

## Cisco D9054 HDTV Advanced Compression Encoder

### Product Overview

The Cisco® D9054 Encoder is the right choice for any operator who wants to compress high-definition video using MPEG-4 Part 10 (H.264/AVC) compression technology.

PreSight*Plus* pre-analysis, dual-pass technology and single-slice architecture, efficiently helps utilize the scarce bandwidth resources in distribution systems and provide excellent picture quality. The encoder offers AVC encoding for various distribution and contribution applications, supporting 1080i and 720p.

Based on a dedicated encoder resource, the D9054 Encoder optionally supports picture-in-picture (PIP) functionality for convenient channel change and mosaic applications.

The D9054 Encoder supports multiple audio formats, MPEG-1 Layer II audio, Dolby® Digital (AC-3) audio, Dolby Digital Plus (AC-3) audio, AAC audio, pass through of pre-encoded audio, with a broad range of bit rates. Up to six stereo audio pairs or as many as two 5.1 audio channels can be supported, depending on the audio format.

**Figure 1.** Cisco D9054 HDTV Encoder



## Features

- Up to 20 Mb/s MPEG-4 part 10 MP @ L4 video compression rate (optional HP @ L4 support)
- PreSight*Plus* Pre-analysis
- Single-slice HD AVC encoder
- Closed Captioning support via SMPTE-334M
- HD-SDI embedded audio support
- 1080i and 720p support
- Dual power supply
- Up to six stereo MPEG audio channels
- Dolby Digital or AAC audio pass-through support
- Dolby E/Linear audio pass-through support
- ASI and Dual IP outputs (10/100BASE-T)
- Multi-service streaming IP output
- Web-based GUI
- SNMP management interface for interfacing to any SNMP-based management system, including the ROSA<sup>®</sup> Network Management System
- AFD signaling, manual or automatic

## Optional Features

- Integrated picture-in-picture (PIP) functionality with dedicated encoder
- Closed loop statistical multiplexing
- SCTE-35 support, triggered via GPI or SCTE-104
- Up to six stereo Dolby Digital audio channels
- Up to six stereo AAC audio channels
- ROSA driver
- High Profile – up to 25 Mb/s
- Dolby E Decoding
- Up to three Dolby Digital Plus stereo channels
- 5.1 Multichannel encoding of Dolby Digital, Dolby Digital Plus, or AAC audio

## Specifications

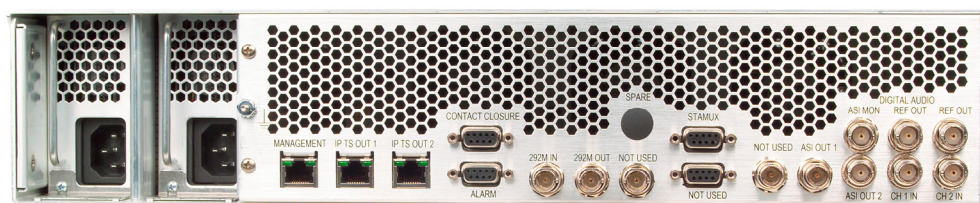
**Table 1.** Product Specifications

| Feature                           | Description                                                                                                         |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| HD-SDI input                      | SMPTE-292M                                                                                                          |
| Systems                           | 1080i @ 29.97 Hz, 1080i @ 25 Hz, 720p @ 59.94 Hz, 720p @ 50 Hz                                                      |
| Impedance                         | 75 ohms unbalanced                                                                                                  |
| Input level                       | 800 mVpp nominal                                                                                                    |
| Return loss                       | ≥ 15 dB, 5 to 1.4 GHz                                                                                               |
| Connector                         | BNC                                                                                                                 |
| Bit rate                          | 1.485 Gb/s ±10 ppm                                                                                                  |
| Jitter acceptance                 | According to SMPTE RP184                                                                                            |
| Aspect ratio                      | 4:3, 16:9                                                                                                           |
| AFD signaling                     | Manual setting or automated with SMPTE-2016                                                                         |
| <b>Audio</b>                      |                                                                                                                     |
| Inputs                            | Digital AES and embedded (any group or pair)                                                                        |
| Connector                         | BNC                                                                                                                 |
| Number of channels                | Up to 4 AES and 6 embedded pairs                                                                                    |
| <b>Embedded Audio</b>             |                                                                                                                     |
| Format                            | SMPTE-299M                                                                                                          |
| Sample frequency                  | 48 kHz (locked to video)                                                                                            |
| Resolution                        | 20 bits                                                                                                             |
| <b>Video and Audio Processing</b> |                                                                                                                     |
| <b>Video</b>                      |                                                                                                                     |
| Encoding                          | MPEG-4 Part 10 Main Profile @ L4<br>Optional – High Profile                                                         |
| Approach                          | Single slice                                                                                                        |
| Chroma format                     | 4:2:0                                                                                                               |
| Encoding rate                     | 4:2:0<br>VBR – 3 - 20 Mb/s for 720p and 1080i @ Main Profile<br>VBR – 3 - 25 Mb/s for 720p and 1080i @ High Profile |
| Modes                             | Capped VBR                                                                                                          |
| Inverse telecine                  | 3:2 pulldown inversion                                                                                              |
| H resolutions                     | 1080i: 1920, 1440, 1280<br>720p: 1280, 960, 640                                                                     |
| V resolutions                     | 1080i, 720p                                                                                                         |
| <b>Picture in Picture</b>         |                                                                                                                     |
| Encoding format                   | H.264 Main Profile                                                                                                  |
| Picture size                      | 192 x 192, 128 x 96                                                                                                 |
| Bit rate                          | 150 to 500 kb/s                                                                                                     |
| <b>Video and Audio Processing</b> |                                                                                                                     |
| <b>Video Pre-processing</b>       |                                                                                                                     |
| PreSight filtering                | Spatial filtering                                                                                                   |

