

SONY®

NTSC

BETACAM SX™

Betacam SX™ Camcorder

DNW-7/9WS/90/90WS



The Digital Camcorders for superior System Performance

Sony Betacam® and Betacam SP® camcorders set the international standard for workhorse field acquisition equipment: excellent picture quality, reliable performance and compact design allowing a generation of ENG and EFP crews to more creatively shoot on location.

Today, digital technology is bringing revolutionary changes and advantages to the broadcast industry. Computerized non-linear editing and digital signal compression have radically increased studio editing power—and transmission speed, networking interface and hard disk storage capacity are becoming critical new innovations in newsroom, post production and broadcast operations. New all-digital acquisition tools are needed to realize the full potential of the digital revolution. Sony has the solution: Betacam SX™ digital camcorders.

The digital recording format used in Betacam SX camcorders is based on MPEG2 4:2:2 Profile at Main Level that maintains digital component broadcast-quality pictures from camera through post production and On-air playback.

The Betacam SX camcorder range offers an unprecedented combination of advantages for ENG and EFP applications. In size and weight, it is exceptionally compact—incorporating a built-in Color Playback capability, optional Slot-in Wireless Microphone Receiver and Internal Light System to improve mobility and lighten the load of crews working in the field.

Sony Betacam SX camcorders are designed to add important digital acquisition benefits to the news acquisition process, where saving time is critically important. In performance, reliability and portability, these new camcorders draw on the proven experience of Sony to bring superior digital advantages to ENG and EFP applications.



Betacam SX Format

The Betacam SX format represents the next generation of Betacam technology, drawing on Sony's long experience of serving the ever-changing, real-world needs of the broadcast community. It combines the proven performance of 1/2-inch analog Betacam SP format with the digital technology leadership of the D-1, D-2 and Digital Betacam® formats.

Broadcast Picture Quality with MPEG2 4:2:2 Profile at Main Level

The Betacam SX format records 8-bit, 4:2:2 component digital signals using an advanced compression algorithm. Betacam SX recordings maintain high-quality pictures with virtually no visible artifacts, at a compression ratio of 10:1 that allows cost-effective digital non-linear editing and archival storage.

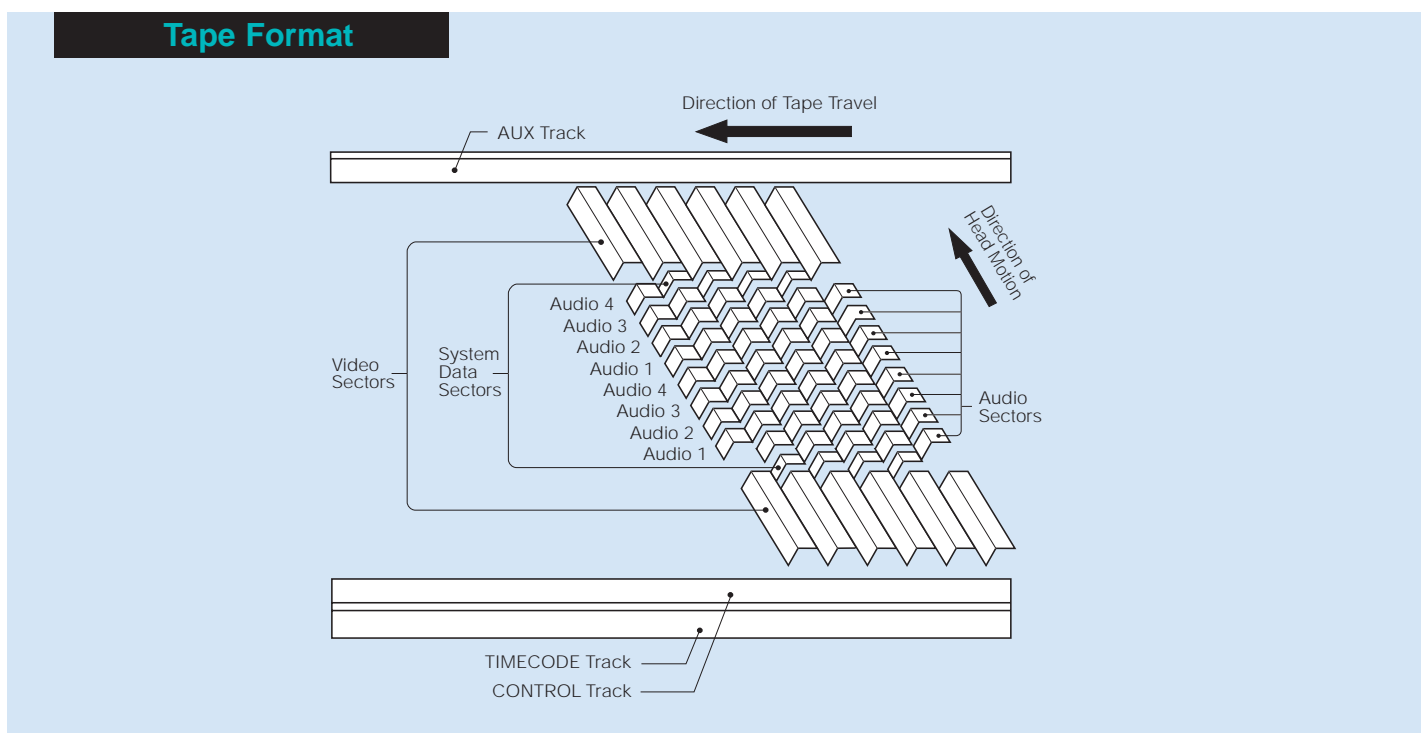
The Betacam SX format also preserves 507 active lines per frame along with vertical blanking signal information. The Betacam SX recording format yields superior picture quality, with excellent luminance detail and improved color resolution. Its 10:1 compression ratio allows either high-speed transmission or simultaneous 2-channel transmission of different video source signals within a limited band width, resulting in reduced transmission fees and facilitating the use of contribution links at a reasonable cost.

