Sony

Digital Video Hybrid Recorder

DNW-A100/A50/A45

NTSC

BETACAM SX™

ISR Interactive Status Reporting
The First Digital Recorder to Combine Tape and Disk

The Sony Digital Video Hybrid Recorder introduces a unique concept in video technology: a high-performance non-linear Digital Video Hybrid Recorder that incorporates both digital tape and digital disk recording.

Digital disk recording has become indispensable for the instant retrieval and non-linear editing of video and audio segments, while digital video tape enjoys a tremendous advantage in terms of acquisition flexibility—and its economical price is not likely to be soon overtaken by disk-based media.

By combining a tape transport and a hard disk drive into one unit, the Sony Digital Video Hybrid Recorder offers significant advantages of productivity and creativity to the broadcast industry.

The Betacam SX™ format used in the Sony Digital Video Hybrid Recorder represents the next generation of Betacam® format, complying with a compression algorithm of MPEG2 4:2:2 Profile at Main Level (MPEG2 4:2:2P@ML) to record high-quality video/audio on tape or hard drive—the key to a Sony total system approach that maintains superior image quality through digital video acquisition, editing and archival storage.

The Betacam SX format is also designed to maintain compatibility with current analog systems; both Betacam and Betacam SP® analog tapes can be played back and digitized by the Hybrid Recorder for non-linear editing.
Compatibility with Analog Betacam and Betacam SP Formats

Betacam SX equipment has the capability to play back tapes recorded in current analog Betacam and Betacam SP formats on oxide or metal particle tape. This means that full access to valuable analog Betacam archives is maintained along with the advantages of digital technology: high-speed non-linear editing, virtually dropout-free recording, and the ability to copy material without picture degradation. As soon as analog video/audio material is played back on the tape transport and loaded onto the hard disk of the Hybrid Recorder, non-linear editing can begin. In reality, the practical effect of using the Sony Hybrid Recorder is of bringing analog tape archives into the digital era. In addition, current Betacam SP metal particle tapes (BCT-MA/UVWT) can also be used for Betacam SX recording — and with the Betacam SX format, recording time is almost double the stated duration of the tape.

The Cost Efficiencies of Betacam SX Products

The Betacam SX format used in the Hybrid Recorder yields significant economies in both tape and maintenance costs.

Lower Tape Running Costs

The Betacam SX format provides long recording times: up to 62 minutes on a single S-cassette and 194 minutes on a single L-cassette. The "multiple head tracing" technology used in the Betacam SX format ensures reliable playback by performing powerful error correction on adjacent tracks. This technology enables the Betacam SX format to 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 has been reduced by almost half. In news applications, where tape consumption ratios are high, the Betacam SX recording format has achieved a tape running cost equivalent to the economy of oxide tape.
The Betacam SX Format

Minimum Maintenance Costs
The "multiple head tracing" technology used in the Betacam SX format does not require DT (Dynamic Tracking) heads during still-frame and slow motion playback, thus drastically reducing the cost of a replacement drum.

In addition, the improved head construction and tape contact gives reduced head wear and brings longer head life compared to analog Betacam SP format.

Betacam SX Hybrid Recorders incorporate an Automatic Alignment System, to maximize the 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
The Betacam SX format is the key to the Sony approach to the digital newsroom, bringing multiple advantages to ENG and EFP applications: high-quality pictures, high-speed transmission, and low-cost operation.

The compression algorithm of MPEG2 4:2:2P@ML 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 and 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 a careful evaluation of the running costs, recording times, mobility factors, and industry-wide compatibility of both tape and disk media.

Sony employs tape media for applications requiring low running costs, longer recording time, and higher mobility—and uses disk media when high-speed random access and non-linear operations are required.

Tape and disk, working together harmoniously and efficiently—that is the attraction of the Sony Hybrid Recording approach.
Compact Non-linear Storage

By utilizing newly developed, application-specific LSI circuitry and combining this with the efficient data-handling capacity of the Betacam SX format, the Sony Digital Video Hybrid Recorder can combine both VTR and hard disk drive in the same compact dimensions as those of a current analog Betacam VTR. By combining a tape transport and a hard disk drive into one unit, the Sony Hybrid Recorder acts as a player/recorder — as though there were two VTRs in one unit.

