

SONY®

NTSC/PAL

BETACAM SX™

Betacam SX Family



BETACAM SX

— A DIGITAL SYSTEM FOR MAINSTREAM PROGRAM PRODUCTION

Since the introduction of the very first models, each line of the Betacam® series has set revolutionary milestones due to the excellent picture performance and high reliability made possible by the adoption of a consistent half-inch platform. Now often referred to as the international standard for use in both the field and in the studio production, Betacam VTRs and camcorders have been in service worldwide in almost every programming application. Today, the Betacam series is offered in a variety of flavors to suit the even more demanding needs of its users in terms of operating cost, performance and application.

The Betacam SX series has been developed as the 'digital workhorse' for day-to-day ENG, EFP and general post-production applications. It adopts an MPEG-2 4:2:2 Profile@ML based compression algorithm to deliver the excellent picture quality of 8-bit, 4:2:2 digital recording at a bit rate optimized for higher robustness and lower running cost.

From the very outset, the Betacam SX series had been established to cover the entire production chain. In pursuit of this goal, the Betacam SX series thus offers a variety of camcorders, choices of editing recorders and players, and portable recorders as well as the capability to integrate into Flexicart™ and LMS systems. Its unique 'legacy playback' capability of analog Betacam/Betacam SP® tapes protects past archives, and for mixed format operations, the system allows seamless migration with MPEG IMX™ MPEG-2 based systems.

The Betacam SX series is certainly the choice where operational costs, hardware reliability and image quality are priorities.

BETACAM SX HIGHLIGHTS

- MPEG-2 4:2:2P@ML Compliant
- Lower Tape Running Costs
- Low Maintenance Costs
- Full Product Line-up
- Compatibility with Analog Betacam and Betacam SP formats
- Powerful Editing Features including Pre-read
- 194 Minutes Record Duration with an L cassette, and 62 Minutes with an S cassette
- Four-channel Uncompressed Digital Audio
- SDTI-CP Output*
- 507 (NTSC)/608 (PAL) Lines per Frame
- 4:2:2 Digital Component Picture Quality

*Available on DNW-A75/A75P/75/75P/A65/A65P.
Requires the optional BKNW-124 SDTI-CP Output Board. SDTI-CP (Serial Data Transport Interface-Content Package) is defined as SMPTE 326M.



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*Unless otherwise noted, all references to specific models refer to both NTSC and PAL versions (except for the J-1 model). (i.e., DNW-A75 refers to the DNW-A75 and the DNW-A75P)

BETACAM SX FORMAT

The Betacam SX format represents the latest generation of Betacam technology, drawing on the long experience of Sony in serving the ever-changing real-world needs of the broadcast and production industry. It combines efficient MPEG-2 compliant data compression, the latest advances in digital processing and the proven performance of 1/2-inch digital technology.

Broadcast Picture Quality with MPEG-2 4:2:2P@ML

The Betacam SX format records 8-bit, 4:2:2 component digital signals using an advanced compression algorithm. Even with the relatively low bit rate of 18 Mb/s, Betacam SX recordings maintain high-quality images from first generation through multi-generation editing. Betacam SX picture quality exceeds that of Betacam SP, and preserves 507(NTSC)/608(PAL) active lines per frame, including vertical blanking signal information. The Betacam SX recording format yields superior picture quality, with excellent luminance detail and improved color resolution. The 4:2:2 sampling structure maintains the chrominance information necessary for editing and special effects – and stands up to the post-production needs of mainstream program production.

Four Channels of Digital Audio

The Betacam SX format records four channels of 16-bit 48 kHz digital audio. Each audio track is recorded uncompressed and can be edited independently of video or any other audio track.

Playback Compatibility with Analog Betacam and Betacam SP

Betacam SX equipment maintains playback compatibility with current analog systems. This analog compatibility provides a logical, cost-efficient migration path to a digital environment.

Analog Playback Capability

The Betacam SX format utilizes the same 1/2-inch tape width and cassette shell as Betacam and Betacam SP tapes. Selected Betacam SX decks can playback Betacam and Betacam SP tapes for easy integration of analog material into your digital Betacam SX edit.

A Choice of Recording Media

Current BCT-MA and UVW-T series Betacam SP metal particle tapes can be used for Betacam SX recording, assuring wide availability of recording media. For superior digital performance at reduced cost, BCT-SXA cassettes have been developed for Betacam SX recording.

The Cost Efficiencies of Betacam SX

The Betacam SX format delivers all the benefits of high-quality digital performance – and achieves significant long-term savings in both media and hardware costs.

Lower Tape Running Costs

The Betacam SX format record times greatly exceed those of Betacam SP recordings. Up to 62 minutes of material can be recorded onto a small cassette, with up to 194 minutes on a large cassette. Compared to conventional Betacam SP tapes, the tape consumption of Betacam SX equipment is reduced by almost one-half – which means that acquisition and archival costs can be significantly reduced, while superior picture quality is maintained.

