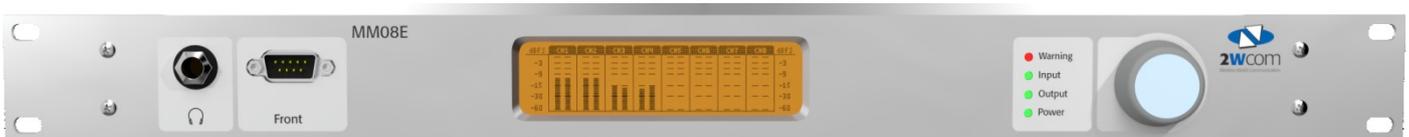# MM08E

DVB Audio IP Encoder

Professional multi-format DVB IP Audio Encoder

User Manual MM08E V1.34

Screenshots: MM08E Version 1.00, 1.09, 1.14

November 2019

Content

1. Symbols in this manual

1.1. References and Hyperlinks in this PDF File

The original text document of this manual uses bookmarks for reference purposes. If you read this manual as a non-print version, please note that this PDF file also contains all bookmarks! So you can navigate through the document via the content overview in your PDF viewing software if you activate "bookmarks view".

All references to pages, sections, figures and tables as well as hyperlinks in the text identify a location within this PDF file. Just click the reference to find the referred passage in the text!

1.2. Warning signs and their meaning

The following warning signals are used in this user manual:

⚠	Warning of general danger location
⚡	Warning of electric shock
♨	Warning of hot surface
🔥	Warning of fire hazard

1.3. Tags and their meaning

The following signal words are used in the product documentation in order to warn the reader about risks and dangers. The tags described here are always used only in connection with the related product documentation and the related product.

⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	Describes precautions necessary to protect the equipment.
ⓘ	**NOTE:** Useful information for the user.

2. Introduction

Description   The MM08E is a professional DVB Audio Encoder. It is able to generate several Audio over IP streams (RTP/UDP) or one or more combined DVB transport streams, which can be output via IP or ASI. Furthermore, the MM08E has up to 8 digital stereo channel inputs and up to 4 stereo analog channel inputs.
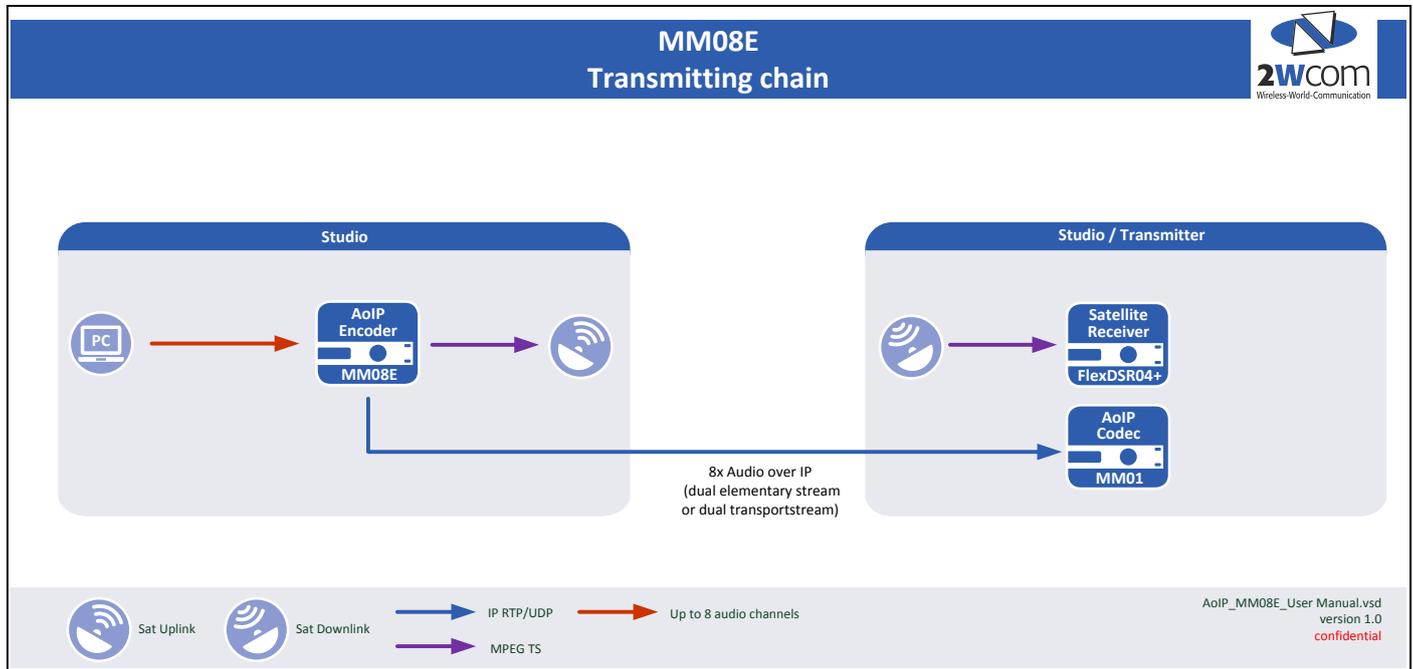
Figure 1: Overview of the possible solution for the MM08E

