

ViBE® EM4000

PREMIUM HD/SD ENCODER



The compression performance of the Harmonic ViBE® EM4000 HD/SD encoder allows for significant cost savings through better use of bandwidth while delivering a premium viewing experience.

The ViBE encoder brand is synonymous with premium, high-quality video compression. Now part of Harmonic, ViBE encoders utilize the most advanced compression technologies available, gained from 20 years of know-how in encoder algorithm optimization. The ViBE EM4000 is especially well-suited for satellite, terrestrial broadcast and premium cable or IPTV applications, as well as various other kinds of content aggregation.

At the heart of the ViBE EM4000 is a decoupled processing engine driving the Mustang 2.0 next-generation compression algorithm. Mustang 2.0 increases HD MPEG-4 AVC encoding efficiency thanks to improved motion estimation, refined multi-pass encoding and advanced preprocessing.

Picture Perfect Video Delivery

The advanced ViBE EM4000 encoder sets a new benchmark in video and audio encoding. It delivers the highest compression performance in all formats – HD AVC, SD AVC, HD MPEG-2 and SD MPEG-2 – allowing users to broadcast more channels per multiplex. Broadcast-grade SD-to-HD up-conversion allows a full HD channel lineup offering; combined with premium HD AVC encoding, the ViBE EM4000 delivers better picture quality than SD MPEG-2 at the same bitrate. With encoding latency of just two seconds in CBR and three seconds in VBR from baseband input, the encoder is perfect for live broadcast applications.

When combined with the Flexstream 2.0 statistical multiplexing solution, the ViBE EM4000 further optimizes bandwidth usage by including non-video components in the statmux pool, and minimizes the number of encoders required for regionalization.

The audio encoding features of the ViBE EM4000 are equally impressive. With integrated Dolby Digital Plus (E-AC-3) 5.1 surround-sound encoding, it is possible to deliver audio that matches the high quality of the video. In addition to E-AC-3, the ViBE EM4000 features the latest AAC audio compression for ultra-low bandwidth utilization.

Simplified & Evolving Headends

Possessing advanced integrated features, the ViBE EM4000 helps reduce the headend footprint and simplify operations. The encoder provides up to eight HD channels per rack unit, including 16 multichannel (5.1) audio services and Dolby E to Dolby Digital (AC-3) transcoding. Baseband (SD/HD-SDI/3G-SDI) or compressed input (IP or ASI) are available to fit any architecture and provide highly secure redundancy schemes.

