

HDV Editing Made Simple (And Fast)

Convergent Design

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HDV Editing Made Simple (And Fast)

Two Simple Rules

1. Convert HDV → I-Frame CODEC
2. Keep it All Digital

Rule #1

Convert HDV → I-Frame CODEC
(or uncompressed)

What is HDV?

- MPEG2 Compression applied to HD Video
- Stored on Mini-DV Tape
- Two Formats:
 - 1920x1080 Interlaced (Sony, Canon)
 - 1280x720 Progressive (JVC)
- Excellent acquisition format, but difficult to edit

HDV Advantages (for acquisition)

- Low data-rate, ideal for tape
- Provides HD Video at same data-rates of SD Video (DV)
- Uses spatial (I-Frame) and temporal (P,B-Frame) to improve compression efficiency
- Approximately 4.5x better compression over DV

HDV Disadvantages (for editing)

- Heavy CPU Processing Load
- Dreaded “HDV Conform”, is extremely time consuming, 4x-12x Real Time
- 4:2:0 Color Space
- No real-time full-resolution playback from time-line (without conform)

I-Frame CODEC Advantages (for editing)

- Low CPU processing load
- No Conforming Video, Only Renders
- 4:2:2 Color Space (DVCPPro, DNxHD)
- Relatively low data rates with excellent quality
- Fast, multiple stream playback, full-resolution from timeline

HDV Conform Vs. I-Frame Render

HDV Conform

- Recreation of entire MPEG stream after any edits
- Extremely time consuming
- Real-Time playback from timeline not possible

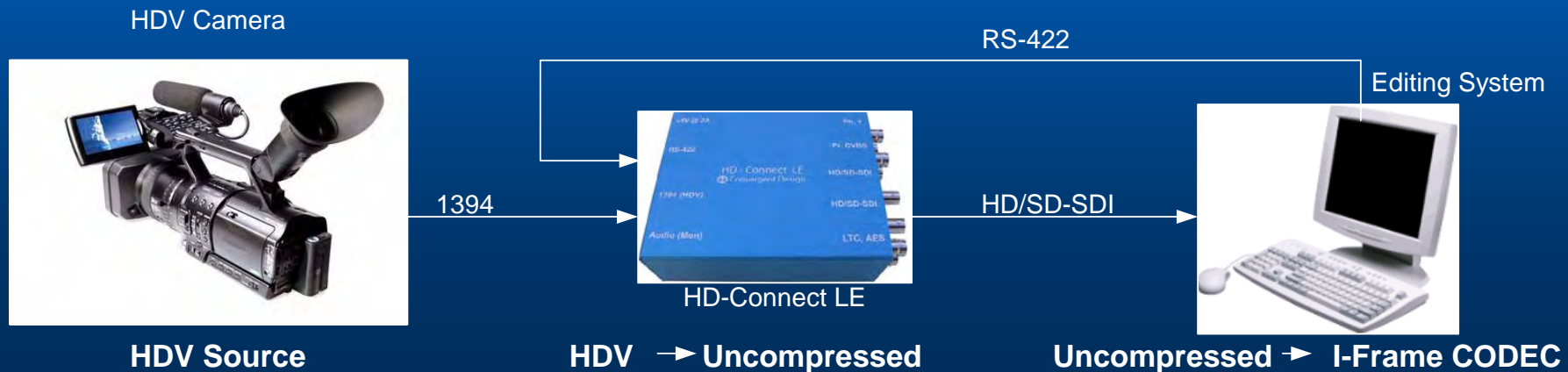
I-Frame Render

- Recreation of only the “edited video”
- Multiple streams can be played back from timeline in real-time