Reduced Maintenance Costs

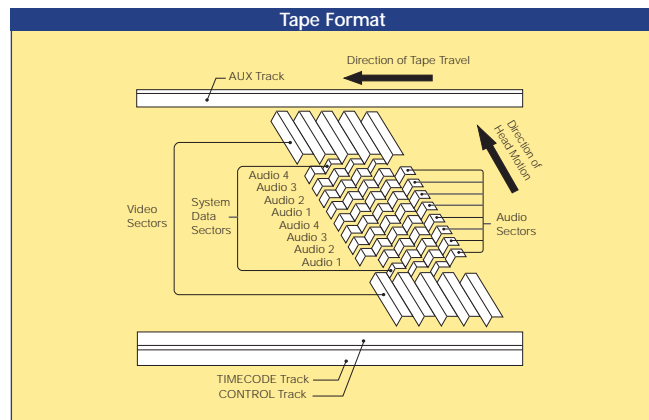
Betacam SX equipment utilizes an Automatic Alignment system that optimizes the recording and reproduction of digital data. Automatic RF equalizers optimize the gain and phase of off-tape RF signals. These automatic systems minimize the need for time-consuming manual equalization and servo system adjustments, significantly reducing equipment down-time.

Robust Tape Format

Two key elements contribute to the extremely robust characteristics of the Betacam SX format. The Powerful Error Correction Coding (ECC) provides an extremely high data-to-parity redundancy, correcting almost any off-tape error resulting from tape burst errors. Furthermore, a logical and sophisticated error concealment scheme is activated should any errors remain after the ECC process. The Betacam SX format provides virtually dropout free performance even in the harshest operational environments.

Betacam SX Format

General	
Tape width:	12.65 mm (1/2 inch)
Tape material:	Metal particle tape
Recording/playing time:	Max. 194 min with L cassette Max. 62 min with S cassette
Tape speed:	59.515 mm/s (525 mode) 59.575 mm/s (625 mode)
Track pitch:	32 μ m
Tracks per GOP (2 frames):	10 (525/60), 12 (625/50)
Longitudinal tracks:	Time code/Control/Aux
Video ancillary data:	1 line/field
Extension data:	20 bytes/frame
Video	
Compression	MPEG-2 4:2:2 Profile@Main Level
Bit rate:	18 Mb/s
Active lines per frame:	507(525/60)/608(625/50) lines
Sampling frequency:	Y:13.5 MHz, R-Y/B-Y: 6.75 MHz
Quantization:	8 bits/sample
Audio	
Compression:	None
Sampling frequency:	48 kHz
Quantization:	16 bits/sample
Channels:	4



Analog and Digital Interfaces

Betacam SX products provide both analog and digital interfaces, allowing easy integration into existing systems in the studio and in the field. This includes analog composite and component video, SDI for serial digital video with embedded digital audio, and individual analog and digital AES/EBU audio inputs and outputs. SDTI-CP is also available as an option.

Convenient Shot Mark System

A significant feature of the Betacam SX series is the Shot Mark system, providing a method for qualitative decisions made in the Betacam SX camcorder to be utilized during logging and editing processes.

Betacam SX camcorders allow recording of Shot Marks that can be used to identify good takes simply by pressing the RETURN button during recording. These marks are recorded onto the tape, and can later be detected by Betacam SX VTRs in editing. The camcorder is also capable of automatically recording REC Start Marks each time the VTR Start button is pressed. Other shooting information such as date, time, shot ID and cassette number can also be recorded automatically or manually. After recording, the tape is loaded into a Betacam SX VTR where it is scanned and the recorded marks are detected. A list indicating the mark numbers and time codes is generated for display on a video monitor or a built-in LCD screen (DNW-A25WS). Operators can easily cue-up to each mark using this list. Betacam SX VTRs can also read the shooting information recorded on the tape.

Shot marks can also be imported to a PC* running the optional Sony JZ-1 Video Logging Software to establish a highly efficient logging system. The JZ-1 software provides an easy-to-use GUI to efficiently log and/or create a storyboard from source materials. It displays the Shot Marks and their associated time codes together with a representative still picture (Stamp Picture). Comments explaining details of each scene can also be added.

*A video capture card must be installed in the PC.



JZ-1 GUI



A WIDE RANGE OF PRODUCT LINE-UP

The Sony Betacam SX product line-up answers the needs of both field and studio operations. Its versatile interfaces and analog compatibility with Betacam and Betacam SP formats make this new digital system easy to integrate into current analog installations.

Upgrading to digital can be accomplished step by step, at a pace that suits the needs and budgets of the user.

With the Betacam SX format approach, new equipment can be added as required without compromising overall system functionality.

And when migration to an all-digital environment is complete, a Sony Betacam SX system achieves all the benefits that digital technology can offer: broadcast picture and sound quality, increased production speed and significant economical media usage for both acquisition and storage.

Acquisition

Studio VTRs

Portable Recorders

Compact Player

Acquisition

DNW-7/9WS/90/90WS DNW-7P/9WSP/90P/90WSP

Digital Camcorder



The Sony Betacam SX camcorders provide the advantages of digital acquisition with compact one-piece designs. All camcorders combine operating simplicity, rugged design, and compact, lightweight portability. Smaller in size and weight than analog 1/2-inch models, these camcorders incorporate color video playback capability without an external adaptor.

