DVC-800

Guide to Installation and Operation

M619-9900-100

Downconverter and DV Encoder for HD Acquisition

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DVC-800

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Warranty Policies

Warranty Statement
Miranda Technologies Inc. warrants that the equipment it manufactures shall be free from defects in material and workmanship for a period of two (2) years from the date of shipment from the factory. If equipment fails due to such defects, Miranda Technologies Inc. will, at its option, repair or provide a replacement for the defective part or product. Equipment that fails after the warranty period, has been operated or installed in a manner other than that specified by Miranda, or has been subjected to abuse or modification, will be repaired for time and material charges at the Buyer's expense.

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from Miranda Technologies Inc.

The Buyer will pay freight and insurance charges for the return of the defective product or part to the manufacturer for repair. Miranda
Technologies will pay freight and insurance charges for the return of the repaired product or part to the Buyer.

Out-Of Warranty Equipment Updates and Spare Parts Policy
Miranda Technologies will charge cost plus 20% of the parts costs and $40.00 shipping and handling for out-of-warranty equipment updates, or the sales of spare parts.

Safety Compliance Information

Safety Compliance

This equipment complies with:

- CAN/CSA C22.2 No. 950-95 / Safety of Information Technology Equipment, Including Electrical Business Equipment.
- UL Std. No. 1950, 3rd Ed. / Safety of Information Technology Equipment, Including Electrical Business Equipment.
- EN 60950:1992 (2nd edition) Incorporating A1, A2, A3, A4, and A11/ Safety of Information Technology Equipment, Including Electrical Business Equipment.

CAUTION

These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel. Servicing should be done in a static-free environment.

Electromagnetic Compatibility

- This equipment has been tested for verification of compliance with FCC Part 15, Subpart B, class A requirements for Digital Devices.
- This equipment complies with the requirements of:
  EN 55022 Class A, Electromagnetic Emissions,
  EN 61000-3-2 & -3-3, Disturbance in Supply Systems
  EN 61000-4-2, -3, -4, -5, -6, -8 & -11 Electromagnetic Immunity

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1.1 Introduction

The DVC-800 is the latest in camera-adapted conversion devices from Miranda and was designed to enhance electronic acquisition of material using HD cameras such as the SONY HDCAM (DVC-800) or Panasonic Varicam (DVC-820). The DVC provides a unique combination of outputs and functionality to facilitate monitoring, review and approval, rough cut editing and the preparation of dailies while on set. Designed in cooperation with a number of electronic acquisition pioneers, the DVC is the indispensable tool for electronic acquisition.

The SD video signal output allows the use of inexpensive monitors instead of costly high definition monitors. The DVC-800 provides a built-in aspect-ratio converter allowing 16:9 images to be displayed on 4:3 monitors. The built-in 4:3 and 16:9 graticule generator allows on-screen display of aspect ratio markers. Also, the OSD (On-Screen Display) unit allows information such as time code and scene numbers to be directly seen on the screen on any down-converted outputs. The DVC-800 also does conversion from DV to composite and SD SDI. The DVC-800's low power consumption and miniature package make it ideal for on-site applications.

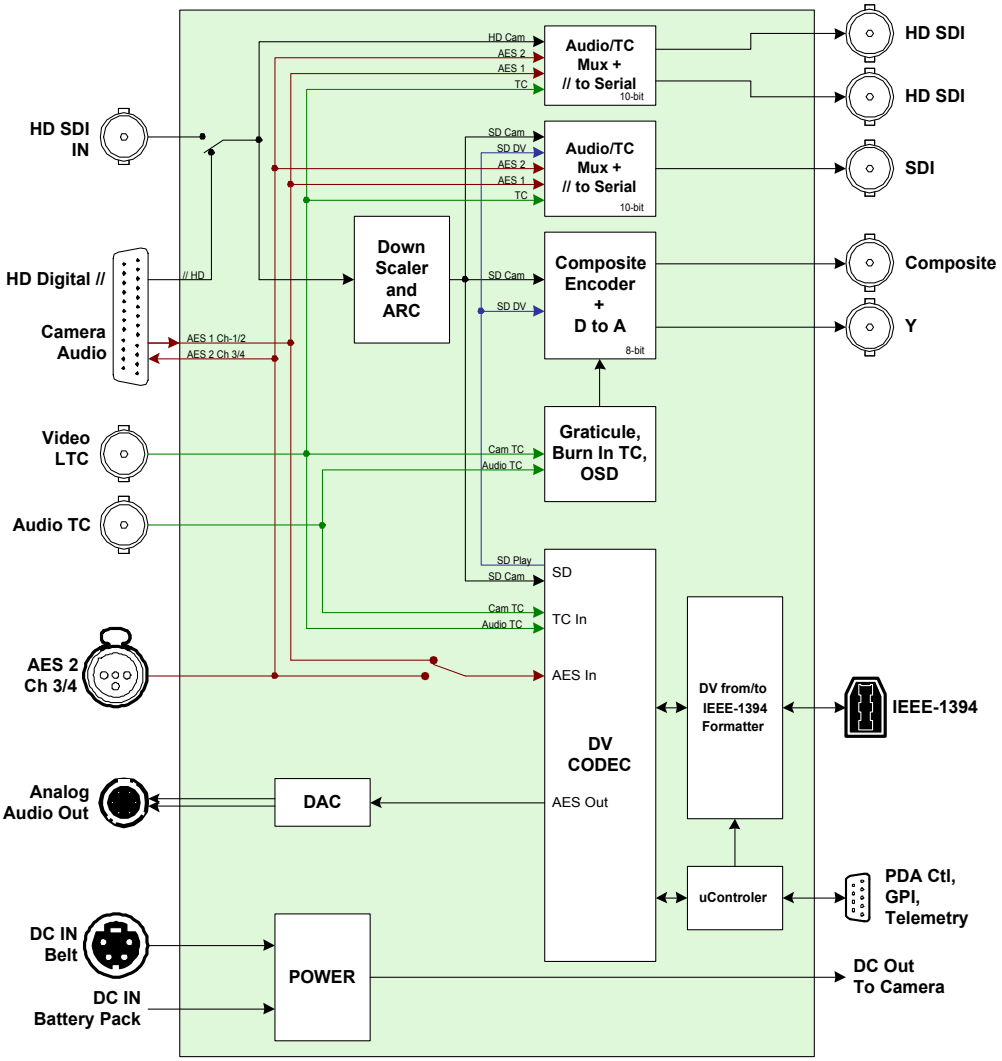


Figure 1 – Block Diagram

1.2 Features

Video Input

- One (1) HD SDI input
  - Extraction of embedded audio group 1
  - Extraction of ATC (video time code)
- One (1) SONY HDCAM Parallel video input with audio
  - Channel 1/2 audio input from camera
  - Channel 3/4 audio output to camera
- Pseudo-Automatic frame rate detection of HD video input
- Down-converted HD Formats:
  1920x1080i/59.94 1920x1080p/29.97sF 1920x1080i/50 1920x1080p/25sF
  1920x1080p/23.98sF 1280x720p/59.94 1280x720p/50
- Pass-through mode formats (to HD SDI out only)
  1920x1080i/60 1920x1080p/30sF 1920x1080p/24sF 720p/60
- Automatic or Manual selection between HD SDI or HDCAM SONY video input