| Feature                                               | Description                                                                                                                                                                                                                                    |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Audio</b>                                          |                                                                                                                                                                                                                                                |
| Encoding                                              | MPEG-1 Layer II, 2 stereo pairs (4012577.600)<br>MPEG-1 Layer II, 6 stereo pairs (4012577.900)<br>Dolby Digital (AC-3), 2 stereo pairs<br>AAC, 2 stereo pairs                                                                                  |
| Pass-through                                          | Dolby Digital (AC-3), 2 stereo pairs (4012577.600)<br>Dolby Digital (AC-3), 6 stereo pairs (4012577.900)<br>Dolby Digital Plus, 6 stereo pairs (4012577.900)<br>AAC, 2 stereo pairs<br>Dolby E, 2 stereo pairs<br>Linear audio, 2 stereo pairs |
| 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, Dolby Digital Plus | 56, 64, 80, 112, 128, 160, 192, 224, 256, 320, 384, 448, 512, 576, 640 kb/s                                                                                                                                                                    |
| Pass-through rates, AAC                               | 14 to 320 kb/s                                                                                                                                                                                                                                 |
| Pass-through rates and word lengths, Linear audio     | 1920 (@ 16-bit samples, 48 kHz sample rate)<br>2304 (@ 20-bit samples, 48 kHz sample rate)<br>2688 (@ 24-bit samples, 48 kHz sample rate)                                                                                                      |
| Pass-through rates and word lengths, Dolby E          | 1920 (@ 16-bit samples, 48 kHz sample rate)<br>2304 (@ 20-bit samples, 48 kHz sample rate)                                                                                                                                                     |
| Pass-through rates and word lengths, Dolby E Plus     | 1920 (@ 16-bit samples, 48 kHz sample rate)<br>2304 (@ 20-bit samples, 48 kHz sample rate)                                                                                                                                                     |
| Encoding rates, AAC                                   | Variable, 14 to 320 kb/s                                                                                                                                                                                                                       |
| Sample rates                                          | 32, 44.1, 48 kHz                                                                                                                                                                                                                               |
| 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                          | Center 1/0, Stereo 2/0, Dual Mono 1+1, 5.1 Multichannel                                                                                                                                                                                        |
| Dolby Digital Plus encoding modes                     | Center 1/0, Stereo 2/0, Dual Mono 1+1, 5.1 Multichannel                                                                                                                                                                                        |
| AAC encoding modes                                    | Dual Mono 1+1, Single Mono 1/0, Stereo 2/0, Joint Stereo 2/0, Mono 1/0 LR, 5.1 Multichannel                                                                                                                                                    |
| AAC support                                           | SBR, Parametric Stereo                                                                                                                                                                                                                         |
| Dolby E Decoding                                      | Embedded, AES                                                                                                                                                                                                                                  |
| <b>DPI</b>                                            |                                                                                                                                                                                                                                                |
| Input                                                 | Contact Closure (GPI) or SCTE-104 via VBI                                                                                                                                                                                                      |
| Signaling                                             | SCTE-35                                                                                                                                                                                                                                        |
| <b>Transport Output</b>                               |                                                                                                                                                                                                                                                |
| Output format                                         | DVB-ASI                                                                                                                                                                                                                                        |
| Number of outputs                                     | Two + one monitor output                                                                                                                                                                                                                       |
| Connector                                             | BNC                                                                                                                                                                                                                                            |
| Impedance                                             | 75 ohms                                                                                                                                                                                                                                        |
| Return loss                                           | ≥ 17 dB, 27 to 270 MHz                                                                                                                                                                                                                         |
| TS rate                                               | 1 to 120 Mb/s ±100 ppm                                                                                                                                                                                                                         |
| TS packet length                                      | 188 bytes, 204 RS Off                                                                                                                                                                                                                          |
| ASI bit rate                                          | 270 Mb/s                                                                                                                                                                                                                                       |
| Output level                                          | 800 mVpp nominal                                                                                                                                                                                                                               |

