

# 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 a single slice in real-time via AVC (H.264) or HEVC (H.265), today's most advanced compression standards. Up to two UHD or eight HD\* video channels, and 32 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. An ultra-low latency encoding mode, less than 100 ms, 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 ProView™ 7100 IRD. It integrates seamlessly with the Harmonic Amethyst™ III 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 per chassis\*
- Superior real-time HEVC/H.264 420/422 10-bit encoding
- Ultra low latency mode: < 100 ms\*
- Up to two UHD or eight HD channels
- Up to 32 audio stereo channels per chassis
- Compliant with EBU UHD Phase-1 specifications
- HLG, PQ10, HDR10 and S-Log3 HDR support
- Front-panel and web-based user interfaces

## SPECIFICATIONS

### INPUT/OUTPUT

|         |  |
|---------|--|
| Inputs  | Four 3G-SDI or one 12G-SDI*<br>SMPTE 425-1 Level A and level B*<br>Four quadrants or 2 Sample Interleave<br>Dual SFP+ (10 Gbe) interfaces (optional)   |
| Outputs | Dual GbE interfaces<br>TS over IP (SMPTE ST 2022-2), SPTS or MPTS<br>UDP, UDP/RTP<br>Synchronous RTP output for hitless redundancy (SMPTE 2022-7)<br>Unicast or multicast<br>FEC generation (SMPTE ST 2022-1)<br>ASI interfaces (optional) |

### VIDEO PROCESSING

|                     |  |
|---------------------|--|
| Performance         | Up to two UHD channels*<br>Up to eight HD channels*  |
| HEVC (H.265/MPEG-H) | Profiles: Main, Main 10 and Main 10 422<br>Level: up to level 6.2  |
| AVC (H.264)         | Profiles: High, High 10, High 10 422<br>Level: Up to 5.2   |
| Encoding Scheme     | CBR (seamless bitrate change)<br>Single slice  |
| Chroma Sampling     | 4:2:0, 4:2:2   |
| Bit Depth           | 8-bit, 10-bit  |
| Resolution          | 3840x2160p (UHD)<br>1920x1080, 1280x720  |
| Frame Rates         | 50i, 59.94i<br>50p, 59.94p, 60p  |
| Video Scanning      | Progressive, Interlaced  |
| GOP Structure       | I-only, IPPP, IBBB<br>Fixed/Adaptive GOP<br>Hierarchical GOP<br>Open/closed GOP  |
| Encoding Latency    | Ultra-low latency mode: <100 ms*<br>Low latency mode: 6 frames   |
| Encoding Bitrate    | Up to 370 Mbps   |
| Pre-Processing      | Deblocking filter<br>Sample Adaptive Offset (SAO)<br>Asynchronous Motion Partitioning (AMP)<br>Coding Tree Block (CTB) from 16x16 to 64x64 |

### AUDIO PROCESSING

|                                       |  |
|---------------------------------------|--|
| Audio Input Formats (Embedded in SDI) | PCM embedded<br>Dolby® Digital (AC-3), Digital Plus (E-AC-3), AC-4 pre-compressed<br>Dolby E   |
| Performance                           | Up to 16 audio stereo channels<br>Up to 10 audio 5.1 surround channels   |
| Encoding Formats & Bitrates           | MPEG-1 Layer II 2.0: 64-384 kbps<br>AC-3 2.0: 128-448 kbps<br>AC-3 5.1: 384-640 kbps<br>E-AC-3 5.1: 192-448 kbps<br>AAC-LC/HE-AAC 2.0: 32-160 kbps<br>AAC-LC/HE-AAC 5.1: 96-448 kbps |
| Passthrough                           | Linear PCM, uncompressed<br>Dolby E<br>AAC-LC/HE-AAC<br>AC-3, E-AC-3, AC-4   |
| Processing                            | Dolby E to AC-3 transcoding<br>Dolby E to E-AC-3 transcoding<br>AC-3 to E-AC-3 transcoding<br>Dolby E to HE-AAC transcoding<br>Jünger Level Magic automatic loudness control         |

### CONTROL & MONITORING

|                                   |
|-----------------------------------|
| Dual GbE interfaces for C&C       |
| Embedded web server               |
| SNMP agent                        |
| Front-panel with keyboard and LCD |

### POWER

|                     |  |
|---------------------|--|
| Power Supply        | Single AC PSU<br>Dual AC PSU (hot-swappable, optional) |
| Input Voltage Range | 100-240 VAC  |
| Power Consumption   | 80 W   |

### PHYSICAL

|                    |   |
|--------------------|---|
| Dimensions (HxWxD) | 1.7 in x 17.2 in x 16.9 in (1 RU)<br>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 104° F<br>5° to 40° C   |
| Storage Temperature        | +23° to 113° F<br>-10° to +70° C  |
| Maximum Humidity           | <90% non-condensing   |
| Electromagnetic Compliance | CE marked in accordance with the 93/68/EEC (22/07/93) directive<br>EN 55022<br>EN 55024<br>EN 61000-3-2 |
| Safety                     | IEC 60950 and EN 60950<br>UL 60950  |

\* Check with your Harmonic representative for availability.

## ORDERING INFORMATION

### HARDWARE

| Part Number        | Description                                 |
|--------------------|---|
| CP9000-1U-1AC      | ViBE CP9000 platform 1 RU with single AC    |
| CP9X00-HW-HEVC-IP  | HEVC card with SDI in and dual 10 Gbps SFP+ |
| CP9X00-HW-HEVC-SDI | HEVC card with SDI in                       |
| CP9X00-HW-ASI      | ASI card with dual ASI output               |
| CP9000-OPT-1AC     | Second or spare hot-swappable AC PSU        |

### VIDEO SOFTWARE LICENSES

| Part Number             | Description                                 |
|-------------------------|---|
| CP9X00-LIC-ENC-HD-420   | HEVC/AVC HD 4:2:0 encoding license          |
| CP9X00-LIC-ENC-HD-422   | HEVC/AVC HD 4:2:0/4:2:2 encoding license    |
| CP9X00-LIC-ENC-UHD-420  | HEVC/AVC UHD 4:2:0 encoding license         |
| CP9X00-LIC-ENC-UHD-422  | HEVC/AVC UHD 4:2:0/4:2:2 encoding license   |
| CP9X00-LIC-ENC-HEVC-ULL | HEVC/AVC ultra-low latency encoding license |

### AUDIO SOFTWARE LICENSES

| Part Number              | Description  |
|--------------------------|--|
| CP9X00-LIC-ENC-MP1L2-AAC | One stereo MPEG-1 LII or AAC/HE-AAC encoding license (three licenses for surround) |
| CP9X00-LIC-ENC-DD        | One stereo DD-DD+ encoding license (three licenses for surround)                   |
| CP9X00-LIC-TRX-DDTODD+   | One stereo DD to DD+ transcoding license   |
| 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 LICENSES

| Part Number        | Description                               |
|--------------------|---|
| CP9X00-LIC-FEC     | FEC SMPTE 2022-1 generation               |
| CP9X00-LIC-HDR-HLG | HDR compliant with Hybrid Log-Gamma (HLG) |
| CP9X00-LIC-HDR-PQ  | HDR compliant with SMPTE 2084 (PQ)        |