Video Output

- Two (2) HD SDI outputs including:
  - Four (4) embedded audio channels
  - ATC video time code (line 10)
- One (1) down-converted 10-bit SDI output including:
  - 4 embedded audio channels
  - DVITC (lines 14/16 and 277/279 in 525, lines 19/21 and 332/334 in 625)
  - Graticule markers (selectable ON/OFF)
  - Burned-in information such as time codes (Selectable ON/OFF)
- Down-converted 525/625 DV output via IEEE-1394 including:
  - Two 16-bit audio channels (48KHz) selectable between channels 1/2 and 3/4
  - Video and audio time codes
  - Telemetry and metadata related to the scenes annotations
  - Burned-in information such as time codes (Selectable ON/OFF)
- Down-converted composite (NTSC/PAL) and luminance (Y) output
  - VITC insertion (lines 14/16 and 277/279 in 525, lines 19/21 and 332/334 in 625)
  - Burned-in information such as time codes (Selectable ON/OFF)
  - Graticule markers
- Aspect-ratio conversion allows:
  - Display of 16:9 camera output on 4:3 (letterbox) or 16:9 monitors
  - Predefined settings for resizing/cropping video in 4:3, 13:9, and 14:9 aspect ratio
- Selectable Graticule markers (for SD SDI, Composite/Y only):
  - Safety zone markers for 4:3, 13:9, 14:9 selectable 50% transparent, line or opaque
  - Safe title (80%), safe area (90%), 92.5%, 95%, 90% of 4:3
  - One (1) user-programmable marker
  - Two (2) types of center cross

General

- One RS-232 port, selectable for telemetry or control
- Analog audio output for monitoring channels 1/2 or 3/4
- Battery Pack style, attached directly to the camera
- Optimized power consumption - only the circuits in use are powered
- Auto Power Off
- DV power management
- DV sequence playback to SDI and Composite/Y
  - Automatic detection of 525/625

- DV/DVCPRO[1] compatible
- Burned-in metadata information

Special

- Frame rate conversion from 23.98sF to 59.94i using conventional 3:2 pull-down sequence
  - White line insertion (line 12) on Composite/Y and SDI output for flagging 1st frame of the sequence
  - Time code processing from 24f/s to 30f/s (non-drop frame only)
- External DV Device Control capabilities (AV/C protocol)
- Audio LTC input
  - Replaces channel 4 of the embedded audio when present
  - Can be inserted in DV as metadata
- Distinct graticule markers settings in DV playback mode and in normal mode
- Default configuration settings: for burned-in information and the user marker

[1] Locked audio not supported for DVCPRO

2 Installation

2.1 Unpacking

Make sure the following items have been shipped with your DVC-800. If any of the following items are missing, contact your distributor or Miranda Technologies Inc.

- DVC-800 Downconverter and DV encoder for HD Acquisition
- This manual

2.2 Mechanical Installation

The DVC-800 is installed at the rear of the camera body, positioned between the camera and the external battery, and incorporates connectors and hardware which allow it to attach and connect to these two components. The DVC-800 is designed to work with Sony HD cameras, and a variety of batteries, e.g. IDX, Anton Bauer or PAG. These batteries have different mechanical interfaces, so it is necessary to specify the battery type when ordering your DVC-800.

Figure 1.1 Mechanical installation of the DVC-800

To install the DVC-800 on the Sony HDCAM:

- remove the external battery or any other attachments on the rear of the camera body
- remove the small cap protecting the camera connector by removing the attaching screw.
- position the DVC-800, and push in and down until the HD CAM connector on the camera body mates with the connector on the DVC-800
- tighten the two screw fasteners on the upper bracket to secure the DVC-800 in position
- Re-install the external battery or other attachment onto the rear of the DVC-800 case

2.3 Electrical Installation

2.3.1 Camera and Battery connectors

The Sony HDCAM connector is integral to the mounting bracket, and connection is made when the DVC-800 is mounted on the rear of the camera body. As well, the external DC input is passed through the DVC-800.

2.3.2 Inputs and Outputs

All remaining input and output connectors are located on the side of the DVC-800 body. The figure shows the location of the various connectors.

