

# IP-8cb

## Audio over IP Codec

### Highlights

- ▶ High-density 8-channel audio encoder/decoder
- ▶ Up to 8 AES-3id digital stereo inputs and outputs
- ▶ AES-3id to AES67 and AES67 to AES-3id converter



## IP-8cb – Audio over IP Codec (1/2)

*The IP-8cb is purely digital 8-channel audio codec tailor-made for high-density installations.*

*Equipped with AES-3id (BNC) digital audio interfaces and optimized to meet latency requirements in live broadcast scenarios, the codec is the ideal choice for demanding audio installations in TV live production environments.*

### Features

- ▶ Purely digital Audio over IP Codec with 8 inputs and 8 outputs
- ▶ Asymmetric digital interfaces via BNC according to AES-3id
- ▶ Includes most relevant audio coding formats (Dolby optional)

### Use-cases

- ▶ High-density audio codec for TV production environments
- ▶ AES-3id to AES67 and AES67 to AES-3id converter

### Audio coding – fitting to your needs

High-quality multi-format audio decoding and encoding

- ▶ MPEG-1/2 Layer 2, 3
- ▶ G.711, G.722, Linear PCM
- ▶ Opus, Ogg Vorbis
- ▶ AAC-LC, HE-AAC v1 & v2, AAC-LD, AAC-ELD, AAC-ELDv2, xHE-AAC
- ▶ Enhanced aptX (E-aptX)
- ▶ Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3), Dolby E on request\*

### Backup / advanced redundancy management

Flexible automatic switch over concept with free definition of alternative input sources as redundancy solution in case of failures

- ▶ 3 backup sources per channel, 1 active at a time with
- ▶ Seamless switching between main and backup
- ▶ Playing files from internal storage or using alternative streams (Icecast, Shoutcast)
- ▶ Dual IP ports for data + 1 IP port for control interface
- ▶ Redundant power supply 230 VAC or 48 VDC\*



## IP-8cb – Audio over IP Codec (2/3)

### IP streaming (unicast, multiple unicast & multicast)

Rock solid network connection even in stress conditions according to standards RFC 3550, RFC 3551, RFC 3640, RFC 2250

- ▶ Professional audio contribution based on EBU TECH 3326, SMPTE ST 2110 (UDP, RTP and SIP/SDP)\*
- ▶ TS RTP, UDP and SRT streaming\*
- ▶ AES67 based on RAVENNA, Livewire or Dante (SAP, RTSP, AES67, PTPv2)\*
- ▶ Livewire / Ravenna\*
- ▶ HLS, Icecast source client\*

### Advanced IP robustness functionalities

- ▶ PRO MPEG FEC, Dual streaming
- ▶ Management of packet size, buffer and QoS
- ▶ Secure Reliable Transport (SRT)\*
- ▶ Reliable Internet Stream Transport (RIST)\*

### Control

Remote control with various possibilities: HTTP/S, FTP, Telnet, NMS, SNMP

- ▶ Revised configuration via web user interface for easier setup
- ▶ Insertion of localized advertisement
- ▶ REST API
- ▶ SNMP v2c, relays, inputs
- ▶ Ember+

### Special

- ▶ Energy efficient 24/7 broadcast quality
- ▶ Perfect network synchronization for SFN\*

### Monitoring

- ▶ IP and MPEG parameters via SNMP v2c and relay
- ▶ Headphone output
- ▶ Icecast Live Listening

### Advanced control functionalities

- ▶ High quality multi-format audio de-/encoding:
- ▶ HTTP/HTTPS: via web interface
- ▶ NMS: Control via centralized Network Management System



## IP-8cb – Audio over IP Codec (3/3)

### Perfect audio & latency management

- ▶ Synchronous playout based on NTP (SPN)\*
- ▶ Perfect latency control in SFN FM networks based on 1PPS or GPS\*<sup>1</sup>
- ▶ PTPv2 network synchronization\*
- ▶ Optimized throughput delay
- ▶ PLL control

### Highly sophisticated monitoring and alarm concept

- ▶ Adjustable silence detection
- ▶ IP buffer and jitter check
- ▶ SNMP, alarm, source switch & event logging

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<sup>1</sup> This function is optional. Please find the complete list of options at the end of the document.



