IP-4d
Audio over IP Decoder

Datasheet

Highlights

- Multi-format 4-channel audio decoder
- Robust IP delivery for professional broadcast distribution
- Up to 4 digital or 2 analog stereo outputs

Your audio. Our solution.

2wcom

IP-4d – Audio over IP Decoder



The IP-4d is a 4-channel multi-format Audio-over-IP decoder. The IP-4d offers reliable IP audio distribution and seamless reception of audio feeds from various sources with precise synchronization. It is the ideal choice for stable audio delivery, for example at transmitter sites, and offers digital and analog stereo outputs.

Flexible in Application – Pay as You Grow

- Versatile in serving various use cases
- Expandable to up to 4 channels, allowing you to pay only for as many as needed
- Supports up to 4 digital channels, up to 2 analog channels, and a mixed operation of up to 2 channels
- Upgradeable with hardware and software options according to your needs

Versatile Compatibility – Complete Audio Decoder Support

- Comprehensive codec support for unmatched interoperability (see Specifications)
- Optimized studio-to-transmitter links (STL) with efficient coding formats like MPEG-Layer 2 and AAC-LC; ensure highest fidelity and minimal latency with bit-transparent transmission of digital audio
- Flexibility for IP based backup feeds with codecs like Opus, Enhanced aptX (E-aptX) and xHE-AAC
- Professional audio streaming: Decoding of web streams supporting mp3, OGG, Opus and the complete AAC family

Smooth Integration – Compatible with various Audio over IP Formats

- 2wcom provides robust network connections by combining multiple proven technologies to deliver your audio even in stressful conditions.
- Unicast, multiple unicast, and multicast for maximum network control
- Proven multimedia transport protocols such as UDP, RTP and RTSP
- De-multiplex and decode from MPEG-TS over IP
- Well-established audio protocols such as AES67, SMPTE ST 2110, Livewire and RAVENNA*
- Receive audio from HLS, MPEG DASH, Icecast Source Client und Icecast Server

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Advanced Streaming Robustness – Unmatched Broadcast Resilience

- PRO MPEG Forward Error Correction (FEC) and dual streaming for resilient, redundant streams
- Secure and reliable streaming over unpredictable networks with Secure Reliable Transport (SRT)* and Reliable Internet Stream Transport (RIST)
- Manage packet size, buffering, and Quality of Service (QoS) for a robust streaming performance
- Multiple redundancy options and source switching for uninterrupted streaming including Dual Streaming and Stream4Sure

Audio Latency Management – Ensuring Precise Synchronization

- SPN (Synchronous Playout Network): Uses NTP (Network Time Protocol) to synchronize audio input and output across devices, preventing timing drifts (for example, at transmitter sites) with a precision of < 20 ms
- SFN (Single Frequency Network)*: Uses 1PPS or GPS for a precision of < 10 µs, enabling SFN operation for FM broadcasting

Reliable and Uninterrupted Operation

- Flexible backup concept with automatic switching between 1 main source and 3 backup sources. Backups can be any kind of input source, including internal storage, physical interfaces, and web stream.
- 2 dedicated IP interfaces for data transmission, along with an extra IP interface for control, allow a dependable IP streaming experience.
- All 3 IP interfaces can be flexibly configured for either data transmission or control.
- Redundant power supplies (90 – 260 VAC or 48 VDC) provide a fail-safe system, ensuring continuous operation even during a power supply failure.

User-Friendly and Streamlined Access

- Modern and easy-to-use web interface
- Uniform operating concept across all 2wcom devices for maximum usability
- LCD menu for direct on-site access
- Audio monitoring via web interface or any web stream client with Live Listening

Smart Management and Seamless Integration

- Well-established APIs and physical control seamlessly integrate into your current infrastructure: Rest API, Ember+, SNMP, NMOS, and GPI
- Stay informed: Flexibly configurable alarm events and notifications over SNMP, GPO, and front panel LED

*optional

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Verified IP Security

- High-level security within open IP infrastructures
- Thoroughly examined by independent audit authorities through whitelist/blacklist penetration tests

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Specifications

Formats and Protocols

Audio

Codecs (included)	Linear PCM, SMPTE 302M, AM824 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)
Codecs (optional)	µMPX
On request	Bit transparent transmission of AES/EBU input
Bit depth	16, 20, 24 bit
Sample rates	16, 22.05, 24, 32, 44.1, 48 kHz (On request: up to 192 kHz)

MPX (optional)

Format	PCM raw
Bit depth	12, 13, 14, 15, 16, 20, 24 bit
Bitrates	2.4 – 4.6 Mbit/s (without FEC)
Sample rates	132, 192 kHz

Streaming

IP protocols	TCP, UDP unicast, multiple unicast & multicast
Audio over IP formats	RTP (RFC 3550, RFC 3551, RFC 3640, RFC 2250) SIP/SAP according to EBU Tech 3326 SMPTE ST 2110 (optional) AES67 based on RAVENNA, Livewire, or Dante (optional) Livewire / RAVENNA (SAP/SDP, RTSP, AES67, PTP, PTPv2) (optional) MPEG-TS
Web streaming	Icecast/Shoutcast Client Icecast Server HLS decoder (optional)
Transmission robustness	SRT, RIST Pro-MPEG FEC #3 release 2 Dual Streaming 2wcom Stream4Sure Adaptive bitrate switching, source switching concept, management of packet size, buffers, QoS

Specifications

Synchronization

Internal	free-running
External	1PPS, PTP, PTPv2, NTP, digital reference input
Decoder synchronization between different devices	< 20 ms using SPN via NTP (optional) < 1 µs using SFN via 1PPS or PTP, PTPv2 (optional)
Sample rate converter	Asynchronous, any ratio