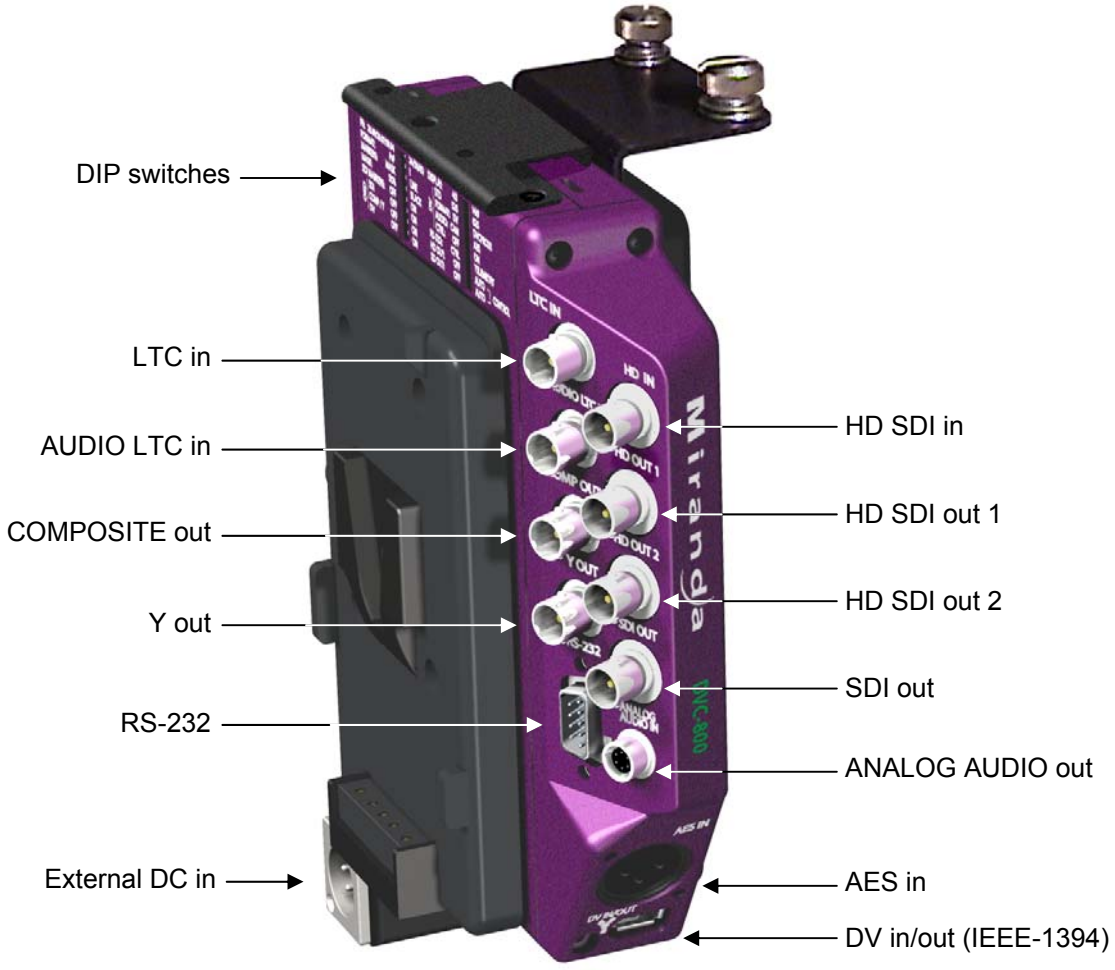
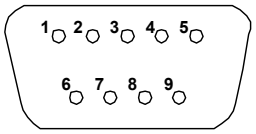


Figure 1.2 Location of connectors on the DVC-800

2.3.3 Serial Communication Connector (RS-232) Layout



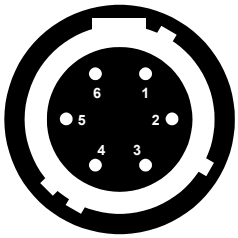
1 = NC
2 = (Rx) Receive (Input)
3 = (Tx) Transmit (output)
4 = 3.3VDC*
5 = Ground
6 = NC
7 = 3.3VDC*
8 = NC
9 = Force HD SDI input

*** WARNING**

The 3.3VDC pins should be used with caution.They are meant to power external devices drawing less than 2mA. Do not short to ground. Any misuse may cause permanent damage to the unit

To force the HD SDI input at all times, short pin 9 to pin 5 (ground). See the discussion on video source selection in Section 4.4.1

2.3.4 Analog audio Connector Layout



1 = Ground
2 = Reserved
3 = Reserved
4 = Ground
5 = Audio Out Right
6 = Audio Out Left

3 Configuration

3.1 Large-scale production

The figure below illustrates a production configuration involving all of the inputs and outputs available on the DVC-800. Observe how master recordings, dailies, on-set monitoring and off-line post-production capabilities are all supported and facilitated through the use of the DVC-800. Subsets of this configuration may be appropriate for less complex production situations.

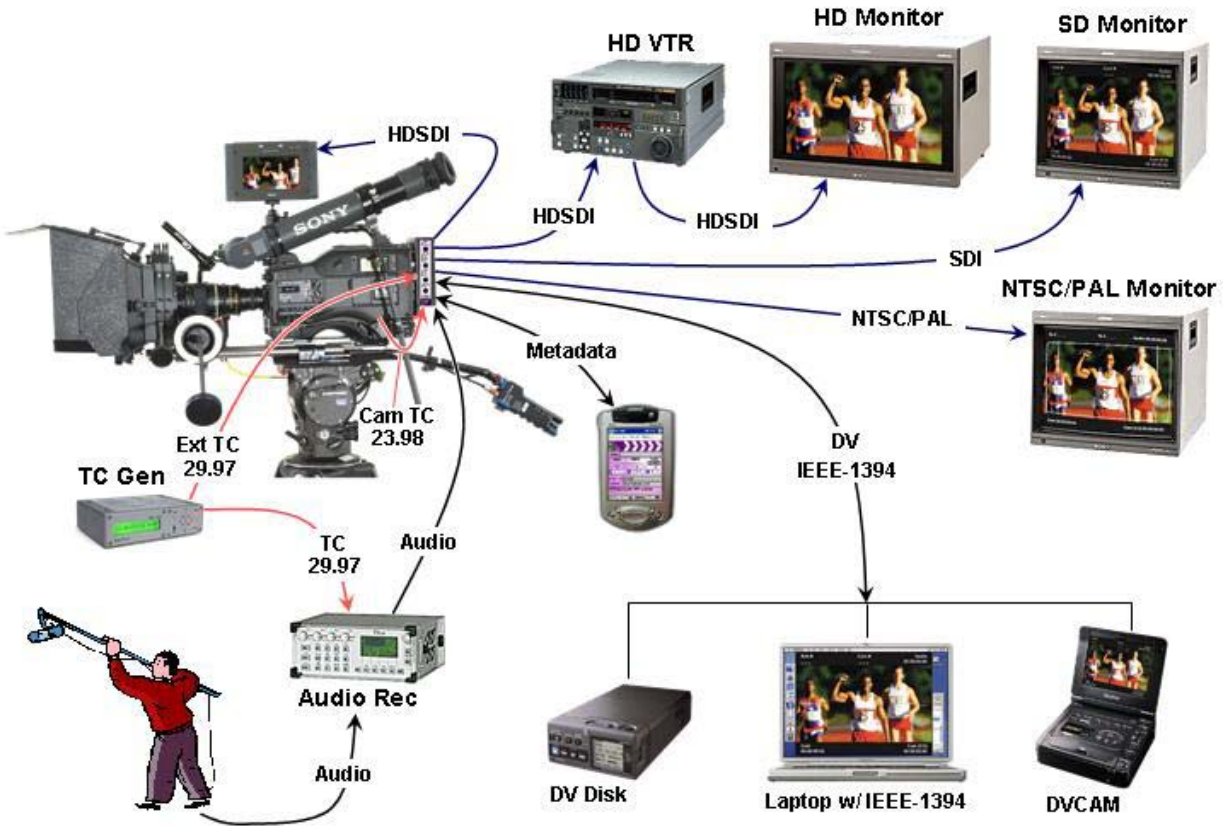


Figure 3.1 DVC-800 at the center of a studio production

3.2 Stand-alone Operation

One useful application for the DVC-800 involves the use of a DV recorder installed between the DVC-800 and the battery, as shown in figure 3.2. This recorder, supplied with DV video and time code through the IEEE-1394 feed, records a low-definition copy of the master recording which is being recorded on the camera's HD cassette. This can be used immediately for off-line post production or dailies, eliminating the need for dubbing after production is completed.