## Technical details (1/3)

### Audio (encoder / decoder)

#### Codecs

<b>Standard</b>	Linear PCM, G.711, G.722 Opus, Ogg Vorbis MPEG 1/2 Layer 2, 3 MPEG-2/MPEG-4 AAC-LC, MPEG-4 HE-AAC v1 & v2, MPEG-4/MPEG-D xHE-AAC MPEG-4 AAC-LD/ELD/ELDV2 Enhanced aptX (E-aptX) Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3), Dolby E on request. (optional) MPX (optional)
<b>On request</b>	Bit transparent transmission of AES/EBU input
<b>Sample rates</b>	16, 22.05, 24, 32, 44.1, 48 kHz

### Interfaces

#### Audio

<b>Digital (in)</b>	8x AES-3id, 75 $\Omega$ unbalanced
<b>Digital (out)</b>	8x AES-3id, 75 $\Omega$ unbalanced
<b>Headphone (out)</b>	L/R, < 10 $\Omega$ , 6,3 mm
<b>Digital reference input</b>	No dedicated input, selectable by user
<b>Sample rate converter</b>	8:1 (with bypass modes)



## Technical details (2/3)

Digital silence detection	-90 ... 0 dBFS
Adjustable gain	-9 ... +6 dB
Dynamic range	16 Bit: > 89 dB; 24 Bit: > 130 dB
Frequency response	Depends on sample rate – e.g. 48 kHz: 0.1 dB; 20 Hz ... 22.5 kHz

### Tuner, ASI

Optional FM tuner	2x 75Ω F-Type
Optional SAT tuner	2x 75Ω F-Type, ASI input
Optional ASI input	BNC, 270 Mbps, MPEG2 TS

### Ethernet

Data	Audio, serial data and GPIO transmission, controlling and setup functions
Connector	3x RJ45
Type	Auto switching 10/100/1000 BASE-T
Protocol	RTP/RTCP/UDP, SRT Secure Reliable Transport, IGMP, ICMP, DHCP, HTTPS, SFTP, SNMP, NTP, TCP (Icecast), HLS, PTPv2, SMTP ST 2110

### Serial

Interface	8x RS-232C (rear), Sub D-15 (breakout cable needed)
Data	Private data, MPEG ancillary data, UECP/RDS (acc.to TR 101 154)
Transmission rate	8x RS-232C (rear), Sub D-15 (breakout cable needed)
USB	1x USB 2.0 interface for service

### Contact closure

Connector	26 pole sub-D male
Inputs	8 inputs
Outputs	7+1 floating relays 7 relays SPST (from A) 1 relay SPDT (from C) DC: max. 30 V, 1 A, 10 W

### Internal storage

Data	internal audio files
Size	7 GB (optional 1000 GB)
Type	eMMC (optional SSD)

### Time synchronization (optional)

PTPv2	Network synchronization according to IEEE 1588-2008
SYNC/AUX 1	BNC – 75 Ω



## Technical details (3/3)

### Control & monitor

#### Ethernet

<b>User interface</b>	Integrated Web GUI, LCD display
<b>Data</b>	Control and setup functions
<b>Optional</b>	Private data, MPEG ancillary data (IRT)
<b>USB</b>	USB 2.0 interface for service, configuration and firmware updates
<b>Protocol</b>	2wcom NMS, Telnet, HTTPS, SNMP, UDP, RTCP, SRT Secure Reliable Transport, SFTP IGMP, ICMP, NTP, DHCP, SNMP, SSH, PTPv2, TCP (Icecast, HLS)

#### Front panel

<b>Display: LCD</b>	Graphical, 264x64 pixel
<b>Jog wheel</b>	Impulse, enter button
<b>4 duo LEDs</b>	Power, input, output, warning

### General data

<b>Power consumption</b>	<20W
<b>Case dimensions</b>	19", 1 HU, Depth: 310 mm, Width: 424 mm, front panel: 484 mm
<b>Weight</b>	< 5 kg
<b>Material</b>	Steel plate (aluminum-zinc coated)
<b>Operating temp. range</b>	0...+45°C
<b>Storage temp. range</b>	-40...+70°C
<b>Languages</b>	English

#### Power supply

<b>Standard AC</b>	1 internal IEC power connector voltage range 90 – 260 VAC (nominal 100 – 240 VAC) frequency range 47 – 63 Hz (nominal 50 – 60 Hz)
<b>Standard DC (optional)</b>	1 internal (Neutrik powerCON) voltage range -40 – -60 VDC (nominal -48 VDC)
<b>Dual internal (optional)</b>	Two internal redundant power supplies (AC or DC) automatic switchover and prioritization AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz) DC: -40 – -60 VDC (nominal -48 VDC)
<b>Dual hot-plug (optional)</b>	Two hot-swappable redundant power supplies (AC or DC) automatic switchover and prioritization AC: 90 – 260 VAC (nominal 100 – 240 VAC), 47 – 63 Hz (nominal 50 – 60 Hz) DC: -40 – -60 VDC (nominal -48 VDC)



