

# IP-8e

## Audio over IP Encoder

### Highlights

- ▶ Multi-format 8-channel audio encoder
- ▶ Robust audio streaming and enhanced redundancy
- ▶ Up to 8 digital or 4 analog stereo inputs



## IP-8e – Audio over IP Encoder (1/2)

### Audio coding fitting to your needs

High quality multi-format audio 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)
- ▶ Bit transparent transmission of digital audio and MPX\*
- ▶ Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3), Dolby E on request\*
- ▶ FRAUNHOFER DAB+ Encoder with EDI/STI-D interface or FhG MuxEnc (MPEG 4 AAC LC, HEv1 & v2)\*

### 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 IP streaming using UDP, RTP and SIP/SDP (standardized by EBU N/ACIP Tech 3326)
- ▶ PRO MPEG FEC, Dual streaming
- ▶ Optional: Livewire/ Ravenna (SIP, SAP, RTSP, AES67)
- ▶ TS RTP, UDP and SRT streaming
- ▶ SRT Secure Reliable Transport
- ▶ Stream4Sure: 2wcom streaming technology with different codecs/qualities and seamless switching of up to 4 Streams\*
- ▶ HLS, Icecast

### Backup / advanced redundancy management

- ▶ 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\*

### 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
- ▶ SNMP v2c, relays, inputs

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\* This function is optional. Please find the complete list of options at the end of the document.



## IP-8e – Audio over IP Encoder (2/2)

### Special

- ▶ Energy efficient 24/7 broadcast quality
- ▶ RDS decoding (built in RDS/UECP decoder)
- ▶ The device provides 2x RS232 IN per channel and four GPIs per channel
- ▶ Embedded auxiliary data (RBDS/RDS or PAD) and GPIO forwarding
- ▶ Perfect network synchronization for SFN applications\*

### Monitoring

- ▶ IP and MPEG parameters via SNMP v2c and relay
- ▶ Headphone output
- ▶ Icecast live listening

### Advanced control functionalities

- ▶ HTTP/HTTPS: via web interface
- ▶ FTP: XML file control
- ▶ NMS: Control via centralized network management system

### Perfect audio quality

- ▶ Balanced analog and digital AES/EBU (integrated XLR connector)

### Advanced IP robustness functionalities

- ▶ Operates under stressful network conditions
- ▶ PRO MPEG FEC
- ▶ Management of packet size, buffer and QoS
- ▶ Stream4Sure – 2wcom streaming technology with different codes / qualities\*
- ▶ and seamless switching of up to 4 streams

### Perfect latency management

- ▶ Optional: GPS/1PPS based 2wcom latency control solution usage in SFN FM networks

### Highly sophisticated monitoring and alarm concept

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

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\* 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) DAB+ (HE-AAC v2, ETSI TS 102 563) (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 (On request: up to 192 kHz)
<b>Sample rate converter</b>	8:1 (with bypass modes)

### Interfaces

#### Audio

<b>Digital (in)</b>	8x AES/EBU, 110 $\Omega$ balanced integrated XLR female, shared with analog in (configurable)
<b>Analog (in)</b>	4x L/R, > 10 k $\Omega$ balanced integrated XLR female, shared with digital in (configurable)
<b>Headphone (out)</b>	L/R, < 10 $\Omega$ , 6,3 mm
<b>Analog reference level</b>	+9 dBu
<b>Digital reference level</b>	-9 dBFS
<b>Dynamic range</b>	16 Bit: > 89 dB; 24 Bit: > 130 dB
<b>Frequency response</b>	Depends on sample rate – e.g. 48 kHz: 0.1 dB; 20 Hz – 22.5 kHz



## Technical details (2/3)

### Ethernet

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

### Serial

<b>Interface</b>	16x RS-232 Sub D-9 using break-out cable
<b>Data transmission format</b>	MPEG ancillary data embedded in audio (IRT) own IP link
<b>Transmission rate</b>	1200 to 115200 baud, asynchronous

