Cisco D9894 HD/SD AVC Low Delay Contribution Decoder

The Cisco® D9894 HD/SD AVC Low Delay Contribution Decoder is an audio/video decoder that utilizes advanced MPEG 4 AVC compression to perform real-time decoding of HDTV at low bit rates over DVB and broadband IP networks. Combined with the Cisco D9093, D9094, or D9094SE AVC Encoder, the Cisco D9894 provides powerful error correction functions that ensure high-quality of service over IP networks by preventing the distortion of decoded images, even when network packet losses occur. With its compact size and rugged construction, the Cisco D9894 reduces the cost of transmission from remote locations that demand HDTV image quality.

Figure 1.   Cisco D9894 HD/SD AVC Low Delay Contribution Decoder

The Cisco D9093, D9094, and D9894 supports transmission of HDTV with 4:2:2 chroma resolution. This is achieved by the 4:2:2 Chroma Scalable Coding (422CSC) concept, which enables standard AVC decoders to decode the 4:2:0 part of the stream, while the D9894 HD/SD AVC Contribution Decoder is capable of decoding the full 4:2:2 chroma resolution.

Applications

Applying the latest H.264 High Profile at Level 4 image processing algorithms, the Cisco D9894 provides best-of-class video quality for use in Electronic News Gathering (ENG) and broadcast contribution networks. Combined with the D9093, D9094, or D9094SE encoder, sophisticated H.264 compression algorithms are utilized, and the streaming bit rate is reduced by more than half compared to MPEG-2 encoding, while still achieving the same video quality. The Cisco D9894 interoperates with various D9093, D9094, and D9094SE encoder delay modes (such as standard and unique low-delay), allowing this codec to be used in delay-sensitive ENG applications.

With 4:2:2CSC, the Cisco D9094/D9093 codec and D9894 decoder also provides high quality video for use in high-end event transmission and studio-to-studio links where 4:2:2 chroma resolution is sometimes required. The 4:2:2CSC enables an easy transition from 4:2:0 to 4:2:2, as existing 4:2:0 AVC decoders can be used to decode the 4:2:0 part of the signal.

The Cisco D9894 utilizes auto-sensing 10BT/100BT/1G Ethernet for IP connectivity and, as an option, ASI input ports for connecting to DVB networks. The unit also provides industry standard HD/SD-SDI and HDMI outputs for connecting to HDTV camcorders and displays. Bidirectional voice intercom capability is provided across broadband networks for interactive communication between remote and studio locations when used together with the Cisco D9093 or D9094 encoder.

Features - Software Version 4.3

- 4:2:0 High Definition MPEG-4 AVC decoding
  - HP @ L4, 1080i, 720p (59.94/50 Hz)
  - Low-delay mode: 300 ms @ ASI, 450ms @ IP, with Cisco D9093, D9094, or D9094SE encoder
- 4:2:0 Standard MPEG-4 AVC decoding
  - MP @ L3, 720 x 480i, 720 x 576i (59.94/50 Hz)
  - Low-delay mode: 300 ms @ ASI, 450ms @ IP, with Cisco D9093, D9094, or D9094SE encoder
- 4:2:2CSC Standard Definition and High Definition MPEG-4 AVC decoding
  - 4:2:2CSC compression is a unique compression scheme that enables standard 4:2:0 decoders to decode the 4:2:0 part of the compressed video.
  - Low-delay mode: 360 ms @ ASI, 510 ms @ IP, with D9093 or D9094 Encoder
- Four embedded AES pairs
  - MPEG-1 Layer II Audio
  - MPEG-2 AAC Audio
  - SMPTE-302M uncompressed audio and Dolby™ E pass-through
- VANC Support
- Advanced error correction functions help to ensure high quality of service
  - Pro-MPEG FEC
  - FEC and ARQ
  - For video transmission using IP network, Forward Error Correction (FEC) and Automatic Repeat Request (ARQ) are provided for network error correction. The combined use of FEC and ARQ provides high quality of service.
  - ARQ enables retransmission of packets lost in the network, and the user may adjust the retransmission buffer size to optimize the end-to-end delay.
- Decryption - BISS 1/E
- Bidirectional Voice Intercom over IP
- SNMP v2 control and traps, ROSA® Driver

Optional Features

- DVB-ASI Input module

Product Specifications

Table 1.   Product Specifications - Software Version 4.3

Parameter	Value
Video	
Genlock Input	1 x NTSC/PAL Black Burst or HD Tri-level Sync
Output	1 x HD-SDI or SD-SDI 1 x HDMI 1 x NTSC/PAL
Video Format	
Decoding	1920/1440/960 (59.94 / 50 Hz) 1280/960/640 (59.94 / 50 Hz) 720 x 480i (59.94 Hz), 720 x 576i (50 Hz)
Video Decoding	
HD	4:2:0 - H.264 MP and HP @ L4, 3 to 27 Mbps 4:2:2CSC - 12 to 38 Mbps
SD	4:2:0 H.264 MP and HP @ L3, 1.3 to 10 Mbps 4:2:2CSC - 6 to 14 Mbps

