

Cisco Modular Encoding Platform D9036

As rich media technologies continue to evolve, modularity is a very useful feature in an encoding platform. The Cisco® Modular Encoding Platform D9036 provides multi-resolution, multi-format encoding for applications requiring high levels of video quality. And its modular design features separate modules for video, audio, input, and output. So as any one of these solutions advances, you can update only the relevant module for better investment protection over longer periods of operation. The modular platform is scalable to support up to eight Standard Definition (SD), four High Definition (HD), or other combinations of video encoders within a single rack unit. It provides broadcast quality video that consumes as little as 40 watts per service and maintains among the best audio density and audio functionality on the market.

Figure 1. Cisco Modular Encoding Platform D9036



Chassis Overview

The Cisco Modular Encoding Platform 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 reduced 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 Cisco Modular Encoding Platform D9036 to MVC video and MMA audio modules. The module is available in two variants, providing either four or eight inputs.

Modular Video Codec First Generation (MVC1G)

The MVC module provides video encoding in the Cisco Modular Encoding Platform D9036. 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 Video Codec Second Generation (MVC2G)

The MVC2G module is the latest released Video Codec card which not only provides exactly the same capability as the MVC1G module, but also is a service module that supports the IP input feature of the Cisco Modular Encoding Platform D9036. The Modular Input/Output (MIO) module receives video in MPEG-2/H.264 transport stream format via the Ethernet port. The second generation MVC module decodes the compressed video stream, up to 4 HD services or 8 SD services, in either AVC or MPEG-2 format.

In addition, MVC2G supports advanced filtering, referred to as SightPlus Advanced Filtering, which is based on 3DMCTF technology. This state-of-the-art filtering is very effective at reducing noise in source video content as well as pre-compressed artifacts.

Modular Multichannel Audio (MMA)

The MMA module provides audio encoding services. The module supports encoding of up to 32 simultaneous stereo audio sources. Licenses enable use of 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, DolbyTM Digital and Dolby Digital Plus audio formats. The audio encoding capabilities can be shared across services in the Cisco Modular Encoding Platform D9036, 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
- HD AVC, SD AVC, MPEG-2 HD, and MPEG-2 SD video encoding
- De-blocking and Motion Compensated Temporal Filtering (MCTF) support
- SightPlus Advanced Filtering
- Closed Captioning support via SMPTE-334M
- ARIB Closed Caption, Audio Mode Control
- 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

- Dolby Digital and Dolby Digital Plus audio encoding
- Dolby Digital Transcode Multichannel support
- MPEG-1 LII stereo encoding
- AAC-LC, HE-AAC V1, and HE-AAC V2 audio encoding
- Dolby E Multichannel audio decoding with internal PCM routing to any/all audio encode engines
- Nielsen watermarking extraction (ID3 tags insertion)
- 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
- Remote Statmux up to 300 msec latency over IP
- DVB[®]/EBU/Cisco PowerVu[®] VBI
- DPI SCTE-35 Signaling via contact closures and SCTE-104 VANC messages
- SMPTE-2031 VANC-based VBI
- Advanced Dolby Descriptive Audio
- Receiver mix using MPEG-1 L2
- IP Input support
- Front end decode capability of up to 4 HD or 8 SD services
- PRO-MPEG Forward Error Correction (FEC)
- Logo Insertion
- ROSA[®] and ROSA Video Services Manager (VSM) driver

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

Feature	Description
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 with variable number of B Pictures	
Video Input Filtering	
Motion Compensated Temporal Filtering (MCTF)	
SightPlus Advanced Filtering	
Mosquito Noise Reduction for MPEG-2	
Input Deblocking filter	
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	Encode up to 32 stereo streams (MPEG-1 Layer II, Dolby Digital, Dolby Digital Plus or AAC/HE-AAC), or up to 8 5.1 multichannel streams (Dolby Digital, Dolby Digital Plus or AAC/HE-AAC) and 8 stereo streams (MPEG-1 Layer II, Dolby Digital, Dolby Digital Plus or AAC/HE-AAC); Decode up to 8 Dolby-E streams per MMA module
Embedded Audio	
Format	SMPTE-299M, SMPTE-272M
Sample frequency	48 kHz (locked to video)
Resolution	20 bits, 24 bits
Audio Processing	
Encoding	MPEG-1 Layer II, Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), AAC/HE-AAC v1/2
Decoding	Dolby-E
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

Feature	Description
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, SMPTE-2031
Digital Program Insertion	SCTE-35 signaling via contact closures or SCTE-104 VANC messages
Transport	
ASI	
Dual DVB-ASI connections, mirrored or independent 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 or two in a 1+1 redundant configuration
Number of inputs	Two in a 1+1 redundant configuration Video Input available through MVC2G decode front end
Type	Eight-pin RJ-45, MDI
Ethernet type	100/1000BASE-T
Format	UDP/IP, RTP/UDP/IP
IP address format	Multicast, unicast
TS streaming	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

Feature	Description
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 Radio communications (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. Cisco Modular Encoding Platform D9036 Rear Panel



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