG-2 with MPEG IMX™ Recorders

MSW-2000P Series MPEG IMX™ Studio Recorders are more than just ideal tools on w
to base your open MPEG-2 infrastructure. They also play a vital role in migrating your
existing operations to MPEG-2.

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

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

DNW-A28P
Betacam SX Digital Portable Recorder

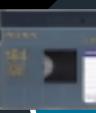DVW-707P/709WSP/790WSP
Digital Betacam Camcorders

DVW-250P
Digital Betacam Portable VTR

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

DVCAM Camcorders

Betacam SX
Small and Large Cassette

Digital Betacam
Small and Large Cassette

PEG IMX
and Large Cassette

Betacam SP
Small and Large Cassette

Betacam
Small and Large Cassette

DVCAM
Mini and standard Cassette

DNW-A75P/75P/
MPEG 50Mb/s o
• Betacam SX Playba
• Betacam SP Playba
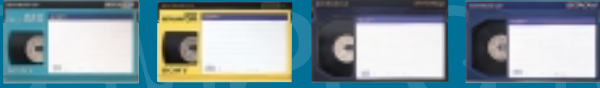• Betacam Playback

DSR-2000P + Op
MPEG 50Mb/s o
• DVCAM Playback
• DV Playback
• DV LP Playback
• DVCPRO Playback

MSW-A2000P MPEG IMX Recorder
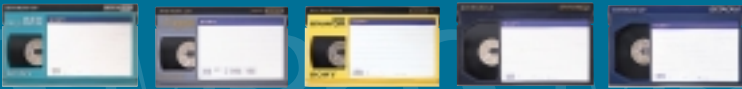
MPEG 50 Mb/s over SDTI-CP I/O
- MPEG IMX Recording and Playback
- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback

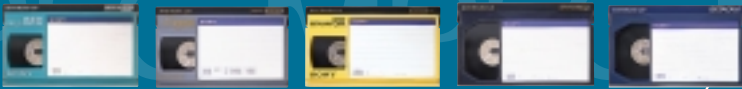## MSW-M2000P MPEG IMX Recorder

MPEG 50 Mb/s over SDTI-CP I/O
- MPEG IMX Recording and Playback
- Digital Betacam Playback
- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback

MSW-M2100P MPEG IMX Player

MPEG 50 Mb/s over SDTI-CP output
- MPEG IMX Playback
- Digital Betacam Playback
- Betacam SX Playback
- Betacam SP Playback
- Betacam Playback

SDTI-CP

MAV-555
Multi Access Video Disk F

MAV-2000
Multi Access Video and Aud

Other manufacturers' s
with SDTI-CP I/O

A65P/65P Series + BKNW-124 SDTI-CP Output Board
ver SDTI-CP output for following:

ack
ack (A75P/A65P)
(A75P/A65P)
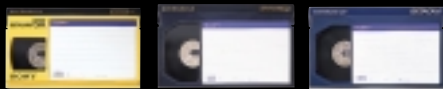
tional DSBK-210 SDTI-CP Output Board
ver SDTI-CP output for following:

World
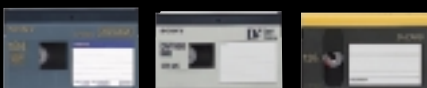
Other manufacturers' NLE or
servers with SDTI-CP I/O

DNE-2000
Nonlinear Editor

...Recorder

MAV-70XGI
Transmission Server

...dio Server

MSW-2000P Series
MPEG IMX Studio Editing Recorders

BDX-2300
BDX Interface Unit

...servers
...O

MSB-2000 Multi-format
Stream Bridge
(MPEG Transcoding)

BDX-N1000
Network Interface Unit

Main features of the MSW-2000P Series
MPEG IMX™ Recorders

MPEG-2 50Mb/s, 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 50Mb/s, I-frame. This provides very high picture quality and excellent multi-generation performance.

MPEG-2 bit stream over SDTI-CP

MSW-2000P Series recorders can input and output an MPEG-2 Elementary Stream via SDTI-CP (SMPTE 326M), enabling the transfer of data to other MPEG devices, such as non-linear editors and servers.

Compact design

The Series features a compact 4U-size design - 174 x 427 x 550 (H x W x D) - and weighs only 22kg.

Elegant front panel design

MSW-2000P Series recorders offer two major innovations in front-panel design, while retaining the familiar operational controls of recorders such as Betacam SP, Betacam SX and Digital Betacam. A clear multi-function display provides comprehensive information, allowing quick access and easy control of a variety of functions. Additionally, dedicated controls 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 48kHz channels as standard. They can also be switched to provide four channels of 24-bit 48kHz digital audio.

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

525/60, 625/50 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 SP tape in 625 machines and vice versa, the analogue composite 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 electronic circuitry of the MSW-2000P Series is arranged on plug-in boards for quick and easy maintenance. The drum assembly and tape transport have been designed to provide low-cost maintenance and ensure rugged and reliable operation. An upper drum mechanism has been used to significantly reduce the time required for periodic scanner replacement.

