

# ERICSSON CE-A SERIES OPTION MODULES



The CE-a Series encoder modules represent the highest density, multi-functional, video processing platform for contribution and distribution (C&D) applications.

The ability to fit up to four hot swappable modules within a single AVP chassis enables broadcasters, operators and service providers to dimension their networks in the most cost-effective way for the needs of today allowing functionality to be upgraded gradually, future proofing investment. The CE-a Series modules are built on a flexible platform capable of encoding both MPEG-2 and MPEG-4 AVC, while supporting C&D specific low delay modes, professional audio encoding, pass-through standards and generic VANC carriage.

The encoder modules provide a uniquely modular software upgradeable solution that allows customers to exploit the advantages of MPEG-4 AVC compression, while maintaining compatibility with the existing generation of MPEG-2 Video based networks.

In conjunction with the extremely flexible multiple I/O options of the AVP chassis, the CE-a Series encoder modules can be used in the widest variety of satellite and terrestrial networks.

## PRODUCT OVERVIEW

### Outstanding Innovation Delivers the Most Dense Contribution and Distribution Encoder

The CE-a Series option modules are the latest addition to the AVP Contribution Encoder range. Based on two decades of encoder design experience, the CE-a Series option modules are multi-functional video encoding platforms for 4:2:0 contribution and distribution applications. The ability to fit up to six multi-format hot-swappable modules in a single AVP chassis provides unmatched flexibility and cost-effective density.

### Hot Swappable Support

All modules in the CE-a Series range are hot swappable to allow on-site servicing, unit re-purposing and maximum portability.

### Software Upgradeability

All modules in the CE-a Series are based on the same future-proof, software-upgradeable platform. This enables users to dimension their networks for the needs of today, ensuring the most cost-effective path to tomorrow's expansions.

### Maximum Flexibility

The ability to fit multiple multi-CODEC encoder modules within a single chassis, support multiple concurrent and independent outputs, contribution and distribution audio format and the carriage of generic VANC data allows customers to target the widest variety of applications across a multitude of different networks.

### Efficient Use of Spectrum

The CE-a Series option modules deliver compression efficiency that allows at least 30 percent or more bandwidth savings compared to MPEG-2 Video at contribution rates.

## OPTION MODULE FEATURES

### CE-a Series Encoder

(CE/HWO/CE-a, FAZ 101 0196/11)

### CE-a Series Encoder Licenses

CE/HWO/CE-a/H264, FAZ 101 0196/22)

(CE/HWO/CE-a/HD, FAZ 101 0196/20)

- Single slot per module. Up to six modules per chassis depending on configuration
- HD/SD-SDI, video input
- MPEG-4 AVC HD/SD 4:2:0 encoding (up to High Profile at Level 4.0)\*
- MPEG-2 Video HD/SD 4:2:0 encoding (up to MP@HL)\*
- 1 Mbps to 50 Mbps video bit-rate\*
- Low latency mode
- Digital AES-EBU and embedded SDI audio input
- MPEG-1 Layer II Audio encoding
- Dolby® Digital 5.1, Dolby®E and Linear PCM pass-through
- iRDO™ HD algorithm implementation
- Generic VANC extraction and carriage (SMPTE 2038)
- Test pattern and test tone generators
- Hot swappable

\* Exact capabilities depend on module choice

## SUPPORTED MODULES

The CE-a Series is purposely built on a single software upgradeable platform. This dedicated hardware allows the encoder to be configured exactly for the needs of the network, while maintaining the portability, the re-purposing capabilities and the easy upgrade path required by today's flexible contribution and distribution operations.

The ability to fit six hot swappable software upgradeable modules within a single chassis, provides service providers, operators and programmers with the most dense and cost-effective solution for 4:2:0 video delivery and the ability to dimension any infrastructure for the needs of today, while maximising future expansion and return on investment.

The following table lists the profiles and capabilities, feature set is decided by adding license to the base card. Additional licenses can be added at any time.

Resolution and Profile	Base Card	License CE/SWO/CE-a/H264	License CE/SWO/CE-aHD
SD and HD MPEG-2, H.264, 4:2:0, 8-bit	CE-a	√	√
SD MPEG-2, H.264, 4:2:0, 8-bit	CE-a	√	
SD and HD MPEG-2, 4:2:0, 8-bit	CE-a		√
SD MPEG-2, 4:2:0, 8-bit	CE-a		

## SOFTWARE OPTIONS

### Additional MPEG-1 Layer II Encoding

(CE/SWO/M1L2, FAZ 101 0119/11)

- Enables one pair of MPEG-1 Layer II Audio encoding
- Up to six additional pairs of audio per encoder module can be supported to make a total of eight pairs per module
- *NOTE: 2 licenses are included as standard*

### Dolby® Digital Stereo Encoding

(CE/SWO/DOLBY/AC3, FAZ 101 0119/8)

- Enables one pair of Dolby® Digital (AC-3) stereo audio encoding
- Up to three independent pairs per encoder module can be supported

### Advanced Audio Coding

(CE/SWO/AAC, FAZ 101 0119/47)

- Enables one pair of Advanced Audio Coding (AAC-LC, HE-AAC, HE-AACv2) stereo audio encoding
- Up to six independent pairs per encoder module can be supported

