

Cisco D9096 4:2:2 10-Bit AVC Encoder

The Cisco® D9096 4:2:2 10-Bit AVC Encoder (Figure 1) is a new encoder designed for contribution applications that employ the latest 4:2:2 10-bit Advanced Video Coding (AVC) codec. The product is available in single- or dual-encoder configurations with IP and Asynchronous Serial Interface (ASI) output. The customer can choose between options for 8-bit or 10-bit chroma subsampling, 4 or 8 pairs of audio, 1080p60 input support, and optional discrete audio inputs.

Figure 1. Cisco D9096 4:2:2: AVC Encoder



The Cisco D9096 also supports MPEG-2 and AVC-I codecs, making it a highly complementary product to the Cisco Digital Content Manager Gateway (DCM-G) for fixed-contribution applications that need to support a variety of codecs, bitrates, and use cases. The D9096 can encode video at up to 120 Mbps, which is suitable for the highest-bitrate-compressed applications.

Along with a high-quality and versatile video encoding engine, the D9096 offers a comprehensive audio encoding feature set, with support for phase-aligned audio, Dolby E decoding, and Dolby Digital and Digital Plus encoding. The IP output allows the user to stream from any physical port, including the management port, and set up a variety of redundancy schemes.

The Cisco D9096 front panel has an alphanumeric keypad and assignable shortcut keys, which streamline operations when a web browser is not available. A thin film transistor (TFT) display on the front panel shows the input video and format. An intuitive web interface meets all operational expectations, and the Cisco ROSA® Video Services Manager (VSM) offers management, monitoring, and redundancy for the D9096.

Encoding Features

- Encoding of standard-definition (SD) and high-definition (HD) MPEG-4 AVC, with 4:2:0 8-bit and 4:2:2 8- and 10-bit support
- AVC-I mode with support of up to 120 Mbps
- Encoding of standard-definition and high-definition MPEG-2 4:2:0 and 4:2:2 8-bit chroma sub-sampling
- Flexible Group of Pictures (GOP) controls and settings
- Latency settings to adjust the tradeoff between latency and quality
- Best-in-class picture quality

Output Features

- Primary and redundant IP settings for each IP configuration
- Four separate IP configurations for streaming over multiple networks
- Streaming from any IP port (including management)
- User Datagram Protocol (UDP) or RTP with SMPTE-2022 CoP3 forward error correction (FEC) support
- High-density dual-channel configuration
- Standards-based ancillary data support for reliable interoperability
- SMPTE-2038 support to allow metadata flexibility
- Redundancy support through Cisco ROSA VSM

Audio Features

- Support for up to 16 audio inputs in SDI
- Support of Phased Aligned Audio (PAA)
- Passthrough and encoding (AAC, Dolby Digital, Dolby Digital Plus, and Layer 2 support
- Configurable 32-384 kbps bitrate audio encoding

Ease of Use Features

- Customizable “quick access” settings areas in the web GUI
- TFT display on front panel for confidence monitoring
- Front-panel-assignable shortcut keys for ease of use
- Up to 128 profiles storable on the unit for quick reconfiguration
- Boot-up in less than 35 seconds

Specifications

Table 1 lists specifications for the Cisco D9096 Encoder.

Table 1. Product Specifications

Feature	Description
Video Specifications	
Video compression	MPEG-4 AVC/H.264 (4:2:0/4:2:2 8-bit, 4:2:0/4:2:2 10-bit), MPEG-2 (4:2:0/4:2:2 8-bit) SD: 0.5 to 30Mbps; HD: 1 to 80Mbps MPEG-4 AVC I frame-only mode up to 110Mbps
Resolutions and frame rates	1080i at 25, 29.97, 30 Hz/1080p at 23.97, 24, 25, 50, 59.94 Hz 720p at 50, 59.94, 60 Hz 576i at 25 Hz/480i at 29.97, 30 Hz
Video processing	CABAC, CAVLC, MBAFF, PAFF, Resize, and Noise Reduction filters Fixed Group of Pictures (GOP), Adaptive GOP, Open GOP, Close GOP Input format detection and autoconfiguration mode Automatic I (intra)frame insertion and scene-cut detection Multipass look-ahead CBR and Capped VBR, and logo insertion
Ancillary data, signaling, and digital program insertion (DPI)	AFD, WSS, WST, VPS, VPI, VITC, ATC, CC, DPI, DVB TELETEXT, VChip, SMPTE2031, OP47 SCTE35 insertion through SCTE104 triggers