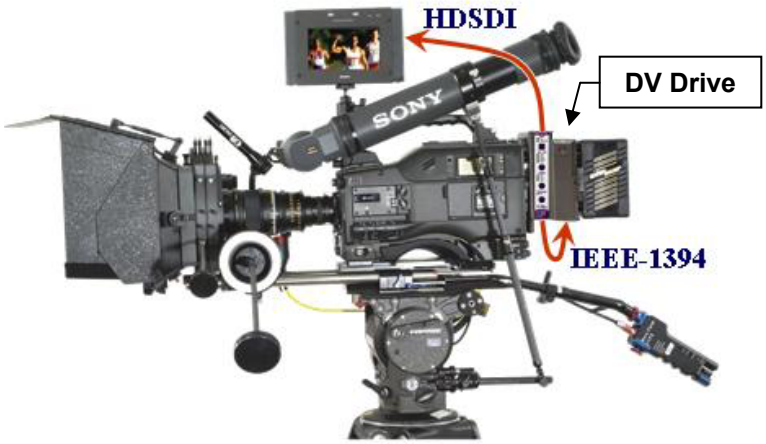


Figure 3.2 Stand-alone operation of the DVC-800

4 Operation

4.1 Powering Up

Use the Power button (section 4.2.1) to toggle between:

1. ON (ON LED is lit)
2. AUTO OFF (both LEDs are lit) If there is no Input signal for more than 30 seconds, the unit will turn off
3. OFF (both LEDs are off) The unit is OFF (Note: no power is consumed when the unit is OFF)

Use the dip switches HD OUT and SD OUT (see section 4.2.6) to control the power to the indicated output.

4.2 Local User Controls

The side panel incorporates 4 pushbuttons and 14 LEDs grouped into 5 sections (see fig.4.1):

4.2.1 POWER *(discussion in section 4.1)*

Pushbutton: Power mode cycles through ON, AUTO OFF, and OFF

LEDs (2): ON Illuminated in ON and AUTO OFF modes
AUTO OFF Illuminated in AUTO OFF mode (turns unit OFF if there is no input signal for more than 30 seconds)

4.2.2 SAFETY ZONE

Pushbutton: Selects between OFF, 80%, 90%, 92.5%, 95%, 4:3

LEDs (4): 80%, 90%, 92.5%, 95%
(both 80% and 90% illuminate to indicate 4:3 mode)

4.2.3 MARKERS *(discussion in section 4.4.2)*

Pushbutton: Selects between OFF, 4/3, 13/9, 14/9, FILM

LEDs (3): 4/3, 13/9, 14/9
(both 4:3 and 13:9 illuminate to indicate FILM mode)

4.2.4 CENTER MARK

Pushbutton: Cycles between ON (normal cross), ON (small cross) and OFF

LED: ON Illuminates when Centre Mark is turned ON (either size)

Note: Two different sets of settings for the markers are stored in the DVC-800 - one for the down-converter mode, and one for the DV playback mode. These settings are memorised and retained when the unit is turned off.

4.2.5 STATUS LEDS

LEDs (4):

HD IN PRESENCE GREEN: HD signal detected at the input
[POWER STATUS}
HD OUT GREEN: HD-SDI output is active
SD OUT GREEN: SD outputs (SDI and analog) are active
DV GREEN: A device is connected to the Firewire plug and powered on.

Figure 4.1

4.2.6 Dip Switches

There are 16 dip-switches located on the upper side panel of the DVC-800, laid out as shown in the figure below.

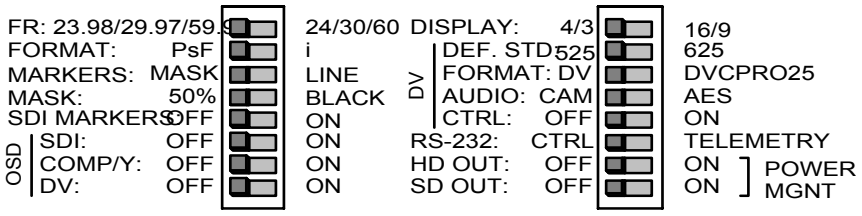


Figure 4.2 DIP-switch layout

The functionality of these switches is as follows:

FR *(frame rate)*	Selects between 60/30/24 or 59.94/29.97/23.98 for HD standard detection
FORMAT	Selects between PsF or i for HD standard detection
MARKERS	Selects between Mask or Line for the markers (See section 4.4.2)
MASK	Selects between 50% transparent or Black. (See section 4.4.2)
SDI MARKERS	Toggles the markers ON/OFF for the SD SDI output
OSD SDI	Selects between ON or OFF for OSD on SDI output
OSD COMP/Y	Selects between ON or OFF for OSD on composite and Y output
OSD DV	Selects between ON or OFF for OSD on DV output
DISPLAY	Selects between 4/3 or 16/9 monitors (See section 4.4.2)
DV DEF. STD	Selects between 525 or 625 for DV default standard
DV FORMAT	Selects between DV or DVCPRO25 compression
DV AUDIO	Selects the audio to record in DV among the 4 available audio channels CAM = Camera audio (either from HD SDI or form SONY connector) AES = From the AES input
DV CTRL	Enable/Disable the DV device control option (See section 4.4.6)
RS232	Selects between Telemetry or Control (See section 4.7)
POWER MGNT	(see section 4.1)
HD OUT	Selects between AUTO or OFF for power on the HD SDI output
SD OUT	Selects between AUTO or OFF for power on composite, Y and SDI outputs