Native HDV Vs. I-Frame

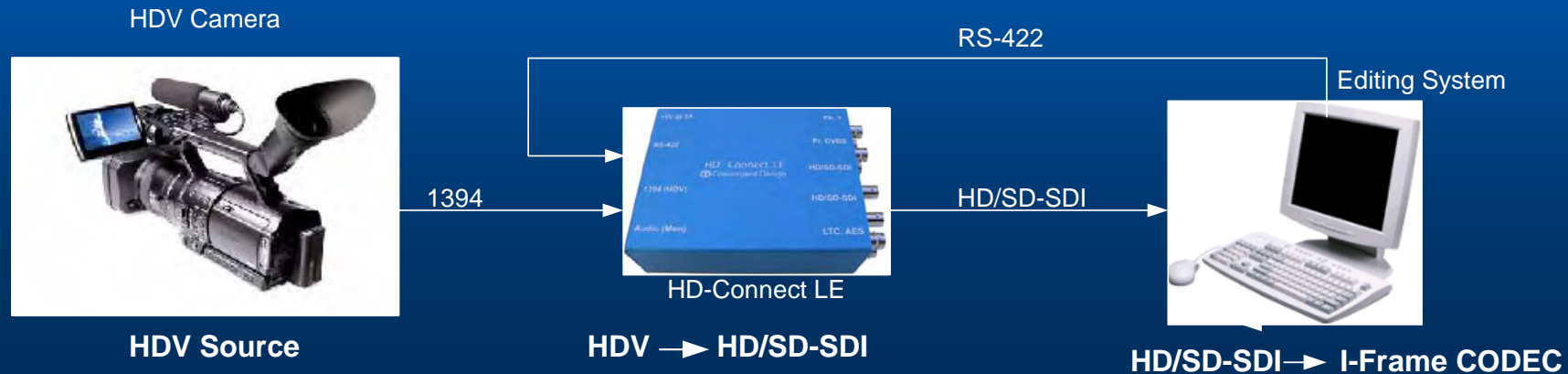
	<u>HDV-1080i</u>	<u>HDV-720p</u>	<u>DVCPProHD</u>	<u>DNxHD</u>	<u>Uncompressed</u>
Data-rate (Mbytes/sec)	3.6	2.4	12.5	20	125
GB/Hour	13	9	45	72	450
Sampling	4:2:0	4:2:0	4:2:2	4:2:2	4:2:2
GOP (Group of Pictures)	15/12	6	1	1	1
Compression Time	12x	10x	3x	3x	NA
De-Compression Time	3x	2x	1x	1x	NA
Disk Drive Requirements	IDE	IDE	SATA	SATA RAID	SCSI RAID

HDV → I-Frame CODEC



- Real-time Capture of HDV
 - HD-Connect LE decodes (de-compresses) HDV to HD/SD-SDI
 - Software CODEC in Mac/PC encodes (compresses) stream to I-Frame CODEC
- Utilizes low-cost HD/SD-SDI capture card
- Divides task into two real-time processes:
 - HDV Decode (Hardware)
 - I-Frame Encode (Software)

