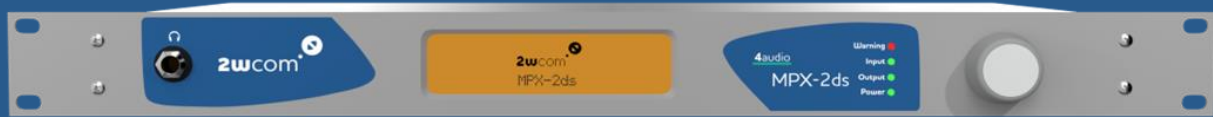


MPX-2ds

FM-MPX Satellite Receiver/Decoder

Highlights

- ▶ 2-channel satellite receiver with MPX and audio outputs
- ▶ 2-channel MPX Composite Decoder
- ▶ Optimized for MPX and μ MPX and audio distribution via IP



MPX-2ds – FM-MPX Satellite Receiver/Decoder (1/2)

The MPX-2ds is a 2-channel decoder for MPX distribution via satellite or IP. Supporting MPX using PCM data (2.4 to 4.6 Mbit/s) or compressed μ MPX (down to 320 kbit/s), it is the perfect fit for cost-efficient operation of FM distribution networks.

In addition to decoding MPX signals, the MPX-2ds also supports the decoding of regular audio feeds. This versatility makes it the ideal device for seamless transitions from audio-only distribution to MPX distribution whenever necessary.

Features

- ▶ Dual Satellite tuner
- ▶ Decodes MPX via PCM or μ MPX*
- ▶ Decodes audio via satellite or IP streaming (RTP / SRT)
- ▶ Two audio/MPX channels, can also be bought with only one channel for a lower price
- ▶ Analog & Digital MPX output
- ▶ Analog & Digital audio output from MPX using stereo decoder
- ▶ Analog & Digital audio output directly from Sat/IP audio decoder
- ▶ Robust IP streaming input – PRO MPEG FEC, dual streaming, RIST, SRT

Flexible in application – pay as you grow

- ▶ Decoding from Satellite or IP feeds
- ▶ One-channel base-unit can be upgraded to two-channel device for two separate distribution feeds
- ▶ Easy transition from audio to MPX, be ready to switch over your satellite transponder anytime
- ▶ Forwarding the received stream via MPE for devices without SAT receiver

Perfect audio & latency management

- ▶ Synchronous playout based on NTP (SPN)* also using μ MPX
- ▶ Perfect latency control in SFN FM networks based on 1PPS or GPS* also using μ MPX

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
- ▶ Dual IP ports for data and one additional IP port for control interface
- ▶ Redundant power supply 90 - 260 VAC or 48 VDC



MPX-2ds – FM-MPX over IP Codec (2/2)

Monitoring and control

- ▶ Remote control with various possibilities: HTTP(S), FTP, NMS, SNMP
- ▶ Revised configuration via web user interface for easier setup
- ▶ SNMP v2c & V3, relays, inputs
- ▶ REST-API
- ▶ Ember+

IP security

- ▶ High level security in open IP infrastructures
- ▶ Tested by independent inspection bodies (white/blacklist penetration tests)



Technical details (1/3)

Codecs

MPX decoder

Type	PCM raw
Bit depth	16, 20, 24 bit
Bitrate	2.4 up to 4.6 Mbit/s (no FEC)
Sample rates	192, ... kHz

μMPX decoder (optional)

Bitrates kbit/s	320, 384, 448, 576, 800 (no FEC)
Sample rates	192 kHz

Audio decoder

Standards	Linear PCM, G.711, G.722 Opus, Ogg Vorbis MPEG 1/2 Layer 2, 3 MPEG-2/MPEG-4 AAC-LC, MPEG-4 HE-AAC v1 & v2, MPEG-4/MPEG-D xHE-AAC MPEG-4 AAC-LD/ELD/ELDv2 Enhanced aptX (E-aptX)
Sample rates	16, 22.05, 24, 32, 44.1, 48 kHz
Sample rate converter	8:1 (with bypass modes)

Robust streaming

Standards	SRT RIST Pro-MPEG FEC #3 release 2 μMPX FEC
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Decoder outputs

Synchronization between different devices	< 20 ms using SPN via NTP (optional) < 10 μs using SFN via 1PPS (optional)
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Technical details (2/3)

FM MPX signal

Signal	FM MPX digital or analog
Frequency response	20 Hz – 90 kHz: <0.05 dB
Stereo separation	> 55 dB
Harmonic distortion	< 0.0025 dB
SNR (CCIR-weighted)	> 75 dB
SNR (A-weighted)	> 90 dB