General	Tape width	12.65mm (1/2 inch)
	Tape material	Metal particle tape
	Recording/playing time	Max. 60 min. with S-cassette
	Tape speed	59.575mm/s
	Track pitch	32µm
	Tracks per frame	10 (525/60), 12 (625/50)
	Longitudinal tracks	Time code / Control / Aux
	Video ancillary data	1 line/field
	Extension data	20 byte/frame
Video	Compression	MPEG2 4:2:2P@ML
	Compression ratio	Approx. 10:1
	Active lines per frame	507 lines (525/60), 608 lines (625/50)
	Sampling frequency	Y: 13.5MHz R-Y/B-Y: 6.75MHz
	Quantization	8 bits/sample
Audio	Compression	None
	Sampling frequency	48kHz
	Quantization	16 bits/sample
	Channels	4

Betacam SX in Action: the Robust Tape Format

The robust tape format of Betacam SX records 8-bit, 4:2:2 component digital video signals and supports four channels of 16-bit/48kHz digital audio. Its powerful ECC (Error Correction Code) automatically compensates for

off-tape data errors caused by burst errors during recording and playback. This ensures virtually dropout-free acquisition of important program material.



Playback Capability of Analog

Betacam and Betacam SP Formats

The Betacam SX format is designed to provide playback capability of tapes made on/for current analog systems. This capability provides a logical, cost-efficient migration path towards a totally digital environment.

Analog Playback Capability

The 1/2-inch tape size used by Betacam SX format is the same size 1/2 inch cassette as current Betacam and Betacam SP equipment, giving Betacam SX playback capability of analog Betacam and Betacam SP recordings made on oxide or metal tape. Using advanced Hybrid Recorders that combine video tape transports with hard disk drive flexibility, the Betacam SX system allows analog Betacam and Betacam SP archive material to be accessed and digitized for non-linear editing.

Wide Range of Recording Media

Current BCT-MA and UVWT Series Betacam SP metal tape cassettes can be used for Betacam SX recording, assuring wide availability of recording media. For superior digital performance at reduced cost, a new metal particle tape has also been developed for Betacam SX recording.

VTR Tape	Betacam		Betacam SP		Betacam SX	
	REC	PB	REC	PB	REC	PB
Betacam	yes	yes	yes	yes	no	yes
Betacam SP (oxide)	no	yes*	yes	yes	no	yes
Betacam SP (metal)	no	no	yes	yes	yes	yes
Betacam SX (metal)	no	no	no	no	yes	yes

*Modification kit is required.

Analog and Digital Interfaces

Betacam SX products provide both analog and digital interfaces, allowing new digital products to integrate with analog systems in the studio and in the field.

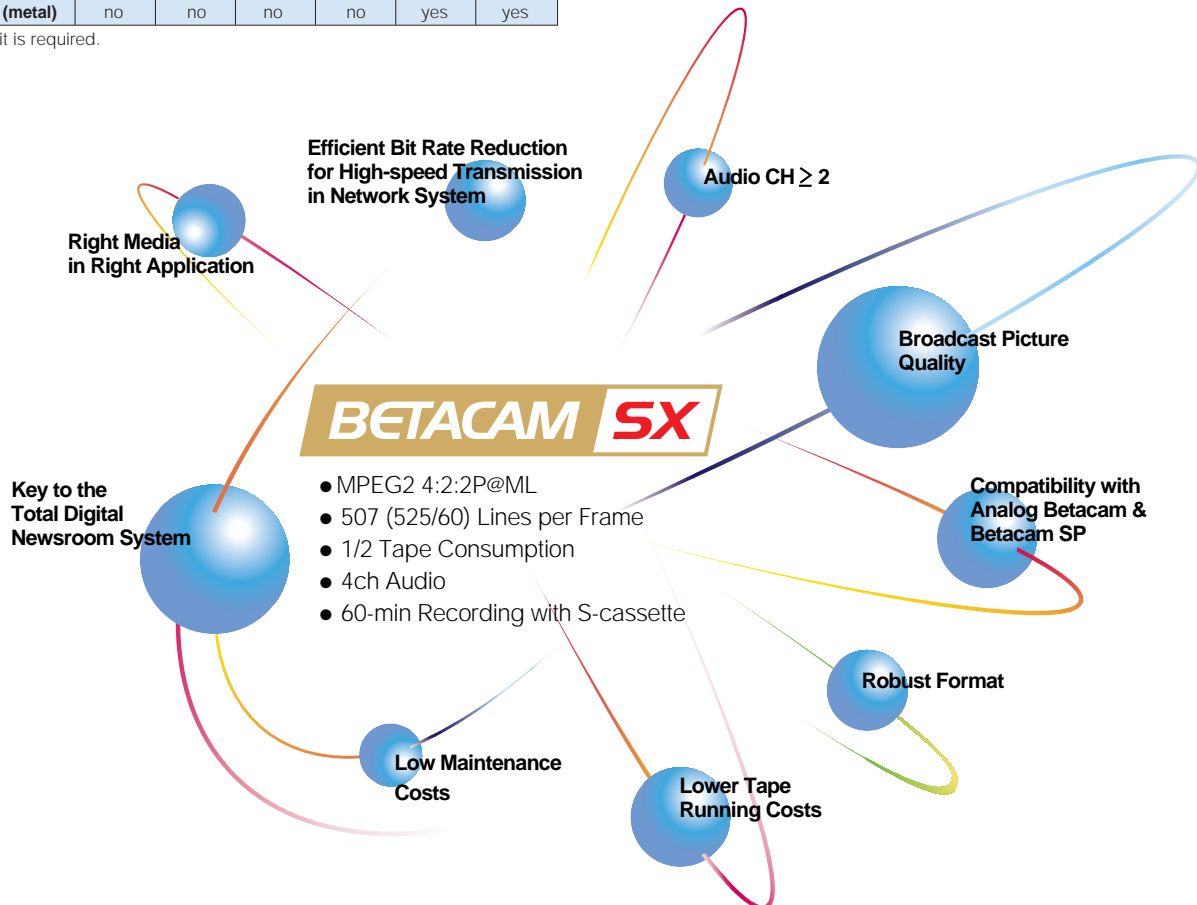
The Cost Efficiencies of Betacam SX Products