### Phased Aligned Audio (Patent Pending)

(CE/SWO/PAA, FAZ 101 0119/45)

- Ericsson's Phase Aligned Audio algorithm for 5.1 and 7.1 audio carriage in contribution and distribution networks
- Requires at least three pairs of MPEG-1 Layer II audio encoding enabled

### 3D Contribution

(CE/SWO/3D, FAZ 101 0119/48)

- Ericsson unique solution for discreet Left + Right full-resolution contribution of 3D images at the highest quality HD MPEG-4 AVC 4:2:2 10-bit
- Requires two CE-a modules in a single AVP chassis
- Requires Simulsync 3D enabled RX8200 receivers

### Motion Compensated Temporal Filtering

(CE/SWO/MCTF, FAZ 101 0119/44)

- Superior professional-grade noise reduction to address the most demanding noisy video sources while preserving high spatial resolution
- It is not suitable for low latency operations

### DPI Splice Point

(CE/SWO/DPI, FAZ 101 0119/87)

- Digital program insertion splice point license
- Allows SCTE-35 stream splicing triggered from SCTE-104 in VANC
- Can also be triggered by GPI on GPI card
- Only suitable for CBR modes, does not function in low latency modes

*Please contact Ericsson or an approved reseller to confirm which combinations of options are supported.*

## SPECIFICATIONS

### CE-a Video and Audio Encoder Option Module

Single slot per module  
 One to six CE-a option modules per chassis  
 Full support for module level hot swap

### Inputs

#### Video

HD/SD-SDI serial digital video with EDH error detection and health monitoring  
 HSYNC support for single PCR operation (separate hardware option for HSYNC input)  
 Input Level 800 mV ptp ±10 percent  
 Return loss >15 dB, 10 MHz to 270 MHz

#### Audio

Up to eight stereo pairs embedded on HD-SDI  
 Up to four stereo pairs via AES EBU (Connector via D-Type to XLR)  
 Supports both balanced (AES3) and unbalanced (AES3id) digital audio inputs  
 48 kHz sampling rate

### Advanced Pre-processing

Clarus™ professional grade adaptive spatial and temporal noise reduction, offering four adaptive levels (option)  
 Frame re-synchronization  
 Scene cut detection and I-frame insertion  
 Still detection

### Video Encoder

MPEG-4 AVC Main Profile @ Level 4.0 (CE/SWO/CE-a/H264)  
 MPEG-4 AVC High Profile @ Level 4.0 (CE/SWO/CE-a/H264) + (CE/SWO/CE-a/HD)  
 MPEG-2 Video Main Profile @ Main Level  
 MPEG-2 Video Main Profile @ High Level (CE/SWO/CE-a/HD)  
 1 Mbps to 25 Mbps bit-rate range  
 CABAC entropy encoding  
 Manual CABAC switching-point override (CE/SWO/CE-a/H264)  
 Triple pass "Pixel Perfect" fully exhaustive motion estimation  
 CBR and Low Delay modes  
 GOP processing includes adaptive GOP structure and adaptive GOP length  
**Video Resolutions**  
**Only with CE/SWO/CE-a/HD license**  
 1920 x 1080i 25  
 1920 x 1080i 29.97  
 1280 x 720p 50  
 1280 x 720p 59.94

#### CE-a Base Card

720, 704, 640, 544, 528, 480, 352 x 576i 25  
 720, 704, 640, 544, 528, 480, 352 x 480i 29.97  
 352 x 288i 25  
 352 x 240i 29.97

### Audio Encoder

Up to 8x stereo audio channel processing  
**MPEG-1 Layer II encoding standard**  
 Encoding rates from 32 kbps to 384 kbps, up to 8 pairs  
**Dolby® Digital (AC-3)**  
 Encoding rates from 56 kbps to 640 kbps (option) - maximum of 3 pairs  
 Pass-through of pre-encoded Dolby Digital, up to 8 streams  
**Advanced Audio Coding**  
 Encoding of AAC-LC (64 kbps to 320 kbps), HE-AAC (48 kbps to 128 kbps) and HE-AACv2 (32 kbps), up to 6 pairs  
**Dolby®E pass-through**  
 Up to four streams  
**Linear PCM pass-through**  
 Up to four independent stereo pairs  
**Phased Aligned Audio (PAA)**  
 Encoding of 6 or 8 audio channels with time synchronous samples.

### Ancillary Data

SMPTE 334-1 Closed Captions  
 SMPTE 2016-3 AFD and Bar Data  
 SMPTE 12-2 Time code extraction and carriage (ETSI TS101 154)  
 SMPTE 2038 Generic VANC data extraction, up to 2 Mbps

### Features

Internal test tone and test pattern generation  
 Auto switching on loss of input source to test pattern, last good video frame with selectable text message  
 Optional PID elimination on loss of input

### Physical and Power

**Approximate Weight**  
 0.33 kg (0.73 lbs) per CE-a option module  
**Power Consumption per module**  
 Less than 40 Watts

### Environmental Conditions

**Operating Temperature**  
 -10°C to 50°C (14°F to 122°F)  
**Operating Humidity**  
 < 95% non-condensing