

## 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					
<b>Video</b>							
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					
<b>Video Format</b>							
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)					
<b>Video Decoding</b>							
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					
<b>Delay (nominal) Encode &amp; Decode – D9094/D9894 @ HD, at 12 Mbit/s</b>							
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		
<b>Delay (nominal) Encode &amp; Decode – D9093/D9094/D9894 @ SD, at 6 Mbit/s</b>							
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
<b>Ancillary Data</b>			
HD	Private PES		
	<ul style="list-style-type: none"> <li>59.94 Hz: SMPTE RDD 11-2007</li> <li>50 Hz: Proprietary (SMPTE RDD 11-2007 base)</li> </ul>		
SD	ATSC Closed Caption (at encoder)		
	<ul style="list-style-type: none"> <li>59.94 Hz: ATSC Closed Caption (ATSC CS/TSG-659r4(A/72))</li> <li>50 Hz: Proprietary (ATSC CS/TSG-659r4(A/72) equivalent)</li> </ul>		
SD	Private PES		
	<ul style="list-style-type: none"> <li>59.94 Hz: SMPTE RDD 11-2007</li> <li>50 Hz: Proprietary (SMPTE RDD 11-2007 base)</li> </ul>		
	ATSC Closed Caption (at encoder)		
	<ul style="list-style-type: none"> <li>59.94 Hz: ATSC Closed Caption (ATSC CS/TSG-659r4(A/72))</li> <li>50 Hz: Proprietary (ATSC CS/TSG-659r4(A/72) equivalent)</li> </ul>		
<b>VBI</b>			
Output	NTSC Closed Caption Line 21 and Line 261 (when encoded with the Cisco D9094 or the D9094SE encoder)		
<b>Audio</b>			
Output	4 x AES pairs embedded in SDI (48 kHz) 1 x HDMI 1 x Analog Stereo Pair (Balanced)		
<b>Audio Coding</b>			
Program	MPEG-1 L2 MPEG-2 AAC SMPTE-302M uncompressed audio (Dolby E pass-through)		
Voice Intercom	G.711		
<b>Transport Interface</b>			
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		
<b>Environmental Specifications</b>			
Operating Temperature	-10° – 55°C (14° – 131°F)		
<b>Chassis Mechanical Specifications</b>			
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
<b>Power</b>	
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
<b>D9894 SD/HD AVC Decoder</b>	
D9894 AVC HD/SD Decoder, IP In	40297680
D9894 AVC HD/SD Decoder, IP and ASI In	40297682
<b>ROSA Drivers</b>	
ROSA Driver for Cisco D9894	70187360
<b>Country Specific Power Cords</b>	
Argentina	207340
China	745415
Australia	1000897
Europe	3989835
United Kingdom	3989836
United States	3989838
Italy	3993130
Japan	3993133

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