High-speed Playback and Recording from Tape to Disk

Betacam SX recordings can be copied from tape to disk at up to four times normal play speed. (Note: This high-speed capability is available for the DNW-A100 only.) The "multiple head tracing" technology enables the high-speed playback of digital data recorded on Betacam SX tape with reliability and accuracy. This high-speed feature saves time recording material to disk, an indispensable step in non-linear editing. Analog Betacam recordings can also be copied and digitized on the hard disk of the DNW-A100/A50/A45 at normal play speed. Once on disk, non-linear editing can begin with full editing functionality.

High-Speed Data Transfer from the DNW-A100 to Server

Edited material on the hard disk of the DNW-A100 can be played back and transferred to an A/V Server via an SDDI interface of the DNW-A100 at up to two times normal play speed while non-edited material can be played back and transferred at up to four times normal play speed. Betacam SX tape can also be played back and transferred to A/V Server through an SDDI link. Connected to a Digital Satellite Link, a compressed digital video signal can be transmitted and recorded at up to two times normal play speed on the DNW-A100.

Dubbing from Disk to Tape

Edited material on the hard disk of the Hybrid Recorder can be copied onto Betacam SX tape at normal play speed.
The Sony Digital Video Hybrid Recorder line-up includes the DNW-A100, DNW-A50, and DNW-A45.

**DNW-A100**
The DNW-A100 is equipped with a hard disk drive capable of recording approximately 90 minutes of 4:2:2 component digital signals and four channels of 16-bit digital audio, and provides high-speed copying of material from tape to disk. Through the SDDI interface of the DNW-A100, audio and video material can be transferred to an A/V server or other SDDI-equipped devices at up to four times normal play speed.

**DNW-A50**
The DNW-A50 is a cost-effective Hybrid Recorder without SDDI interfacing and high-speed tape/disk operation, which can be utilized in the applications not requiring a high-speed copying capability. The DNW-A50 is equipped with a hard disk drive capable of 90 minutes of recording.

**DNW-A45**
The DNW-A45 is also a cost-effective Hybrid Recorder without SDDI interfacing and high-speed tape/disk operation. The DNW-A45 gives 45 minutes of recording on its built-in hard disk drive.

**BKNW-116 Sony Disk Unit**
The BKNW-116 Sony Disk Unit is an external Hard Disk Drive for the DNW-A100/A50/A45 Hybrid Recorders. The BKNW-116 gives the maximum of 6 hours (72 GB) of additional recording time. This Disk Unit is connected to the DNW-A100/A50/A45 Hybrid Recorders through the SCSI interfaces.
Simple, User-friendly Operation
The DNW-A100/A50/A45 provides simple, VTR-like operation from the control panel. The control panel operates basic editing functions on both hard drive and tape transport, with a familiar Jog/Shuttle dial to give editors a “hands-on” feel.

Playback Capability of Analog Betacam and Betacam SP
Analog Betacam and Betacam SP recordings made on oxide or metal particle tape can be played back on the DNW-A100/A50/A45.

Betacam SX Tape
Plus Use of Current Metal Particle Tape
Conventional Betacam SP metal particle tape (BCT-MA/UWWT) can be used in Betacam SX recording with the DNW-A100/A50/A45—and recording time is almost double the stated duration of the tape. To maximize the digital performance at reduced cost, a new metal particle tape has also been developed for Betacam SX recording.

Long Recording Time
Both S-size cassettes and L-size cassettes can be used with the DNW-A100/A50/A45. For Betacam SX recording, a single S-cassette records up to 62 minutes of audio/video signals while an L-cassette records for up to 194 minutes.

Comprehensive Indication Display
In addition to the LED indicators, various information on the operating status of the Hybrid Recorder can be displayed digitally on the front control panel. Time code, CTL, user-bit data, duration and time remaining of both tape and disk area, error messages and set-up menus are displayed.

High-speed Picture Search
Speed search with VTR: ±50 times normal play speed.
Speed search with HDD: ±100 times normal play speed.

Jog Speed Control
Smooth jog speed control is available over a range of -1 to +1 times normal play speed.

Remote Control Interface
Through its Sony 9-pin remote interface, the DNW-A100/A50/A45 can be remotely controlled from the DNE-700 Digital Editing System and the DLE-110 Live Editing System, providing GUI-based non-linear editing. Current BVE Series editing controllers can also control the tape transport of the DNW-A100/A50/A45 as a player.
525/60
or 625/50 Versatility
SDDI, SDI and component I/O and composite outputs are all switchable from 525/60 to 625/50. When playing back Betacam SX recordings, the DNW-A100/A50/A45 operates in 525/60 mode without an external adapter.