MPEG IMX™ Format

General	
Tape width	12.65 mm (1/2-inch)
Tape material	Metal Particle tape
Recording/Playback time	Max. 184 (525)/220 (625) with L cassette
Tape speed	64.467 (525)/53.776 (625) mm/s
Track pitch	21.7 µm
Tracks per frame	8 tracks/frame
Longitudinal tracks	Time code/Control
Playback compatibility	
MSW-M2000P + MSW-M2100P	Betacam, Betacam SP, Betacam SX, Digital BETACAM
MSW-A2000P	Betacam, Betacam SP, Betacam SX
Video	
Compression	MPEG-2 4:2:2P@ML, Intra frame coding
	(ISO/IEC 13818-2000)
Video bit rate	50 Mb/s
Active lines per frame	512 (525)/608 (625)
Sampling frequency	Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz
Quantization	8 bits/sample
Error correction	Reed-Solomon
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

Operational features of MSW-2000P Series
MPEG IMX™ Recorders

Frame-accurate insert/assemble editing

Video and any of the 8 channels of digital audio can be edited independently. Editing is to +/-0 frame accuracy.

Pre-read editing

Pre-read editing is a standard feature of all MSW-2000P Series recorders. This significantly speeds up the editing process and simplifies operations such as titling, video layering and audio sweetening.

Wide variable speed range

- MPEG IMX™ cassette: -1 to +3 times
- Digital Betacam cassette: -1 to +3 times
- Betacam SX cassette: -1 to +2 times
- Betacam, Betacam SP cassette: -1 to +3 times

With noiseless image and Digital Jog Sound.

High speed picture search

Shuttle search speed

- MPEG IMX™ cassette:

  +/-78 times normal play speed

- Digital Betacam cassette:

  +/-50 times normal play speed

- Betacam SX cassette:

  +/-78 times normal play speed

- Betacam, Betacam SP cassette:

  +/-42 times normal play speed

Dynamic motion control

For programmable slow-motion playback from the recorder control panel, or from external edit controllers.

Shot marks

Tapes containing Shot Marks can be scanned by the MSW-2000P Series. The position of each Shot Mark can be automatically detected and - after scanning - can be displayed on a monitor. This allows fast and easy cueing to any mark.

Multi-segment record capability for use in Flexicart and LMS systems

For easy and low cost integration into existing "on-air" facilities

Optional accessories

With all the interfaces provided as standard, the number of accessories to the MSW-2000P Series has been kept to a minimum. Options are shown below:

- BKMW-101 Remote Control panel
- BKMW-102 Control panel case
- BKMW-103 Control panel extension kit
- RMM-131 Rack mount kit
- Maintenance manual
- MPEG IMX™ Videocassettes*

BCT-6MX (7) / 12MX (14) / 22MX (26) / 32MX (38) / 60MX (71) (small)

BCT-64MXL (76) / 94MXL (112) / 124MXL (148) / 184MXL (220) (large)

* 625 record duration shown in brackets

Specifications

	MSW-A2000
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	22.0 kg (48 lb 7 oz)
Dimensions (W x H x D)	427 x 194 x 544 mm (16 $^7/_8$ x 7 $^3/_4$ x 21 $^1/_2$ inches)
Tape speed — MPEG IMX™	64.467 (525)/53.776 (625) mm/s
Betacam SX	59.515 (525)/59.575 (625) mm/s
Betacam/Betacam SP	118.6 (525)/101.51 (625) mm/s
Digital playback time	Max. 184 (525)/220 (625) min with BCT-184MXL cassette
Fast forward/rewind time	Approx. 3 min with BCT-184MXL cassette
Search speed range — MPEG IMX™	±78 times normal playback speed
Betacam SX	±78 times normal playback speed
Betacam/Betacam SP	±35 (525)/±42 (625) times normal playback speed (Betacam/Betacam SP)
Servo lock time	0.5 (NTSC)/0.7 (PAL) s or less (from standby on)
Load/unload time	4.5 (S-cassette)/5.5 (L-cassette) s or less
Inputs/Outputs signal	
Analog composite input	BNC (x 2), 1.0 Vp-p, 75 Ω, sync negative
Analog composite output	BNC (x 3, including one character out), 1.0 Vp-p, 75 Ω, sync negative
Analog 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
Analog 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)
Analog audio input	XLR (x 4) (4CH :channel selectable)
Analog 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)
Processor adjustment range	
Video level	±3 dB/ - ∞ to +3 dB selectable
Chroma level	±3 dB/ - ∞ to +3 dB selectable
Black level	±30 IRE/±210 mV
Chroma phase	±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
Digital video performance	
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 analog component output	K-factor (2T pulse): 1 % or less
Analog component input to analog 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
Analog composite input to analog 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)
Analog 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

*ISR: Interactive Status Reporting

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Studio Editing Recorders