

IP-4d

Audio over IP Decoder

Highlights

- ▶ Multi-format 4-channel audio decoder
- ▶ Up to 4 digital or 2 analog stereo outputs



IP-4d – Audio over IP Decoder (1/3)

Audio networks based on different protocols

- ▶ Broadcast based on EBU TECH 3326, SMPTE ST 2110*
- ▶ AES67 based on RAVENNA, Livewire or Dante*

Audio decoding – fitting to your needs

High quality multi-format audio decoding

- ▶ 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*
- ▶ Bit transparent reception of digital audio and MPX / μ MPX signals*

IP input

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
- ▶ SRT (Secure Reliable Transport)*
- ▶ TS RTP, UDP and SRT streaming
- ▶ Livewire / Ravenna (SIP, SAP, RTSP, AES67, PTPv2)*
- ▶ Stream4Sure; 2wcom streaming technology with different codecs / qualities and seamless switching of up to 4 Streams*
- ▶ HLS, Iccast source client*

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



IP-4d – Audio over IP Decoder (2/3)

Backup / advanced redundancy management

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

- ▶ 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
- ▶ REST-API
- ▶ Ember+

Special

- ▶ Energy efficient 24/7 broadcast quality
- ▶ RDS decoding (built in RDS / UECP decoder)
- ▶ Embedded auxiliary data (RBDS / RDS or PAD) and GPIO forwarding
- ▶ Satellite tuner / ASI input*
- ▶ FM tuner; capable to receive up to two FM or DAB or HDR programs*
- ▶ Perfect network synchronization for SFN*

Monitoring

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

Advanced control functionalities

- ▶ High quality multi-format audio decoding
- ▶ HTTP/HTTPS: via web interface
- ▶ NMS: control via centralized network management system
- ▶ Perfect audio quality
- ▶ Balanced analog and digital AES/EBU (integrated XLR connector)

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



IP-4d – Audio over IP Decoder (3/3)

Advanced IP robustness functionalities

Even to operate in standard IP networks

- ▶ 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 audio & latency management

- ▶ GPS-based 2wcom latency control solution usage in SFN FM networks*
- ▶ ACIP-compliant high-audio quality and extremely low latency (PTPv2 network synchronization) *

Highly sophisticated monitoring and alarm concept

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

* 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

| | |
|------------------------------|---|
| Standard | 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) |
| On request | Bit transparent transmission of AES/EBU input |
| Sample rates | 16, 22.05, 24, 32, 44.1, 48 kHz (On request: up to 192 kHz) |
| Sample rate converter | 8:1 (with bypass modes) |

Interfaces

Audio

| | |
|----------------------------------|--|
| Digital (out) | 4x AES/EBU, 110 Ω balanced integrated XLR male, shared with analog out (configurable) |
| Digital (out) | 4x AES/EBU, 110 Ω balanced integrated XLR male, shared with analog out (configurable) |
| Headphone (out) | L/R, < 10 Ω, 6,3 mm |
| Analog reference level | +9 dBu, Max. +18 dBu (input/output) |
| Digital reference input | No dedicated input, selectable by user |
| Digital reference level | -9 dBFS |
| 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 |



Technical details (2/3)

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

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

Front panel

| | |
|---------------------|-------------------------------|
| Display: LCD | Graphical, 264x64 pixel |
| Jog wheel | Impulse, enter button |
| 4 Duo LEDs | Power, input, output, warning |

General data

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

Power supply

| | |
|---------------------------------|--|
| Standard AC | 1 internal IEC power connector voltage range 90 – 260 VAC (nominal 100 – 240 VAC) frequency range 47 – 63 Hz (nominal 50 – 60 Hz) |
| Standard DC (optional) | 1 internal (Neutrik powerCON) voltage range -40 – -60 VDC (nominal -48 VDC) |
| Dual internal (optional) | 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) |
| Dual hot-plug (optional) | 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-4d base unit variations

Each unit includes one audio channel by default. You can choose between the following base unit variations:

| Article no. | Name |
|-------------|--|
| VER63501 | Base unit IP-4d with 1x internal AC power supply |
| VER63502 | Base unit IP-4d with 2x internal AC power supplies |
| VER63503 | Base unit IP-4d with slot for 2x hot-plug power supply <ul style="list-style-type: none">▶ 2x hot-plug power supplies AC / DC not included.▶ Please order 2 hot-plug power supplies AC (VER45851) or DC (VER45852). |
| VER63504 | Base unit IP-4d with 1x AC / 1x DC (DC leading) internal power supplies |
| VER63505 | Base unit IP-4d with 1x DC internal power supply |

IP-4d 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 |
|-------------|--------------------------------|--|
| VER63010 | Dual satellite tuner(*) | DVB-S/S2 Dual-tuner module <ul style="list-style-type: none">▶ QPSK, 8PSK, 16APSK, 32APSK▶ Supported symbol rates: 1 MSym/s - 45 MSym/s (*) Excludes options FM tuner (VER63020) and ASI expansion module (VER63021) |
| VER63003 | SFN (single-frequency network) | Perfect timing and network synchronization for SFN applications. |
| VER63020 | FM/DAB tuner (*) | FM/DAB multi-band tuner for rebroadcasting, monitoring & control <ul style="list-style-type: none">▶ Dual tuner with 75Ω F-Type connector input▶ Alarm messages via SNMP or relay (*) Excludes options SAT tuner (VER63010) and ASI expansion module (VER63021) |
| VER63005 | 192 kHz sample rate for MPX | Higher sample rate to support digital MPX (AES192). |
| VER63021 | ASI expansion module (*) | Adds 1x ASI input and 1x ASI output to the device. (*) 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">▶ 90 – 260 VAC (nominal 100 – 240 VAC),▶ 47 – 63 Hz (nominal 50 – 60 Hz) |
| VER45852 | Hot-plug DC power supply | Power supply with automatic switch over in case of failure. <ul style="list-style-type: none">▶ 40 – -60 VDC (nominal -48 VDC) |



Options (2/2)

IP-4d software options

Please note that software options can be retrofitted remotely.

| Article no. | Name | Description |
|-------------|--|---|
| VER63610 | Activation of additional audio channel | Activation of additional audio channel of the 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 any web stream client. Price per activated channel. |
| 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. |
| 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. |
| VER63024 | MPE | MPE (Multiprotocol Encapsulation) decoding. Price per unit. |
| VER63025 | TS forwarding over IP | TS Forwarding enables the forwarding of a complete TS or together with the MPE Option (VER63024) MPE-forwarding. The SAT tuner is used as source.. Price per activated channel. |
| VER63019 | Dolby Digital Pro Decoder | Option: Dolby Digital Pro Decoder Supports Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3). Support of Dolby E on request. Price per activated channel. |