

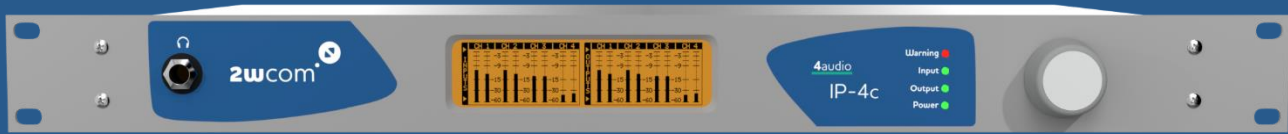
IP-4c

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 / μ MPX signals
- ▶ Optional: Dolby codecs

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, Iccast 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 (Iccast / 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
- ▶ Optional: FM tuner; capable to receive up to two FM or DAB or HDR programs
- ▶ Optional: Perfect network synchronization for SFN

Monitoring

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



IP-4c – Audio over IP codec 2/2

The screenshot displays the 2wcom IP-4c web interface. At the top, there's a header with the device name 'IP-4c', location '2wcom Systems', and a 'Live Source' dropdown set to 'Audio Output 1'. Below this is a 'Codec' section with 'Input Sources / Profiles' and a table of profiles. The table has columns for Name, Address, Interface, Delay, FEC ports, Codec, Buffer, Ancillary, and Clock. Two profiles are listed: 'Default' at '@:5004' and '@:6004', both on 'Data 1' interface with a delay of 100 and 'Auto' codec. Below the table are 'Encoder' and 'Decoder' tabs, and a 'Source Assignment' section with four slots: 'Main', 'Backup 1', 'Backup 2', and 'Backup 3'. The 'Main' slot is assigned 'Default @:5004', 'Backup 1' is assigned 'NDR 2 SH', and the other two are set to 'None'.

Advanced control functionalities

High quality multi-format audio de-/encoding:

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

Highly sophisticated monitoring and alarm concept

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

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 codexs Optional: MPX / μ 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 k Ω bal., integrated XLR
Analog (out)	2x L/R, < 20 Ω bal., integrated XLR
Optional FM tuner	2x 75 Ω F-Type
Optional SAT tuner	2x 75 Ω F-Type
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 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	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



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
(Icecast, 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