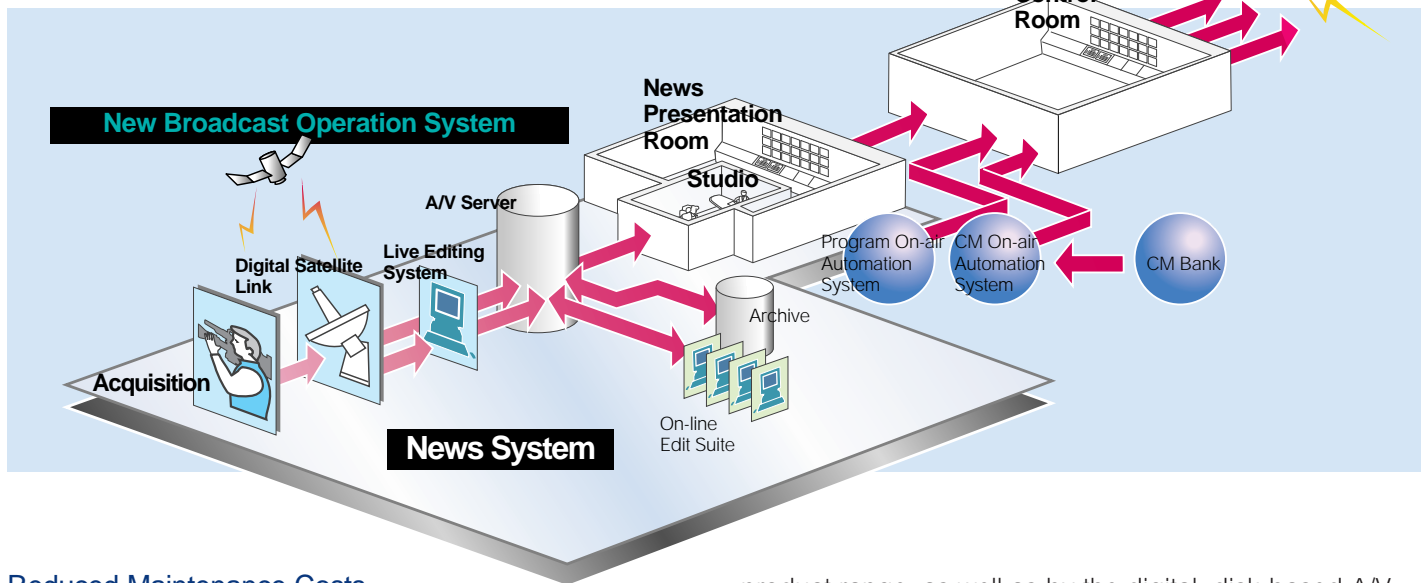
Betacam SX equipment is designed to deliver unsurpassed digital picture and sound performance—and also to achieve—significant long-term saving in both media and hardware costs, compared to previous generations analog VTRs.

Lower Tape Running Costs

The advanced signal compression technology of the Betacam SX format has brought the important advantage of longer tape recording times: up to 60 minutes on a single S-cassette.

Powerful error correction capability means Betacam SX can handle a high bit-rate signal within narrow tracks, allowing the development of low-cost, high-quality Betacam SX tape. Compared to conventional Betacam SP tapes, tape consumption can actually be reduced by one-half. ENG acquisition and archival tape costs will be significantly reduced, while superior picture quality is maintained.





Reduced Maintenance Costs

Betacam SX equipment also incorporates an Automatic Alignment System that maximizes accurate tape recording and reproduction of digital data. An Automatic RF Equalizer optimizes the gain and phase of off-tape RF signals. These automatic systems minimize the need for time-consuming manual equalization and servo system adjustments, which can lower maintenance costs.

Betacam SX: The Key to the Digital Newsroom

Betacam SX format is Sony's key approach to the digital newsroom. The compression has been carefully designed to maintain high picture quality during every phase of end-to-end broadcast news operations, from camera through post production and On-air playback. The compression algorithm of MPEG2 4:2:2 Profile at Main Level is universally employed within the full Betacam SX

product range, as well as by the digital, disk-based A/V Servers in the Sony system. This means that throughout the total newsroom system, no encoding/decoding is needed, so picture quality is not compromised.

The Right Media in the Right Application

Sony expertise in every aspect of video technology has led to careful evaluation of the running costs, recording times, mobility factors, and industry-wide compatibility of both tape and disk media. In the Betacam SX system, tape is employed for camcorder applications where low running costs, longer recording time, physical robustness, and higher mobility are required—and disk media is used for in-house applications where high-speed random access and non-linear operations are mandated. As part of a total system approach, Sony Betacam SX camcorders bring the acquisition process into the digital age. They are designed to let you move ahead today—without compromising the full functionality and cost efficiency that are needed in tomorrow's digital world.



The Betacam SX Camcorder Line-up

The Betacam SX line-up includes the DNW-7, 9WS, 90 and 90WS camcorders.

DNW-7: This Betacam SX camcorder is equipped with 2/3-inch 400K Power HAD™ 1000 IT CCDs. It incorporates 10-bit/28MHz full digital signal processing in the camera section and Betacam SX digital recording in the VTR section. The DNW-7 brings cost-effective, fully digital operation to day to day ENG acquisition assignments and EFP shooting applications.



DNW-9WS: This Betacam SX camcorder is switchable between 4:3 standard and 16:9 widescreen ratios. It is equipped with 2/3-inch 520K switchable 16:9/4:3 Widescreen Power HAD 1000 IT CCDs. It incorporates 10-bit/36MHz full digital signal processing in the camera section and Betacam SX digital recording in the VTR section. The DNW-9WS is the newest member of the line-up of Betacam SX camcorders. Its high technology design provides an excellent cost performance ratio.



DNW-90: This Betacam SX camcorder is equipped with 2/3-inch 520K Power HAD 1000 FIT CCDs. It incorporates 10-bit/36MHz full digital signal processing in the camera section and Betacam SX digital recording in the VTR section. Its superior low-light shooting capability and spectacular digital image quality make it the high-performance choice for both high-end ENG and EFP shooting situations.



DNW-90WS: This Betacam SX camcorder is switchable between 4:3 standard and 16:9 widescreen ratios. It is equipped with 2/3-inch 520K switchable 16:9/4:3 Widescreen Power HAD 1000 FIT CCDs. The DNW-90WS gives superior-quality digital recording in both screen aspect ratios, and makes it easy to bridge the transition from 4:3 world to the growing world of widescreen 16:9.



* Lens, light, battery and WRR-855A are options.