### Transport stream

<b>ASI IN</b>	BNC – 75 $\Omega$
<b>ASI OUT 1</b>	BNC – 75 $\Omega$
<b>ASI OUT 2</b>	BNC – 75 $\Omega$ - configurable to be either ASI OUT or SYNC OUT (e.g. 1PPS)

### Contact closure

<b>Inputs</b>	32 inputs
<b>Outputs</b>	8 floating relays (7x SPST, 1x SPDT) (for DC: max. 30 V, 0.5 A) 26 pole sub-D male
<b>Optional:</b>	24 floating relays (replaces: 8x serial inputs)

### Internal storage

<b>Data</b>	internal audio files
<b>Size</b>	7 GB (optional 1000 GB)

### Time synchronization (optional)

<b>PTP</b>	Network synchronization according to IEEE 1588-2008
<b>SYNC IN</b>	BNC – 75 $\Omega$ - 1PPS / 10MHz
<b>SYNC OUT</b>	BNC – 75 $\Omega$ - 1PPS / 10MHz configurable to be either ASI OUT or SYNC OUT



## Technical details (3/3)

### Control & monitor

#### Ethernet

<b>User interface</b>	Integrated Web GUI, LCD display
<b>Data</b>	Control and setup functions
<b>Protocol</b>	2wcom NMS, Telnet, HTTPS, SNMP, UDP, RTCP, SRT Secure Reliable Transport, SFTP IGMP, ICMP, NTP, DHCP, SNMP, SSH, PTPv2, TCP (Iccast, 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>	< 20 W
<b>Case dimensions</b>	19", 1 RU, 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-8e base unit variations

Each base unit includes one stereo encoder channel. You can choose between the following base unit variations:

Article no.	Name
VER65001	Base unit IP-8e with 1x internal AC power supply
VER65002	Base unit IP-8e with 2x internal AC power supplies
VER65003	Base unit IP-8e 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) or DC (VER45852).</li></ul>
VER65004	Base unit IP-8e with 1x AC / 1x DC (DC leading) internal power supplies
VER65005	Base unit IP-8e with 1x DC internal power supply

### IP-8e 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
VER65108	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>

### IP-8e software options

Please note that software options can be retrofitted remotely.

Article no.	Name	Description
VER65100	Activation of additional audio channel	Activation of additional audio channel for IP-8e unit incl. all ordered audio codecs.
VER65101	Ravenna, AES67, PTP	According to the standard Ravenna of audio over IP interoperability (including AES67, SAP, RTSP, PTP). Price per activated channel.



## Technical details (2/2)

Article no.	Name	Description
VER65103	SFN (single frequency network)	Perfect timing and network synchronization for SFN applications. Price per unit.
VER65104	PTPv2 (network time synchronization)	Perfect timing and network synchronization without external clock signal (1pps/10MHz) in slave mode. On request: also grandmaster function possible. Price per activated channel.
VER65110	Livewire+	According to the standard of audio over IP interoperability Livewire+ (Including AES67, LWRP, LWCP, Livewire Advertisement). Price per activated channel.
VER65111	Live listening	Audio monitoring via web interface or any web stream client. Price per activated channel.
VER65113	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.
VER65115	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.
VER63024	MPE	MPE (Multiprotocol Encapsulation) encoding. Price per unit.
VER65116	HLS encoder (per stereo channel)	Adds HLS, HTTP Live Streaming Encoder function. ► Max number of output coding qualities and number of playlists per container: 2 per activated channel
VER65117	DAB+ Encoder license	FRAUNHOFER Professional DAB+ Codec with EDI/STI-D output. ► Local insertion of PAD (DLS, SLS), TA, PTy. Price per DAB+ subchannel instance, requires audio channel VER65100.
VER65118	DAB Classic Encoder license	MPEG 1 Layer 2 with EDI/STI-D output. ► Local insertion of PAD (DLS, SLS), TA, PTy. Price per DAB subchannel instance, requires audio channel VER65100.
VER65119	Fraunhofer MuxEnc license	For connection to Fraunhofer DAB ContentServer. With central configuration, PAD insertion and monitoring of the DAB/DAB+ encoders at the multiplexer. Price per unit.