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 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 Layer II, Dolby Digital (AC-3), Dolby Digital Plus (EAC-3), 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 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
Type	Eight-pin RJ-45, MDI

Feature	Description
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
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

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed by technology and by network complexity to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

To learn more about this product, contact your local account representative.

To subscribe to receive end-of-life/end-of-sale information, go to http://www.cisco.com/cisco/support/notifications.html.

Manage your network with ROSA service and element management. Get faster mean-time-to-repair, increased uptime, and management that evolves as you provision your networks.

US toll-free 1-800-722-2009. EMEA +32 56 445 445. www.cisco.com/go/rosa.

Cisco Systems, Inc.
800 722-2009 or 678 277-1120
www.cisco.com

Part Number 7018589 Rev D
November 2011