

Cisco D9036 Modular Encoding Platform

The Cisco[®] D9036 Modular Encoding Platform provides multi-resolution, multi-format encoding for applications requiring high levels of video quality. The modular platform is scalable to support as many as eight Standard Definition (SD), four High Definition (HD), or other combinations of video encoders within a single rack unit, while providing excellent broadcast quality video and consuming as little as 40 Watts per service.

Figure 1. Cisco D9036 Modular Encoder



Chassis Overview

The D9036 chassis features dual redundant, hot-swappable power supplies and capacity for up to six modules. The chassis supports advanced internal common synchronization mechanisms which can be used to synchronize the various services being hosted. Dedicated management and auxiliary input ports are also provided for remote Web GUI control. All modules are field-replaceable to allow for fast service with minimum down time.

Modular Video Input (MVI)

The MVI module provides an SDI input to the chassis. SDI inputs are both SDI and HD-SDI compatible. The module supports VBI and HANC extraction, and processing for ancillary services and audio de-embedding. Video and audio data are routed from the SDI inputs of the MVI module through the D9036 encoder to MVC video and MMA audio modules. The module is available in two variants, providing either four or eight inputs.

Modular Video Codec (MVC)

The MVC module provides video encoding in the D9036 platform. Each module is capable of encoding up to two HD services or four SD services in either AVC or MPEG-2 format. These functions are provided on common hardware with license control, making resolution or encoding format changes in the field as easy as loading a license file. Video encoding capabilities include support for 50 Hz and 60 Hz content with a variety of horizontal resolutions. In addition to 576-line and 480-line SD resolutions, the module is capable of HD 1080i and 720p.

Modular Multichannel Audio (MMA)

The MMA module provides audio encoding services. The module supports encoding of up to 32 simultaneous stereo audio sources. Licenses are used to enable various numbers and formats of audio encoding, allowing for easy field upgrade to new formats in the future. The module supports MPEG-1 LII, AAC, Dolby[™] Digital and Dolby Digital Plus audio formats. The audio encoding capabilities can be shared across services in the D9036 encoder, providing flexible use of resources across SD and HD channels with different audio encoding requirements, all within the same chassis.

Modular Input/Output (MIO)

The MIO module provides advanced ASI and Ethernet input and output capabilities. It features two ASI ports. Encoded services can be transmitted on one or more physical interfaces in a variety of different transport streams. The Ethernet connection supports multicast with IGMP and provides support for advanced redundant IP configurations.

Features

- 1080i and 720p support
- Deblocking and Motion Compensated Temporal Filtering (MCTF) support
- Closed Captioning support via SMPTE-334M
- SD/HD-SDI embedded audio support
- Dual redundant, hot-swappable power supplies
- Dolby Digital, Dolby Digital Plus, AAC/HE-AAC, and Dolby-E audio pass-through support
- Dual ASI and Quad IP outputs (100/1000BASE-T) in a 2+2 redundant configuration
- Multi-service streaming IP outputs
- Web-based GUI for device management
- Active Format Description (AFD) Signaling, manual or automatic
- Statmux over IP support
- DVB[®]/EBU/PowerVu[®] VBI
- DPI SCTE-35 Signaling via contact closures and SCTE-104 VANC messages

Options

- HD AVC, SD AVC, MPEG-2 HD, and MPEG-2 SD video encoding
- ROSA[®] and ROSA Video Services Manager (VSM) driver
- Dolby Digital and Dolby Digital Plus audio encoding
- MPEG-1 LII stereo encoding
- AAC-LC, HE-AAC V1, and HE-AAC V2 audio encoding
- Deblocking and MCTF filtering

Specifications

 Table 1.
 Product Specifications

Feature	Description	
Video Specifications		
Video Input		
SDI input	SMPTE-292M, SMPTE-259M, SMPTE-296M, SMPTE-274, SMPTE- 424M ready	
Systems	1080i @ 29.97 Hz, 1080i @ 25 Hz, 720p @ 59.94 Hz, 720p @ 50 Hz, 576i @ 25Hz, 480i @ 29.97 Hz	
Impedance	75 ohms unbalanced	
Input level	800 mVpp nominal	
Return loss	≥ 15 dB, 5 to 1.485 GHz, ≥ 10 dB, 1.485 to 2.97 GHz	
Connector	BNC	
Bit rate	1.485 Gb/s ±10 ppm	
Jitter acceptance	According to SMPTE RP-184	
Aspect ratio	4:3, 16:9	
AFD signaling	SMPTE-2016, manual, VII	
Video Encoding		
MPEG-4 Part 10 High Profile @ L4	3 to 25 Mbps	
MPEG-4 Part 10 Main Profile @ L3	0.5 to 10 Mbps	
MPEG-4 Part 10 High Profile @ L3	0.5 to 12.5 Mbps	
MPEG-2 Main Profile @ Main Level	1 to 15 Mbps	
MPEG-2 Main Profile @ High Level	5 to 50 Mbps	
Chroma format	4:2:0	
Inverse telecine	3:2 pulldown inversion	
H resolutions	1080i: 1920, 1440, 1280, 960 @ 25/29.97 Hz 720p: 1280, 960, 640 @ 50/59.94 Hz	
	576i: 720, 704, 640, 528, 480, 352 @ 25 Hz	
	480i: 720, 704, 640, 544, 528, 480 @ 29.97 Hz	
V resolutions	1080i, 720p, 576i, 480i	
Video Processing		
LookAhead processing		
Scene change and fade detection		
Adaptive Hierarchical and Dynamic GOP		
Video Input Filtering		
Deblocking, Motion Compensated Temporal Filteri	Deblocking, Motion Compensated Temporal Filtering (MCTF)	
Audio Specifications		
Inputs	16 Digital AES-3id inputs and 6 metadata inputs per MMA module, 64 embedded channels (any group or pair). Cable not included. An optional Breakout Panel for Audio and GPI inputs is available.	
Outputs	Four AES-3id reference outputs per MMA module	
Connector	25-pin MicroD for AES-3id input/output and metadata inputs	
Sample Frequency	32 kHz, 48 kHz	
Number of channels	32 stereo MPEG-1 Layer II, Dolby Digital, AAC/HE-AAC, or 10 Dolby Digital Plus, or up to ten 5.1 multichannel audios (Dolby Digital, Dolby Digital Plus or AAC/HE-AAC) per MMA module	