4.3 Supported HD Video Frame Rates

			DVC-800 OUTPUT				
			SDI/DV/CVBS/Y 29.97Hz	Time Code	SDI/DV/CVBS/Y 25Hz	Time Code	HD SDI
CAMERA FORMAT	60i	NDF	n/a	n/a	n/a	n/a	60i
		DF	n/a	n/a	n/a	n/a	
	59.94i	NDF	OK	30 f/s NDF	n/a	n/a	59.94i
		DF	OK	30 f/s DF	n/a	n/a	
	50i	-	n/a	n/a	OK	25 f/s	50i
	30PsF	NDF	n/a	n/a	n/a	n/a	30PsF
		DF	n/a	n/a	n/a	n/a	
	29.97PsF	NDF	OK	30 f/s NDF	n/a	n/a	29.97PsF
		DF	OK	30 f/s DF	n/a	n/a	
	25PsF	-	n/a	n/a	OK	25 f/s	25PsF
	24PsF	-	n/a	n/a	n/a	n/a	24PsF
	23.98PsF	-	3:2 Pull Down	30 f/s NDF	n/a	n/a	23.98PsF

Table 4.1 – Supported HD Video Frame Rates

4.4 Video Operation

4.4.1 Video Source Selection

If DV is input to the DVC-800 on the IEEE1394 connector, it is by default converted and sent to the SD video outputs (composite,Y,SDI).

When there is no DV input to the DVC-800, the output is derived from one of the two HD inputs, selected according to the following priorities:
- If a signal is present on the HDCAM connector, it is selected
- If no signal is present on the HDCAM connector, the HD SDI input is selected
- The user can short a pin on the RS-232 connector to force the HD SDI input to be selected (see section 2.3.3 for details)

The input video format is detected automatically within groups which are selected by the user using the Frame Rate dip-switch and the i/PsF dip-switch. Here is a table of the supported formats and the state of those switches for each case.

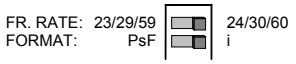
HD Format	Dip switch state
1080i59.94 1080i50 720p50 720p59.94	
1080p29.97sF 1080p23.98sF 1080p25sF	
720p60 1080i60	
1080p30sF 1080p24sF	

Table 4.2 dip-switch settings for video source selection

4.4.2 Markers

There exist multiple configurations for the markers. They are configured using the dip switches and the buttons on the DVC-800 case. Figure 4.3 on the next page shows each configuration and its corresponding dip switch position. Note that there is no black mask in 4:3 display mode. Instead the screen is scaled to fit the selected aspect ratio. This mode activates the aspect-ratio converter (ARC).

The markers are always visible on the Composite/Y outputs. They can be set to ON or OFF on the SD SDI output. They are never present on the DV output.

The FILM marker is use-programmable via software. The factory default is 1.85:1 aspect ratio.

4.4.3 Using the Aspect-Ratio Converter

The aspect-ratio converter (ARC) can be enabled only with 4:3 monitors. To activate the ARC:
Set the dip switch DISPLAY to the position 4/3
Set the dip switch MARKERS to the position Mask.
Set the dip switch MASK to the position Black.
Use the Markers button on the control panel to choose the aspect-ratio

The result is shown on the right-hand column of figure 4.3. The ARC affects all down-converted outputs.

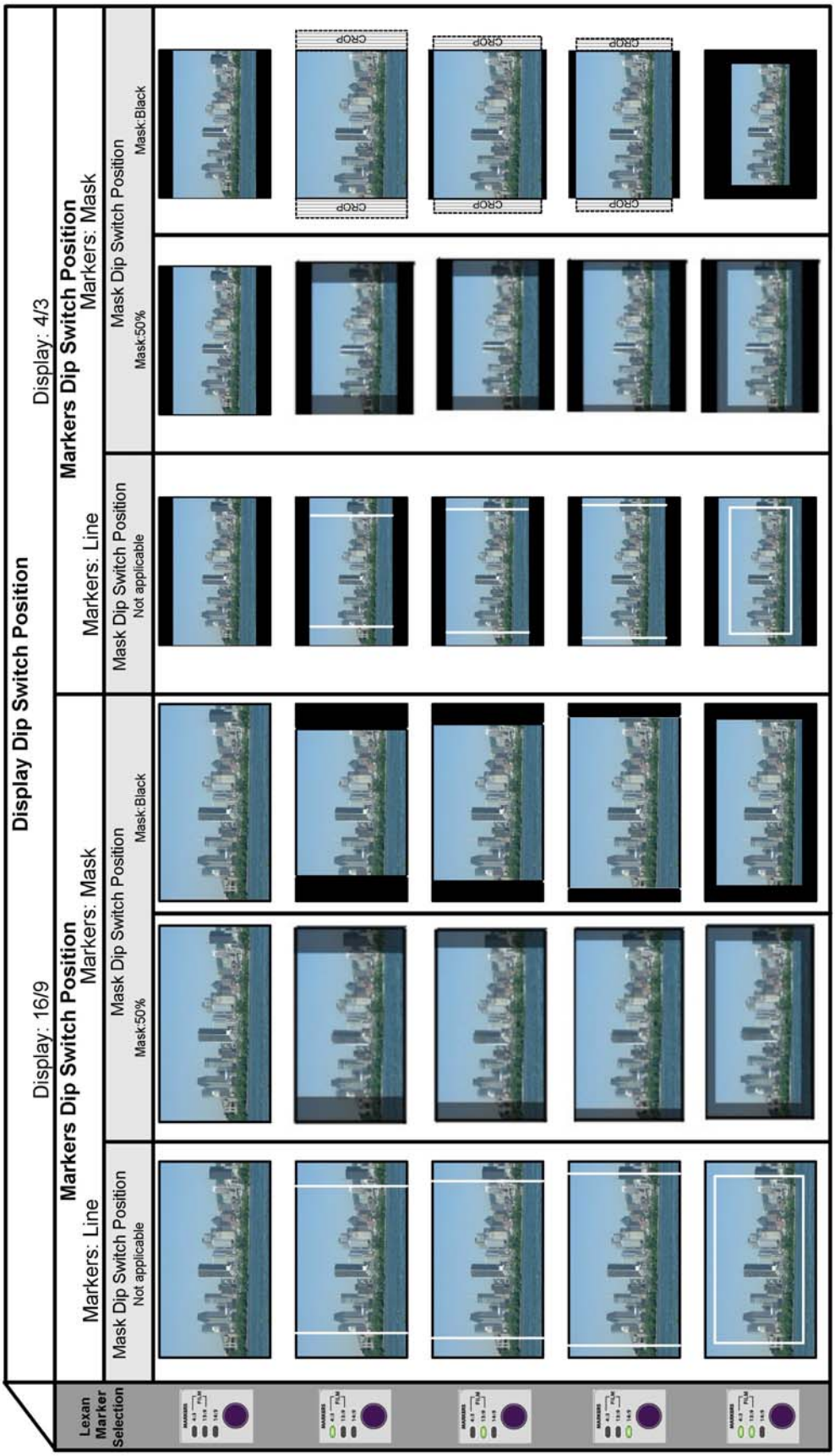


Figure 4.3 Marker configurations

4.4.4 On-Screen Display (OSD) Configuration

It is possible to display the following elements on the screen:

Main Title
Scene Description
Episode Number
Scene Number
Shot Number
Take Number
Reel Number
Director's name
Cameraman's name
Camera Number
Lens description
Location
Circled take
UMID 32 Bytes Binary
Producer's name
10 User-defined fields
HD TC Position
Rec Video TC Position
Rec Audio TC Position
HD Video Format
Start Time
Title TC Position
Recorded Date

The OSD screen can display 12 lines of 28 characters.