They also incorporate many useful features, including an optional Slot-in Wireless Microphone Receiver and an Internal Light System. This all-in-one design reduces the total package weight for crews in the field.

Betacam SX camcorders provide another important feature: the ability to record Shot Marks and REC Start Marks. Identifying these recorded segments during the edit process allows editors to get started faster – and save time by selecting only these selected scenes.

The Betacam SX camcorder family offers four models. The DNW-7 is equipped with 2/3-inch type 400K (NTSC)/470K (PAL) Power HAD™ IT CCDs while the DNW-90 adopts 2/3-inch type 520K (NTSC)/620K (PAL) Power HAD FIT CCDs. Furthermore, the DNW-90WS and DNW-9WS are switchable between 16:9 and 4:3 aspect ratios. The DNW-90WS is equipped with the 2/3-inch 520K (NTSC)/620K (PAL) Power HAD FIT widescreen CCDs and the DNW-9WS is the IT model. All models employ digital processing in the camera section and component digital recording in the VTR section.

Features

- Compact and lightweight design: approximately 6 kg (13 lb 3 oz) including battery, tape and lens
- A fully charged BP-L90A Lithium-ion Battery or BP-M100 Nickel Metal Hydride Battery gives approximately 180 minutes of continuous operating time (in the case of the DNW-7)
- Up to 62 minutes recording using an S-cassette
- Variable speed electronic shutter for shooting high-speed moving objects
- TruEye™ process
- DynaLatitude™ process
- Auto Tracing White balance (ATW)
- Slot-in Wireless Microphone Receiver (option)
- Power connection for optional camera lighting unit, controlled by the REC start/stop button
- Viewfinder: the DNW-7 and DNW-90 are equipped with a 1.5-inch* type monochrome viewfinder. The DNW-9WS and 90WS comes with a wide 2-inch* type monochrome viewfinder
- Optional Camera Adaptors: CA-701 for four-channel audio input and SDI output, CA-702 for external SDI input and 26-pin connection with portable VTRs, and CA-755/755P for use with Camera Control Unit (CCU-550A/550AP)

*Viewable area measured diagonally.

Studio VTRs

DNW-A75/75 DNW-A75P/75P

Editing Recorder



The DNW-A75 and DNW-75 offer a wide range of features, including frame-accurate video/audio insert editing, variable speed playback, Shot Mark support and optional SDTI-CP (Serial Digital Transport Interface – Content Package) output. They are ideally suited for

many aspects of linear operations such as machine-to-machine, and A/B roll editing, to installation in a Flexicart or LMS multi-cassette system. The DNW-A75 additionally offers the capability to playback analog Betacam/Betacam SP recordings.

Features

- ± 0 frame insert/assemble editing
- Preread editing capability
- Variable speed control from -1 to +2 times with noiseless video and digital sound (Betacam SX)
- Betacam/Betacam SP playback capability (DNW-A75 only)
- Dynamic Tracking™ playback from -1 to +3 times (Betacam/Betacam SP, DNW-A75 only)
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- 525/60, 625/50 switchable operation
- Versatile interfaces including composite, component and SDI inputs/outputs, analog and AES/EBU inputs/outputs for four-channel audio and output for two-channel audio monitoring as standard, and SDTI-CP* output as option
- High-speed color picture search: ± 78 times normal playback speed (Betacam SX)
- Long recording and playback time of 194 minutes using an L cassette and 62 minutes on an S cassette

* SDTI-CP output requires the optional BKNW-124 board (see page 9).

DNW-A65 DNW-A65P

Editing Player



The DNW-A65 player offers a wide range of features, including DMC (Dynamic Motion Control), Freeze function, 525/625 operation, variable speed playback, Shot Mark support, and an optional SDTI-CP (Serial Data Transport Interface-Content Package) output. It is ideally

suited for many aspects of linear operations such as machine-to-machine, A/B roll editing feeder. The DNW-A65 can be installed in a Flexicart or LMS multi-cassette system. The DNW-A65 also provides the capability to playback analog Betacam/Betacam SP recordings.

Features

- Betacam/Betacam SP playback capability with variable speed from -1 to +3 times
- Variable speed control from -1 to +2 times with noiseless video and digital sound (Betacam SX)
- DMC (Dynamic Motion Control) function
- Shot Mark handling
- 525/60, 625/50 switchable operation
- Versatile interfaces including composite, component and SDI outputs, analog and AES/EBU outputs for four-channel audio and output for two-channel audio monitoring as standard, and SDTI-CP* output as an option
- High-speed color picture search: ± 78 times normal playback speed (Betacam SX)
- Long playback time for 194 minutes using an L cassette and 62 minutes using an S cassette

*Requires the optional BKNW-124 SDTI-CP Output Board.

SDTI-CP Option: BKNW-124

Designed for Betacam SX Studio VTRs



Users of Betacam SX Studio VTRs now have a powerful choice: perform the entire edit within the 18 Mb/s Betacam SX environment, or playback material into the 50 Mb/s MPEG IMX I-frame only system for subsequent post production.