TS protection   The MM08E is equipped with a combined mechanism for improving the stability and robustness of the audio data distribution over IP:

- Pro-MPEG FEC (forward error correction) scheme to account for bit errors or packet loss (IP).
- Dual Streaming on two physically separated Ethernet ports for elementary stream and transport stream over IP (RTP/UDP) for redundancy (2x Ethernet LAN 10/100/1000 Base-T (RJ45) interface).

Audio

- The MM08E is equipped with balanced analogue (4x Stereo L/R, integrated XLR) and digital (8x Stereo AES/EBU integrated XLR) interfaces with a configurable level for the audio inputs (over web interface).
- If you activate more than 4 channels, no analog audio input option is available.

Stream4Sure   (optional) enables continuous audio transmission using sample precise seamless data selection:

- up to 4 source streams with different codecs

- combinable with FEC, Dualstreaming (IP packet based redundancy) and SFN
- must be activated in both devices: encoder as well as decoder (e.g. MM01)
- available only for output type "Elementary stream (RTP/UDP)"
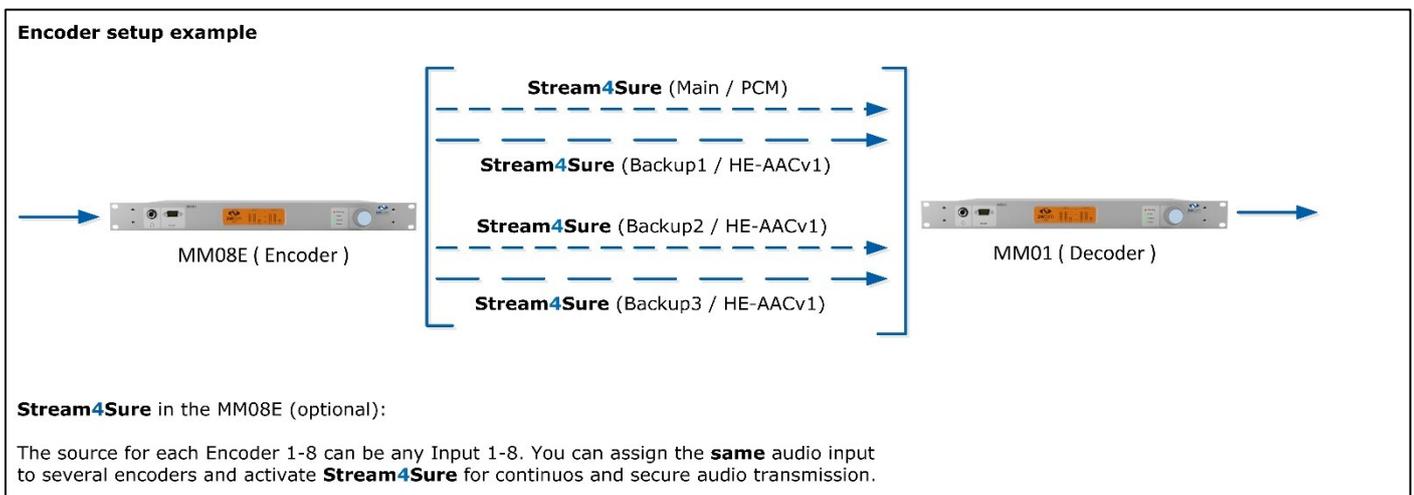
Figure 2: 2wcom Stream4Sure Overview

Monitoring

- Audio inputs
- Device functions (power failure, temperature etc.)
- LED, log messages

Alarm reporting via

- SNMP traps
- Activation of floating relay contacts
- LED, log messages

Control

Settings backup
The MM08E is able to store and load all settings through the web interface to a local file.