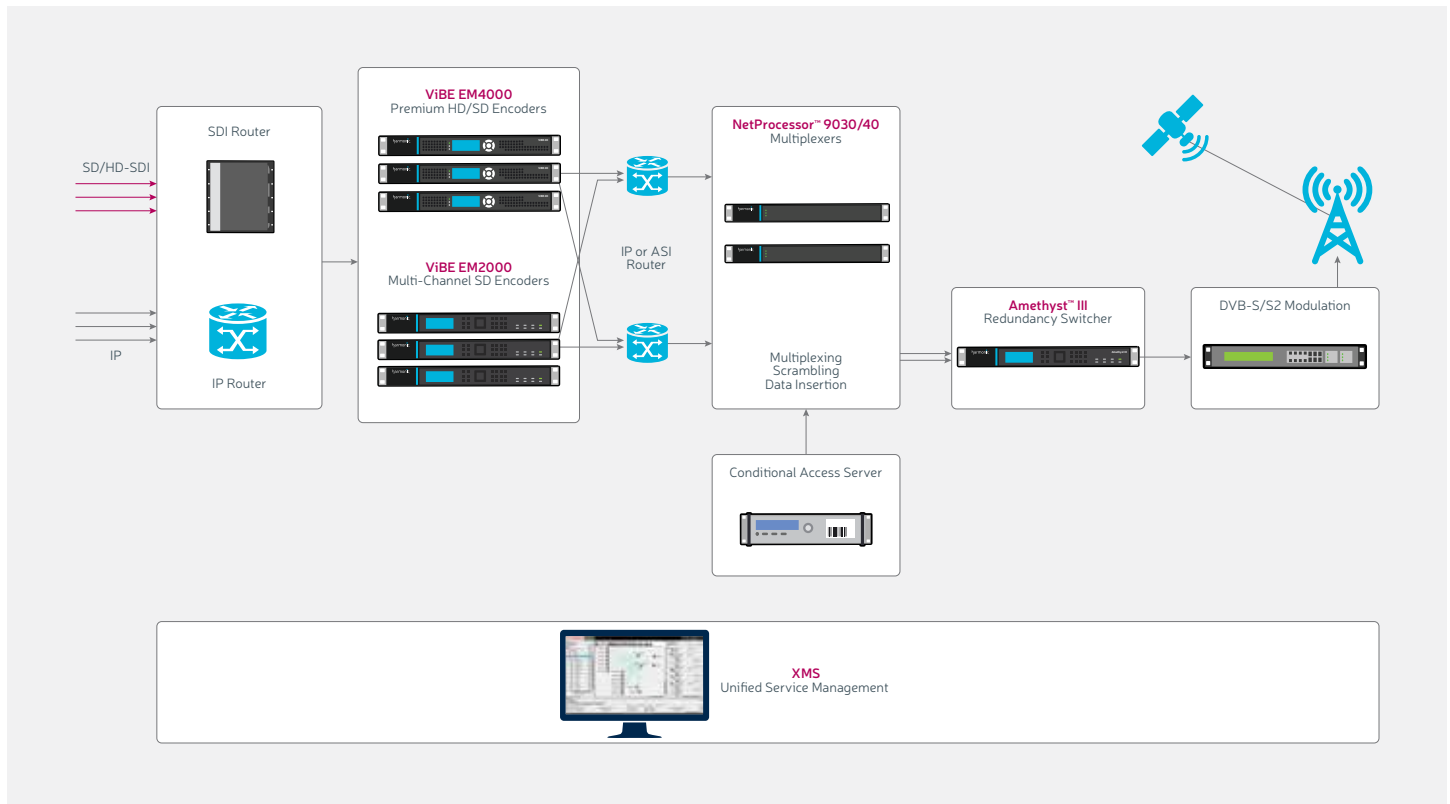
The ViBE EM4000 simplifies workflows with additional features such as Jünger Level Magic™ automatic loudness control, teletext-to-DVB subtitle transcoding using Cavena subtitling technology, broadcast-grade up/down-scaling and logo insertion. The encoder further helps users lower their OPEX via low power consumption of less than 65W per channel (eight-channel model) and front-to-back cooling. Dual power supplies add peace of mind.

World-Class Service & Support

Harmonic stands behind the ViBE EM4000 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

- Superior SD/HD MPEG-4 AVC video encoding
- Advanced preprocessing, including motion-compensated filtering, even for compressed input
- SD/HD and MPEG-2/AVC change via software license
- Baseband and compressed input
- Up to eight HD channels per RU
- Dolby® Digital, Dolby Digital Plus and AAC/HE-AAC support
- Dolby E and SMPTE 2020 to HE-AAC 5.1 transcoding with metadata and auto switch out
- 3G capable input
- Harmonic Flexstream™ WAN, LAN and internal statistical multiplexing
- Embedded DVB subtitle generation
- Embedded automatic loudness control
- Broadcast-grade upscale/downscale
- Logo insertion
- DPI and targeted advertising support
- Dual power supply



ViBE EM4000 DTT/DTH Workflow

SPECIFICATIONS

INPUT/OUTPUT

Inputs	SD-SDI (SMPTE 259M) and HD-SDI (SMPTE 292M) serial digital video, featuring frame synchronizer to cope with unclean input switching 3G-SDI ready (SMPTE 424M/372M) Dedicated ASI input for data such as DVB subtitling injection ASI and dual GbE for re-encoding applications Custom slide
Outputs	MPTS and multi SPTS (IP streaming) Dual GbE interfaces FEC generation (SMPTE 2022-1) on IP streams

VIDEO PROCESSING

Encoding Profiles	MPEG-2 MP @ ML and HL 4:2:0 MPEG-4 AVC MP @ L3 and L4 HP @ L3 and L4
Encoding Schemes	CBR, VBR, cVBR (seamless bitrate changes)
Resolutions and Frame Rates	480i @ 29.97 Hz 576i @ 25 Hz 720p @ 50 and 59.94 Hz 1080i @ 25 and 29.97 Hz 1080p @ 25 Hz
Advanced Preprocessing	Pixel-based motion-compensated noise reduction 2D smart adaptive filtering for very low bitrate applications Cut, fade and flash detection Block artifact reduction Mosquito noise reduction
Ancillary Data Processing	AFD HD teletext subtitling (OP-47 and SMPTE 2031) Closed captioning and extended data service VITC and D/VITC Teletext transcoding to DVB-subtitling