The BKNW-124 can be fitted into the DNW-A75/75/A65 to provide a high quality MPEG-2 4:2:2P@ML I-frame output via the SDTI-CP (Serial Data Transport Interface-Content Package). Material from Betacam SX cassettes can be transcoded to 50 Mb/s and output at up to twice normal playback speed into the growing number of MPEG IMX systems and third party nonlinear devices that operate using intra-frame recording. Material from Betacam and Betacam SP tapes (in DNW-A75 and DNW-A65 VTRs) can also be encoded to 50 Mb/s MPEG 4:2:2P@ML I-frame data and output at normal playback speed.

Portable Recorders and Compact Player

DNW-A25WS DNW-A25WSP

Digital Portable Editing Recorder



The DNW-A25WS Digital Editing Recorder is designed to be compact and lightweight. The recorder provides editing functions including ± 0 frame accurate editing, variable speed search and versatile interfaces, and Betacam/Betacam SP playback capability. It is also capable of displaying both 16:9 and 4:3 aspect ratios on its LCD screen without picture squeezing. Two DNW-A25WS units can be easily docked together, forming a compact dual-deck laptop editor. The recorder can also be combined with a DSR-70A DVCAM™ Portable Recorder, allowing DVCAM-to-Betacam SX format editing in a single package. A single DNW-A25 can be used as a feeder or an editing recorder in an editing system. The DNW-A25WS is ideal for field editing.

Features

- Compact and lightweight design
- Provides recording and playback time of 62 minutes using an S cassette
- Analog Betacam/Betacam SP playback capability
- Battery operation (attaching a Sony BP-L60A/L90A/M50/M100 battery) or AC power operation with an AC-DN2B AC Power Unit
- Built-in 6.4-inch* type LCD screen for main video display
- Display of 16:9 and 4:3 aspect ratio picture (three modes provided: Letter Box, Edge Crop, Squeeze)
- Bright VDF (Vacuum Fluorescent Device) screen for sub-menu display
- Shot Mark and Shot Data handling
- Four channels of 16-bit/48 kHz digital audio
- 525/60, 625/50 switchable for international operation
- High speed color picture search: ± 24 times normal playback speed
- SDI input/output
- Analog composite video input and two outputs, two-channel analog audio input and output and two-channel monitor outputs
- Sony 9-pin remote control interface

*Viewable area measured diagonally.

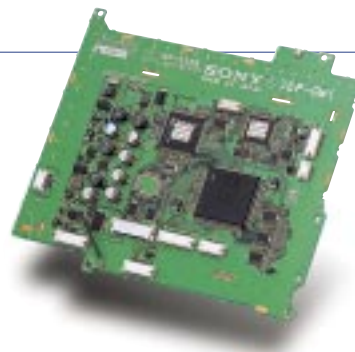
Notice: Liquid Crystal Display Panel. The liquid crystal display fitted to this recorder is manufactured with high precision technology, giving a functioning pixel ration of at least 99.99%. Thus a very small proportion of its pixels (at most 0.01%) may be "stuck", constantly off. In addition, over a long period of use, because of the physical characteristics of the liquid crystal display, such "stuck" pixels may appear spontaneously. These problems have been kept to the absolute minimum, but are an unavoidable characteristic of liquid crystal technology.

BKNW-26: 16:9 Upgrade Option

Designed for the Existing DNW-A25/A220/A225 Models

The BKNW-26 Upgrade Kit is available to add 16:9 wide-screen monitoring capability to existing Betacam SX DNW-A25 portable recorders and DNW-A220/A225 portable editors. This upgrade allows your current models to fulfill the requirements of both 16:9 and 4:3 production.

*Two BKNW-26 kits are required to upgrade the DNW-A220 and DNW-A225 models. 'Edge Crop' mode is not available.



A software upgrade by an authorized Sony service center may also be required with the installation of this kit, depending on the existing software version of the unit involved. Please contact your local authorized service center for information and labor charges.

DNW-A28 DNW-A28P

Portable Editing Recorder



The DNW-A28 Portable Editing Recorder is designed to be compact and lightweight. Its half-rack size makes it convenient for very space limited environments such as in OB vans. Features of the DNW-A28 include Slide Key Panel, Recording and Playback Volume Priority Switching function, Manual Editing function, 525/625 switchable operation, analog Betacam/Betacam SP playback capability, sequential recording with two DNW-A28s, Shot Mark support, and reading Shot Data function. The DNW-A28 can also record four-channel audio inputs.

Features

- Compact design for use in a limited space such as an OB van
- Provides recording and playback time of 62 minutes using an S cassette
- Analog Betacam/Betacam SP playback capability
- SDI/analog composite video input/output
- Sliding Key Panel
- Small Jog Dial
- Manual Editing function
- Shot Mark, REC Start and Virtual Shot Marks
- Reading Shot Data function
- 525/625 switchable for international operation
- Continuous recording with two DNW-A28s
- Sony 9-pin remote control interface

J-1

Compact Player (J-1/901 with analog component output capability and J-1/902 with SDI output capability)

The J-1 is the smallest ever of Betacam-family players. The design concept of the J-series was for affordable, compact office viewers to be used by producers, journalists and production staff. The J-1 can playback Betacam, Betacam SP and Betacam SX S cassettes and L cassettes. At the same time, they also have all the features required for viewing and logging, and – although not designed for editing applications, or on-air use – ideal for source feeding to servers or nonlinear editing systems.