** Lens with 'shrinker' function are recommended for the WS model.

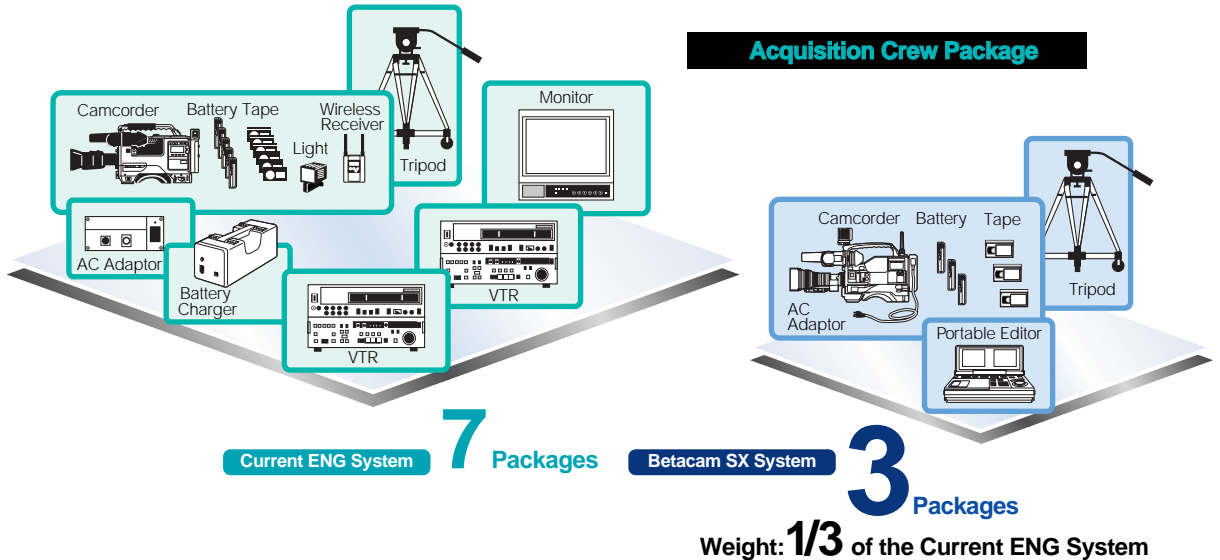
Compact and Lightweight Design, Approximately 6kg

Betacam SX camcorders are designed to bring both superior digital performance and high mobility to single camcorder operations in the field, even when shooting under difficult conditions. The smaller recording head drum developed by Sony has made possible a design more compact than conventional analog Betacam SP camcorders, with a shorter overall length and lower center of gravity for excellent balance.

The DNW-7/9WS/90/90WS weighs approximately 6kg. (13 lb. 3 oz.) including battery, tape and lens.

Reduced Weight and Fewer Elements in the Total Crew Package

Betacam SX camcorders are not only smaller and lighter, they also achieve further reductions in the total shooting system needed by news acquisition crews. Betacam SX camcorders provide full-color playback without an external adapter—and a recording time of up to 60 minutes on a single S-cassette, so fewer tapes are required. They can incorporate an optional Slot-in Wireless Microphone Receiver and Internal Light System, even further saving on the equipment load that must be carried in the field.



Longer Recording Time, Up to 60 Minutes on a Single Cassette

Betacam SX camcorders combine the performance of digital recording with the convenience of an efficient data-handling format that allows up to 60 minutes of recording on a single 1/2-inch S-cassette. Compared to conventional analog Betacam SP equipment, Betacam SX camcorders can reduce tape consumption by half.

<Tape Recording Time List>

Models	Betacam SP Recording Time (min)	Betacam SX Recording Time (min)
BCT-5MA	6	12
BCT-10MA	12	22
BCT-20MA	24	42
BCT-30MA	36	62
UVWT-10MA	12	22
UVWT-20MA	24	42
UVWT-30MA	36	62
BCT-12SX	-	12
BCT-22SX	-	22
BCT-32SX	-	32
BCT-60SX	-	60

Use of Current Metal Particle Tape

Conventional Betacam SP metal particle tape (BCT-MA/UVWT) can be used in Betacam SX camcorders. With Betacam SX camcorders, recording time is double the stated duration of the tape.



Features

16:9/4:3 Switchable (DNW-9WS/90WS)

The DNW-9WS and the DNW-90WS are equipped with 2/3-inch 520K switchable 16:9/4:3 Widescreen Power HAD 1000 CCDs. They offer superior quality digital recording in both aspect ratios.

Wide Selection of Viewfinders

The DNW-7 and DNW-90 are equipped with a lightweight 1.5-inch monochrome viewfinder; the DNW-9WS and the DNW-90WS come with a wide 2-inch monochrome viewfinder, allowing easy focusing even in 16:9 widescreen mode. There is also an optional 1.35-inch color viewfinder available, the BVF-VC10W. Using this color viewfinder allows color playback through the camcorder viewfinder, as Betacam SX camcorders do not require an external



BVF-VC10W

adapter. And when shooting with the BVF-VC10W, color objects are more clearly identifiable.

Comprehensive Menu Control

Setup parameters are well organized in a two-layer menu system, categorized as User Menus and Engineer Menus. User Menus allow access to only the standard setup functions needed by operators. Engineer Menus allow access to all camcorder setup functions. Menu pages are visible in the camcorder viewfinder and may also be displayed on a monitor screen through the video outputs. The setup control system is easily operated using a rotary switch on the camcorder.



Precision Audio Level Adjustment

The audio level of the front microphone can be easily and precisely adjusted by using the rotary switch located under the lens tele-converter of the camcorder. Positioning the rotary switch in this location helps to prevent an operator's hands from accidentally touching the lens or entering the frame.

Setup Card for Uniform Camcorder Settings

The Betacam SX camcorder family allows a large number of setup parameters to be stored on a removable Setup Card. These setup cards allow operators to set up camcorders more quickly, easily and accurately in the field. Several different camcorder settings can be stored on Setup Cards prepared in the studio. Setup Cards also aid in matching the setup of multiple camcorders, when shooting in several remote locations or when time passes between shooting assignments on a single story or production.



Low Acoustic Noise

A sophisticated noise barrier is incorporated in the VTR section to reduce acoustic emission and to prevent transport noise pickup by the onboard microphone during shooting.

Color Filters

Betacam SX camcorders are equipped with four types of color filter: 3200K, 5600K + 1/8ND, 5600K and 5600K + 1/64ND.



Turbo Gain: High Sensitivity

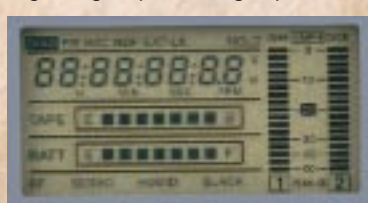
The Turbo Gain function of Betacam SX camcorders quickly raises the gain level to +42 dB at the touch of a button on the side of the camcorder, allowing immediate exposure in extremely low light conditions. By combining DPR Plus (Dual Pixel Readout Plus) technology with a conventional electronic gain-up function, a high signal-to-noise ratio is obtained with only a small loss of resolution in the Turbo Gain mode. The maximum gain level of the Turbo Gain mode is +36 dB/+42 dB selectable.



