

Cisco D9036 Modular Encoding Platform

Product Overview

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
- HD-SDI embedded audio support
- Dual redundant, hot-swappable power supplies
- Dolby Digital, Dolby Digital Plus 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
- AFD Signaling, manual or automatic
- DVB VBI

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 audio encoding
- Deblocking and MCTF filtering

Specifications

Table 1. Product Specifications

Feature	Description												
Video Input													
SDI input	SMPTE-292M, SMPTE-259M, SMPTE-296M, SMPTE-424M												
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												
Audio													
Inputs	16 Digital AES-3id inputs per MMA module, 64 embedded channels (any group or pair) (cable not included)												
Outputs	4 AES-3id reference outputs per MMA module												
Connector	Mini sub-D for AES-3id input/output												
Number of channels	32 stereo LII, Dolby Digital, AAC, or 10 Dolby Digital Plus, or up to eight 5.1 multichannel audios per MMA module												
Embedded Audio													
Format	SMPTE-299M, SMPTE-272M												
Sample frequency	48 kHz (locked to video)												
Resolution	20 bits												
Video and Audio Processing													
Video													
Encoding	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">MPEG-4 Part 10 Main Profile @ L4</td> <td style="text-align: right;">(3 to 20 Mb/s)</td> </tr> <tr> <td>MPEG-4 Part 10 High Profile @ L4</td> <td style="text-align: right;">(3 to 25 Mb/s)</td> </tr> <tr> <td>MPEG-4 Part 10 Main Profile @ L3</td> <td style="text-align: right;">(0.5 to 10 Mb/s)</td> </tr> <tr> <td>MPEG-4 Part 10 High Profile @ L3</td> <td style="text-align: right;">(0.5 to 12.5 Mb/s)</td> </tr> <tr> <td>MPEG-2 Main Profile @ Main Level</td> <td style="text-align: right;">(1 to 15 Mb/s)</td> </tr> <tr> <td>MPEG-2 Main Profile @ High Level</td> <td style="text-align: right;">(5 to 50 Mb/s)</td> </tr> </table>	MPEG-4 Part 10 Main Profile @ L4	(3 to 20 Mb/s)	MPEG-4 Part 10 High Profile @ L4	(3 to 25 Mb/s)	MPEG-4 Part 10 Main Profile @ L3	(0.5 to 10 Mb/s)	MPEG-4 Part 10 High Profile @ L3	(0.5 to 12.5 Mb/s)	MPEG-2 Main Profile @ Main Level	(1 to 15 Mb/s)	MPEG-2 Main Profile @ High Level	(5 to 50 Mb/s)
MPEG-4 Part 10 Main Profile @ L4	(3 to 20 Mb/s)												
MPEG-4 Part 10 High Profile @ L4	(3 to 25 Mb/s)												
MPEG-4 Part 10 Main Profile @ L3	(0.5 to 10 Mb/s)												
MPEG-4 Part 10 High Profile @ L3	(0.5 to 12.5 Mb/s)												
MPEG-2 Main Profile @ Main Level	(1 to 15 Mb/s)												
MPEG-2 Main Profile @ High Level	(5 to 50 Mb/s)												
Chroma format	4:2:0												
Inverse telecine	3:2 pulldown inversion												

Feature	Description
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 and Audio Processing	
Video Pre-processing	
Video prefiltering	Deblocking, Motion Compensated Temporal Filtering (MCTF)
Audio	
Encoding	MPEG-1 Layer II, Dolby Digital (AC-3), AAC/HEAAC, Dolby Digital Plus
Pass-through	Dolby Digital (AC-3)
Encoding rates, Layer II	32, 48, 56, 64, 80, 112, 128, 160, 192, 224, 256, 320, 384 kb/s
Encoding rates, Dolby Digital	56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kb/s
Encoding rates, Dolby Digital Plus	56, 64, 80, 96, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kb/s
Pass-through rates, Dolby Digital	56, 64, 80, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kb/s
Layer II encoding modes	Dual Mono 1+1, Single Mono Left and/or Single Mono Right, Stereo 2/0, Joint Stereo
Dolby Digital encoding modes	Mono, Stereo 2/0, Dual Mono 1+1, 5.1 Multichannel
VBI	
Closed captions	CEA-608/708 SMPTE-334M carriage (HD-SDI) Line 21 (SDI)
VBI formats	WST, DVB-WST, Inverted WST, WSS, VPS, Transparent lines, VII, OP47
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 Mb/s ±100 ppm
ASI TS packet length	188 bytes, 204 bytes, no RS
ASI bit rate	270 Mb/s
ASI output level	800 mVpp nominal
IP TS	
Number of outputs	4 in a 2+2 redundant configuration
Type	Eight-pin RJ-45, MDI
Ethernet type	100/1000 BASE-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.

Feature	Description
Relative humidity	0 to 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

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, refer to Cisco Technical Support Services or Cisco Advanced Services.

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.

With respect to each AVC/H.264 product, we are obligated to provide the following notice:

AVC VIDEO LICENSE

THIS PRODUCT IS LICENSED UNDER THE AVC PATENT PORTFOLIO LICENSE FOR THE PERSONAL AND NON-COMMERCIAL USE OF A CONSUMER TO (i) ENCODE VIDEO IN COMPLIANCE WITH THE AVC STANDARD ("AVC VIDEO") AND/OR (ii) DECODE AVC VIDEO THAT WAS ENCODED BY A CONSUMER ENGAGED IN A PERSONAL AND NON-COMMERCIAL ACTIVITY AND/OR WAS OBTAINED FROM A VIDEO PROVIDER LICENSED TO PROVIDE AVC VIDEO. NO LICENSE IS GRANTED OR SHALL BE IMPLIED FOR ANY OTHER USE. ADDITIONAL INFORMATION MAY BE OBTAINED FROM MPEG LA, L.L.C. SEE <http://www.mpegla.com>.

Accordingly, please be advised that service providers, content providers, and broadcasters are required to obtain a separate use license from MPEG LA prior to any use of AVC/H.264 encoders and/or decoders.



Cisco and the Cisco logo are trademarks of Cisco and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at www.cisco.com/go/trademarks.

Dolby is a registered trademark of Dolby Laboratories.

Other third party trademarks mentioned are the property of their respective owners.

The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1009R)

Specifications and product availability are subject to change without notice.

© 2011 Cisco and/or its affiliates. All rights reserved.

1-800-722-2009 or 678-277-1120
www.cisco.com

Part Number 7018589 Rev C
March 2011