Equipped for ISR
The DNW-A100/A50/A45 all incorporate the Sony Interactive Status Reporting (ISR) system to provide error/warning reports on the equipment, enabling engineers to take appropriate action to correct the situation.

Versatile System Interface

SDI Interface
The DNW-A100/A50/A45 is equipped with SDI I/O, allowing easy interfacing with existing SDI systems.

SDDI Connections
For high-speed transfer of video/audio material at faster than normal play speed, SDDI outputs are provided with the DNW-A100. Various output speeds can be selected. An SDDI input can be added as an option (BKNW-103).

Analog Composite/Component Input
Either a BKDW-506 analog composite input board or a BKNW-104 analog component input board can be fitted as an option.

Analog Composite/Component Output
The DNW-A100/A50/A45 is equipped with three analog composite outputs (one monitor output with character superimposition) and one component output.

Analog 4ch Audio Input/Output

AES/EBU Input/Output
AES/EBU digital audio inputs/outputs can be fitted as an option (BKNW-105) in place of analog 4ch audio inputs/outputs.

Time Code Input/Output

SCSI I/F
The DNW-A100/A50/A45 is equipped with an SCSI output to an external disk drive, BKNW-116.

Remote Control
Editors can remotely control the DNW-A100/A50/A45 through a Sony 9-pin interface.

RS-232C Remote Control
Various parameters can be set up and monitored via this port using the Sony ISR system.
Versatile Editing Features to Enhance Productivity and Creativity

The DNW-A100/A50/A45 Hybrid Recorder can be utilized for online editing offering excellent editing functionality.

Two Editing Modes

Two editing modes are available during editing with the Hybrid Recorder.

Full Edit mode: for audio/video split editing and voice-over recording. Video and four channels of audio can be edited independently. Material edited in the Full Edit mode is played back from the hard disk at normal play speed.

Simple Edit mode: for assemble editing of audio/video material. The DNW-A100 plays back the material edited in the Simple Edit mode at up to two times normal play speed, while DNW-A50/A45 plays at normal speed.

Voice-over Recording

Voice-over audio recording is available using the audio insert mode of the Hybrid Recorder. Through a line audio input, a voice-over audio file is created on the hard disk of the Hybrid Recorder. A specified part of the audio track is replaced by this audio file during playback.

"Good Shot Marker" Handling

Good Shot Markers and REC Start Markers recorded on tape by Betacam SX camcorders can be read and recorded on the hard disk of the DNW-A100/A50/A45, which helps to speed the edit search process. The DNW-A100/A50/A45 can search and cue up the next/previous mark recorded on tape. When the DNE-700 Digital Editing System is connected to the DNW-A100/A50/A45, "picture stamps" are highlighted at these markers on the GUI screen of the DNE-700.

Insert Edit/Overlay Edit

During non-linear editing on disk, there are two methods to edit the events.

Insert edit: places an event at the selected IN point so as to move following events that already exist. Duration of the total story becomes longer.

Overlay edit: places an event at the IN point so as to keep the total duration as before. Any existing events are overwritten by the new event.

Editing Workflow of the Hybrid Recorder

ex.) from Tape to HDD using the front control panel

STEP 1
Select and mark the IN/OUT points of the required scenes on tape.

STEP 2
Record selected scenes from tape to hard disk. (Create files on DISK MASTER)

STEP 3
Trim and rearrange the EVENTS if required.
Combining tape and disk in a single unit brings all the many benefits to ENG and EFP applications. Once material has been recorded onto the hard disk of the Hybrid Recorder, non-linear editing functions may be performed within the recorder. By connecting the Hybrid Recorder to a Sony Digital Editing System, even more advanced non-linear editing functions can be controlled with a simple "drag-and-drop" graphical user interface.

**Hybrid Recorder + DNE-700 Digital Editing System**

Combining the DNW-A100/A50/A45 with the Sony DNE-700 Digital Editing System gives the speed and productivity of picture-based drag-and-drop editing. Simple graphical user interface of the DNE-700 allows the control of non-linear editing functions with ease and creativity. The DNE-700 can also access various functions of the DNW-A100/A50/A45, including setting up video parameters of the Hybrid Recorder and copying material from tape to disk and disk to tape. Together, the DNW-A100/A50/A45 and DNE-700 create a compact non-linear editing system than can be easily integrated into any current broadcast facility.