## Options (1/2)

### IP-8cb base unit variations

You can choose between the following base unit variations:

Article no.	Name
VER63101	Base unit IP-4c with 1x internal AC power supply
VER63102	Base unit IP-4c with 2x internal AC power supplies
VER63103	Base unit IP-4c with slot for 2x hot-plug power supply <ul style="list-style-type: none"><li>▶ 2x hot-plug power supplies AC / DC not included.</li><li>▶ Please order 2 hot-plug power supplies AC (VER45851) and/or DC (VER45852).</li></ul>
VER63104	Base unit IP-4c with 1x AC / 1x DC (DC leading) internal power supplies
VER63105	Base unit IP-4c with 1x DC internal power supply

### IP-8cb hardware options

Please note that hardware options are installed at the factory in Flensburg, Germany, and can only be retrofitted independently in individual cases.

Article no.	Name	Description
VER63020	FM/DAB dual tuner (*)	FM/DAB multi-band tuner for rebroadcasting, monitoring & control <ul style="list-style-type: none"><li>▶ Dual tuner with 75Ω F-Type connector input</li><li>▶ Alarm messages via SNMP or relay</li></ul> (*) Excludes options SAT tuner (VER63010) and ASI expansion module (VER63021)
VER63021	ASI expansion module (*)	Adds 1x ASI input and 1x ASI output to the device. Hardware option. (*) Excludes options SAT tuner (VER63010) and FM tuner (VER63020)
VER63009	Breakout cable RS232 8-times	Cable for in- and output of 8x ancillary data (e. g. UECP RDS data) via RS232 cable
VER45851	Hot-plug AC power supply	Power supply with automatic switch over in case of failure. <ul style="list-style-type: none"><li>▶ 90 – 260 VAC (nominal 100 – 240 VAC),</li><li>▶ 47 – 63 Hz (nominal 50 – 60 Hz)</li></ul>
VER45852	Hot-plug DC power supply	Power supply with automatic switch over in case of failure. <ul style="list-style-type: none"><li>▶ 40 – -60 VDC (nominal -48 VDC)</li></ul>





## Options (2/2)

### IP-8cb software options

Please note that software options can be retrofitted remotely.

Article no.	Name	Description
VER63110	Activation of additional audio channel	Activation of additional audio channel for base unit incl. all ordered audio codecs
VER63001	Ravenna, AES67, PTP	According to the standard Ravenna of audio over IP interoperability (including AES67, SAP, RTSP, PTP). Price per activated channel.
VER63011	EBU Tech 3326	According to the standard of audio over IP interoperability EBU Tech 3326 (including SDP, SIP, SIP phonebook, 2wcom Easy2connect). Price per activated channel.
VER63012	Livewire+	According to the standard of audio over IP interoperability Livewire+ (Including AES67, LWRP, LWCP, Livewire Advertisement). Price per activated channel.
VER63002	Stream4Sure - Quad streaming with different coding and quality	Simultaneous transmission/reception (IP-4d) of up to four IP streams of different coding and quality and seamless exchange of audio samples in case of failure. Price per activated channel.
VER63013	Live listening	Audio monitoring via web interface or web stream client. Price per activated channel.
VER63003	SFN (single frequency network)	Perfect timing and network synchronization for SFN applications.
VER63014	MPEG-2 TS decoder	Decoding of a MPEG-2 TS (transport stream) according to ISO/IEC 13818-1 or ITU-T Rec. H.222.0. Price per activated channel.
VER63015	MPEG-2 TS encoder	Encoding of a MPEG-2 TS (transport stream) according to ISO/IEC 13818-1 or ITU-T Rec. H.222.0. Price per activated channel.
VER63016	SRT/RIST decoder	SRT functionality for decoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for decoder according to IETF standard "RIST Simple Profile" and RFC 4585. Price per activated channel.
VER63017	SRT/RIST encoder	SRT functionality for encoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for encoder according to IETF standard "RIST Simple Profile" and RFC 4585 Price per activated channel.
VER63018	Dolby Digital Pro Encoder	Supports Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3). Support of Dolby E on request. Price per activated channel.