

## Cisco D9894 HD/SD AVC Low Delay Contribution Decoder

### Product Overview

The Cisco D9894 AVC 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 D9093/D9094 AVC Encoder, the D9894 Decoder 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 D9894 Decoder reduces the cost of transmission from remote locations that demand HDTV image quality.

**Figure 1.** Cisco D9894 AVC Decoder



The D9094 Codec and the D9894 Decoder now also support transmission of HDTV with 4:2:2 chroma resolution. This is achieved very elegantly by a concept called Chroma Scalable Coding (CSC), that enables standard AVC decoders to decode the 4:2:0 part of the stream, while the D9894 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 D9894 Decoder provides best-of-class video quality for use in Electronic News Gathering (ENG) as well as broadcast contribution networks. Combined with the D9093/D9094 AVC 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 D9894 Decoder interoperates with various D9093/D9094 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 D9094 Codec and D9894 Decoder also provides high video quality for use in high-end event transmission and studio-to-studio links where 4:2:2 chroma resolution is sometimes required. 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.

As a result, HDTV content can now be transmitted at lower bandwidths over existing DVB satellite or low-cost broadband IP networks.

The D9894 Decoder 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. A bi-directional voice intercom capability is provided across broadband networks for interactive communications between remote and studio locations, when used together with the D9093/D9094 Encoder.

### Features – Software Version 4.0

- 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 D9093/D9094 Encoder
- 4:2:0 Standard MPEG-4 AVC decoding
  - MP@L3, 720x480i, 720x576i (59.94/50 Hz)
    - Low-delay mode: 300 ms@ASI, 450ms@IP, with D9093/D9094 Encoder
- 4:2:2csc 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.
- Four Embedded AES pairs
  - MPEG-1 Layer II Audio
  - MPEG-2 AAC Audio
  - SMPTE 302M uncompressed audio & Dolby E pass-through
  - AC-3 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 re-transmission buffer size to optimize the end-to-end delay.
- Decryption - BISS 1/E
- Bi-directional Voice Intercom over IP
- SNMP v2 control and traps, ROSA<sup>®</sup> Driver

### Optional Features

- ASI Input module

### Anticipated Future Factory Options

- Dual ASI Input module

## Product Specifications

**Table 1.** Product Specifications – Software Version 4.0

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 & HP @ L4, 3 to 27 Mbps 4:2:2csc - 12 to 38 Mbps
SD	4:2:0 H.264 MP & HP @ L3, 1.3 to 10 Mbps
<b>Delay (nominal) Encode &amp; Decode – when combined with D9094 @ HD</b>	
IP Ultra Low @ 4:2:0	0.43s (59.94 Hz), 0.45s (50 Hz)
IP Low @ 4:2:0	0.69s (59.94 Hz), 0.70s (50 Hz)
IP Standard @ 4:2:0	1.19s (59.94 Hz), 1.28s (50 Hz)
IP Standard @ 4:2:2csc	1.22s (59.94 Hz), 1.33s (50 Hz)
DVB-ASI Ultra Low @ 4:2:0	0.28s (59.94 Hz), 0.30s (50 Hz)
DVB-ASI Low @ 4:2:0	0.54s (59.94 Hz), 0.55s (50 Hz)
DVB-ASI Standard @ 4:2:0 & 4:2:2csc	1.07s (59.94 Hz), 1.18s (50 Hz)
<b>Delay (nominal) Encode &amp; Decode – when combined with D9093/D9094 @ SD</b>	
IP Ultra Low	0.41s (59.94 Hz), 0.44s (50 Hz)
IP Low	0.55s (59.94 Hz), 0.58s (50 Hz)
IP Standard	1.05s (59.94 Hz), 1.12s (50 Hz)
DVB-ASI Ultra Low	0.26s (59.94 Hz), 0.29s (50 Hz)
DVB-ASI Low	0.40s (59.94 Hz), 0.43s (50Hz)
DVB Standard	0.90s (59.94 Hz), 0.97s (50 Hz)
<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>
	ATSC Closed Caption (@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 (@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>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>	

Parameter	Value
Program	MPEG-1 L2 MPEG-2 AAC SMPTE-302M uncompressed audio (Dolby E pass-through) AC-3 pass-through (ATSC/DVB)
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°C to 55°C (14°F to 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)
<b>Power</b>	
Voltage Range	100 to 240 VAC
Line Frequency	50/60 Hz
Power Consumption	60 W maximum @ 100 VAC 90 W maximum with option @ 100 VAC



**Figure 2.** D9894 AVC HD/SD Decoder Rear Panel (Base unit – No Option card installed)

**Ordering Information**

**Table 2.** Ordering Information

Cisco D9894 SD/HD AVC Decoder	Part Number
D9894 AVC HD/SD Decoder, IP In	40297680
D9894 AVC HD/SD Decoder, IP & ASI In	40297681
<b>Power Cords</b>	
UK power cord	1002798
Euro power cord	503414
Australia power cord	1002604
Argentina power cord	1002655
Brazil power cord	1003648
China power cord	1003670
India power cord	1003667
<b>ROSA Drivers</b>	
ROSA driver for D9894 Decoder	7018619



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Part Number 7017630 Rev B  
 June 2009