**Hybrid Recorder + DLE-110 Live Editing System**

When a DNW-A100/A50/A45 is connected to the Sony DLE-110 Live Editing System, GUI-based non-linear editing can be performed on-line. The combination of DNW-A100/A50/A45 and DLE-110 enables simultaneous recording and playback, which can be utilized for live applications such as sports programs. This allows editing of highlight scenes, slow-motion replay and random access replay at the same time as the live feed is being continuously recorded on tape. In addition, continuous loop recording on the hard disk of the Hybrid Recorder is available while editing. This enables highlight sequences to be prepared while recording, and to be aired during breaks in the sports action. Necessary scenes reserved and used for highlight editing are saved as MASTER files on the hard disk and are not erased during continuous loop recording.
**System configurations**

**Edited Material**
Edited program can be recorded from HDD to Betacam SX tape for transmission and archiving.

**Field**
- Betacam SX Tape
- Betacam SP Tape
- Mic
- Video monitor
- Headphone
- Editing Controller: DLE-110
- Digital Transmission
  - DSM-T1
  - DSM-R1
- Analog Transmission
  - Microwave Link
  - Telco Link

**In-house**
- Betacam SX Tape
- Betacam SP Tape
- Mic
- Video monitor
- Headphone
- Editing Controller: DLE-110
- Digital Transmission
  - DSM-T1
  - DSM-R1
- Analog Transmission
  - Microwave Link
  - Telco Link
- Server System
- DVW-500 Series Digital BETACAM studio VTRs

**Equipment**
- DNW-A100/A50/A45
- SDI Sony 9-pin
- DLE-110 Editing Controller
- Mic
- Video monitor
- Headphone
- DEP-100
- DNE-700
- DLE-110 Editing Controller
- Server System
Optional Accessories

Video Processor Controller
BVR-50

Digital Rate Converter
DFX-2101

Digital Rate Converter
DFX-1201

Digital Audio Delay Unit
DDU-2100

Digital Colour Corrector
BVX-D10

Digital Video Interface Unit
PFV-D300/D100A/D50/D20

Audio Converter Unit
DAF-1500

Sony Disk Unit
BKNW-116

Control Panel
BKNW-120

Control Panel Case
BKNW-121

Control Panel Extension Kit
BKNW-122

Modification Kit
BKNW-123

Rack Mount Kit
RMM-111

SDDI Input Kit
BKNW-103
(for DNW-A100)

Analog Component Input Board
BKNW-104

AES/EBU I/F Kit
BKNW-105

Analogue Composite Decoder Board
BKDW-506

Betacam SX Video Cassette
BCT-12SX/22SX/32SX/60SX/62SXLA
(Small Cassette)
BCT-64SX/94SX/124SX/184SX/194SXLA
(Large Cassette)