HDV → I-Frame CODEC

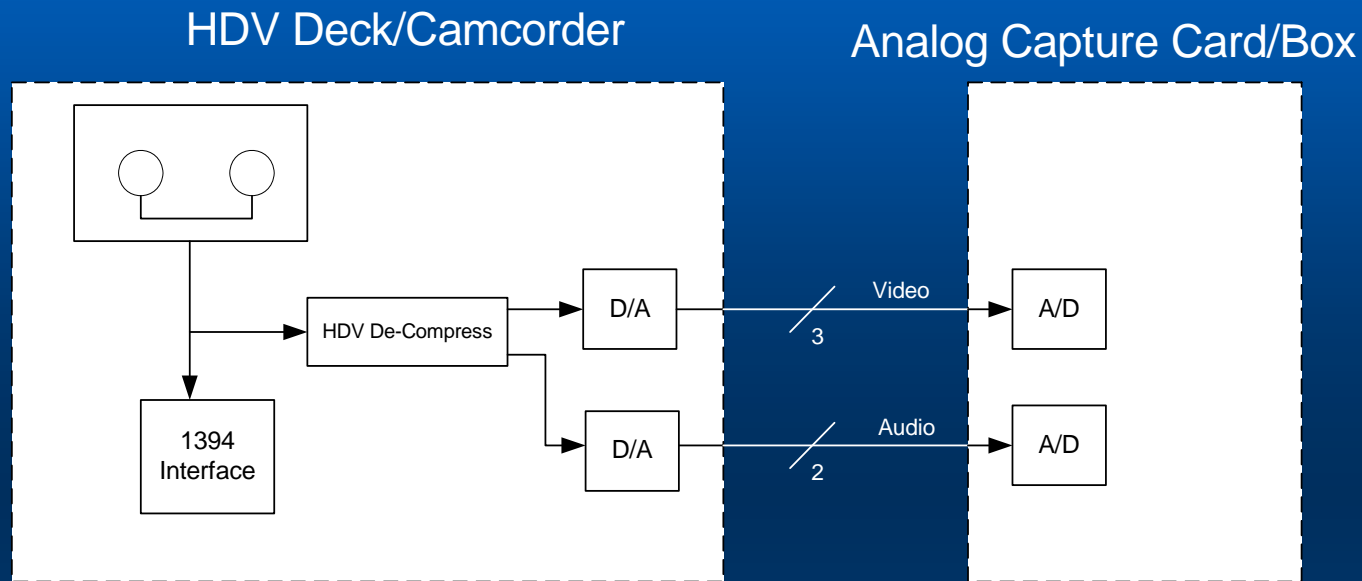


- No lengthy HDV Conform operation
- Deck control via RS-422
- Relatively low disk drive I/O requirements
- Simple Connection
- Fast Workflow