*DPR Plus: A technology that can increase sensitivity by a factor of four times normal sensitivity by reading out an electric charge of four adjacent CCD pixels.

Diagnostic Information for Easy Maintenance

The DNW-7/9WS/90/90WS models incorporate a sophisticated diagnostic system to detect malfunctions within the camcorder.



Digital signal processing improves the ability to specify the precise location and nature of a fault; camera faults are indicated by warning lights in the viewfinder, and VTR faults are indicated on the camcorder LCD display.



TruEye™ Process

In conventional RGB analog digital processing, some non-linear signal processing occurs after gamma correction, such as knee and white clip. This can result in hue errors—a phenomenon that is particularly obvious in extreme highlight conditions. This significant problem is virtually eliminated by the TruEye process which manages video signal data according to three factors: Brightness, hue and saturation, so that color reproduction, even with very wide dynamic ranges can approach the faithfulness of the human eye. With TruEye processing active, the factory preset value of the knee point (in case of DCC OFF mode) is shifted from 98% to 85% for more faithful reproduction.



DynaLatitude™

Based on a TruEye system, the Betacam SX camcorders further offer a unique new feature called DynaLatitude Function that adaptively manages the contrast of each pixel according to a histogram of video signal level distribution. DynaLatitude brings a new dimension to the technology of Dynamic Contrast Control (DCC), that controls the extensive range of video signals. DynaLatitude optimizes video level distribution to expand the limited contrast range of video signals. DynaLatitude is switchable in four steps: LOW, MID, HIGH and OFF—via a menu control system and a graphic display in the viewfinder.



Auto Tracing White Balance (ATW)

DNW-7/9WS/90/90WS camcorders are all equipped with Auto Tracing White Balance (ATW) capability, which enables automatic adjustment of white balance according to the overall scene lighting conditions. When lighting conditions change quickly—for example, moving from indoors to outdoors—white balance is rapidly readjusted with this ATW function.



Comprehensive LCD Display

The extensive LCD displays on Betacam SX camcorders provide critical information on VTR operating status. Time code, CTL and User-bit data, Tape Remaining and Battery Capacity are displayed via a bargraph meter. A digital audio peak meter allows precise adjustment of audio recording level.



Stereo Audio Line Output (5-pin XLR)



The 5-pin XLR connector on Betacam SX camcorders carries two audio output channels. Either CH-1/2 or CH-3/4 can be selected through the VTR menu.

User-Friendly Controls

Betacam SX camcorders are carefully designed for simple operation. Switches are located in similar positions on both Betacam SX and Betacam SP camcorders, so operators accustomed to using Sony analog equipment will immediately find these new digital camcorders familiar and easy to use.

Fail-Safe Audio Recording

Through the VTR menu, four channels of audio can be assigned according to the user's needs. When Parallel mode is selected, the same signals are recorded by CH-1/CH-3 and CH-2/CH-4. In Separate mode, CH-3 automatically records the front microphone and CH-4 records the wireless microphone. This function ensures the microphone will not accidentally miss the audio recording; even if the external microphone is not connected. Audio from the front microphone and the output of the wireless microphone will still be captured on audio channels 3 and 4.

NEW AC Adaptor

The optional AC-DN1 AC Adapter supplies power directly to Betacam SX camcorders to provide uninterrupted shooting capability in situations such as special events or extended conference sessions. The AC-DN1 can also be used to charge the Lithium-Ion batteries in an emergency.



6-pin Remote Interface

Remote control of the basic functions and adjustments of Betacam SX camcorders can be accomplished by connecting the RM-B150 Remote Control Unit via a 6-pin remote interface.

TC REGEN Function

A time code regenerator is included with the DNW-7/9WS/90/90WS, providing continuous time code recording in the REGEN mode so time code editing can begin immediately after shooting.



Multiple Tally Functions

In addition to tally functions on the front and back of the camcorder, these new Betacam SX models have a camera tally on the viewfinder at the side of the eyepad, so the operator can see the tally even when looking into the viewfinder from a distance.

Superimposed Camera ID on Color Bars

For easy confirmation of which camcorder was used for an individual recording, a Camera ID can be superimposed on color bars. The Camera ID is set using the system control menu.

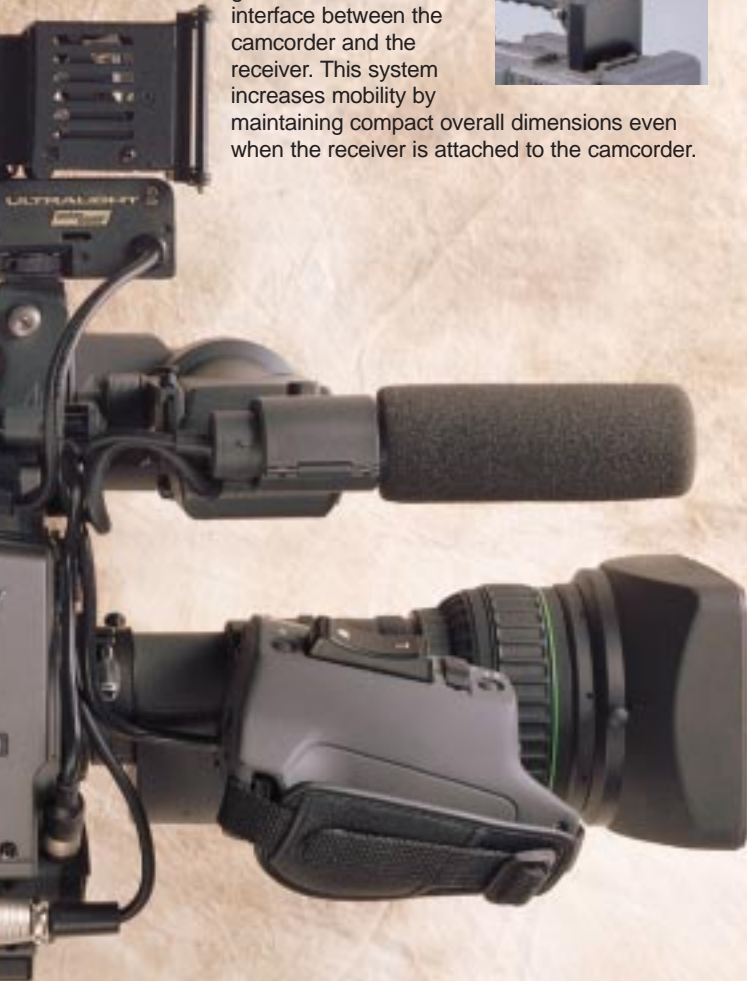


Test Output

The DNW-7/9WS/90/90WS all incorporate a test output port, providing composite video, red, green or blue signals for camera testing.