SPECIFICATIONS

AUDIO PROCESSING

Formats and Bitrates

MPEG-1 Layer II	32-192 kbps
AC-3 2.0	96-448 kbps
AC-3 5.1	384-640 kbps
E-AC-3 5.1	192-448 kbps
AAC-LC/HE-AAC/HE-AACv2 2.0	32-128 kbps
AAC-LC/HE-AAC 5.1	96-448 kbps

Processing Capabilities	Dolby E to AC-3 transcoding Dolby E to E-AC-3 transcoding AC-3 or E-AC-3 passthrough with error masking AC-3 to E-AC-3 transcoding Dolby E to HE-AAC transcoding SMPTE 2020 support Jünger Level Magic automatic loudness control Radio encoding
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CONTROL AND MONITORING

XMS network management system, including N+P redundancy
Embedded web server
SNMP agent
Front panel
Interface with Harmonic FUZE-1™ playout system for ingest
Insertion of digital cue tones (SCTE 35) from Ethernet (SCTE 104), SDI (SMPTE 2010) or compressed input

PHYSICAL

Rack Height	1 RU x 19 in
Power Consumption	≤ 460 W (for 8 channels)
Input Voltage	100-240V AC
Cooling	Front to rear airflow
Features	Dual power supplies

ENVIRONMENTAL

Operating Temperature	41° to 104° F 5° to 40° C
Storage Temperature	23° to 113° F -10° to 70° C
Maximum Humidity	90%
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 ELEMENTS

Part Number	Description
EM4000-1U-2AC-2CH	EM4000 platform with single PSU, IP output, capability for two HD channels
EM4000-1U-2AC-4CH	EM4000 platform with single PSU, IP output, capability for four HD channels
EM4000-1U-2AC-6CH	EM4000 platform with single PSU, IP output, capability for six HD channels
EM4000-1U-2AC-8CH	EM4000 platform with single PSU, IP output, capability for eight HD channels
EM4000-HW-2ASI-IN	ASI input connectors for auxiliary data

VIDEO SOFTWARE LICENSES

Part Number	Description
EM4000-LIC-MP4HD	One HD MPEG-4 AVC encoding channel
EM4000-LIC-MP2SD	One SD MPEG-2 encoding channel
EM4000-LIC-MP4SD	One SD MPEG-4 AVC encoding channel
EM4000-LIC-MP2HD	One HD MPEG-2 encoding channel
EM4000-LIC-DEC-HD	One HD/SD MPEG-2/MPEG-4 AVC decoding channel
EM4000-LIC-PIP	Picture-in-picture operation

AUDIO SOFTWARE LICENSES

Part Number	Description
EM4000-LIC-MPEG1L2	MPEG-1 Layer II stereo
EM4000-LIC-DE	Dolby E decoding
EM4000-LIC-DD51	AC-3 or E-AC-3 5.1 surround encoding
EM4000-LIC-DD20	AC-3 or E-AC-3 2.0 stereo encoding
EM4000-LIC-AAC	AAC/HE-AAC 2.0 stereo encoding
EM4000-LIC-DEC-DD51	AC-3 or E-AC-3 2.0/5.1 stereo/surround decoding
EM4000-LIC-HEAAC51	AAC/HE-AAC 5.1 surround encoding
EM4000-LIC-DDtoDD+	AC-3 to E-AC-3 transcoding

FEATURE SOFTWARE LICENSES

Part Number	Description
EM4000-LIC-FLXREM	Flexstream statistical multiplexing
EM4000-LIC-FLXSRV	Allows non-video components into statistical multiplexing pool
EM4000-LIC-DVBSUB	DVB subtitling transcoder
EM4000-LIC-JUNG	Jünger Level Magic automatic loudness control
EM4000-LIC-FEC	FEC SMPTE 2022-1 generation
EM4000-LIC-SD-UPSCALE	SD to HD up-conversion
EM4000-LIC-LOGO	Logo insertion
EM4000-LIC-TARGETED-AD	Targeted advertising support