

IP-4c

Audio over IP codec

Professional multi-format 4-channel audio coder / decoder



IP-4c - Audio over IP codec 1/2



Audio networks based on different protocols

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

Audio coding – fitting to your needs

High quality multi-format audio de-/encoding

- ▶ MPEG 1/2 Layer 2, 3
- ▶ G.711, G.722, Linear PCM
- ▶ Opus
- ▶ Ogg Vorbis
- ▶ MPEG 2/4 AAC LC
- ▶ MPEG 4 AAC LD/ELD/ELDv2
- ▶ MPEG 4 HE-AAC v1&v2
- ▶ Extended HE-AAC (xHE-AAC)
- ▶ Enhanced aptX (E-aptX)
- ▶ Optional: Bit transparent transmission of digital audio and MPX
- ▶ Optional: Dolby Digital Pro / E encoder supporting AC3, Dolby E, Dolby Digital (DD) and Dolby Digital Plus (DD+)

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: SRT Secure Reliable Transport
- ▶ Optional: TS RTP, UDP and SRT streaming
- ▶ Optional: Livewire / Ravenna (SIP, SAP, RTSP, AES67, PTPv2)

- ▶ Optional: Stream4Sure; 2wcom streaming technology with different codecs / qualities and seamless switching of up to 4 Streams
- ▶ Optional: HLS, Icecast source client

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
- ▶ Optional: 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
- ▶ 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
- ▶ Optional: Satellite tuner / ASI input
- ▶ Optional: FM tuner; capable to receive up to two FM or DAB or HDR programs
- ▶ Optional: Perfect network synchronization for SFN



IP-4c - Audio over IP codec 2/2

Name	Address	Interface	Delay	FEC ports	Codec	Buffer	Ancillary	Clock
Default	@:5004	Data 1	100	--	Auto	100	--	Internal
Default	@:6004	Data 1	100	--	Auto	100	--	Internal

Source	Main	Backup 1	Backup 2	Backup 3
Audio 1	Default @:5004	NDR 2 SH	None	None

Monitoring

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

Highly sophisticated monitoring and alarm concept

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

Advanced control functionalities

High quality multi-format audio de-/encoding:

- ▶ HTTP/HTTPS: via web interface
- ▶ NMS: Control via centralized
- ▶ Network Management System

Perfect audio quality

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

Advanced IP robustness functionalities

- ▶ Even to operate in standard IP networks
- ▶ PRO MPEG FEC
- ▶ Management of packet size, buffer and QoS
- ▶ Optional: Stream4Sure – 2wcom streaming technology with different codes / qualities and seamless switching of up to 4 streams

Perfect audio & latency management

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



Technical details 1/2



Audio (encoder / decoder)

Codexs

Standard

MPEG 1/2 Layer 2, 3
 Linear PCM
 G.711, G.722
 Opus
 Ogg Vorbis
 MPEG 2/4 AAC LC
 MPEG 4 AAC LD/ELD/ELD v2
 MPEG 4 HE-AAC v1&v2
 Extended HE-AAC (xHE-AAC)
 Enhanced aptX (E-aptX)
 Optional: Dolby Digital Pro / E encoder supporting AC 3, Dolby E, Dolby Digital (DD) and Dolby Digital Plus (DD+)
 Optional: MPX

On request

Bit transparent transmission of AES/EBU input

Sample rates

kHz: 16, 22,05, 24, 32, 44.1, 48 (On request: up to 192 kHz)

Sample rate converter

8:1 (with bypass modes)

Interfaces

Audio

Digital (in/out)

4x AES/EBU, 110 Ω bal., integrated XLR

Analog (in)

2x L/R, > 10 kΩ bal., integrated XLR

Analog (out)

2x L/R, < 20 Ω bal., integrated XLR

Optional FM tuner

2x 75Ω F-Type

Optional SAT tuner

2x 75Ω F-Type, ASI input

Optional ASI input

BNC, 270 Mbps, MPEG2 TS

Headphone (out)

L/R, < 10 Ω, 6,3 mm

Analog reference level (input / output)

+9 dBu

Digital reference input

No dedicated input, selectable by user

Digital reference level

-9 dBFS

Digital level

Max. 0 dBFS (input/output)

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

Ethernet

Data

Audio, serial data and GPIO transmission, controlling and setup functions

Connector Type

3x RJ45
 Auto switching
 10/100/1000 BASE-T

Protocol

RTP/RTCP/UDP, SRT
 Secure Reliable Transport, IGMP, ICMP, DHCP, HTTPS, SFTP, SNMP, NTP, TCP (Iccast), HLS, PTPv2, SMTP ST 2110



Technical details 2/2

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	1200 to 115200 baud, asynchronous
USB	1x USB 2.0 interface for service

Interfaces

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

Control & monitor

Ethernet

User interface	Integrated WebGUI, 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
(Iccast, HLS)

Front panel

LCDisplay	Graphical, 264x64 pixel
Jog wheel	Impulse, enter button
4 Duo LEDs	Power, input, output, warning

General data

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

Power supply

Standard	1x internal, 90...260 VAC, 47...63 Hz, 1x power port (rubber connector)
Optional version 1	Two internal redundant power supplies (230 VAC or 48 VDC), aut. switchover
Optional version 2	Two external hot swappable redundant power supplies (230 VAC or 48 VDC), aut. switchover