Slot-In Wireless Microphone Receiver (Built-in UHF Synthesizer Receiver Unit)

The optional WRR-855A Wireless Microphone Receiver can be fitted directly into all four Betacam SX camcorders using a slot-in mechanism that gives a cable less interface between the camcorder and the receiver. This system increases mobility by maintaining compact overall dimensions even when the receiver is attached to the camcorder.



Internal Light System

An optional Anton/Bauer® Ultralight® can be directly attached to the camcorder using a standard lighting connector and a specially designed very short cable. This internal light system can be powered from the camcorder's Lithium-Ion battery. Lighting on/off can be controlled manually or automatically synchronized with the REC. Start function of the camcorder.

*Anton/Bauer products may not be available in some countries.



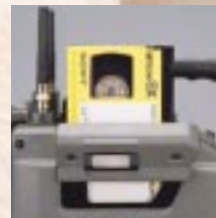
Lithium-Ion Battery

Lithium-Ion batteries provide higher capacity in a smaller, lighter size. Betacam SX camcorders will operate for more than two hours using a fully charged BP-L60/A Lithium-Ion Battery; using a BP-L90/A Lithium-Ion Battery, three hours of recording can be achieved. Lithium-Ion batteries can be attached directly to the camcorder using the V-shoe attachment, which facilitates quick, easy battery changes. With an optional adapter, current NP-1B and BP-90A Ni-Cd batteries can also be used, allowing users to take advantage of existing battery and charging equipment for greater system flexibility.



Redesigned Cassette Compartment

The cassette compartment does not pop up during cassette loading and ejecting, which helps to prevent damage to the cassette compartment mechanism. Cassettes are loaded vertically through a narrower entry that helps to keep out dust particles. The window on the cassette case has been repositioned, so it is easier for the operator to see how much tape remaining for recording.



Record/Review Function

Recordings can be quickly checked by pressing the RETURN button on the side of the lens while the camcorder is in the REC. Pause mode. The tape automatically rewinds for about two seconds, the end of the last scene will be played back, and the tape will stop precisely at its previous position. Pressing the RETURN button and holding it longer can extend the tape rewind time up to a maximum of approximately ten seconds.



Genlock Capability/Camera Return

Genlock capability is incorporated within the DNW-7/9WS/90/90WS, allowing these camcorders to be integrated in multi-camera systems. Camera Return video can also be accessed through the same connector.

Color Playback without External Adapters as well as Viewfinder Playback on Location

Betacam SX camcorders allow full color playback together with two audio channels without an external adapter, and makes it easy to verify recording results and send recordings to the studio via microwave transmission. Recordings can also be reviewed in the camcorder viewfinder while monitoring audio via an earphone or the speaker built in to the side of the camcorder.

Variable Speed Electronic Shutter



In order to capture clear images of high-speed moving subjects without motion blur, Betacam SX models have several shutter speeds available: 1/100, 1/125, 1/250, 1/500, 1/1000 and 1/2000 of a second.

Camcorder Performance Features in a Sony Betacam SX System

Data on Tape to Enhance the Edit Search Process

Betacam SX camcorders allow automatic or manual recording of shooting data on tape. Data such as Date, Time, Shot ID, Cassette Number and Shot Number can all be recorded during the shooting process. Shot Data can be used to retrieve material during editing.

Good Shot Marker and REC. Start Marker

Betacam SX camcorders provide an innovative function to speed the editing process which increases the ability to identify good takes while shooting in the field. A REC. Start Marker is automatically placed on the tape each time the VTR Start button is pressed while the VTR is in standby mode. A Good Shot Marker can be added at any time by pressing the RETURN button on the side of the lens while in recording mode.



When tapes are played back with DNW-A220/A225, these Digital Portable Editors can scan through the tape and detect all the REC. Start Markers and Good Shot Markers recorded on the tape. After detecting the markers, a list of all the markers

is displayed on the LCD screen, allowing easy cueing to any marker.

During the Play, Shuttle, Jog and Still, these portable editors can memorize additional markers called Virtual Shot Markers, entered by the operators. Using this list of markers, tedious searching process will be completely eliminated from tape-to-tape news editing.



Shot Marker List



Shot Marker Log

When tapes are copied onto DNW-A100/A50/A45 Digital Video Hybrid Recorders' built-in hard drive, these markers will appear highlighted as picture stamps on the GUI of the DNE-50/700 Digital News Editing System. Using picture stamps also helps to eliminate tedious searching from non-linear news editing and saves hard disk space by

downloading only the scenes selected by editors. This Shot Marker Handling functions of the Betacam SX helps to speed-up the newsroom operation.



CA-701 Camcorder Adapter

4-Channel Audio Input and SDI Output Capability

The optional CA-701 Camcorder Adapter can be attached to the DNW-7/9WS/90/90WS via the camcorder's built-in 40-pin connector, enabling simultaneous 4-channel audio recording by providing access to audio channels 3 and 4. In addition, two SDI outputs are provided, allowing direct connection to the other digital equipment via a single coaxial cable. Full component digital signals to standard ITU-R.601 are available.

General	Power requirements: Power consumption: Operating temperature: Storage temperature: Humidity: Mass: Dimensions (W/H/D):	Approx. DC 12V +5.0V/-1.0V Approx. 7W 0°C to +40°C (+32°F to +104°F) -20°C to +60°C (-4°F to +140°F) 25% to 85% (relative humidity) Approx. 1.0kg (2 lb 3 oz) 157x195x65mm (6 1/8x7 7/8x2 5/8 inches)
Connectors	AUDIO IN: AUDIO OUT: DC IN: DC OUT HEADPHONE: SDI OUT: CAMERA:	XLR-31 type (x2) XLR 5-pin male (stereo) XLR 4-pin male, 11 to 17V 4-pin, 11 to 17V, max. 0.1A Stereo standard phone jack BNC (x2), 0.8Vp-p, 75Ω 40-pin (DNW-7/9WS/90/90WS)
Supplied accessories	Operation manual (1) Maintenance manual (1)	



CA-702 Camcorder Adapter

External Input and Analog Component/SDI Output Capability

The optional CA-702 Camcorder Adapter can be attached to the DNW-7/9WS/90/90WS via a camcorder's built-in 40-pin connector. With this adapter fitted, the Betacam SX camcorders can record an external analog component signal and BNC output connector to feed a SDI signal to an external VTR. Through this connector, the camera signal can be recorded with a BWV-50 Betacam SP portable VTR or DVW-250 Digital Betacam portable VTR. This feature has many applications in field acquisition.

