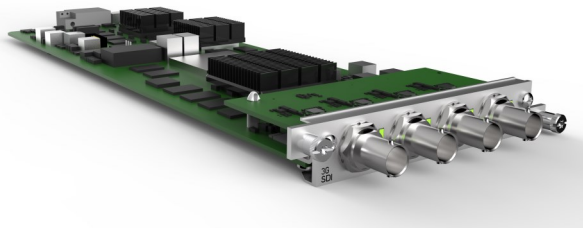




# MediaKind CE-HEVC Encoder Module



The CE-HEVC encoder module delivers the latest high performance video compression technology to the market leading contribution encoder platforms; the AVP 2000 Contribution Encoder and the AVP 3000 Voyager. The module has the processing power to be able to encode four HD video inputs or one UHD (4K) video input. What's more it has been designed to support the emerging standards for high dynamic range (HDR) and wider colour gamut (WCG).

HEVC provides up to 30% greater compression performance compared to an MPEG-4 AVC encoder in typical Contribution and Primary Distribution (C&D) use cases, which can equate to significant cost savings. Video compression performance is typically not the only priority in C&D applications, low end to end latency is also often required. The CE-HEVC card can provide low latency, or even super low latency encoding for when very low end to end latency is a priority.

For existing owners of AVP 2000 Contribution Encoders or AVP 3000 Voyagers, CE-HEVC cards can be fitted to any existing units enabling the performance of HEVC and UHD encoding capability to your existing encoders.

## Product Overview

### Outstanding Innovation Delivers the Most Powerful Flexible Contribution Encoder

The CE-HEVC option module provides.

#### Video Encoding of 1 x UHD (4K) or up to 4 x HD (720p or 1080i)

MPEG-4 or HEVC encoding of up to 4 x HD (720p, 1080i, 3 x 1080p HEVC, 2 x 1080p MPEG-4) video inputs or 1 UHD (4K) video input.

#### Video input via copper, fiber, or SDI/IP

The module can have either traditional electrical 3G/HD SDI inputs via 4 x 75 ohm BNC connectors (SMPTE-292M, SMPTE-424M), fiber 3G/SDI inputs (SMPTE-297M), 12G copper (SMPTE ST 2082) or SDI over IP via SMPTE ST 2022-6 / SMPTE ST 2110

#### Extensive audio processing capabilities

The CE-HEVC supports a wide range of audio codecs as well as having the ability to pass-through Linear PCM and Dolby®E audio. It also supports groups of up to 16 mono channels of Phase Aligned Audio encoding, MediaKind's patented method of carrying multiple audio channels and accurately maintaining the phase relationship between them.

#### Futureproof

The standards for ultra high definition television are still evolving, with discussions around support for high dynamic range (HDR) and wider color gamut (WCG) amongst other things. So the CE-HEVC card has been designed with the processing power and resources to enable it to support the HDR and WCG standards as they evolve, with signaling for PQ10, HLG, and HDR10 supported today.

## Option Module Features

### CE-HEVC Encoder

HEVC Encoding Card with BNC connections (CE/HWO/CE-HEVC/BNC/A)

HEVC Encoding Card with SFP interface (CE/HWO/CE-HEVC/SFP/B)

SFP options  
 CE/HWO/SFP-M/C—Copper 3G SDI  
 CE/HWO/SFP-M/F—Fibre 3G SDI  
 CE/HWO/SFP-M/F26—Fibre SMPTE ST 2022-6  
 CE/HWO/SFP-M/12G/C—Copper 12G SDI (12G/3G)  
 CE/HWO/SFP-M/12G/F—Fibre 12G SDI (12G/3G)  
 CE/HWO/SFP-M/2110F—10G fibre Ethernet SMPTE ST 2110 (up to 1080p)  
 (12G-SDI module feature 2 inputs per module. When using for 12G-SDI, only 1 input is supported. When using for 3G-SDI 2 inputs are supported)

### CE-HEVC Encoder Value Packs single channel HD encoding

(CE/SWO/VP/HEVC/HEVC/HD) Enables HEVC HD Encoding, and 4 x 2.0 MPEG-1 Layer II audio encode including ALC

(CE/SWO/VP/HEVC/MP4/HD) Enables MPEG-4 HD Encoding, and 4 x 2.0 MPEG-1 Layer II audio encode including ALC

(CE/SWO/VP/HEVC/CONT) Enables 4:2:2 10bit for single HD encoding channel

(CE/SWO/VP/HEVC/SLD) Enables super low delay encoding for a single HD HEVC encoding channel

### CE-HEVC Encoder Licenses 4K or 4 x HD\* functionality

(CE/SWO/VP/HEVC/HEVC/4K) Enables 1 x HEVC UHD Encoding, or up to 4 x HD HEVC Encoding and 16 x 2.0 MPEG-1 Layer II audio encode including ALC

(CE/SWO/VP/HEVC/MP4/X4) Enables 4 x HD MPEG-4 Encoding and 16 x 2.0 MPEG-1 Layer II audio encode including ALC

(CE/SWO/VP/HEVC/SLD/4K) Enable Super low delay mode for UHD.

