ViBE® CP9000

HD/UHD CONTRIBUTION ENCODER

The Harmonic ViBE® CP9000 encoder enables rapid, reliable deployment of superior-quality HD and Ultra HD content for mission-critical contribution applications.

With the significant increase in UHD TV sets hitting the market, content providers and broadcasters are looking for a solution to address the needs of early adopters of the premium TV standard. Compact and reliable, the ViBE CP9000 contribution encoder is the answer. Superior video quality is a primary objective of the platform, and the ViBE CP9000 delivers with pristine 2160p UHD and 1080p HD content featuring high dynamic range (HDR).

Innovative Compression Technology

The ViBE CP9000 encoder addresses the call for preserving video quality at the front of the broadcast chain with the ability to process uncompressed UHD signals at eight times the bitrate of current HD sources, up to 370 Mbps. The platform encodes content in real-time in a single slice via AVC (H.264) or single-slice or multi slices via HEVC (H.265), today's most advanced compression standards. Up to two UHD or eight video channels, and 64 audio stereo channels, can be encoded on the 1-RU chassis. With its wide range of encoding tools, HEVC offers incredible compression efficiency, making distribution and delivery of live UHD content available for satellite, cable, terrestrial and fiber networks.

The ViBE CP9000 encoder employs 4:2:2 10-bit precision encoding technology originally designed for professional transmission. Compatible with the Hybrid Log-Gamma (HLG) and SMPTE ST 2084 (PQ) HDR formats, the platform is also ready for the next phases of UHD content delivery. As a result, image detail, sharpness and color gradients are preserved throughout the distribution process — right up to the consumer's UHD display.

Versatile and Future-Proof

With a depth of just 16.9 inches, the compact and rugged ViBE CP9000 encoder is a perfect fit for DSNG vehicles, teleports and flyaway packages. SDI and all-IP contribution and primary distribution use cases are both supported. A low latency encoding mode offers broadcasters the chance to get a true jump on the competition, and also enables home/remote production application. The encoder can be used to transport pristine live video from a field location to the studio via IP, significantly reducing production costs by cutting the number of vehicles and staff members sent to cover live events.

Simple and cost-effective to deploy, the ViBE CP9000 encoder is interoperable with most professional decoders, including the Harmonic RD9000 IRD. It integrates seamlessly with the Harmonic ProSwitch smart redundancy switch as well, enabling a compact 1+1 UHD redundant solution in just 3 RU. DVB/SMPTE standards are supported. The small system footprint and low power consumption of the ViBE CP9000 ensures exceptional ROI and helps assure that your investment will pay off well into the future.

Pay-As-You-Grow Scalability

License-based pricing assures that customers pay only for the features they need. Video and audio codecs and formats are easily added to the ViBE CP9000 encoder via firmware upgrade, enabling a scalable migration path that provides operational flexibility and business continuity, and extends the system's value.

World-Class Service and Support

Harmonic stands behind the ViBE CP9000 platform with comprehensive service and support programs, including system design, service deployment, technical support and network maintenance. World-class service plans and a global network of flexible and responsive support professionals help ensure your ability to deliver outstanding "anytime, anywhere, any-device" customer experiences.

HIGHLIGHTS

- Ultra HD and HD single-slice encoding
- Superior real-time HEVC/H.264 420/422 10-bit encoding
- Up to two UHD or eight HD channels per chassis
- Up to 64 audio stereo channels per chassis
- Compliant with EBU UHD Phase-1 specifications
- HLG, PQ10, HDR10 and S-Log3 HDR support
- Web-based user interfaces

ViBE® CP9000 HD/UHD CONTRIBUTION ENCODER

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SPECIFICATIONS

INPUT

Inputs	Up to 8 x 3G-SDI or 2 x 12G-SDI Four quadrants or 2 Sample Interleave Dual SFP+ (10 GbE) interfaces SMPTE-2022-6 video over IP SMPTE-2110 video over IP

VIDEO

HEVC (H.265/MPEG-H)	Profiles: Main, Main 10 and Main 10 422 Level: up to level 6.2
AVC (H.264)	Profiles: Main High, High 10, High 10 422 Level: Up to 5.2
Encoding Scheme	CBR (seamless bitrate change) UHD single slice or multi-slice
Chroma Sampling	4:2:0, 4:2:2
Bit Depth	8-bit, 10-bit
Resolution / Frame rate	UHD: 3840 x 2160p @60, 59.94, 50, 30, 29.97, 25, 24 1080p: 1920 x 1080p @60, 59.94, 50, 30, 29.97, 25, 24 HD: 1920 x 1080i @30, 29.97, 25 HD: 1280 x 720p @60, 59.94, 50, 30, 29.97, 25, 24 SD: 720x576i @25fps SD: 720x480i @29.97fps
Downscaling	UHD to HD or SD, HD to SD
Video Scanning	Progressive, Interlaced
GOP Structure	I-only, IPPP, IBBB Fixed/Adaptive GOP Hierarchical GOP Open/closed GOP
Encoding Latency	Ultra low, low, standard, long encoding modes
Encoding Bitrate	Up to 370 Mbps
Pre-Processing	Deblocking filter Sample Adaptive Offset (SAO) Asynchronous Motion Partitioning (AMP) Coding Tree Block (CTB) from 16x16 to 64x64
Dynamic Range	SDR, HDR, Dynamic HDR
Wide Color Gamut	BT.709, BT.2020
Color Space	DCI-P3 D65, DCI-P3 Theater, Custom
High Dynamic Range (HDR)	BT-2020/HLG BT-2020/SMPTE-2084 HDR-10 & PQ10 HDR custom mode
Logo insertion	32 x user configurable
Slate insertion	32 x user configurable