Interfaces

Audio

Digital (out)	4x AES/EBU, 110 Ω balanced integrated XLR male, shared with analog out (configurable)
Analog (out)	2x L/R, < 20 Ω balanced integrated XLR male shared with digital out (configurable)
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. For example: 48 kHz: 0.1 dB; 20 Hz – 22.5 kHz

Interface Extensions

FM/DAB/HD Radio® tuner (optional)	2x 75 Ω F-type
SAT tuner (optional)	2x 75 Ω F-type
ASI input (optional)	75 Ω BNC socket, 270 Mbit/s, MPEG2 TS Note: Configurable to be either ASI input or 1PPS SYNC input.
ASI output (optional)	75 Ω BNC socket, 270 Mbit/s, MPEG2 TS

Ethernet

Connector	3x RJ45 (1x Control, 2x Data)
Type	Auto-switching 10/100/1000 BASE-T

Synchronization

1PPS input	75 Ω BNC socket Note: Configurable to be either 1PPS SYNC input or ASI input.

Serial and GPIO

DTE	15 pole D-Sub male connector for serial RS-232C data communication
USB	USB 2.0 interface for service, configuration, and firmware updates

Specifications

GPIO	26 pole D-Sub male; combined connector for inputs (GPI) and outputs (GPO)

Internal Storage

Size	7 GB (optional 128 GB)
Type	eMMC (optional SSD)

Front Panel

Headphone	6.3 mm / 1/4" socket, < 10 Ω
LEDs	Power, Input, Output, Warning
Operation	Display and Jog Wheel
Display	LCD, graphical, 264x64 pixel

General Data

Integrated Web GUI

Languages	English
Web technologies	HTML5, Java Script

Device

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

Power Supply

Standard AC	1x 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)	1x internal (Neutrik powerCON) voltage range -40 – -60 VDC (nominal -48 VDC)
Dual internal (optional)	2x 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)	2x 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



IP-4d Base Unit Variations

To customize your device, start by selecting a base unit variation, then choose from our range of hardware and software options to fit your needs. Each unit includes one audio channel by default. You can choose from 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 supplies Note: 2x hot-plug power supplies AC/DC not included. Please order 2x hot-plug power supplies AC (VER45851) or DC (VER45852).
VER63504	Base unit IP-4d with 1x AC and 1x DC (DC leading) internal power supplies
VER63505	Base unit IP-4d with 1x DC internal power supply

Options

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
VER63030	Dual satellite tuner (*)	DVB-S/S2/S2X Dual tuner module • QPSK, 8PSK, 16APSK, 32APSK • Supported symbol rates: 1 MSym/s – 45 MSym/s (*) Excludes options FM/DAB/HD Radio® tuner (VER63020) and ASI Input/Output (VER63021).
VER63020	FM/DAB/HD Radio® tuner (F-type) (*)	Multi-band tuner supporting FM, DAB and HD Radio® for rebroadcasting, monitoring and control. • Dual tuner with 75 Ω F-Type connector input • Alarm messages via SNMP or relay (*) Excludes options Dual satellite tuner (VER63030) and ASI Input/Output (VER63021).
VER63005	192 kHz sample rate for MPX	Higher sample rate to support digital MPX (AES/EBU at 192 kHz).
VER63021	ASI Input/Output (*)	Adds 1 ASI input and 1 ASI output to the device. Input can be configured as either ASI or 1PPS. (*) Excludes options Dual satellite tuner (VER63030) and FM/DAB/HD Radio® tuner (F-type) (VER63020).
VER65120	Internal SSD storage	128 GB internal SSD storage
VER63009	Breakout cable RS232 8-times	Cable for in- and output of 8 ancillary data (for example UECP RDS data) via RS232 cable.
VER45851	Hot-plug AC power supply	Power supply with automatic switch over in case of failure. • 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. • 40 – -60 VDC (nominal -48 VDC)

Options

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. The third and fourth channels are only available as digital channels.
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.
VER63014	MPEG-2 TS decoder	Decoding of a MPEG-2 TS (transport stream) according to ISO/IEC 13818-1 or ITU-T Rec. H.220.0. Price per activated channel.
VER63028	HLS decoder	Adds HLS, HTTP Live Streaming Decoder function. Price per activated stereo channel.
VER63002	Stream4Sure – Quad streaming with different coding and quality	Simultaneous transmission/reception 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.
VER63001	RAVENNA, AES67, PTP	Audio output according to the RAVENNA technology for audio over IP interoperability (including AES67, SAP/SDP, RTSP, PTP, PTPv2). Price per activated channel.
VER63011	EBU Tech 3326	According to the standard of audio over IP interoperability EBU Tech 3326 (including SAP/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.
VER63024	MPE	MPE (Multiprotocol Encapsulation) encoding/decoding. Price per unit.
VER63025	TS forwarding over IP	TS Forwarding enables the forwarding of a complete TS or MPE-forwarding (requires option MPE VER63024). The SAT tuner is used as source. Price per activated channel.

Options

Article no.	Name	Description
VER63003	SFN (single frequency network)	Perfect timing and network synchronization suitable for FM-SFN networks. Timing sources: • 1PPS • PTP, PTPv2 (*) (*) Requires option Ravenna, AES67, PTP (VER63001). Price per unit.
VER63029	Loudness measurement	Loudness measurement for the audio outputs according to EBU R128 and ITU-R BS.1770/BS.1771. Measures and displays momentary/short-term/integrated loudness, loudness range (LRA) and True Peak (dBTP). Price per activated channel.