Rule #2

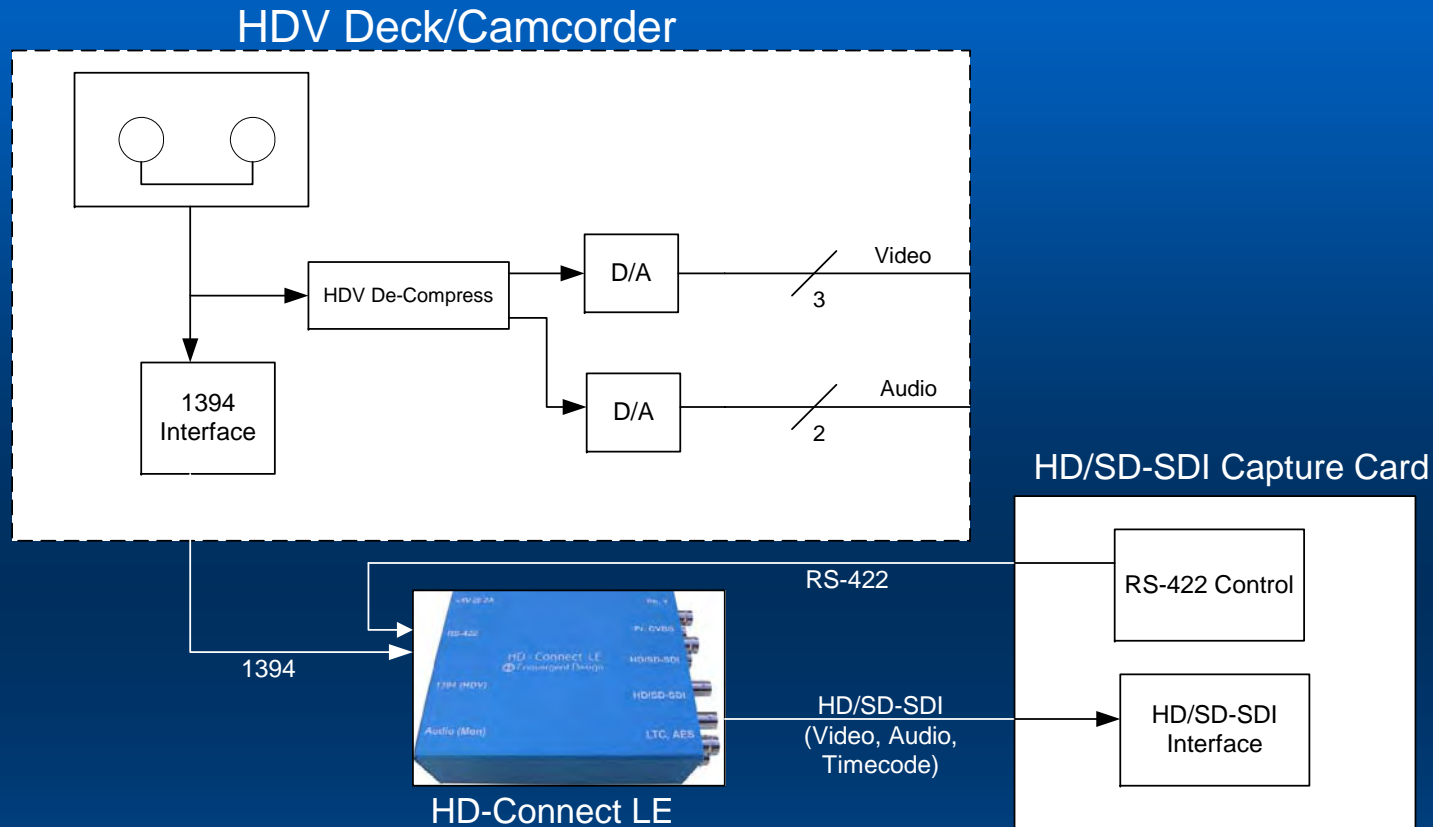
Keep it All Digital

The Analog Approach



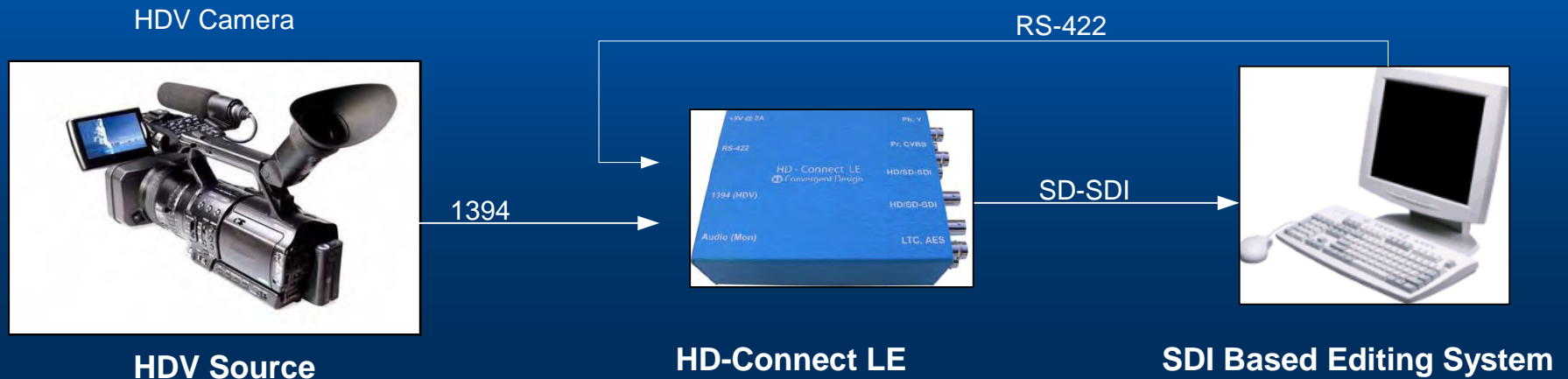
- Analog approach requires additional D/A and A/D conversion, reducing video/audio quality
- Deck control can be complicated (RS232 to LANC)
- Requires expensive capture card

The All Digital Approach



- All digital, no A/D or D/A quality loss
- Simple deck control
- Uses low-cost HD/SD-SDI capture card

HDV → SD Conversion



- HD-Connect LE can decode (de-compress) HDV and scale to SD in hardware (letterbox or edge-crop output)
- SD Video captured into I-Frame CODEC (DVCPPro50) or even uncompressed (21 Mbytes/sec)
- Excellent SD Video quality, superior to DV down-convert (from camcorder)
- Tremendous time saver over software approach

1080i ↔ 720p Conversion

- HD-Connect LE also supports cross conversions
 - 1080i HDV → 720p
 - 720p HDV → 1080i
- Allows users to bring all material into the same timeline
- Simultaneous HDV Decode & Cross Convert

Summary

Two Simple Rules

1. Convert HDV → I-Frame CODEC (or uncompressed)
 2. Keep it all digital.
- Use external hardware (HD-Connect LE) for HDV → Uncompressed conversion (HD/SD-SDI output)
 - Connect HD/SD-SDI output to low-cost capture card and use software I-Frame CODEC (DVCPProHD, DNxHD)
 - Eliminate the dreaded “HDV Conform”
 - Take advantage of hardware down-scaling or cross conversions (in HD-Connect LE) for additional time savings.

More Information

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