MPX-2c

FM-MPX over IP Codec

Highlights

- 2-channel MPX Composite Decoder
- 2-channel MPX Composite Encoder via software upgrade
- Optimized for MPX and µMPX distribution via IP

Your audio. Our solution.

2wcom

MPX-2c – FM-MPX over IP Codec (1/2)

MPX-2c Base unit

- Base unit with decoding function
- Dual channel, one channel activated
- Analog & Digital MPX interface
- Pro-MPEG FEC Practice #3 release 2 to reduce packet loss and burst errors in IP data stream
- Free configurable GPIO interface
- RS232 interfaces are flexibly assignable to the services
- 2x Gigabit IP Interface
- 2x 230VAC internal PSU's or hot-pluggable power supplies*

Options: MPX-2c

- Activation of the 2nd MPX codec*
  MPX-2c supports 2x MPX over IP
- Activation MPX encoder*
  MPX-2c acts as a MPX over IP encoder
- Dual streaming*
  Simultaneous transmission and reception of
  2 IP streams and seamless exchange of
  IP packages in case of failure
- Dual Left/Right audio decoded MPX output via BNC*
- SFN/1PPS*
  Synchronization of MPX streams for FM-SFN
  networks accurate to the microsecond
- µMPX decoder or encoder*

Flexible in application

- Synchronization with microsecond accuracy is possible by an implemented latency control (useful for synchronous playout)
- One device can be used as an encoder or as a decoder
- Combinable with a satellite tuner

Pay as you grow

- Upgradable, because of pure SW module
- Scalable up to 2 MPX encoder and decoder modules in one device

---

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

MPX-2c – FM-MPX over IP Codec (2/2)

Hybrid operation

- Forwarding the MPX signal via IP or via SAT by using MPE to increase coverage

Transmission robustness

- Dual Streaming to increase transmission robustness
- Pro-MPEG FEC (Forward Error Correction) to reduce bit errors in data stream

Technical details (1/3)

Codecs

PCM

Bit depth	12 – 16, 20, 24 bit
FEC	RIST, ProMPEG FEC #3 release 2
Bitrate	2.4 – 4.6 Mbps (no FEC)

µMPX

Bitrates kbit/s	320, 384, 448, 576, 800
FEC	µMPX FEC, RIST, Pro-MPEG FEC #3 release 2
Bitrate	320 – 800 kbps (no FEC)

Decoder outputs

Connectors MPX out

Digital	2x XLR (digital), balanced, 110 Ω shared with analog out (configurable)
Analog	2x BNC, analog, unbalanced

FM MPX signal

Signal	FM MPX digital or analog, FM analog L+R signal
Frequency response	20 Hz – 90 kHz: <0.05 dB
Stereo separation	> 55 dB
Harmonic distortion	< -90 dB
SNR (CCIR-weighted)	> 75 dB
SNR (A-weighted)	> 90 dB

FM µMPX signal

Signal	Digital and analog
Frequency response	20 Hz – 66 kHz: <0.15 dB
Stereo separation	@500Hz > 50 dB
THD	@500 Hz > 70 dB
SNR (CCIR-weighted)	> 69 dB

Technical details (2/3)

Encoder inputs

Connectors MPX in

Digital	2x XLR, balanced, >20 Ω, digital shared with analog out (configurable)
Analog	2x BNC, 75 Ω, analog, unbalanced

FM MPX signal

Signal	FM MPX digital or analog
Frequency response	20 Hz – 90 kHz: <0.05 dB
Input voltage range	0 – 14 dBu

Synchronization

External	1PPS, PTP, NTP
Decoder synchronization between different devices	< 20 ms using SPN via NTP (optional) < 1 µs using SFN via 1PPS or PTP (optional)

Front Panel

Headphone	6.3 mm / 1/4” socket
LEDs	Power, Input, Output, Warning
Operation	Display and jog wheel

Back Panel

Gigabit IP

Type	10/100/1000 Base-T
Data	RAW Data via UDP, UDP/RTP, as Unicast or Multicast IGMPv2 Optional: Activation of 2nd data interface
Connectors	3x RJ45 (2x Data and 1x Control)

GPIO

Connector	26 pole sub-D male
Inputs	8 inputs
Outputs	8 floating relays (7x SPST, 1x SPDT) (for DC: max. 30 V, 0.5 A)

Technical details (3/3)

Serial

Interface	2x RS-232 Sub D-9
Data transmission format	MPEG ancillary data embedded in audio (IRT) own IP link
Transmission rate	1200 to 115200 baud, asynchronous
Interface	2x RS-232 Sub D-9

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)
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)
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)

Options (1/2)

MPX-2c base unit variations

You can choose between the following base unit variations:

Article no.	Name
VER68001	Base unit MPX-2c with 1x internal AC power supply
VER68002	Base unit MPX-2c with 2x internal AC power supplies
VER68003	Base unit MPX-2c with slot for 2x hot-plug power supply ▶ 2x hot-plug power supplies AC / DC not included. ▶ Please order 2 hot-plug power supplies AC (VER45851) or DC (VER45852).

MPX-2c 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
VER68016	Analog MPX output L/R	▶ Configurable 2x analogue MPX or audio L/R. ▶ 2x BNC output. ▶ 2 HW options per device possible.
VER68018	GPS module (*)	Output synchronization via GPS input signal (needs VER68013). ▶ Parallel output of 10 MHz and 1PPS signals. ▶ Antenna not included. (*) Not before Q3/Q4 2023
VER65120	Internal SSD storage	128 GB internal SSD storage
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)

MPX-2c software options

Please note that software options can be retrofitted remotely.

Article no.	Name	Description
VER68010	Second MPX encoder/decoder	Activates the second MPX encoder and decoder.
VER68011	MPX encoder (analog/digital MPX Input)	▶ This option is needed if you want to use the MPX-2c as an encoder ▶ Supports analog & digital MPX input Price per activated channel.

Options (2/2)

Article no.	Name	Description
VER69013	µMPX decoder - MPX decompression	Algorithm to decompress the full MPX/composite signal, including pilot and from IP to MPX. ▶ 5 available bitrates: 320 and 800 Kbps. ▶ Max. 2 µMPX encoder or decoder per unit possible. Price per activated channel.
VER69014	µMPX encoder - MPX compression	Algorithm to compress the full MPX/composite signal, including pilot and RDS to IP. ▶ 5 available bitrates: 320 - 800 kbps. ▶ Max. 2 µMPX encoder or decoder per unit possible. Price per activated channel.
VER68017	SRT/RIST encoder/decoder	SRT functionality for encoder/decoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for encoder/decoder according to IETF standard "RIST Simple Profile" and RFC 4585. Price per activated channel.
VER68013	SFN (Single-frequency Network)	Synchronization of MPX streams for FM-SFN networks ▶ < 1 µs accuracy with 1PPS for SFN operation ▶ includes SPN functionality (NTP synchronization with 20 ms accuracy) Price per unit.
VER68022	SPN (Synchronized Playout Network)	Output synchronization via NTP time server. ▶ Accuracy: 20 ms Price per unit.
VER68023	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.
VER68024	MPEG-2 TS encoder	Encoding of a MPEG-2 TS (transport stream) according to ISO/IEC 13818-1 or ITU-T Rec. H.222.0. Price per activated channel.
VER68025	MPE	MPE (Multiprotocol Encapsulation) encoding/decoding. Price per unit.