The J-1 has choices of two models: the J-1/901 provides composite and component analog video outputs, while the J-1/902 provides a composite analog and SDI output. The J-1 player has a Jog/Shuttle dial, 525/625 switchable versatility, simple remote control capability via RS-422A and audio meters – all packed into their compact size.



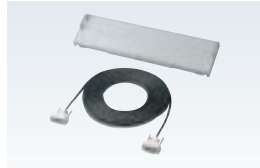
Features

- Extremely compact: 307 x 100 x 397 mm (12 1/8 x 4 x 15 3/4 inches) in size and just 7 kg (15 lb 7 oz)
- J-1/901 has composite and component analog video outputs
- J-1/902 has composite analog and SDI video outputs
- Playback of Betacam, Betacam SP and Betacam SX cassettes
- Playback of S cassettes and L cassettes
- Jog/Shuttle dial with x35 maximum color picture search for Betacam SX cassettes
- 525/625 switchable for international operation
- Monitor output of two audio channels (selectable on front panel)
- Audio meters for display of two selected channels of audio
- Equipped with industry-standard RS-422A control interface for remote feeding into servers and nonlinear editing systems
- Four-channel digital audio output via SDI output (in the case of the J-1/902)
- Shot Mark handling when used with Betacam SX cassettes

Optional Accessories



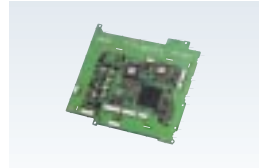
Control Panel Case
BKNW-121



Control Panel Extension Kit
BKNW-122



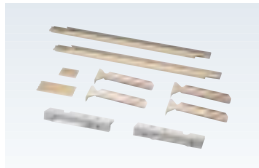
SDTI-CP Output Board
BKNW-124



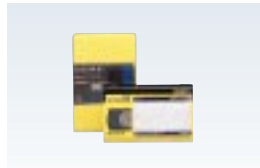
16:9 LCD Kit
BKNW-26



Docking Kit
BKNW-225



Rack Mount Kit
RMM-111



Betacam SX Video Cassette (Small)
**BCT-12SXA/22SXA/
32SXA/62SXA**



Betacam SX Video Cassette (Large)
**BCT-64SXLA/94SXLA/
124SXLA/184SXLA/194SXLA**



Cleaning Cassette
BCT-5CLN



Remote Cable
RCC-5G/10G/30G



Video Process Controller
BVR-50



Remote Controller
BVR-3



Dynamic Motion Controller
DTR-3000



Carrying Case (Hard)
LC-DN220



Rechargeable Lithium-ion Battery
BP-L60A/L90A



Rechargeable Nickel Metal Hydride Battery
BP-M50/M100



Battery Charger
BC-L120



Battery Charger
BC-M50



AC Adaptor
AC-550/550CE



AC Adaptor
AC-DN2B



Carrying Case (for Camcorder)
LC-DN7



Remote Controller
RM-P9



Camera Control Unit
CCU-550A/550AP



Return Video Selector
CAC-6



Viewfinder Rotation Bracket
BKW-401



Slot-in Wireless Receiver
WRR-855A/855B



Dual Diversity Wireless Receiver*
WRR-862A*/862B
*An optional mounting bracket is
required.