(CE/SWO/VP/HEVC/CONT/X4) Enables 4:2:2 encoding for UHD or multi-channel HD

\*3x1080p HEVC. 2 x 1080p MPEG-4. All inputs must be the same.

## Specifications

|                               |   |
|-------------------------------|---|
| <b>CE-HEVC Encoder Module</b> | Single slot module<br>Up to four CE-HEVC option modules per chassis |
|-------------------------------|---|

## Inputs

|              |  |
|--------------|--|
| <b>Video</b> | 4 x 3G/HD-SDI Level A serial digital video either electrical (SMPTE 292M/SMPTE 424M) or optical (SMPTE 297M) on SFP on Fibre connections.<br>SMPTE ST 2022-6 on SFP Fibre / 10G ethernet<br>1 x 12G SDI either electrical or optical on SFP. (SMPTE ST-2082) |
| <b>Audio</b> | Up to eight stereo pairs embedded on HD-SDI<br>Up to sixteen stereo pairs embedded on 3G SDI<br>48 kHz sampling rate   |

## Video Encoder

|  |   |
|--|---|
| Video Encoder  | <b>HEVC Main 10 Level 4.1/4.0 High Tier</b><br>720p: 2 Mbps to 50/30 Mbps*<br>1080i: 3 Mbps to 50/30 Mbps*<br>1080p: 4 Mbps to 50 Mbps*           |
|  | <b>HEVC Main 4:2:2 10 Level 4.1/4.0 High Tier</b><br>720p: 2.5 Mbps to 50/30 Mbps*<br>1080i: 3.5 Mbps to 50/30 Mbps*<br>1080p: 6 Mbps to 50 Mbps* |
|  | <b>HEVC Main 10 Level 5.1 High Tier</b><br>UHD: 9 Mbps to 140 Mbps  |
|  | <b>HEVC Main 4:2:2 10 Level 5.1 High Tier</b><br>UHD: 12 Mbps to 140 Mbps   |
|  | <b>H.264 Main Profile Level 4.0 4:2:0 8bit (HD)</b><br>(4 Mbps to 20 Mbps)  |
|  | <b>H.264 High Profile Level 4.1 4:2:0 8bit (HD)</b><br>(4 Mbps to 62.5 Mbps)*   |
|  | <b>H.264 Hi 422 Profile Level 4.1 4:2:2 10-bit (HD)*</b><br>(5 Mbps to 80 Mbps)   |
| Low delay modes as standard<br>Optional super low delay mode (~ 160 ms latency depending on configuration) |   |
| *Max bitrate in Multi-channel mode is 30MBps   |   |

## Video Encoder

|                   |  |
|-------------------|--|
| HD                | 1920 x 1080i 25<br>1920 x 1080i 29.97<br>1280 x 720p 50<br>1280x 720p 59.94<br>1920 x 1080p 50<br>1920 x 1080p 59.94 |
| UHD (4K)          | (HEVC only)<br>3840 x 2160P 50<br>3840 x 2160P 59.94   |
| HDR/SDR signaling | Colour space: BT.709, BT.2020<br>HDR signalling: PQ10, HDR10, HLG  |

## Audio Encoder

|                      |  |
|----------------------|--|
| <b>Audio Encoder</b> | <p>Up to 32 x stereo audio channel processing depending on licensing and configuration</p> <p><b>MPEG-1 Layer II encoding standard</b></p> <p>Encoding rates from 32 kbps to 384 kbps</p> <p>Dolby® Digital +</p> <p>Encoding rates from 32 kbps to 640 kbps</p> <p>Dolby® Digital (AC-3)</p> <p>Encoding rates from 56 kbps to 640 kbps</p> <p>Pass-through of pre-encoded Dolby Digital</p> <p><b>Advanced Audio Coding (AAC)</b></p> <p>Encoding of AAC-LC (64 kbps to 320 kbps), HE-AAC (48 kbps to 128 kbps), HE-AACv2 (32 kbps)</p> <p><b>Linear PCM pass-through</b></p> <p><b>Dolby®E pass-through</b></p> <p><b>Dolby Digital Plus JOC (Joint Object Coding)</b></p> <p><b>Phased Aligned Audio (PAA)</b></p> <p><b>MPEG-H Contribution Audio (encode and pass-through)</b></p> |
|----------------------|--|

## Ancillary Data

|                       |  |
|-----------------------|--|
| <b>Ancillary Data</b> | <p>SMPTE 334-1 Closed Captions</p> <p>SMPTE 2016-3 AFD and Bar Data</p> <p>SMPTE 12-2 Time code extraction and carriage (ETSI TS101 154)</p> <p>SMPTE 2038 Generic VANC data extraction, up to 2 Mbps</p> <p>SMPTE 2031 Teletext extraction and carriage</p> <p>OP47 captions pass-through</p> |
|-----------------------|--|

## Physical and Power

|                                     |                                   |
|-------------------------------------|-----------------------------------|
| <b>Approximate Weight</b>           | 0.35 kg per CE-HEVC option module |
| <b>Power Consumption per module</b> | Less than 45 Watts                |

## Environmental Conditions

|                              |                               |
|------------------------------|-------------------------------|
| <b>Operating Temperature</b> | -10°C to 50°C (14°F to 122°F) |
| <b>Operating Humidity</b>    | < 95% non-condensing          |