The user-defined fields allow the display of almost anything on the screen. The configuration of the OSD can be accomplished using software available on Miranda's web site. Software is available for both PC and PDA platforms. For more information on how to configure the OSD, see section 4.7.2.

The OSD can be turned ON and OFF independently on the SDI, COMPOSITE/Y and DV outputs. Select the desired status using the three OSD dip-switches.

4.4.5 Frame rate conversion from 23.98sF to 29.97

When 23.98sF HD formats are input to the DVC-800, a frame rate conversion is done automatically. The process involves a conventional 3:2 pull-down sequence. The DVC-800 uses the video time code to synchronize the sequence. The pull-down sequence, and the resulting frame correspondence over a period of 1 second are shown in figure 4.4.

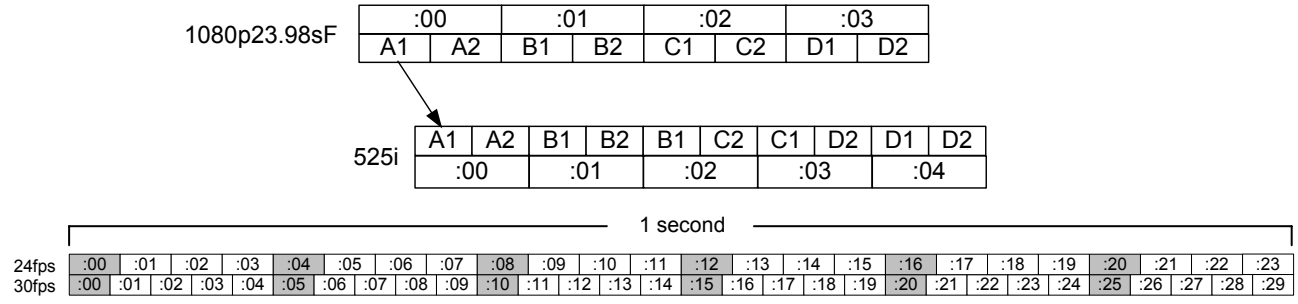


Figure 4.4 Frame-rate conversion using 3:2 pull-down

4.4.6 DV Operation & External Device Control

The DVC-800 is able to encode or decode DV25 and DVCPRO25[2] video formats in 525-line or 625-line format (corresponding to the video input signal). In the normal state when there is no incoming DV stream, the DVC-800 encodes a DV stream from the HD downconverted video input to the DV port. When an external DV stream is detected, the DVC-800 decodes this video stream and displays it through the other SD outputs.

The DVC-800 can control one external DV device[3] (through the DV port) if it has VTR (**v**ideo **t**ape **r**ecorder) capabilities (e.g. the AV/C protocol).

We don't recommend connecting more than one DV device (of the VTR type[4]) to the DVC-800 because, if there is more than one, there is no way to select which one will be controlled.

Device control works as follows:
- The DVC-800 searches for an external DV device that supports VTR commands.
- If it finds one, it polls the VTR stable state (stop, pause/still or record pause)[5].
- When a running timecode starts at the LTC input (*LTC in*), the DVC-800 sends a record command to the external VTR.
- If the timecode stops or there is a discontinuity in the timecode sequence, the DVC-800 sends a command corresponding to the previous stable state.

So, the user must set the VTR to the desired stable state before connecting it to the DVC-800, and ensure that there is no running timecode at the LTC input when the device is connected.

4.5 Audio Operation

Figure 4.5 on the next page illustrates the audio processing functions of the DVC-800.

Audio Inputs:	Audio Outputs:
- Sony camera	- Embedded in HD
- HD SDI in (embedded audio)	- Embedded in SD
- AES external	- Audio 3-4 to camera
- Audio LTC in	- Analog audio out
- DV	- DV

Audio follows the same priorities as video; that is, if a DV input is present, it takes priority over the HD input, and the audio from the DV input will appear on the analog and SD outputs. In the HD->DV mode, audio will be embedded in this order of priority: Audio LTC in, AES in, HD SDI in or Sony audio.

Description of inputs and outputs :

HD CAM Sony:

The HD CAM connector is proprietary to Sony, and is located at the rear of their cameras. There is always an audio signal, either voice, tone or mute. Audio 3 and 4 from the external AES IN of the DVC-800 is always routed to the camera through this connector.

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[2] Locked audio is not supported for the DVCPRO25 format. This can be a problem for some DVCPRO VTRs that will not accept the DVCPRO stream from the DVC-800. To be able to record the DVCPRO stream on a DVCPRO VTR, the user might have to select a different audio source than the one included in the stream.

[3] By "DV device" we mean a camcorder, a VTR, a firewire hard drive with device control capabilities (e.g. the AV/C protocol) but not a computer. A computer is a general firewire device and not specifically a DV device.

[4] A DV device of the VTR type can be a real VTR, a camcorder set in VTR mode, a hard drive with DV VTR capabilities or a device of the DV-Bridge series (or any other DV transcoders with device control capabilities).

[5] No other state is supported.

HD SDI IN:

The audio found in group 1 of the HD VIDEO IN is disembedded. If there is no external AES IN or AUDIO LTC (time code) IN, this audio is completely reconstituted at the output. The group 1 audio is extracted for the other outputs in any case..

AES IN:

This audio is input through the XLR AES IN connector, also referred to as external AES. This source will be embedded in AES2, and will be sent to the DV and analog outputs when the dip switch is in the AES position.

Audio LTC in:

When audio time code is present, it will be embedded in channel 4, i.e. the right channel of AES2.