Camera Adaptor
CA-701



Camera Adaptor
CA-702/702P



Camera Adaptor
CA-755/755P

Specifications

		DNW-7/7P		DNW-9WS/9WSP		DNW-90/90P		DNW-90WS/90WSP	
				16:9 MODE	4:3 MODE			16:9 MODE	4:3 MODE
General									
Weight		Approx. 8 lb 13 oz (4.0 kg)							
Operating mass		Approx. 13 lb 3 oz (6.0 kg)							
Power requirements		DC 12 V +5.0 V/-1.0 V							
Power consumption		29 W	31.5 W		31 W		32 W		
Operating temperature		0 °C to +40 °C (+32 °F to +104 °F)							
Storage temperature		-20 °C to +60 °C (-4 °F to +140 °F)							
Humidity		25 to 85% (relative humidity)							
Continuous operating time		With BP-L60A Approx. 120 (NTSC)/135 (PAL) min	With BP-L90A Approx. 165 (NTSC)/205 (PAL) min		Approx. 110 (NTSC)/125 (PAL) min		Approx. 165 (NTSC)/190 (PAL) min		
Signal inputs		Genlock video input		BNC (x1), 1.0 Vp-p, 75 Ω		Time code input		BNC (x1), 0.5 to 18 Vp-p, 10 kΩ	
		Audio (CH-1/2)/Mic input		XLR-3-31 type (x2), -60 dBu/+4 dBu selectable, high impedance, balanced					
Signal outputs		Video output		BNC (x1), 1.0 Vp-p, 75 Ω, sync negative					
		Test output		BNC (x1), 1.0 Vp-p, 75 Ω, sync negative					
		Time code output		BNC (x1), 1.0 Vp-p, 75 Ω					
		Earphone		Mini-jack					
		Audio output		XLR 5-pin male (stereo)					
Other inputs/outputs		Lens		12-pin					
		Remote		6-pin					
		Light		2-pin, DC 12 V, max. 30 W					
		DC input		XLR 4-pin (for the optional AC-550/550CE)					
		DC output		4-pin (for wireless microphone receiver), DC 12 V					
VTR section									
General		Recording format							
		Betacam SX							
		Tape speed							
		59.515 mm/s (NTSC)/59.575 mm/s (PAL)							
		Playback/Recording time							
		Max. 62 min with BCT-62SXA cassette							
		Fast forward time							
		Approx. 5 min with BCT-62SXA							
		Rewind time							
		Approx. 5 min with BCT-62SXA							
		Recommended tape							
		Sony Betacam SX cassette (BCT-SXA series)							
		Sony Betacam SP cassette (BCT-MA series/UVWT-MA series)							
		Sampling frequency							
		Y: 13.5 MHz, R-Y/B-Y: 6.75 MHz							
		Quantization							
		8 bits/sample							
		Error correction							
		Reed-Solomon code							
Video performance		K-factor (2T pulse)							
		1% or less							
		Y/R-Y/B-Y delay							
		15 ns or less							
Digital audio performance		Sampling frequency							
		48 kHz (synchronized with video)							
		Quantization							
		16 bits/sample							
		Frequency response							
		20 Hz to 20 kHz +0.5 dB/-1.0 dB							
		Dynamic range (emphasis ON)							
		More than 85 dB							
		Distortion (at 1kHz, emphasis ON, reference level)							
		Less than 0.08%							
		Cross talk (at 1kHz, reference level)							
		Less than -70 dB							
		Wow & flutter							
		Below measurable limit							
		Head room							
		20 dB							
		Emphasis (ON/OFF selectable)							
		T1 = 50 μs, T2 = 15 μs							
* The specifications given above were measured by CA-701, Camera Adaptor.									
Camera section									
Camera		Pickup device		3-chip 2/3-inch type Power HAD 1000 IT CCD		3-chip 2/3-inch type Power HAD 1000 16:9/4:3 Widescreen IT CCD		3-chip 2/3-inch type Power HAD 1000 FIT CCD	
		Picture elements		NTSC: 811 (H) x 508 (V) PAL: 795 (H) x 596 (V)		NTSC: 1038 (H) x 504 (V) PAL: 1038 (H) x 594 (V)			
		Optical system		F1.4 prism system					
		Built-in filters		1: CLEAR 2:5600 K+1/8 ND 3:5600 K 4:5600 K+1/64 ND					
		Shutter speed		NTSC: 1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s) PAL: 1/60, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)					
		Gain		-3, 0, +3, +6, +9, +12, +18, +24, +30, +36, +42 dB (select in camera set up menu for L/M/H/TURBO)					
		Clear scan		NTSC		CLS:60.3 to 10156 Hz (260 steps)		CLS:60.1 to 7000 Hz (260 steps)	
				PAL		CLS:50.0 to 10101 Hz (312 steps)		CLS:50.2 to 9000 Hz (310 steps)	
		Lens mount		Special bayonet mount					
		Sensitivity (2000 lx, 89.9% reflective)		F10		F9			
		Minimum illumination		Approx. 0.3 lx (F1.4 lens, +42 dB Turbo Gain)		Approx. 0.35 lx (F1.4 lens, +42 dB Turbo Gain)			
		Video S/N ratio (typical)		63 dB (NTSC)/61 dB (PAL)					
		Vertical resolution		NTSC: (without EVS) 400 TV lines, (with EVS) 450 TV lines PAL: (without EVS) 480 TV lines, (with EVS) 530 TV lines					
		Registration		0.05% (all zones, without lens)					
		Geometric distortion		Below measurable level (without lens)					
		Warm-up time		2 s					
		Modulation depth at 5 MHz		60% (Typical)		70% (Typical)		55% (Typical)	
				70% (Typical)		55% (Typical)		70% (Typical)	
				55% (Typical)		70% (Typical)		55% (Typical)	
Viewfinder		CRT		1.5-inch monochrome		2-inch monochrome		1.5-inch monochrome	
		Controls		BRIGHT control, CONTRAST control, PEAKING control, TALLY, ZEBRA, DISPLAY switches					
		Horizontal resolution		600 TV lines		450 TV lines		600 TV lines	
		Microphone		Ultra-directional (detachable)					
Supplied accessories		Shoulder Belt (1), Microphone (1), XLR Cap (4), Maintenance Manual Part 1 (1), Operation Manual (1)							
Optional accessories (see page 12, for detail)		BP-L90A/L60A Battery, BP-M50/M100 Battery, BC-L120 Battery Charger, BC-M50 Battery Charger, AC-DN2B AC adaptor, AC-550/550CE AC Adaptor, WRR-855A/855B Slot-in Wireless Receiver, WRR-862A/862B Dual Diversity Wireless Receiver*, RM-P9 Remote Control Unit, CCU-550A/550AP Camera Control Unit, CA-701, CA-702/702P, CA-755 Camera Adaptors, CAC-6 Return Video Selector, BKW-401 Viewfinder Rotation Bracket, LC-DN7 Carrying Case, BCT-5CLN Cleaning Cassette, BCT-12SXA/22SXA/32SXA/62SXA Betacam SX Cassette							
*An optional mounting bracket is required to mount a WRR-862A/862B onto a camcorder.									