General	Power consumption: Mass: Dimensions (W/H/D):	MAX. 5.5W Approx. 0.9kg(2 lb) 165x195x65mm(6 1/2x7 7/8x2 5/8 inches)
Connectors	DC IN: DC OUT: SDI/Composite IN: SDI OUT: EARPHONE: VTR:	XLR 4-pin 4-pin BNC (x1) BNC (x1) Mini-jack CCZ 26-pin
Supplied accessories	Operation manual (1) Maintenance manual (1)	



CA-755 Camcorder Adapter

Studio Camera Integration with Triax System

The DNW-7/9WS/90/90WS can be easily integrated into a studio setup with other portable cameras using a Triax system. The optional CA-755 Camera Adapter can be directly attached via the built-in 40-pin connector; precise camera setup parameters such as gamma, detail, iris control, electronic shutter on/off, shutter speed, etc., can then be remotely controlled from the CCU-550 Camera Control Unit or from a Remote Control Panel attached to the CCU-550.

General	Power consumption: Mass: Dimensions (W/H/D):	Approx. 13W Approx. 1.9kg (4 lb 3 oz) 145X185.3X167mm(5 7/8x7 1/8x6 5/8 inches)
Connectors	DC IN: RET OUT: RETURN CONTROL: EARPHONE: CAMERA CCU: INCOM/PGM:	XLR 4-pin, 11.5V to 17V BNC (x1), 1.0Vp-p, 75Ω 6-pin Mini-jack, 8Ω 40-pin (DNW-7/9WS/90/90WS) KINGS type Headset XLR 5-pin
Supplied accessories	Operation manual (1) Maintenance manual (1) Cable clamp (1) M3/M4 screws for cable clamp (2x2)	
Optional accessories	Extention board EX-454	



Optional Accessories



Setup Card
(Package of four Setup Cards and a soft case)
BSC-1-Pack



Rechargeable Lithium-ion Battery
BP-L90A



Rechargeable Lithium-ion Battery
BP-L60A



Battery Case for an optional BP-90A NiCd Battery
DC-L90



Battery Case for an optional NP-1B NiCd Battery
DC-L1



Battery Charger for four BP-L60/A and BP-L90/A
BC-L100



Battery Charger for two BP-L40 and L60/A and BP-L90/A
BC-L50



Battery Charger for four BP-90A and four NP-1B Batteries
BC-410



Battery Charger for four NP-1B Batteries
BC-1WD



AC Adapter
AC-DN1



AC Adapter
AC-550



Slot-in Wireless Microphone Receiver
WRR-855A



Interface Box
VA-DN1



Remote Control Unit
RM-P9



Camera Control Unit
CCU-550



5-inch Viewfinder
BVF-55



Return Video Selector
CAC-6



Tripod Adapter
VCT-14



Viewfinder Rotation Bracket
BKW-401



Viewfinder Eye-piece
High magnification : **A-8262-537-A**
Low magnification : **A-8262-538-A**
Standard magnification with special compensation for aberrations : **A-8267-737-A**



Viewfinder Eye-piece
(High performance (x3): **A-8314-798-A**)



1.35-inch 16:9 Color Viewfinder
BVF-VC10W



1.5-inch 4:3 B/W Viewfinder
BVF-V10
(supplied with DNW-7/90)



2.0-inch 16:9 B/W Viewfinder
BVF-V20W
(supplied with DNW-9WS/90WS)