SNMP, Telnet, NMS
Additional monitoring of the device using SNMP. Rudimentary device control, status information and alarm trap generation is featured. Optional: control via centralized Network Management System (NMS).

LCD and jog wheel
Initial configurations and major status information can be called up via LCD menu and jog wheel.

GPIO Forwarding
GPI transmission/forwarding embedded in audio IP streams.

HTTP web interface

The unit is controlled via built-in web interface.

Figure 3: Web interface of the MM08E

User   Only experienced technical personnel or engineers should operate the MM08E.

> **NOTE:** Read this manual carefully before attempting to operate the unit. Save this user manual for future reference – it contains important safety and operating instructions for the device.

3. Safety Instructions

For a secure operation of the device the user should read and hold on all safety instructions mentioned in this manual before the first operation.

⚠ **WARNING**	Non-compliance with the safety instructions can lead to serious injury.

Any changes on the device or operation of the parts not having been proved and released by the manufacturer can lead to unforeseen damage.

Every improper use of the device and all actions on the device not mentioned in this user manual are regarded as a not allowed misuse outside the statutory limits for liability of the manufacturer.

If you sell the device or give it to another person, attach this user manual to the device.

Never operate the device, if it does not function properly. If the device or its part is out of order, put it out of operation. Never repair the device by yourself. If there are any damages in the device, send it immediately to 2wcom Systems for maintenance or dispose it professionally according to the regional disposal regulations.

Keep the device away from unauthorized persons.

⚠	**DANGER**
⚡	**DANGER of electric shock** Plug the device into a grounded power socket only. Never remove the grounding wire/contact. Never open the housing of the device by yourself. Never touch open electrical parts. Dangerously high voltages are present inside the housing. Even after disconnecting the mains supply, dangerously high voltage levels may be present for a certain time. Do not touch the device with wet hands. Never expose the device to liquids. If any liquid comes inside the housing, immediately disconnect the device completely from the power supply. Do not continue operating the device.
🔥	**FIRE HAZARD of overheating or electric shock** Ensure sufficient heat dissipation during operation. Avoid following when installing the device:

	– non-ventilated environment, for example a narrow shelve or built-in wardrobe;
	    – extremely warm or cold place;
	    – direct sunlight exposure;
	    – too high or too low temperature;
	    – extremely wet or dusty environment.
	
	Do not operate the device in the presence of flammable gases.
	
	Do not cover the ventilation openings of the device to avoid heat accumulation.
	
	Do not put objects with open flames such as burning candles on the device.
	
	Do not put heavy objects on the supply cord. A damaged cord can lead to fire or electric shock hazards.
	
	To disconnect the supply cord, drag always the plug and never the cable to avoid the cord damage.

⚠WARNING

⚠	**WARNING of explosive atmosphere** Risk of the explosion hazard. Do **not** use the device in an explosive environment.
♨	**WARNING of hot surface** The device is equipped with an active cooling system. The surface of the device can still heat up during operation. Do not touch the surface of the device during operation.

NOTICE

	CAUTION: Risk of equipment damage *Before the first operation:* Check the housing, the front panel, the supply cord and the plug for visible damage (e.g. scratches, cracks, damaged isolation and abrasion) In case of damage, unplug immediately the supply cord. Never operate device with a damaged supply cord.

All damaged components must be replaced immediately.

Installation:

Use only a grounded three-wire power supply cord and -plug that complies with the national regulations.

If necessary, another than the supplied supply cord has to be used, in compliance with the regulations of the country where the device is operated.

Make sure that the AC power outlet is next to the device and readily accessible to the user.

Installation of other devices:

External devices which are connected to the device could be damaged by the device or damage the device itself if the output levels exceed the specified limits.

Cleaning:

Do not use corrosive detergents on the device such as benzine, thinner, alcohol or acetone. Clean the surface of the device only with a soft dry cloth.

4.   Supplied Parts

- MM08E
- Power supply cord*
- Breakout cable for 8x DTE input (optional)
- User manual in PDF format to download; on request by paper

*available for different countries

> ℹ️ **NOTE**: The scope of delivery may deviate in special cases.

5. Manufacturer

2wcom Systems GmbH • Am Sophienhof 8 • 24941 Flensburg • Germany

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6. Installation

Best setup location

The device should be installed in a 19" rack. Avoid direct sunlight, proximity to radiators and air conditioning, dust, water, and chemicals. Choose a rack location that permits a clear view of the indicators on the device and ensure a sufficient heat dissipation of the device.