Specifications

	DNW-A75/A75P Editing Recorder	DNW-75/75P Editing Recorder	DNW-A65/A65P Editing Player
General			
Power requirements	AC 100 V to 240 V, 50/60 Hz		
Power consumption	215 VA	184 VA	195 VA
Operating temperature	+41°F to +104°F (+5°C to +40°C)		
Storage temperature	-4°F to +140°F (-20°C to +60°C)		
Humidity	25 to 80% (relative humidity)		
Weight	62 lb 13 oz (28.5 kg)	58 lb 13 oz (26.7 kg)	61 lb 10 oz (28 kg)
Dimensions (W x H x D)	16 7/8 x 9 3/8 x 20 3/4 inches (427 x 237 x 524 mm)		
Tape speed	Betacam SX Betacam/Betacam SP		
	118.6 mm/s (DNW-A75)/ 101.5 mm/s (DNW-A75P)	59.515 mm/s (525 mode), 59.575 mm/s (625 mode)	- 118.6 mm/s (DNW-A65)/ 101.5 mm/s (DNW-65P)
Digital playback time	Max. 194 min with BCT-194SXLA cassette		
Fast forward/rewind time	Approx. 3 min with BCT-194SXLA cassette		
Search speed range	Betacam SX Betacam/Betacam SP		
	±78 times normal playback speed		
Servo lock time	±35 (NTSC)/42 (PAL) times normal playback speed (except for DNW-A75/A75P)		
Load/unload time	0.5 s or less (from standby on)		
Input/output signals	6 s or less		
Analog composite input	BNC (x1 with active through out), 1.0 Vp-p, 75 Ω, sync negative		-
Analog composite output	BNC (x3, including one character out), 1.0 Vp-p, 75 Ω, sync negative		
Analog component input	BNC (x3 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 (x3 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 (x2, including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mb/s		-
SDI output	BNC (x3, including one active through out), SMPTE 259M (ITU-R BT.656-3), 270 Mb/s		
SDTI-CP output (option)	BNC (x2), Max. x2 speed SMPTE 326M		
Analog audio input	XLR (x4, CH1/2/3/4)		-
Analog audio output	XLR (x4, CH1/2/3/4)		
Headphone output	Standard jack (x1), stereo		
Analog audio monitor output (L/R)	XLR (x2)		
Digital audio input (CH1/2, 3/4)	BNC (x2), AES/EBU		-
Digital audio output (CH1/2, 3/4)	BNC (x2), AES/EBU		
Remote control	Remote		
	D-sub 9-pin (x2, IN/OUT), Sony 9-pin remote interface		
	RS-232C		
	D-sub 9-pin (x1), RS-232C interface		
	Video Process		
	D-sub 15-pin (x1)		
	Connector for Control Panel		
	Mini D-sub 29-pin (x1)		
	Parallel Remote		
	50-pin (x1)		
Reference input	BNC (x1), 0.3 Vp-p, 75 Ω, sync negative (with loop through out)		-
Time code input	XLR (x1)		-
Time code output	XLR (x1)		
Processor adjustment range			
Video level	±3 dB/∞ to +3 dB selectable		
Chroma level	±3 dB/∞ to +3 dB selectable		
Setup/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)	-	±100 ns (Betacam/Betacam SP playback only)
Digital video performance			
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 analog component output	K-factor (2T pulse): 1% or less		-
Analog component recording playback	Input A/D quantization: 10 bits/sample K-factor (2T pulse): 1% or less LF non-linearity: 3.0% or less		
Analog composite recording playback	Differential gain: 2% or less Differential phase: 2° or less YC delay: 20 ns or less K-factor (2T pulse): 1% or less		
Digital audio performance			
Sampling frequency	48 kHz (synchronized with video)		
Quantization	16 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	PSW 4 x 16 Rack Mount Screw (x4), Operation manual (x1), Maintenance manual (x1)		
Optional accessories (see page 12, for each item)	BVR-50 Video Process Controller, DTR-3000 Dynamic Motion Controller, BKNW-121 Control Panel Case, BKNW-122 Control Panel Extension Kit, BKNW-124 SDTI-CP Output Board, RMM-111 Rack Mount Kit, BCT-125XA/225XA/325XA/625XA Betacam SX Cassette (Small), BCT-645XLA/945XLA/1245XLA/1845XLA/1945XLA Betacam SX Cassette (Large), BCT-5CLN Cleaning Cassette, RCC-5G/10G/30G Remote Cable, Maintenance Manual (Part 2)		