| Feature                                     | Description                                                                                              |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>IP TS Output</b>                         |                                                                                                          |
| Number of outputs                           | 2                                                                                                        |
| Type                                        | 8-pin RJ-45, MDI                                                                                         |
| Ethernet type                               | 100 BASE-T                                                                                               |
| Format                                      | UDP/IP                                                                                                   |
| IP address format                           | Multicast, unicast                                                                                       |
| TS streaming                                | Multiple SPTS streams                                                                                    |
| TS bit rate                                 | Follows the ASI output rate                                                                              |
| TS packet length                            | 188 bytes, 204 RS On, 204 RS Off                                                                         |
| ToS                                         | Quality of service in streaming IP output                                                                |
| <b>Closed loop statistical multiplexing</b> |                                                                                                          |
| Statistical multiplex interface             | IP based statistical multiplexing via management                                                         |
| Modes of operation                          | Synchronous and Asynchronous mode support                                                                |
| Statistical multiplex groups and pools      | Up to 16 encoders in one pool<br>Up to 20 pools supported                                                |
| <b>Environment/Physical</b>                 |                                                                                                          |
| Dimensions                                  | 3.5 in. H x 17.6 in. W x 21 in. D (8.9 cm H x 44.7 cm W x 53.3 cm D),<br>2 U high, 19 in. rack mountable |
| Operating temperature                       | 0 - 40°C (32 - 104°F)                                                                                    |
| Storage temperature range                   | -10 - 70°C (14 - 158°F)                                                                                  |
| Weight                                      | 14.1 kg / 31 lbs                                                                                         |
| Relative humidity                           | 0 to 95%, non-condensing                                                                                 |
| Cooling                                     | Forced cooling with air inlets on front panel, air exit at rear                                          |
| <b>Power Requirements</b>                   |                                                                                                          |
| Voltage range                               | 100 to 240 V AC nominal $\pm 10\%$                                                                       |
| Line frequency                              | 47 to 63 Hz                                                                                              |
| Consumption                                 | $\leq 500$ W                                                                                             |

**Figure 2.** D9054 HDTV Advanced Compression Encoder Rear Panel



## Ordering Information

**Table 2.** Ordering Information

| Base Units                                                                                                 | Part Number              |
|------------------------------------------------------------------------------------------------------------|--------------------------|
| D9054 – MPEG-4 HD, Dual AC PSU, 2 MPEG-1 Layer II stereo audio channels, dual ASI/IP output                | 4012577.600 <sup>1</sup> |
| D9054 – MPEG-4 HD, Dual AC PSU, 6 MPEG-1 Layer II stereo audio channels, dual ASI/IP output                | 4012577.900 <sup>1</sup> |
| <b>Options</b>                                                                                             |                          |
| Dolby Digital (AC-3) 2.0 encoding, channel 1 and 2                                                         | 4012577.0001             |
| Dolby Digital (AC-3) 2.0 encoding, channel 3 and 4                                                         | 4012577.0021             |
| Dolby Digital (AC-3) 2.0 encoding, channel 5 and 6                                                         | 4012577.0031             |
| HE-AAC stereo internal encoding, channel 1 and 2                                                           | 4012577.0004             |
| HE-AAC stereo internal encoding, channel 3 and 4                                                           | 4012577.0024             |
| HE-AAC stereo internal encoding, channel 5 and 6                                                           | 4012577.0034             |
| Dolby Digital Plus 5.1 encoding (or 3 stereos), requires DASM                                              | 4012577.0100             |
| Dolby E decoding, requires DASM                                                                            | 4012577.0200             |
| Picture in picture (PIP) license                                                                           | 4012577.0002             |
| DPI license for support via GPI or SCTE-104 via SDI                                                        | 4012577.0008             |
| High Profile license                                                                                       | 4012577.0010             |
| AVC Statistical multiplexing license                                                                       | 4012577.0020             |
| ROSA Driver                                                                                                | 7009171                  |
| <b>Hardware Upgrades</b>                                                                                   |                          |
| Upgrade kit, DCA to MCA conversion, includes 6 MPEG-1 LII Stereo channels, Dolby Digital Plus pass-through | 4028478                  |
| Factory Upgrade - Dolby Advanced Sub-Module (DASM)                                                         | 4028638                  |
| <b>Power Cords</b>                                                                                         |                          |
| North America                                                                                              | 3993138                  |
| Europe                                                                                                     | 700788                   |
| UK                                                                                                         | 3993131                  |
| Australia                                                                                                  | 180178                   |
| Argentina                                                                                                  | 207340                   |
| Italy                                                                                                      | 3993130                  |
| Japan                                                                                                      | 3993133                  |

<sup>1</sup> When ordering, choose the power cord from this table to ensure the correct power cord is provided with your product. Part numbers are to be converted to configured part numbers prior to order entry.

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1-800-722-2009 or 678-277-1000  
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