Mains supply connection

The device is designed for operation with 100 to 240 V AC, 50 to 60 Hz. Check the corresponding device labeling for compatibility to the domestic line voltage and frequency before connecting the IEC power connector to the mains supply!
Check the corresponding device labeling for compatibility to the domestic line voltage and frequency before connecting the IEC power connector to the mains supply!
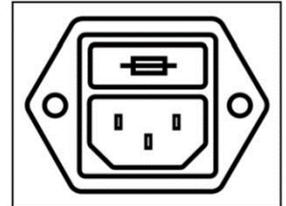
No power switch is available; unplug mains supply connector to remove power. Keep the mains supply plug readily accessible to the user.

⚠ **WARNING**

⚠	**WARNING** Disconnect mains power plug before you open the housing. Repair of the equipment must only be carried out by authorized and qualified personnel. Read also Section „Safety Instructions" (see page 8).

7. Operation

7.1. Device Control via web interface

The device has an integrated web interface. All configurations and operations can be made using a web browser.

To control the device via web interface:

Connection: for network configuration and access to the web interface see Section 8.2 "Network configuration" on page 17.

> **NOTE:** To maintain security, you can activate session timeout function and the current user will be automatically logged out after the configured period of inactivity (for more information see section 14.11 "Set up the session timeout" on page 56).

Buttons:

- if you want to save any changes made in the configuration of the device, press the „Save" button;

- if you do not want to save the changes, press the „Cancel" button.

> **NOTE:** Each block has to be saved individually.
> If you change data in several blocks, you must click the „Save" button under each block, in order to save all changed data.
> Otherwise, the unsaved block will be reset to the previously saved status.

Numbers: use a decimal point as the decimal separator in numbers in the input fields (i.e. "6.5" for six and a half).

Input fields: After entering a number or text in an input field, you must click on the corresponding „Save" or „OK" button to activate the changes. Alternatively you can use the ENTER-key of your computer keyboard.

The next sections explain the separate web interface functions. The operation via jog wheel and LCD on the device is similar to these descriptions.

7.2. Operation via LCD/jog wheel

Some basic functions of the device can also be operated via the LCD/jog wheel at the device.

Via LCD and jog wheel you can:

- configure network settings for the first access to the device over the web interface
- view the device status and the level of the input signals.

If a function of the web interface is applicable for the LCD/ jog wheel, the corresponding `menu path` is shown at the web interface description.

- To change from the default status screen to the main menu screen, push the jog wheel.

- To move the cursor in the menu structure, turn the jog wheel.

- To open a menu entry or to confirm a setting, push the jog wheel.

- To select a configurable menu entry, turn the jog wheel.

- To adjust a menu entry, push and then turn the jog wheel.

- To confirm the adjustment, push the jog wheel.

- To return to a previous menu level, activate the menu entry "<<".

Some settings need a restart of the device to be activated.

8. First Steps

The following section contains instructions for a quick start.

✓ You have already unpacked and installed the device in an appropriate place.

8.1. Power supply

<table>
<tr><td colspan="2">NOTICE</td></tr>
<tr><td></td><td>Make sure that the device and the contained cords are compatible to the domestic line voltage and frequency!</td></tr>
</table>

The device has two plug-in exchangeable power supply units which can be equipped with different redundant power supply connectors:

<table>
<tr>
<td></td>
<td>230 V AC, 90…260 V AC, 47…63 Hz
If the device is compatible, connect the power supply cord fully to the IEC power connector at the back panel of the device and an independent mains power outlet.</td>
</tr>
<tr>
<td></td>
<td>– 48 DC Neutrik powerCON socket, aut. switchover (NAC3MPA-1)
– Neutrik powerCON connector (NAC3FCA)

Note: No power cords are delivered!</td>
</tr>
</table>

Assembly Instruction for the 48V connector:

To connect your cable to the delivered terminal blocks for [Power IN], insert the wires into the delivered terminals and fasten the screws with a POZIDRIV® screwdriver No 1 to maximal torque of 0.5 Nm.