Cleaning Cassette
BCT-D12CL

Cleaning Cassette
BCT-5CLN
Specifications

<table>
<thead>
<tr>
<th></th>
<th>DNW-A100</th>
<th>DNW-A50</th>
<th>DNW-A45</th>
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</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power requirements</td>
<td>AC 100V to 240V, 50/60Hz</td>
<td>320W</td>
<td>300W</td>
</tr>
<tr>
<td>Power consumption</td>
<td>118.6mW</td>
<td>95.5mW</td>
<td>95.5mW</td>
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<tr>
<td>Operating temperature</td>
<td>+5°C to +40°C (+41°F to +104°F)</td>
<td>427 x 237 x 524mm (16 7/8 x 9 3/8 x 20 3/4 inches)</td>
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<tr>
<td>Humidity</td>
<td>25% to 80% (relative humidity)</td>
<td></td>
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<tr>
<td><strong>Tape transport system</strong></td>
<td>Betacam SX</td>
<td>Betacam SX</td>
<td>Betacam SX</td>
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<tr>
<td><strong>Digital record/playback time</strong></td>
<td>Max. 194 min with BCT-194SXLA cassette</td>
<td>6s or less</td>
<td>6s or less</td>
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<tr>
<td><strong>Smooth JOG speed range</strong></td>
<td>±100 times normal playback speed</td>
<td>±100 times normal playback speed</td>
<td>±100 times normal playback speed</td>
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<tr>
<td><strong>Search speed range (shuttle mode)</strong></td>
<td>±50 times normal playback speed</td>
<td>±50 times normal playback speed</td>
<td>±50 times normal playback speed</td>
</tr>
<tr>
<td><strong>Load/unload time</strong></td>
<td>6s or less</td>
<td>6s or less</td>
<td>6s or less</td>
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<tr>
<td><strong>Disk system</strong></td>
<td>Betacam SX</td>
<td>Betacam SX</td>
<td>Betacam SX</td>
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<tr>
<td><strong>Inputs/Outputs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Video input</strong></td>
<td>SDI (option)</td>
<td>BNC (x1) with active through out SX</td>
<td>270Mbits/s</td>
</tr>
<tr>
<td>Analog component (option)*</td>
<td>BNC (x2 for 1 set, Y/H-1/B-Y), Y: 1.0Vp-p, 75Ω, 10k, sync negative, R-Y/B-Y: 0.7Vp-p, 75Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog composite (option)*</td>
<td>BNC (x2 in loop through), 0.3Vp-p, 75Ω, sync negative with use of optional BKDW-505</td>
<td></td>
<td></td>
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<tr>
<td><strong>Video output</strong></td>
<td>SDI **</td>
<td>BNC (x2), SMPTE259M, 270Mbits/s</td>
<td></td>
</tr>
<tr>
<td>Analog component</td>
<td>BNC (x2)</td>
<td>BNC (x2), SMPTE259M</td>
<td></td>
</tr>
<tr>
<td><strong>Audio input</strong></td>
<td>SDI (option)</td>
<td>BNC (x1, video &amp; audio), SMPTE259M, 270Mbits/s</td>
<td>270Mbits/s</td>
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<tr>
<td>Digital (CH 1, 2, 3, 4)</td>
<td>AES/EBU **</td>
<td>BNC (x2), video &amp; audio, SMPTE259M, BNC (x2) with use of optional BKNW-103 input board</td>
<td></td>
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<tr>
<td>Analog composite</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
</tr>
<tr>
<td><strong>Audio output</strong></td>
<td>SDI **</td>
<td>BNC (x1, video &amp; audio), SMPTE259M, 270Mbits/s</td>
<td></td>
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<tr>
<td>Digital (CH 1, 2, 3, 4)</td>
<td>AES/EBU **</td>
<td>BNC (x2), video &amp; audio, SMPTE259M, BNC (x2) with use of optional BKNW-103 input board</td>
<td></td>
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<tr>
<td>Analog composite</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
<td>BNC (x2), video &amp; audio, SMPTE259M</td>
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<tr>
<td><strong>Processor adjustment range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video level</td>
<td>±3dB to +3dB selectable</td>
<td>±3dB to +3dB selectable</td>
<td>±3dB to +3dB selectable</td>
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<tr>
<td>Chroma level</td>
<td>±3dB to +3dB selectable</td>
<td>±3dB to +3dB selectable</td>
<td>±3dB to +3dB selectable</td>
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<tr>
<td>Set up-Black level</td>
<td>±30IRE/B210mv</td>
<td>±30IRE/B210mv</td>
<td>±30IRE/B210mv</td>
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<tr>
<td>Chroma phase/hue</td>
<td>15°</td>
<td>15°</td>
<td>15°</td>
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<tr>
<td>System sync phase</td>
<td>115ns</td>
<td>115ns</td>
<td>115ns</td>
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<tr>
<td>System SC phase</td>
<td>±200ns</td>
<td>±200ns</td>
<td>±200ns</td>
</tr>
<tr>
<td>Y/C delay</td>
<td>±100ns (Betacam/Betacam SP playback only)</td>
<td>±100ns (Betacam/Betacam SP playback only)</td>
<td>±100ns (Betacam/Betacam SP playback only)</td>
</tr>
<tr>
<td><strong>Digital video performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical frequency</td>
<td>13.5MHz, Y, H/Y, B-Y: 6.75MHz</td>
<td>13.5MHz, Y, H/Y, B-Y: 6.75MHz</td>
<td>13.5MHz, Y, H/Y, B-Y: 6.75MHz</td>
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<tr>
<td>Quantization</td>
<td>8 bits/sample</td>
<td>8 bits/sample</td>
<td>8 bits/sample</td>
</tr>
<tr>
<td>Error correction</td>
<td>Reed-Solomon code</td>
<td>Reed-Solomon code</td>
<td>Reed-Solomon code</td>
</tr>
<tr>
<td>Analog composite input (option) to analog component output</td>
<td>K-factor (2T pulse):1% or less</td>
<td>K-factor (2T pulse):1% or less</td>
<td>K-factor (2T pulse):1% or less</td>
</tr>
<tr>
<td>Differential phase:3° or less</td>
<td>Differential phase:3° or less</td>
<td>Differential phase:3° or less</td>
<td>Differential phase:3° or less</td>
</tr>
<tr>
<td><strong>Digital audio performance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vertical frequency</td>
<td>48kHz (synchronized with video)</td>
<td>48kHz (synchronized with video)</td>
<td>48kHz (synchronized with video)</td>
</tr>
<tr>
<td>Quantization</td>
<td>16 bits/sample</td>
<td>16 bits/sample</td>
<td>16 bits/sample</td>
</tr>
<tr>
<td>Analog input to audio A/D and D/A quantization</td>
<td>20bits to 18bits, 100kHz, 100kHz</td>
<td>20bits to 18bits, 100kHz, 100kHz</td>
<td>20bits to 18bits, 100kHz, 100kHz</td>
</tr>
<tr>
<td>Distortion (at 1kHz, emphasis ON)</td>
<td>Less than 0.05%</td>
<td>Less than 0.05%</td>
<td>Less than 0.05%</td>
</tr>
<tr>
<td>Cross talk (at 1kHz, between any two channels)</td>
<td>Less than -80dB</td>
<td>Less than -80dB</td>
<td>Less than -80dB</td>
</tr>
<tr>
<td>Headroom</td>
<td>20dB (18dB selectable)</td>
<td>20dB (18dB selectable)</td>
<td>20dB (18dB selectable)</td>
</tr>
<tr>
<td><strong>Emphasis (ON/OFF selectable in REC mode)</strong></td>
<td>T1=30µs, T2=15µs</td>
<td>T1=30µs, T2=15µs</td>
<td>T1=30µs, T2=15µs</td>
</tr>
</tbody>
</table>