Carrying Case
LC-DN7



Video Head Cleaning Cassette
BCT-D12CL

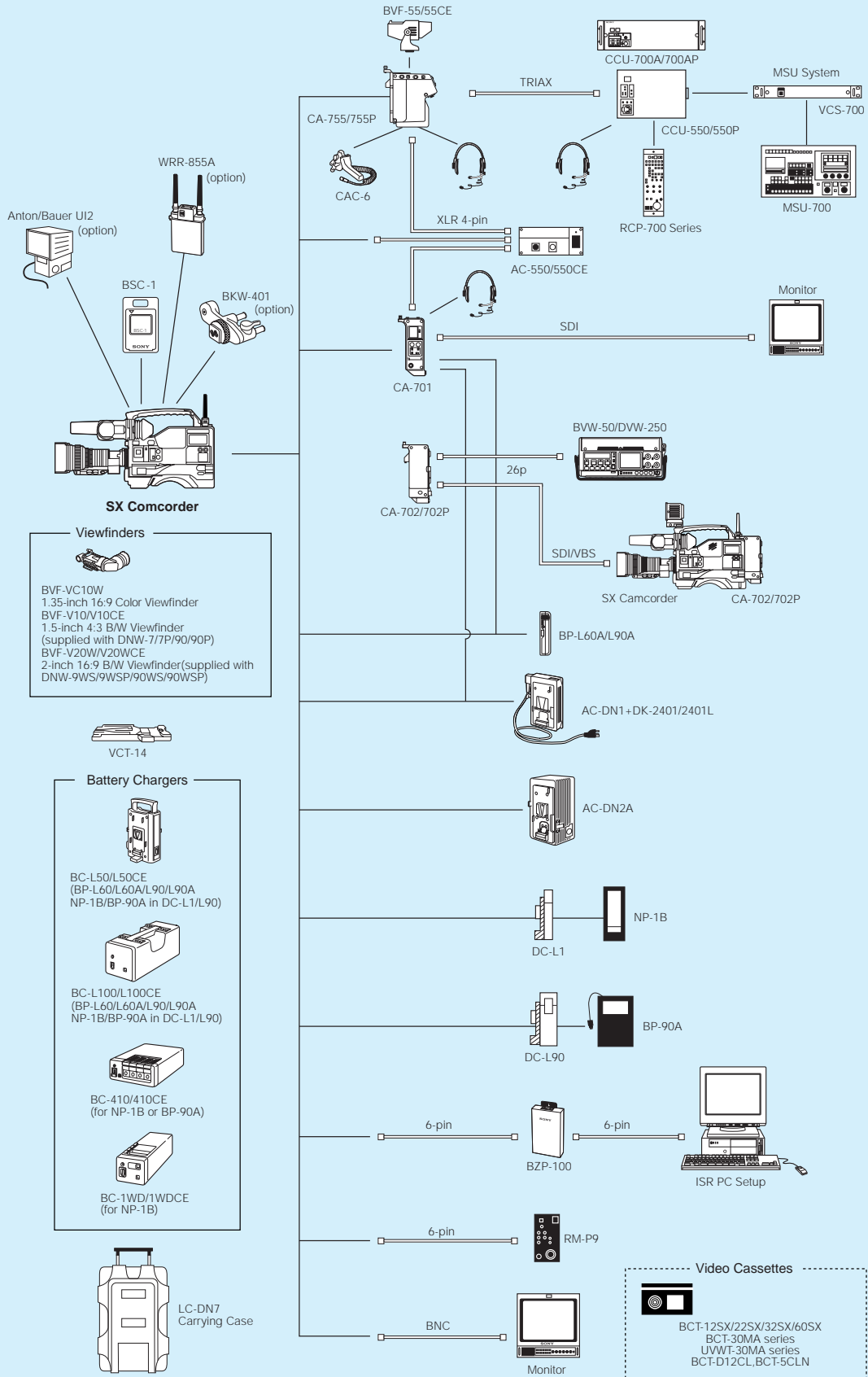


Video Head Cleaning Cassette
BCT-5CLN



Betacam SX Video Cassette
BCT-12SX/22SX/32SX/60SX

System Configuration



Specifications

DNW-7/9WS/90/90WS Camcorders

Camera	DNW-7	DNW-9WS		DNW-90	DNW-90WS	
		(16:9 MODE)	(4:3 MODE)		(16:9 MODE)	(4:3 MODE)
General						
Mass	Approx. 4.0Kg (8 lb 13 oz)					
Operating weight	Approx. 6.0Kg (13 lb 3 oz)					
Power requirements	DC 12V +5.0V/-1.0V					
Power consumption	29W	31.5W		31W	32W	
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	Approx. 120 min (with BP-L60A) Approx. 165 min (with BP-L90A)	Approx. 110 min (with BP-L60A) Approx. 165 min (with BP-L90A)		Approx. 110 min (with BP-L60A) Approx. 165 min (with BP-L90A)	Approx. 105 min (with BP-L60A) Approx. 160 min (with BP-L90A)	
Signal inputs	Genlock video	BNC (x1), 1.0Vp-p, 75 Ω				
	Time code input	BNC (x1), 0.5 to 18Vp-p, 10 kΩ				
	Audio (CH-1/2)	XLR-3-31 type (x2), -60 dBu/ +4 dBu selectable, high impedance, balanced				
	Mic input	XLR-3-31 type (x2), -60 dBu/ +4 dBu selectable, high impedance, balanced				
Signal outputs	Video output	BNC (x1), 1.0Vp-p, 75 Ω, sync negative				
	Video test output	BNC (x1), 1.0Vp-p, 75 Ω, sync negative				
	Time code output	BNC (x1), 1.0Vp-p, 75 Ω				
	Earphone	Mini-jack				
Others	Audio output	XLR 5-pin male (stereo)				
	Lens	12-pin				
	Remote	6-pin				
	Light	2-pin, DC 12V, max. 30W				
DC input	XLR 4-pin (for the optional AC-550)					
DC output	4-pin (for wireless microphone receiver), DC12V					
VTR section						
General						
Recording format	Betacam SX					
Tape speed	59.575 mm/s					
Playback/Recording time	Max. 60 min. with BCT-60SX cassette					
Fast forward time	Approx. 5.5 min. with BCT-60SX					
Rewind time	Approx. 5 min. with BCT-60SX					
Recommended tape	Sony Betacam SX cassette (BCT-60SX series), Sony Betacam SP cassette (BCT-30MA series/UVWT-30MA series)					
Sampling frequency	Y: 13.5 MHz, Y/B-Y: 6.75 MHz					
Quantization	8bits/sample					
Error correction	Reed-Solomon code					
Video performance	K-factor (2T pulse)	1 % or less				
	Y/R-Y/B-Y delay	15ns or less				
Digital audio performance	Sampling frequency	48 kHz (synchronized with video)				
	Quantization	16bits/sample				
	Frequency response	20 Hz to 20 kHz +0.5 dB/-1.0 dB				
	Dynamic range (emphasis ON)	More than 85 dB				
	Distortion (at 1 kHz, emphasis ON, reference level)	Less than 0.08 %				
	Cross talk (at 1 kHz, 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 via CA-701 Camera Adaptor.						
Camera section						
Camera	Pickup device	3-chip 2/3-inch Power HAD 1000 IT CCD	3-chip 2/3-inch Power HAD 1000 16.9/4:3 Widescreen IT CCD	3-chip 2/3-inch Power HAD 1000 FIT CCD	3-chip 2/3-inch Power HAD 1000 16.9/4:3 Widescreen FIT CCD	
	Picture elements	811 (H) x 508 (V)		1038 (H) x 504 (V)		
	Optical system	F1.4 prism system				
	Built-in filters	1: CLEAR 2:5600K +1/8ND 3:5600K 4:5600K+1/64ND				
	Shutter speed	1/100, 1/125, 1/250, 1/500, 1/1000, 1/2000 (s)				
	Gain Selection	-3, 0, +3, +6, +9, +12, +18, +24, +30, +36, +42 dB, (select in camera setup menu for L/M/H/TURBO)				
	Clear scan	CLS: 60.3 to 10156 Hz (260 steps)	CLS: 60.1 to 7000 Hz (260 steps)	CLS: 60.1 to 7000 Hz (260 steps) ECS: 30.4 to 58.3 Hz (248 steps)		
	Lens mount	Special bayonet mount				
	Sensitivity (2000lx, 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				
	Vertical resolution	(without EVS) 400 TV lines, (with EVS) 450 TV lines				
	Registration	0.05 % (all zones, without lens)				
	Geometric distortion	Below measurable level (without lens)				
	Warm-up time	2 sec.				
	Modulation depth at 5 MHz	60 % (Typical)	70 % (Typical)	55 % (Typical)	70 % (Typical)	70 % (Typical) 55 % (Typical)
Viewfinder	CRT	1.5-inch monochrome		2-inch monochrome		1.5-inch monochrome 2-inch monochrome
	Controls	BRIGHT control, CONTRAST control, PEAKING control, TALLY, ZEBRA, DISPLAY switches				
	Horizontal resolution	600 TV lines	450 TV lines	600 TV lines	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)						

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