Note: the specification for the power supplies and the position of the poles in the connector and in the [Power IN] socket on the back panel of the housing as shown in Figure 4:
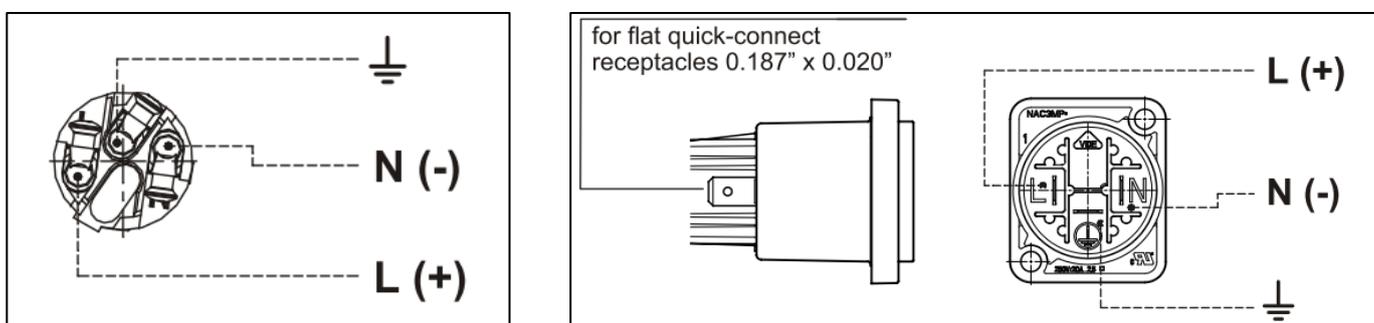

Figure 4: Wiring of the 48V connector (left) and of the 48V socket (right), rear side
N – "neutral"
L – phase conductor "line"

NOTICE
If you see the voltage of 48+ V and 0 V, fasten the +48 V wire to "L" in the connector. If you use the voltage 0 V and -38 V, fasten the 0 V wire to "L" in the connector.

⇒ The "Power" LED will turn on green if both power supply cords are connected.
⇒ The "Power" LED will blink green/red if only one power supply cord is connected.

The MM08E is equipped with a left and right plug-in power supply unit that are independent from each other. You can exchange one of them in the MM08E **during ongoing operation** if one power supply unit fails. To unplug the defect power supply unit, just pull out carefully the plug housing. Exchange the defect power supply unit by an intact power supply unit.

NOTICE
The current information about the operation of the both power supply units you can view over the web interface of the device under **Status→Device** (see Figure 37 on page 50).

8.2. Network configuration

NOTICE
False connection of the Ethernet interfaces will lead to incorrect operation Use the [Data 1/Data 2] connectors only for the data transfer. Use the [Ctrl] connector only for the access to the device via the web interface and for SNMP.

For delivery, the device is configured with default settings for the first connection via the IP interface. The default IP address / netmask are `192.168.14.250 / 255.255.255.0`.

You can activate the access to the device or to adjust the default configuration to your own network via LCD screen and jog wheel.

Use jog wheel to configure the IP network:

1. Push the jog wheel to select "`Main Menu`". The TCP/IP configuration menu appears.

2. Configure settings for your existing IP network (IP address, netmask, gateway etc.; consult the responsible network administrator if applicable).

3. Save the settings by using the jog wheel and reboot the device under "Global" selecting the reboot button.

4. Connect a network patch cable to the 10/100-Base-T connector [Ctrl] on the back panel of the device and your existing IP network.

   ⇒ Your device is now connected to the IP network.

8.3. Web interface

The device can be fully operated with an internet browser via the integrated web interface. For this purpose use a computer that is connected to the same IP network that the device is connected to.

To operate the device via the web interface:

1. Start an internet browser (always use an up-to-date version with Java Script activated).

2. Enter the configured IP address in the address bar of the browser. If the IP address has not been changed in step 8.2, please enter the default address in the address bar of the browser: 192.168.14.250.

3. A login screen with Username/Password appears. Use the default accounts:

   i.   for a read-only access use "user"/"user"

   ii.   for a full access use "manager"/manager" or "admin"/"admin"

   ⇒ After entering the correct login data (case sensitive), the main MM08E page appears.

NOTE: Change the login data as soon as possible to avoid unauthorized access to the device and document the login data in a safe place.
You can change your login data under **System Settings→User**.

8.4. Connecting the device

For data distribution, connect the device as follows:

1. To feed an audio/digital audio signal to the encoder, use the XLR jacks [Analog L/R 1-4]/ [AES/EBU 1-8] for the audio input.

2. To output the encoded signal over IP, use the [Data 1/Data 2] RJ-45 connectors for redundant distribution over IP.

3. To output the encoded MPEG2 TS via ASI, use the BNC [ASI 1/2 OUT] connectors.

---

4. Use the headphone output for monitoring the input audio signals. Set up the mode for the headphones output under **Interface Settings→Headphone** (possible options: "mute"/"Channel 1-8").