AUDIO

Audio Input Formats (Embedded in SDI)	PCM embedded Dolby® Digital (AC-3), Digital Plus (E-AC-3), AC-4 pre-compressed Dolby E
Performance	Up to 64 audio stereo channels Up to 16 audio 5.1 surround channels
Encoding Formats & Bitrates	MPEG-1 Layer II 2.0: 64-384 kbps AC-3 2.0: 128-448 kbps AC-3 5.1: 384-640 kbps E-AC-3 5.1: 192-448 kbps AAC-LC/HE-AAC 2.0: 32-160 kbps AAC-LC/HE-AAC 5.1: 96-448 kbps
Passthrough	Linear PCM, uncompressed Dolby E AAC-LC/HE-AAC AC-3, E-AC-3, AC-4
Processing	Dolby E to AC-3 transcoding Dolby E to E-AC-3 transcoding AC-3/E-AC-3 to AC-3/E-AC-3 transcoding AC-3/E-AC-3 to MPEG1 Layer 2 transcoding Dolby E to HE-AAC transcoding 5.1 down-mix to 2.0 Automatic Loudness Control (ALC)

ANCILARY & DATA

Closed Caption	EIA-608 (embedded in band as video user data) EIA-708
Teletext	SMPTE-2031 & OP-47
DPI	SCTE-104 to SCTE-35
Transparent Ancillary	SMPTE-2038
Timecode ATC	SMPTE-12M-2

PROCESSING

Multiplexing	SPTS or MPTS Up to 8 x SPTS MPTS of up to 8 x services PSI/SI generation
Scrambling	BISS 1 mode 1, E BISS 2 mode 1, E, CA (BISS-CA)

OUTPUT

Outputs	Dual GbE interfaces TS over IP (SMPTE ST 2022-2), SPTS or MPTS UDP, UDP/RTP Synchronous RTP output for hitless redundancy (SMPTE 2022-7) Unicast or multicast FEC generation (SMPTE ST 2022-1) ZIXI, SRT output (with encryption) Up to 4 x ASI outputs (optional)

CONTROL & MONITORING

Dual GbE interfaces for C&C
Embedded web server (HTTPS secure connection)
SNMP agent and RestFul API

POWER

Power Supply	Dual hot-swappable AC PSU
Input Voltage Range	100-240 VAC
Power Consumption	90 W

PHYSICAL

Dimensions (HxWxD)	1.7 in x 17.2 in x 16.9 in (1 RU) 4.3 cm x 43.7 cm x 42.9 cm
Weight	26.7 lbs/12 kg

ENVIRONMENTAL

Cooling	Front to rear airflow
Operating Temperature	+41° to 113° F 5° to 45° C
Storage Temperature	+23° to 158° F -10° to +70° C
Maximum Humidity	<90% non-condensing
Electromagnetic Compliance	CE marked in accordance with the 93/68/EEC (22/07/93) directive EN 55022 EN 55024 EN 61000-3-2
Safety	IEC 60950 and EN 60950 UL 60950

ORDERING INFORMATION

HARDWARE

Part Number	Description
CP9000-1U-2AC-V4	ViBE CP9000 platform 1 RU with dual AC
CP9X00-HW-HEVC-IP-V2	AVC/HEVC card with SDI in and 2 x10 Gbps SFP+
CP9X00-HW-ASI-4	Card with 4 x ASI outputs

VIDEO SOFTWARE LICENSES

Part Number	Description
CP9X00-LIC-ENC-HEVC-HD	HEVC/AVC HD 4:2:0/4:2:2 encoding license 3 x licenses to enable one UHD channel
CP9X00-LIC-ENC-HEVC-ULL	One HEVC Ultra Low Latency encoding license (4 x for UHD)

AUDIO SOFTWARE LICENSES

Part Number	Description
CP9X00-LIC-ENC-AAC	One stereo AAC/HE-AAC encoding license (MPEG1 Layer II included by default, 3 x licenses per surround 5.1)
CP9X00-LIC-ENC-DD	One stereo DD-DD+ encoding license (three licenses for surround)
CP9X00-LIC-ENC-AC4	One AC4 stereo encoding license (3 licenses for surround)
CP9X00-LIC-TRX-DDTODD+	One stereo DD/DD+ to DD/DD+ transcoding license or one stereo DD/DD to MPEG1 Layer 2
CP9X00-LIC-DEC-DE	One Dolby E decoding license
CP9X00-LIC-JUNG	One stereo Jünger Level Magic auto loudness control (three licenses for surround)

FEATURE SOFTWARE LICENCES

Part Number	Description
CP9X00-LIC-SMPTE-2110	HD over SMPTE-2110 input
CP9X00-LIC-BISS-CA	BISS-CA (BISS-2 mode CA) encryption
CP9X00-LIC-FEC	FEC SMPTE 2022-1 generation
CP9X00-LIC-HDR	HDR Hybrid Log-Gamma (HLG), HDR10, PQ10 (SMPTE 2084)
CP9x00_LIC_SCTE	SCTE-104 TO SCTE-35 conversion
CP9X00-LIC-LOGO-SLATE	Logo & Slate insertion
CP9X00-LIC-GEO-SYNC	Geo-synchronization between 2 CP9000

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