

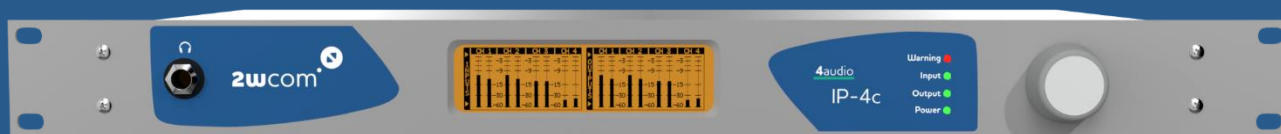
IP-4c

# 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

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

## Audio coding – fitting to your needs

High quality multi-format audio de-/encoding

- ▶ MPEG ½ 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)
- ▶ On request: Bit transparent transmission of digital audio and MPX signals
- ▶ On request: Dolby Digital plus (AC3)

## 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)
- ▶ Unicast, Multiple Unicast & Multicast
- ▶ PRO MPEG FEC
- ▶ Dual 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
- ▶ 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

## Special

- ▶ Energy efficient DSP based 24/7 broadcast quality
- ▶ RDS decoding (built in RDS/UECP decoder)
- ▶ Embedded auxiliary data (RBDS/RDS or PAD) and GPIO forwarding
- ▶ Optional: Perfect network synchronization for SFN applications

## Monitoring

- ▶ IP and MPEG parameters via SNMP v2c and relay
- ▶ Headphone output
- ▶ Icecast 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 status indicators for Power, Warning, Input, and Output. Below this is the 'Codec' section, which includes a table of 'Input Sources / 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 using 'Data 1' interface and 'Auto' codec. Below the table are tabs for 'Encoder' and 'Decoder', and a 'Source Assignment' section. This section shows four slots: 'Main', 'Backup 1', 'Backup 2', and 'Backup 3'. The 'Main' slot is assigned to 'Default @:5004', 'Backup 1' to '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
- ▶ FTP: XML file control
- ▶ 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
- ▶ ACIP compliant high audio quality and extremely low latency (PTPv2 network synchronization)



## Technical details 1/2



### Audio (encoder / decoder)

#### Codexs

<b>Standard</b>	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)
<b>On request</b>	Dolby digital plus (AC3) ask for other codexs
<b>On request I</b>	Bit transparent transmission of AES/EBU input
<b>Sample rates</b>	kHz: 16, 22,05, 24, 32, 44.1, 48 (On request: up to 192 kHz)
<b>Sample rate converter</b>	8:1 (with bypass modes)

### Interfaces

#### Performance

<b>Digital (in/out)</b>	4x AES/EBU, 110 Ω bal., integrated XLR
<b>Analog (in)</b>	2x L/R, > 10 Ω bal., integrated XLR
<b>Analog (out)</b>	2x L/R, < 20 Ω bal., integrated XLR
<b>Headphone (out)</b>	L/R, < 10 Ω, 6,3 mm
<b>Digital reference input</b>	No dedicated input, selectable by user

<b>Digital reference level</b>	9 dBFS (adjustable)
<b>Gain</b>	-9...+6 dB
<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

#### Ethernet

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

#### Serial

<b>Interface</b>	8x RS-232C (rear) Sub D-15
<b>Data</b>	Private data, MPEG ancillary data, UECF/RDS (acc.to TR 101 154)
<b>Transmission rate</b>	1200 to 115200 baud, asynchronous
<b>USB</b>	1x USB 2.0 interface for service



## Technical details 2/2

### Interfaces

#### Contact closure

<b>Inputs</b>	8x 26 pole sub-D female
<b>Outputs</b>	7+1 floating relays 7 relays SPST (from A) 2 relays SPDT (from C) DC: max. 30 V, 1 A, 10 W 26 pole sub-D male

#### Internal storage

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

#### Time synchronization (optional)

<b>PTPv2</b>	Network synchronization according to IEEE 1588-2008
<b>1PPS</b>	SMA connector

### Control & monitor

#### Ethernet

<b>User interface</b>	Integrated WebGUI, LCD display
<b>Data</b>	Control and setup functions
<b>USB</b>	USB 2.0 interface for service, configuration and firmware updates
<b>Protocol</b>	2wcom NMS, Telnet, HTTPS, SNMP, UDP, RTCP, SRT Secure Reliable Transport, SFTP, IGMP, ICMP, NTP, DHCP, SNMP, SSH, PTPv2, TCP (Icecast)

#### Front panel

<b>LCDisplay</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>	<20W
<b>Case dimensions</b>	19", 1 HU, Depth: 310 mm, Width: 424 mm, Front panel: 484 mm
<b>Weight</b>	< 5 kg
<b>Material</b>	Steel plate (aluminium-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</b>	1x internal, 90...260 VAC, 47...63 Hz, 1x power port (rubber connector)
<b>Optional version 1</b>	Two internal redundant power supplies (230 VAC or 48 VDC), aut. switchover
<b>Optional version 2</b>	Two external hot swappable redundant power supplies (230 VAC or 48 VDC), aut. switchover