* Either analog component or composite input can be selected as an option.
** AES/EBU audio input can be selected as an option to replace analog audio.
## Specifications

### BKNW-116

#### General
- **Power requirements**: AC 100 to 240 V, 50/60 Hz
- **Power consumption**: 3 to 1.5 A
- **Operating temperature**: 5 to 40 °C (41 F to 104 °F)
- **Storage temperature**: -20 to +60 °C (-4 F to +140 °F)
- **Operating humidity**: 25 to 80 %
- **Storage humidity**: 25 to 80 %
- **Dimensions (W x H x D)**: 427 x 177 x 475 mm (16 7/8 x 7 x 18 3/4 inches) (excluding projections)
- **Weight**: Approx. 23 kg (50 lb. 11oz.)

#### Characteristics
- **Total capacity**: 9 GB x 8 = 72 GB (6 hours)
- **SCSI interface**: SCSI-2 FAST/WIDE Differential (LVD)

#### Input/Output connectors
- **SCSI**: SCSI-2 68-pin, female (differential type) (2)

#### Dimensions

<table>
<thead>
<tr>
<th>DNW-A100/A50/A45</th>
<th>BKNW-116</th>
</tr>
</thead>
<tbody>
<tr>
<td>227 (9 3/8) x 219 (8 1/8)</td>
<td>498.5 (19 3/4)</td>
</tr>
<tr>
<td>427 (16 7/8)</td>
<td>475 (18 3/4)</td>
</tr>
<tr>
<td>543.5 (21 1/2)</td>
<td>427 (16 7/8)</td>
</tr>
<tr>
<td>534 (20 3/4)</td>
<td></td>
</tr>
</tbody>
</table>

#### Supplied Accessories

<table>
<thead>
<tr>
<th>DNW-A100/A50/A45</th>
<th>BKNW-116</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Power code (1)</td>
<td>SCSI cable (1)</td>
</tr>
<tr>
<td>RCC-5G 9-pin remote control cable (1)</td>
<td>Installation Manual (1)</td>
</tr>
<tr>
<td>PSW 4 x 16 screws for rack mounting (1)</td>
<td>Operation Manual (1)</td>
</tr>
<tr>
<td>Operation manual (1)</td>
<td></td>
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