

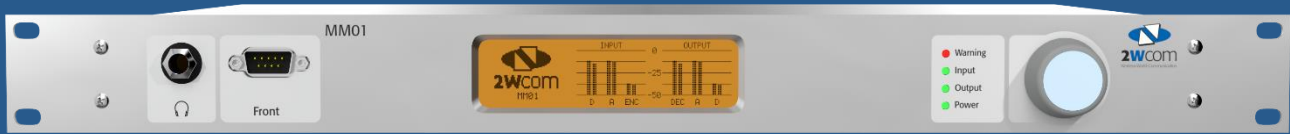
MM01

Audio over IP codec

Professional multi-format duplex audio coder / decoder



MM01 – Audio over IP codec



Audio coding fitting to your needs

High quality multi-format audio de/en/transcoding

- ▶ MPEG 1 / 2 Layer 1, 2, 3
- ▶ G.711, G.722, PCM
- ▶ Optional: MPEG 2 / 4 AAC LC, HEv1&v2
- ▶ Optional: AAC-LD
- ▶ Optional: Enhanced aptX(E-aptX)
- ▶ Optional: Bit transparent transmission of digital audio and MPX signals (AES/EBU input at 32 – 192 kHz)

IP streaming

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)
- ▶ Optional Stream4Sure: 2wcom streaming technology with different codecs/qualities and seamless switching of up to 4 Streams

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



MM01 – Audio over IP codec

The screenshot displays the MM01 web interface with the following sections:

- Overview:**
 - Audio Levels:** Six meters for AES/EBU, Input Analog, Encoder, Decoder, Output Analog, and AES/EBU, each with L and R channels.
 - Status:**
 - Device: 29 days, 20:22:36
 - Uptime: 20. May 2019, 11:22:31
 - Last reboot: 52°C
 - LAN: UP, 100 Mbit, Full Duplex - 192.168.12.28
 - Data 1: DOWN - 192.168.50.28
 - Data 2: DOWN - 192.168.50.100
- Decoder:**

Name	Type	Address	Audio Version	BR	SR	Delay	Error	IP BR	Delay Miss	Reord	FEC	Recov	Unrec
Main	incoming	SIP @:5004, Data 1	--	--	--	0	0	0k	0	0	0	--	--
Backup 1	input stream #04	RTP @:5008, Data 1	--	--	--	0	0	0k	0	0	0	--	--
Backup 2													
Backup 3													
- Encoder:**
 - Source:**
 - Main: Analog
 - Backup 1: Livewire - Channel 1
 - Backup 2: None
 - Backup 3: None
 - Settings:**

Type	Format	Mode	SR	SW	BR	FEC	
Encoder A	RTP	HE-AACv2	Stereo	48000	16	128k	--
Encoder B	RTP	MPEG1 L2	Stereo	48000	16	256k	--
- Stream Destinations:**

Name	Enc	IP	Port	Eth	VLAN	Delay	Stream4Sure	SFN Lat	FEC C	FEC R	BR
	A	239.0.0.1	5004	Data 1	0	0	--	900	--	--	0k

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 analog and digital AES/EBU (integrated XLR connector)

Advanced IP robustness functionalities

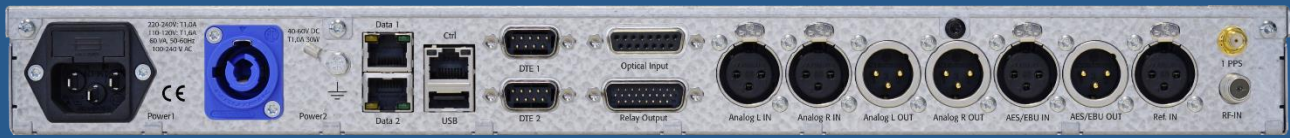
- ▶ Even to operate in standard IP networks
- ▶ PRO MPEG FEC
- ▶ Management of packet size, buffer and QoS
- ▶ Optional: Stream4Sure – 2wcom streaming technology with different codes / qualities
- ▶ And seamless switching of up to 4 streams

Perfect latency management

- ▶ Optional: GPS based 2wcom latency control solution usage in SFN FM networks



Technical details 1/2



Audio (encoder / decoder)

Codexs

Standard	MPEG 1/2 Layer 2, 3 Linear PCM
Optional	MPEG 2/4 AAC LC/LD HEv1&v2 E-aptX ask for other codexs
Optional:	Bit transparent transmission of AES/EBU input (Audio and MPX)
Sample rates	32 kHz, 44.1 kHz, 48 kHz optional: up to 192 kHz
Digital audio bandwidth	10 Hz through to 22.5 kHz mono & stereo
Sample rate converter	8:1 (with bypass modes)

Interfaces

Performance

Digital (in/out)	AES/EBU, 110 Ω bal., integrated XLR
Analog (in)	L/R, >10 kΩ bal., integrated XL
Analog (out)	L/R, <20 Ω bal., integrated XLR
Headphone (out)	L/R, <10 Ω, 6.3 mm
Digital reference input	AES/EBU, 110 Ω bal., integrated XLR
Digital reference level	9 dBFS (adjustable)
Volume	-32...+6 dB
Dynamic range	16 Bit, >89 dB 24 Bit >130dB
Frequency response	0,1 dB; 20 Hz .. 20 kHz

Ethernet

Data

Audio, serial data and
GPIO transmission,
controlling and setup
functions

Connector Type

3x RJ45
Auto switching
10/100/1000 BASE-T

Protocol

RTP/RTCP/UDP, IGMP,
ICMP, DHCP, HTTP, FTP,
SNMPv2c, NTP, SMTP
(Mail), TCP (Iccast)

Serial

Interface

3x RS-232 (1 front, 2
rear) Sub D-9

Function

Front: Control,
Rear: Data transmission

Data transmission format

MPEG ancillary data
embedded in audio (IRT)
Own IP link

Transmission rate

1200 to 115200 baud,
asynchronous

USB

1x USB 2.0 Interface for
service, configuration
and firmware



Technical details 2/2

Interfaces

Contact closure

Inputs	7 inputs (excludes option: 24 relay contacts) 15 pole sub-D female
Outputs	12 floating relays (10x SPST, 2x SPDT) (for DC: max. 30 V, 0.5 A) 26 pole sub-D male
Optional:	24 floating relays (excludes: 7 inputs)

Internal storage

Data	Internal audio files
Size	4 GB

Time synchronization (optional)

PTP	Network synchronization according to IEEE 1588-2008
1PPS	BNC – 75 Ω
10MHz	BNC – 75 Ω

Control & monitor

Ethernet

Data	Controlling and setup functions
Optional:	Private data, MPEG ancillary data (IRT)
Protocol	2wcom NMS, Telnet, HTTP/HTTPS, SNMPv2c, UDP, IGMP, ICMP, DHCP, FTP, SNMPv2c, NTP, TCP (Icecast), PTP

Front panel

LCDisplay	Graphical, 264x64 pixel
Jog wheel	Impulse, enter button
4 duo LEDs	Power, input, output, warning

General data

Power consumption	<40 VA (<20 W)
Case dimensions	19", 1 HU, Depth: 310 mm, Width: 424 mm, Front panel: 484 mm
Weight	< 6 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