Feature	Description
Audio Specifications	
Audio compression	MPEG-1 Layer 2 Dolby Digital E, DD, DD+, AC3, AC3+, PCM passthrough MPEG-2/MPEG-4 AAC-LC, HEV1-AAC, HEV2-AAC Dolby Digital E decode and Dolby Digital (AC3) encode Dolby Digital Plus (AC3+) encode Support for up to 16 channels of audio
Output Specifications	
Transport layer	MPEG-2 TS over UDP, unicast, and multicast streaming MPEG-2 TS over RTP with SMPTE-2022 CoP3 FEC MPEG-2 TS over DVB-ASI (EN 50083-9) ASI and IP streaming simultaneously Conformance to standards: MPEG-2 TS, DVB, ATSC, and ISDB-Tb
Input/Output Specifications	
Video input	SD-SDI (SMPTE 259M-C) HD-SDI (SMPTE292M) 3G-SDI (SMPTE-424M)
Audio input	Embedded in SDI (up to 8 pairs per video input) AES-EBU input (up to 8 pairs with optional AES board)
Output interfaces	1 GbE port for out-of-band for management 2 GbE ports for service streaming 2 DVB-ASI outputs per video channel (75-ohm BNC connector)
Configuration and Management	
	HTML web GUI Front panel with LCD menus and 17 keys for input and navigation SNMP (MIB v2c) and ROSA VSM support
Physical and Environmental	
	Dimensions (1RU): 19 in. x 1.73 in. x 20.4 in. (482 mm x 44 mm x 519 mm) Minimum weight: 14.1 lb. (6.4 kg) Maximum weight: 17 lb. (7.3 kg) Cooling airflow from front to back, and user-serviceable air filters Redundant power supply: 100-240 VAC, 50/60 Hz Typical consumption: 70W (single channel) Operating temperature: 41° to 149°F (5° to 65°C) Storage temperature: 32° to 158°F (-20° to 70°C) Operating humidity: 5 to 90% (noncondensing)

Ordering Information

Table 2 lists ordering information for the Cisco D9096.

Table 2. Ordering Information

PID	Description
D9096-1C8-NU-K9	D9096 single-channel 8-bit (nonupgradeable) 4:2:2 AVC Encoder with 4 audio support
D9096-1C8-K9	D9096 single-channel 8-bit 4:2:2 AVC Encoder with 4 audio support
D9096-2C8-K9	D9096 dual-channel 8-bit 4:2:2 AVC Encoder with 4 audio support
D9096-1C10-K9	D9096 single-channel 10-bit 4:2:2 AVC Encoder support
D9096-2C10-K9	D9096 dual-channel 10-bit 4:2:2 AVC Encoder support
D9096-1C10-60-K9	D9096 single-channel 10-bit 4:2:2 AVC Encoder with 1080p60 support
D9096-2C10-60-K9	D9096 dual-channel 10-bit 4:2:2 AVC Encoder with 1080p60 support
D9096-1C8-A-K9	D9096 single-channel 8-bit 4:2:2 AVC Encoder with 4 audio support and discrete audio
D9096-2C8-A-K9	D9096 dual-channel 8-bit 4:2:2 AVC Encoder with 4 audio support and discrete audio
D9096-1C10-A-K9	D9096 single-channel 10-bit 4:2:2 AVC Encoder with discrete audio
D9096-2C10-A-K9	D9096 dual-channel 10-bit 4:2:2 AVC Encoder with discrete audio
D9096-1C10-60-A-K9	D9096 single-channel 10-bit 4:2:2 AVC Encoder with 1080p60 support with discrete audio
D9096-2C10-60-A-K9	D9096 dual-channel 10-bit 4:2:2 AVC Encoder with 1080p60 support with discrete audio



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