MPX-2c
FM-MPX over IP Codec

Datasheet

Highlights

- 2-channel MPX composite decoder
- 2-channel MPX composite encoder via software upgrade
- Optimized for MPX and µMPX distribution via IP

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MPX-2c – FM-MPX over IP Codec

The MPX-2c is a point-to-point or point-multipoint MPX codec using IP-based network technologies for real-time distribution of complete FM-MPX (FM composite signal) to connect your signal generation in the studio directly to the transmitter site. The MPX-2c offers you a variety of features and opportunities to ease your daily work.

Main Features

- Decodes MPX from PCM or µMPX*
- Encodes MPX from PCM or µMPX*
- Available with 1 or 2 audio/MPX channels
- Analog and digital MPX input and output

Flexible in Application – Pay as You Grow

- Expandable 1-channel base unit to a 2-channel device for two separate distribution feeds
- Operation as a 1-channel decoder with optional upgrade to a 1-channel encoder
- Upgradeable with hardware and software options according to your needs

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

Perfect 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

*optional

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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

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

MPX

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

µMPX (optional)

Bitrates	320, 384, 448, 576, 800 kbit/s (without FEC) Note: 800 kbit/s only possible with µMPX v4
Sample rates	192 kHz

FM MPX Signal

Signal	FM MPX digital or analog
Frequency response	20 Hz – 90 kHz: < 0.05 dB
Harmonic distortion	< 0.0025 %
SNR (CCIR-weighted)	> 75 dB
SNR (A-weighted)	> 90 dB

Stereo decoder

Stereo separation	> 55 dB
Deemphasis	0, 50 or 75 µs
Output available for	Live Listening, headphones and hardware option Dual analog output (BNC)

Streaming

IP protocols	unicast, multiple unicast & multicast
Transmission robustness	Dual Streaming

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 (optional)
Sample rate converter	Asynchronous, any ratio

Interfaces

Audio/MPX

Digital (in)	2x AES/EBU, 110 Ω balanced integrated XLR female, shared with analog in (configurable) up to 192 kHz sampling rate for MPX
Digital (out)	2x AES/EBU, 110 Ω balanced integrated XLR male, shared with analog out (configurable) up to 192 kHz sampling rate for MPX
Analog (in)	2x L/R, > 10 kΩ balanced integrated XLR female, shared with digital in (configurable)
Analog (out)	2x L/R, < 20 Ω balanced integrated XLR male shared with digital out (configurable)
Analog MPX (in)	2x integrated 50 Ω BNC socket
Analog MPX (out)	2x integrated 50 Ω BNC socket
Analog reference level	+9 dBu max. +18 dBu (input/output)
Digital reference level	-9 dBFS
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

Ethernet

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

Synchronization

1PPS input	50 Ω SMA socket
GPS (optional)	75 Ω BNC socket
10 MHz output (optional)	50 Ω SMA socket, from GPS module
1PPS output (optional)	75 Ω BNC socket, from GPS module

Specifications

Serial and GPIO

DTE 1+2	2x 9 pole D-Sub male connector for serial RS-232C data communication
USB	USB 2.0 interface for service, configuration, and firmware updates
GPIO	26 pole D-Sub male; combined connector for inputs (GPI) and outputs (GPO)

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)
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

MPX-2c 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 channel for MPX decoding. You can choose from 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 supplies Note: 2x hot-plug power supplies AC/DC not included. Please order 2x hot-plug power supplies AC (VER45851) or DC (VER45852).

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
VER63419	FM/DAB/HD Radio® tuner (BNC) (*)	Multi-band tuner supporting FM, DAB and HD Radio® for rebroadcasting, monitoring and control • Dual tuner with 50 Ω BNC connector input • Alarm messages via SNMP or relay
VER68016	Dual analog output (BNC)	2 additional BNC outputs for analog MPX or audio L/R
VER68018	GPS module (*)	Output synchronization via GPS input signal. • Parallel output of 10 MHz and 1PPS signals. • Antenna not included. (*) Requires option SFN (VER68013).
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)

Options

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
VER68010	Second MPX decoder/encoder	Activates the second MPX decoder and encoder.
VER68011	MPX encoder (analog/digital MPX input)	• This option is necessary to use the MPX-2c as an encoder. • Supports analog and digital MPX input. Price per activated channel.
VER69013	µMPX decoder – MPX decompression	Algorithm to decompress the full MPX/composite signal, including pilot and RDS from IP to MPX. Up to 2 µMPX 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. Price per activated channel.
VER68017	SRT/RIST decoder/encoder	SRT functionality for decoder and encoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for decoder and encoder according to IETF standard "RIST Simple Profile" and RFC 4585. Price per activated channel.
VER68023	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.
VER68024	MPEG-2 TS encoder	Encoding of a MPEG-2 TS (transport stream) according to ISO/IEC 13818-1 or ITU-T Rec. H.220.0. Price per activated channel.
VER68025	MPE	MPE (Multiprotocol Encapsulation) encoding/decoding. Price per unit.
VER68013	SFN (single frequency network)	Synchronization of MPX streams for FM-SFN networks accurate to the microsecond. • 1PPS input • Accuracy: < 1 µs Price per unit.
VER68022	SPN (synchronized playout network)	Output synchronization via NTP time server. • Accuracy 20 ms Price per unit.

Options

Article no.	Name	Description
VER66030	Delay measurement (*)	FM/HD Diversity delay measurement • Configuration of FM/DAB/HD Radio® tuner in split mode • Measurement of diversity delay between analog FM signal and HD1 (*) Requires option FM/DAB/HD Radio® tuner (BNC) (VER63419).
VER66031	FM + HD transport	Transport of merged E2X and MPX stream • Enables merging of an EX2 (HD Radio®) stream and an MPX signal into a combined transport stream. • Synchronized stream can be output by decoders as either E2X or MPX. • Generation of one combined stream per encoder that can be sent to multiple targets. • Reception of one combined stream per decoder that can be streamed as E2X to multiple targets.