	DNW-A28/A28P Portable Recorder	DNW-A25WS/A25WSP Portable Recorder	J-1/901 (analog component output) Compact Player	J-1/902 (SDI output) Compact Player
General				
Power requirements	DC 12 V		AC 100 to 240 V, 50/60 Hz	
Power consumption	58 W	65 W	50 W	
Operating temperature	+32°F to +104°F (0°C to +40°C)		+5°C to +40°C (+41°F to +104°F)	
Storage temperature	-4°F to +140°F (-20°C to +60°C)		-20°C to +60°C (-4°F to +140°F)	
Humidity	25 to 80% (relative humidity)		25 to 80% (relative humidity)	
Weight	12 lb. 12 oz (5.8 kg)	14 lb 5 oz (6.5 kg)	7 kg (15 lb 7 oz)	
Dimensions (W x H x D)	8 3/8 x 5 1/4 x 18 inches (210 x 132 x 455 mm)	8 3/8 x 5 7/8 x 18 1/2 inches (211 x 149 x 467 mm)	307 x 100 x 397 mm (12 1/8 x 4 x 15 3/4 inches)	
Tape speed	Betacam SX Betacam/Betacam SP	59.515 mm/s (525 mode), 59.575 mm/s (625 mode) 118.6 mm/s (NTSC)/101.5 mm/s (PAL)	59.515 mm/s (525 mode), 59.575 mm/s (625 mode) 118.6 mm/s (525 mode), 101.5 mm/s (625 mode)	
Digital playback/recording time	Max. 62 min with BCT-62SXA cassette		Max. 194 min playback with BCT-194SXA cassette	
Fast forward/rewind time	Approx. 3 min with BCT-62SXA cassette		Approx. 5 min with BCT-184SXA cassette	
Search speed range	Betacam SX Betacam/Betacam SP	±24 times normal playback speed ±10 times normal playback speed	±35 times normal playback speed ±18 times normal playback speed	
Servo lock time	0.5 s or less (from standby on)		0.5 s or less (from standby on)	
Load/unload time	6 s or less		6 s or less	
Input/output signals				
Analog composite input	BNC (x1), 1.0 Vp-p, 75 Ω, sync negative		-	
Analog composite output	BNC (x2, including one character out), sync negative		BNC (x1), Pin Jack (x1), 1.0 Vp-p, 75 Ω	
Analog component output	-		BNC (x3) -	
SDI input	BNC (x1), SMPTE 259M (ITU-R BT.656-3) 270 Mb/s		-	
SDI output	BNC (x2), SMPTE 259M (ITU-R BT.656-3) 270 Mb/s		- BNC (x1), SMPTE 259M (ITU-R BT.656-3) 270 Mb/s	
S-Video output	-		Mini DIN 4-pin (x1)	
Analog audio input	XLR (x2, CH1/2)		-	
Analog audio output	XLR (x2, CH1/2)		-	
Analog monitor output	XLR (x2, L/R)		XLR (x2), Pin Jack (x1)	
Headphone output	Standard jack (x1), stereo		JM-60 Stereo Phone Jack (x1)	
Remote control	Remote Aux	D-sub 9-pin (x1), Sony 9-pin remote interface 6-pin (x1, for maintenance)	RS-422A (x1, female), RS-232C (x1)	
Reference input	BNC (x1), 0.3 Vp-p, 75 Ω, sync negative (with loop through out)		External sync (BNC)	
Time code input	BNC (x1)		-	
Time code output	BNC (x1)		-	
Processor adjustment range				
Video level	±3 dB/-∞ to +3 dB selectable		-	
Chroma level	±3 dB/-∞ to +3 dB selectable		-	
Setup/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)		-	
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		-	
Analog composite recording playback	Differential gain: 2% or less Differential phase: 2° or less YC delay: 15 ns or less K-factor (2T pulse): 1.5% or less		-	
Digital audio performance				
Sampling frequency	48 kHz (synchronized with video)		-	
Quantization	16 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 88 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		-	
Others				
LCD Monitor	Display method	-	Active matrix transmission	
	Size	-	6.4 inches x 1	
	Picture elements	-	640 x 480 x 3 pixels	
	Luminance/brightness	-	Adjustable by knob	
Built-in speakers	-	-	x 1, monaural	
Display	-	-	Counter, Servo Lock, Tape Remain, Battery Remain, etc.	
Audio level meter	-	-	Ch 1, Ch 2 (Indication of Ch 3,4 is also available by switch)	
Supplied accessories				
	Operation manual (x1), Installation manual (x1)	Operation manual (x1), Installation manual (x1), Shoulder belt (x1)	Operation manual (CD-ROM)(x1), Vertical stand (x1), Quick operation guide (x1)	
Optional accessories (see page 12, for each item)				
	DTR-3000 Dynamic Motion Controller, BVR-3 Remote Controller, AC-550/550CE AC Adaptor, BCT-12SXA/22SXA/32SXA/60SXA/62SXA Betacam SX Cassette (Small), BCT-5CLN Cleaning Cassette *Only for DNW-A25WS/A25WSP BC-M50 Battery Charger, BC-L120 Battery Charger, BP-M50/M100 Nickel Metal Hydride Battery, BP-L60A/L90A Lithium-ion Battery, BKNW-225 Docking Kit, LC-DN220 Carrying Case (Hard)		-	

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