Embedded HD:

When both external AES audio and LTC time code are absent, the audio from the HD source is present at this output in its entirety. When external AES audio is present, the camera audio will be found on AES1, while the external AES audio will appear in AES2.

Embedded SD:

Only the first group is embedded. In the HD->SD mode, AES1 comes from either the camera or from the audio embedded in the HD SDI IN. AES 2 could come from the audio embedded in the HD SDI IN, from the external AES IN or from the AUDIO LTC IN. In the DV->SD mode, AES1 is sourced from the DV, while AES2 comes from the external AES IN or from the AUDIO LTC IN

Audio 3-4:

The audio which is sent to the camera, audio 3/4, always comes from the external AES input.

Analog:

The analog audio output is identical to the audio sent to the DV output; it originates from the DV input in the DV->SD mode.

DV:

Source of audio in the DV-> SD mode, receiver of audio in the HD-> DV mode. Choose between AES1 and AES2 with the CAM/AES dip-switch, where CAM=AES1 and AES=AES2.

Note that the internal sampling rate is always 48KHz because of the sample rate converters. DV audio is 16 bits, whereas the HD and SD audio is 24 bits.

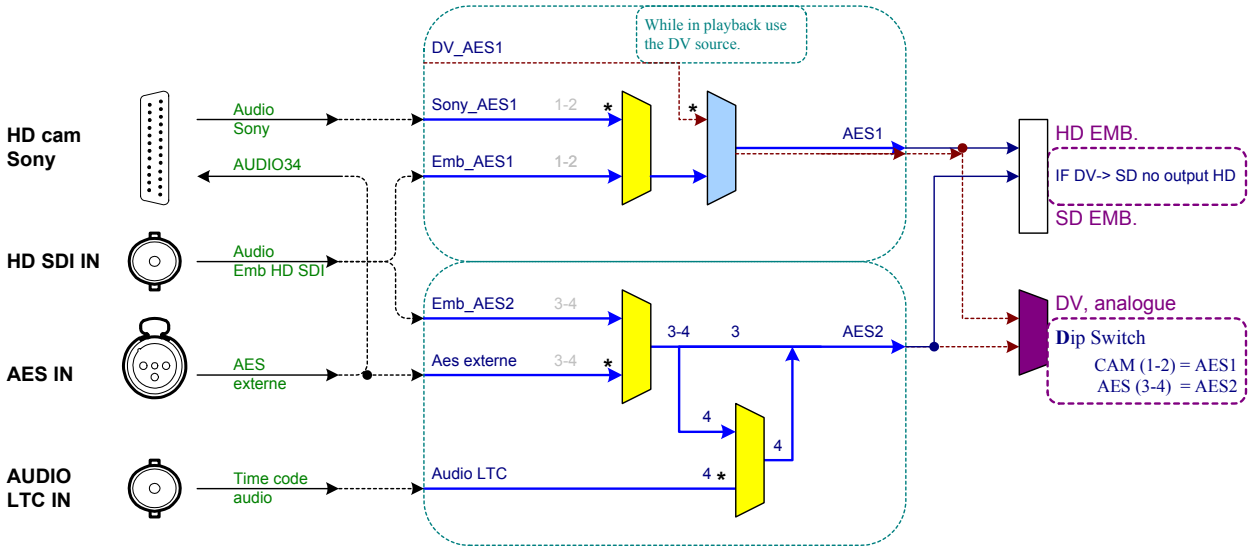

Figure 4.5 Audio processing in the DVC-800

Audio Operation											
Input					Internal		Output				
Sony CAM[1]	HD SDI	AES IN	AUDIO LTC IN	DV IN	AES1	AES2	EMB HD	EMB SD	Audio 3-4	Analog & DV OUT CAM[3]	Analog & DV OUT AES
√					Sony	-----	Aes1	Aes1	-----	Sony	-----
√		√			Sony	AES in	Aes1+2	Aes1+2	AES in	Sony	AES in
√		√	√		Sony	AES+TC	Aes1+2	Aes1+2	AES in	Sony	AES+TC
√		√	√	√	DV	-----	-----	Aes1	AES in	DV	DV
	√				HD SDI	HD SDI	Audio[2]	Aes1+2	-----	HD SDI	HD SDI
	√	√			HD SDI	AES in	Aes1+2	Aes1+2	AES in	HD SDI	AES in
	√	√	√		HD SDI	AES+TC	Aes1+2	Aes1+2	AES in	HD SDI	AES+TC
	√	√	√	√	DV	-----	-----	Aes1	AES in	DV	DV
	Video				-----	-----	-----	-----	-----	-----	-----
	Video	√			-----	AES in	Aes2	Aes2	AES in	-----	AES in
	Video	√	√		-----	AES+TC	Aes2	Aes2	AES in	-----	AES+TC
	Video	√	√	√	DV	-----	-----	Aes1	AES in	DV	DV

√ = Audio present
1 = There is always audio coming from the SONY HDCAM.
2 = Passthrough audio only
3 = Dip switch (audio DV)

4.6 Time Code Operation

The DVC-800 integrates many different time codes:

Title Time Code: In DV playback only. Time code generated by DV applications
Video HD time code : Original time code synchronized with the HD video input
Video SD time code: Processed time code synchronized with the SD video output
Audio time code: Audio time code sampled at SD frame rate

Any of these time codes can be displayed on the screen.

4.6.1 Time Code source selection

There are 3 possible sources of video time code and one source of audio time code:

Video time code sources: External LTC, External from HD SDI input, Internally generated
Audio time code source: External LTC only

Video time code source selection:

- When all time code sources are present, the LTC input has priority over the others. Therefore, the DVC-800 will not read the time code embedded in the HD SDI input signal if an external LTC signal is present.
- When no time code source is present, the DVC-800 generates its own time code. This is necessary for DV to work properly and also for the frame rate converter.

Audio time code source selection:

- If a signal is present at the Audio LTC input, the time code is extracted and re-sampled at the SD frame rate. This is necessary since the audio LTC has to follow the video path.
- If no signal is present, no internal time code is generated and its value remains unchanged

In some cases, the time code is processed and compensated for delays. In other cases, no compensations are required. See section 5.4.3 for time code processing performance.

4.6.2 User Bits

User bits are part of the time code. They are transported along with the time code. No modifications are performed on them. In some cases, the user bits are delayed with respect to the picture. See section 5.4.3 for information on delays.