Feature	Description	
Embedded Audio		
Format	SMPTE-299M, SMPTE-272M	
Sample frequency	48 kHz (locked to video)	
Resolution	20 bits, 24 bits	
Audio Processing		
Encoding	MPEG-1 Laver II. Dolby Digital (AC-3). Dolby Digital Plus (EAC-3)	
Encoding	AAC/HE-AAC v1/2	
Passthrough	AAC ADTS, AAC LATM, Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), SMPTE-302/Dolby-E	
Encoding rates, Layer II	32, 48, 56, 64, 80, 112, 128, 160, 192, 224, 256, 320, 384 kbps	
Encoding rates, Dolby Digital	56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kbps	
Encoding rates, Dolby Digital Plus	32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kbps	
Encoding rates, AAC/HE-AAC	14 to 640 kbps, depending on the encoding mode	
Passthrough rates, Dolby Digital	56, 64, 80, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kbps	
Passthrough rates, Dolby Digital Plus	32, 40, 48, 56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 540 kbps	
Passthrough rates, AAC/HE-AAC	20 to 640 kbps	
Layer II encoding modes	Mono Left, Mono Right, Mono Sum, Stereo, Dual Mono 1+1, Joint Stereo	
Dolby Digital encoding modes	Mono Left, Mono Right, Mono Sum, Stereo, Dual Mono 1+1, 5.1 Multichannel	
Dolby Digital Plus encoding modes	Mono Left, Mono Right, Mono Sum, Stereo, Dual Mono 1+1, 5.1 Multichannel	
AAC/HE-AAC encoding modes	Mono Left, Mono Right, Mono Sum, Stereo, Dual Mono 1+1, 5.1 Multichannel	
VBI & Ancillary Data		
Closed captions	CEA-608 from Line 21 (SDI) CEA-708 VANC extraction - SMPTE-334M (HD-SDI)	
VBI formats	WST, DVB-WST, Inverted WST, WSS, VPS, Transparent lines, VII, OP-47	
Digital Program Insertion	SCTE-35 signaling via contact closures or SCTE-104 VANC messages	
Transport		
ASI		
Dual DVB-ASI connections, mirrored or independent	ent operation	
ASI connector	BNC	
ASI impedance	75 ohms	
ASI return loss	≥ 17 dB, 27 to 270 MHz	
ASI TS rate	1 to 120 Mbps ±100 ppm	
ASI TS packet length	188 bytes, 204 bytes, no RS	
ASI bit rate	270 Mbps	
ASI output level	800 mVpp nominal	
IP Transport Stream		
Number of outputs	Four in a 2+2 redundant configuration	
Туре	Eight-pin RJ-45, MDI	

Feature	Description	
Ethernet hine		
Ethemet type		
	Multiple SPTS/MPTS streams	
ToS	Quality of service in streaming IP output	
Environment/Physical		
Dimensions	1.25 in. H x 17.65 in. W x 21 in. D (3.2 cm H x 44.8 cm W x 53.3 cm D) 1U high, 19 in. rack mountable, stackable	
Operating temperature	0 – 50°C (32 – 122°F)	
Storage temperature range	-10 – 70°C (14 – 158°F)	
Weight	9.5 kg / 21 lbs.	
Relative humidity	0 – 95%, non-condensing	
Cooling	Forced cooling with air inlets on front panel, air exit at rear	
Power Requirements		
Voltage range	90 to 264 V AC input	
Line frequency	47 to 63 Hz	
Consumption	≤ 400 W maximum, < 40 W per SD channel, < 75 W per HD channel in maximum configuration	
Regulatory Compliance Standards		
CFR 47, Part 15, Subpart B Class A Unintentional Radiators		
CISPR 22:2008-09		
EN 55022:2006 +A1:2007, Class A - Information Technology Equipment		
CISPR 24:1997 +A1:2001, +A2:2002		
EN 55024:1998 +A1:2001, +A2:2003 EMC Requirements - Information		
Technology Equipment - Immunity Characteristics		
IEC 61000-3-2:2005 / EN 61000-3-2:2006 Harmonic Currents, Class A		
IEC 61000-3-3:2002 / EN 61000-3-3:1995' +A1:2001, +A2:2005 Flicker		
Australia Radiocommunications (Electromagnetic Compatibility) Standard 2008		
Korea Technical Requirements for EMI KN 22 with KCC Notice No. 2009-27 (2009.11.05)		
Korea Technical Requirements for EMS KN 24 with KCC Notice No. 2009-27 (2009.11.05)		
Safety and Environmental Standards Compliance		
CAN/CSA-C22.2 No. 60950-1-07		
UL 60950-1 Ed. 2 Mar 27 2007		
IEC 60950-1-am1 ed2.0 (2009-12), including all country and regional differences currently in force		
EN 60950-1:2006+A1:2010		

Figure 2. D9036 Encoder Rear Panel



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Part Number 7018589 Rev D November 2011