FM μ MPX signal

Signal	analog
Frequency response	40 Hz – 15 kHz: < 0,15dB
Stereo separation	> 36dB @500Hz > 50dB
Harmonic distortion	> 56dB bzw. < 0,16% @500Hz > 70dB bzw. < 0.035%
SNR (CCIR-weighted)	> 69dB
SNR (A-weighted)	> 78dB

Interfaces

MPX/Audio

Analog MPX out	2x integrated 50 Ω BNC socket; unbalanced >10k Ω
Digital Audio/MPX out	110 Ω balanced, integrated XLR male 1-channel configuration: 2x AES/EBU 2-channel configuration: 4x AES/EBU, shared with analog out (configurable)
Analog Audio out	< 20 Ω balanced, integrated XLR male 1-channel configuration: 1x L/R 2-channel configuration: 2x L/R, shared with digital out (configurable)
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 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



Technical details (3/3)

Dual Satellite tuner

Connector RF1	F connector female (input)
Connector RF2	F connector female (2 nd input)
	950 – 2.150 MHz, step 1 kHz All LNB oscillator frequencies possible
Input level, impedance	-75 – -20 dBm, 75 Ω
LNB Control	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band
Noise figure	Typical 6dB, max. 12 dB
DVB-S Demodulation/ Decoding	QPSK CCM VITERBI and Reed-Solomon decoder 1/2, 2/3, 3/4, 5/6, 6/7, 7/8
DVB-S2 Demodulation/ Decoding	QPSK, 8PSK, 16APSK and 32APSK CCM, VCM and ACM LDPC and BCH decoder 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10
Symbol rates	1 – 45 MSym/s (on request: 0.128 – 45 MSym/s)
Data processing	single and multiple MPEG TS
PL scrambling	ID 0 – 262144
IF Filter bandwidth	Automatic selection
MPEG decoding	according to ETSI TR 101 154

Ethernet

Connector	3x RJ45 (Control, 2x Data)
Type	Auto switching 10/100/1000 BASE-T, Unicast, Multicast
Data	Audio, serial data and GPIO transmission, controlling and setup functions MPEG TS or MPE output

Synchronization

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

Serial/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
Contact closure	26 pole sub-D male; 8 inputs (GPI); 8 outputs (GPO)



Technical details (3/3)

Front Panel

Headphone	6.3 mm / 1/4" socket, < 10 Ω
LEDs	Power, Input, Output, Warning
Operation	Display and Jog Wheel

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-2ds base unit variations

Each base unit includes one channel for MPX decoding. You can choose between the following base unit variations:

Article no.	Name
VER63401	Base unit MPX-2ds with 1x internal AC power supply
VER63402	Base unit MPX-2ds with 2x internal AC power supplies
VER63403	Base unit MPX-2ds with slot for 2x hot-plug power supply <ul style="list-style-type: none">▶ 2x hot-plug power supplies AC / DC not included.▶ Please order 2 hot-plug power supplies AC (VER45851) or DC (VER45852).

MPX-2ds 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
VER63412	GPS module	Output synchronization via GPS input signal. <ul style="list-style-type: none">▶ Parallel output of 10 MHz and 1PPS signals.▶ Antenna not included. Requires option SFN (VER68013).
VER45851	Hot-plug AC power supply	Power supply with automatic switch over in case of failure. <ul style="list-style-type: none">▶ 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-2ds software options

Please note that software options can be retrofitted remotely.

Article no.	Name	Description
VER63410	Second decoder output	Activates the second decoder and MPX/audio output. Two programs get decoded and put out in parallel.
VER63411	SPN (Synchronized Playout Network)(*)	Output synchronization via NTP time server <ul style="list-style-type: none">▶ Accuracy: 20ms (*) On request
VER68013	SFN (Single-frequency Network)	Synchronization of MPX streams for FM-SFN networks accurate to the microsecond. <ul style="list-style-type: none">▶ 1PPS input▶ Accuracy: < 10 µs Price per unit.



Options (2/2)

Article no.	Name	Description
VER69013	μMPX decoder – MPX decompression	Algorithm to decompress the full MPX/composite signal, including pilot and RDS from IP to MPX. ▶ 5 available bitrates: 320 and 800 Kbps. Up to 2 μMPX decoder per unit possible. Price per activated channel.
VER63413	TS forwarding over IP	TS Forwarding enables the forwarding of a complete TS or MPE-forwarding. The SAT tuner is used as source. Price per unit.
VER63016	SRT/RIST decoder	SRT functionality for decoder according to SRT standard of the SRT Alliance (including UDP). RIST functionality for decoder according to IETF standard "RIST Simple Profile" and RFC 4585. Price per activated channel.