4.7 Metadata and Telemetry

Metadata (for the DVC-800) is data that carries information about the video image such as time, date, scene number, etc. This data is directly inserted into the DV signal. It can be extracted from the resulting DV file during post-production and used to select desired scenes. Metadata is a powerful tool for video editing.

The DVC-800 can insert and extract metadata is two different ways:

- *Telemetry Mode*: Everything (every character) received via the asynchronous port (RS-232) is inserted in metadata.
- *Control Mode*: Use this mode to configure the OSD and at the same time the information that will be inserted as metadata. This mode should be selected in order to use the configuring software.

The user can select the operating mode using the CTRL/TELEMETRY dip switch. In all cases, the information to be inserted as metadata is sent via the RS-232 connector, and the DVC-800 must connected to a PC or a PDA.

4.7.1 Telemetry Mode

In Telemetry Mode, all data arriving at the RS-232 port is packaged and inserted as metadata into the DV signal. Miranda does not specify the data format, so this mode is suitable for third-party devices using proprietary formats for specialized applications which involve the transfer of metadata into postproduction. As an example, this mode could be used to transfer camera positioning and movement data for integrating camera video into graphical environments.

4.7.2 Control Mode

In Control Mode, the RS-232 port is connected to a PC or PDA running software created by Miranda. This software allows the user to perform two functions:

- Specify the metadata which is to be included in the DV datastream. A list of standard items representing the most-frequently used information is pre-defined, but there are also ten user-defined items which can include any other data which is available.
- Specify which of this metadata will be shown in the On Screen Display (OSD) and how and when it will appear.

The functionality of this software is fully explained in its User Manual.

5 Specifications

5.1 Input Specifications

HD SIGNAL	20-bit Y-Pb-Pr HD as per HDW-F900 Sony Interface	
FORMAT	1920x1080i/59.94	SMPTE-274M
	1920x1080i/60	SMPTE-274M
	1920x1080p/30sF	SMPTE-274M
	1920x1080p/29.97sF	SMPTE-274M
	1920x1080i/50	SMPTE-274M
	1920x1080p/25sF	SMPTE-295M
	1920x1080p/24sF	SMPTE-274M
	1920x1080p/23.98sF	SMPTE-274M
	1280x720p/59.94	SMPTE-296M
	1280x720p/50	SMPTE-296M
	1280x720p/60	SMPTE-296M
CONNECTOR	50-pin camera connector, as per Sony HDW-F900	

HD SDI SIGNAL	4:2:2 SMPTE 292M, SMPTE 299M
RETURN LOSS	> 15 dB up to 1.5 GHz
CONNECTOR	75 Ω BNC

AUDIO CAM (1/2)	per Sony HDW-F900
LEVEL:	LVTTL, 3.3V
CONNECTOR	50-pin camera connector, as per Sony HDW-F900

AES2 (3/4) SIGNAL	AES3
LEVEL:	0.2 to 7.0 Vp-p
IMPEDANCE:	110 Ω balanced
CONNECTOR	XLR-3F

LTC SIGNAL	SMPTE 12M
LEVEL:	0.2 to 5 Vp-p
CONNECTOR	75 Ω BNC

5.2 Output Specifications

HD SDI SIGNAL	4:2:2 SMPTE 292M, SMPTE 299M
RETURN LOSS	> 15 dB up to 1.5 GHz
JITTER	< 0.2 UI p-p
CONNECTOR	75 Ω BNC

SDI SIGNAL	4:2:2 SMPTE 259M, SMPTE 272M
RETURN LOSS	> 15 dB up to 270 MHz
JITTER	< 0.2 UI p-p
CONNECTOR	75 Ω BNC

COMPOSITE SIGNAL	NTSC (525/60) SMPTE 170M PAL (625/50) ITU RT 470
RETURN LOSS	> 20 dB up to 5.75 MHz
SNR	< -58 dB to 5.75 MHz (unweighted)
CONNECTOR	75 Ω BNC

Y SIGNAL	Luminance only (525/60 or 625/50)
RETURN LOSS:	> 20 dB up to 5.75 MHz
SNR	< -58 dB to 5.75 MHz
CONNECTOR:	75 Ω BNC
DV SIGNAL	DV/DVCPRO25 on IEEE-1394a
CONNECTOR	IEEE-1394 6 pin
AUDIO SIGNAL	Stereo unbalanced line out
LEVEL:	1.0 Vp-p
IMPEDANCE	< 600 Ω
SNR	< 70 dB Ref 0 dBFS (A weighted)
CONNECTOR	Mini XLR-5
AUDIO CAM (3/4)	per Sony HDW-F900
LEVEL:	LVTTL, 3.3V
CONNECTOR	50-pin camera connector, as per Sony HDW-F900

5.3 Power Specifications

POWER INPUT:	11 – 17 VDC
POWER CONNECTOR:	XLR-4, and Battery connector “IDX” or “Anton Bauer” or “PAG”
POWER:	10 Watts Max
TEMP. RANGE	0-40^{o} C

5.4 Processing Performance

5.4.1 Video

SIGNAL PATH: 10-bit HD SDI,
10-bit SD SDI,
8-bit COMPOSITE,
8-bit DV

PROCESSING DELAY: HD input to HD SDI output: < 2uS
HD input to SD SDI and COMPOSITE outputs:
- Frame rate of 59.94Hz = 34ms
- Frame rate of 50Hz = 41ms
- Frame rate of 23.98Hz = 83ms

HD input to DV output: Same as for composite + 1.5 SD FRAME
DV input to SD SDI and COMPOSITE output: 1.5 SD FRAME

DV:

COMPRESSION: DV format at 25 Mbps as per DV Blue Book, and DVCPRO25
DV 4:1:1 in NTSC, 4:2:0 in PAL, DVCPRO25 4:1:1 in PAL

5.4.2 Audio

SIGNAL PATH: 24-bit HD SDI,
20-bit SD SDI,
16-bit DV

PROCESSING DELAY: AES to Analog out
- Frame rate 59.94Hz = 34ms
- Frame rate 50Hz = 40ms
- Frame rate 23.98Hz = 83ms

5.4.3 Time Code

Source→ Dest.	Time Code	User Bits
LTC→ SD,DV	1fr compensation	1fr delay
DVITC → SD,DV	Transparent	Transparent
DV → SD	1fr compensation	Transparent
LTC → HD DVITC	2fr compensation	1fr delay
DVITC → HD DVITC	Transparent	Transparent

Transparent = Remains unprocessed, i.e. Out = In
Compensation = Time code is compensated for delays
Delay = The user bits will lag the video by 1 frame.