Delay (nominal) Encode & Decode – D9094/D9894 @ HD, at 12 Mbit/s

GOP mode		1080i		720p	
	Field/Frame frequency	59.94 Hz	50 Hz	59.94 Hz	50 Hz
Ultra Low	IP @ 4:2:0	0.43s	0.45s	0.41s	0.44s
	IP @ 4:2:2CSC	0.46s	0.48s	0.43s	0.45s
	DVB-ASI @ 4:2:0	0.28s	0.30s	0.26s	0.29s
	DVB-ASI @ 4:2:2CSC	0.31s	0.33s	0.28s	0.30s
Low	IP @ 4:2:0	0.69s	0.70s	0.65s	0.67s
	IP @ 4:2:2CSC	0.71s	0.74s	0.67s	0.70s
	DVB-ASI @ 4:2:0	0.54s	0.55s	0.50s	0.52s
	DVB-ASI @ 4:2:2CSC	0.56s	0.59s	0.52s	0.55s
Standard	IP @ 4:2:0	1.19s	1.28s	1.03s	1.10s
	IP @ 4:2:2CSC	1.23s	1.34s	1.08s	1.14s
	DVB-ASI @ 4:2:0	1.04s	1.13s	0.88s	0.95s
	DVB-ASI @ 4:2:2CSC	1.08s	1.19s	0.93s	0.99s

Delay (nominal) Encode & Decode – D9093/D9094/D9894 @ SD, at 6 Mbit/s

GOP mode	Field frequency	59.94 Hz	50 Hz
Ultra Low	IP @ 4:2:0	0.41s	0.44s
	IP @ 4:2:2CSC	0.44s	0.46s
	DVB-ASI @ 4:2:0	0.26s	0.29s
	DVB-ASI @ 4:2:2CSC	0.29s	0.31s
Low	IP @ 4:2:0	0.55s	0.58s
	IP @ 4:2:2CSC	0.58s	0.61s
	DVB-ASI @ 4:2:0	0.40s	0.43s
	DVB-ASI @ 4:2:2CSC	0.43s	0.46s

Parameter		Value	
Standard	IP @ 4:2:0	1.05s	1.12s
	IP @ 4:2:2CSC	1.12s	1.20s
	DVB-ASI @ 4:2:0	0.90s	0.97s
	DVB-ASI @ 4:2:2CSC	0.97s	1.05s
Ancillary Data			
HD		Private PES • 59.94 Hz: SMPTE RDD 11-2007 • 50 Hz: Proprietary (SMPTE RDD 11-2007 base)	
		ATSC Closed Caption (at encoder) • 59.94 Hz: ATSC Closed Caption (ATSC CS/TSG-659r4(A/72)) • 50 Hz: Proprietary (ATSC CS/TSG-659r4(A/72) equivalent)	
SD		Private PES • 59.94 Hz: SMPTE RDD 11-2007 • 50 Hz: Proprietary (SMPTE RDD 11-2007 base)	
		ATSC Closed Caption (at encoder) • 59.94 Hz: ATSC Closed Caption (ATSC CS/TSG-659r4(A/72)) • 50 Hz: Proprietary (ATSC CS/TSG-659r4(A/72) equivalent)	
VBI			
Output		NTSC Closed Caption Line 21 and Line 261 (when encoded with the Cisco D9094 or the D9094SE encoder)	
Audio			
Output		4 x AES pairs embedded in SDI (48 kHz) 1 x HDMI 1 x Analog Stereo Pair (Balanced)	
Audio Coding			
Program		MPEG-1 L2 MPEG-2 AAC SMPTE-302M uncompressed audio (Dolby E pass-through)	
Voice Intercom		G.711	
Transport Interface			
Interface Type		10BASE-T/100BASE-TX/1000BASE-T DVB-ASI (optional)	
Error Correction		FEC and ARQ Pro-MPEG FEC	
Decryption on ASI		BISS 1/E	
Environmental Specifications			
Operating Temperature		-10° – 55°C (14° – 131°F)	
Chassis Mechanical Specifications			
Height		4.2 cm (1.65 in.)	
Width		42.5 cm (16.73 in.)	
Depth		35.0 cm (13.8 in.)	
Weight		6 kg (13.2 lb)	

Parameter	Value
Power	
Voltage Range	100 to 240 VAC
Line Frequency	50/60 Hz
Power Consumption	60 W maximum at 100 VAC 90 W maximum with option at 100 VAC

Figure 2. D9894 AVC HD/SD AVC Low Delay Contribution Decoder Rear Panel (Base unit - No Option card installed)

Table 2. Ordering Information

Description	Part Number
D9894 SD/HD AVC Decoder	
D9894 AVC HD/SD Decoder, IP In	40297680
D9894 AVC HD/SD Decoder, IP and ASI In	40297682
ROSA Drivers	
ROSA Driver for Cisco D9894	70187360
Country Specific Power Cords	
Argentina	207340
China	745415
Australia	1000897
Europe	3989835
United Kingdom	3989836
United States	3989838
Italy	3993130
Japan	3993133