8.5.   Encoder configuration

The MM08 Encoder can output either Elementary streams or Transportstreams over RTP/UDP.

You can configure up to 8 Encoders (if the option available) that are assigned to the 8 input channels. The number of the available Encoders depends of the activated rights (for more information see section 14.3 "Set up rights" on page 50).

In the following instructions only first steps are described. For more information see section 11 "Encoder settings" on page 28.

8.5.1. Configuration of Elementary streams

To configure the encoder for Elementary stream:

1. Set the "Elementary stream" mode under **Output Settings→Encoder** in the dropdown menu "Output Type".

2. Click the "Save" button.

3. For each available Encoder 1-8 configure the encoding format by clicking the "Edit" button in the corresponding field.

4. Click the "Save" button, to save the changes.

5. Activate and set up the destinations for each Encoder in the same menu.

    Note: If more than 4 channels are activated (Rights), no analog option is available.

6. Under **Output Settings→Encoder** and **Information→Overview** you can see the current status of the available encoders.

8.5.2. Configuration of Transportstreams

To configure the encoder for Transportstream:

1. Set the "Transportstream" mode under **Output Settings→Encoder** in the dropdown menu "Output Type".

2. Click the "Save" button.

3. For each available Encoder 1-8 configure the coding format by clicking the "Edit" button in the corresponding field.

4. Assign the Encoder configurations 1-8 to max. 8 multiplexed output streams under **Output Settings→TS Multiplexer** by clicking the "Edit" button.

    Note: In sum you can only assign as much Encoder configurations to the multiplexed output streams as you have channels activated. So if you have 8 channels activated, you can assign e.g. 4 Encoder configurations to Multiplex 1 and another 4 to Multiplex 2. Or you can assign 1 Encoder configuration to each Multiplex 1 to 8 and so on.

5. Under **Information→Overview** you can see the current status of the activated outputs.
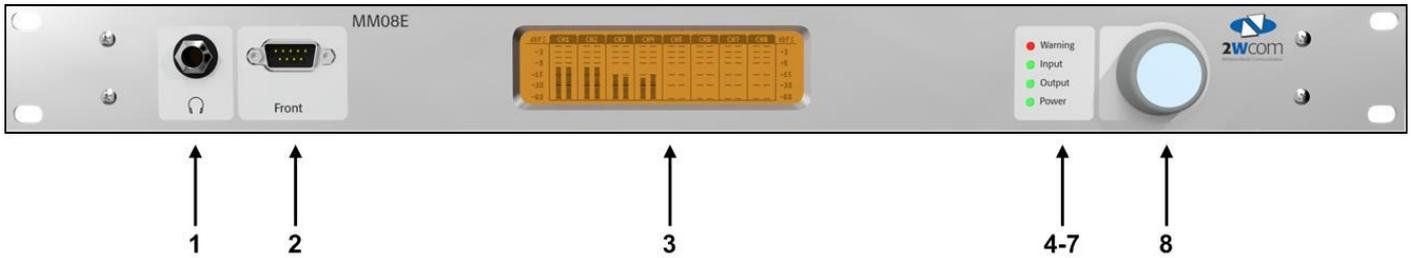
8.6.   Set up alarm

You can set up monitoring of certain device and input parameters which should be measured. In case of failure, an alarm can be sent over SNMP, GPO switching and/or will be indicated by a warning LED in the front of the device and/or through an entry in the log.

To set up alarms for the available parameters:

1. Select **System Settings→Alarm** in the web interface to open the monitoring setup page.

2. Activate monitoring for each parameter separately by selecting the corresponding checkboxes in the column "Enable".

3. Select for each alarm function the severity level of the alarm in the dropdown menu "Priority" (for more information about alarm priority see Table 1 on page 37).

4. Some alarms need a threshold value. Change or enter the threshold value in the corresponding fields.

5. For each parameter default values are already preset. T1 vs. T2 is the time a parameter has to be "bad" vs. "good" before an alarm will be generated vs. retracted.

6. Activate the way of the alarm distribution (SNMP, GPO, LED) by selecting the corresponding checkboxes.

7. In the same menu you can set up the alarm in case of LAN connection failure or device overheating.

8. Click the „Save" button to save the changes.

9. In the same menu you can see status LEDs of each monitoring parameter and under **Status→Log** details about the sent alarms (for more information about log see section 14.5).

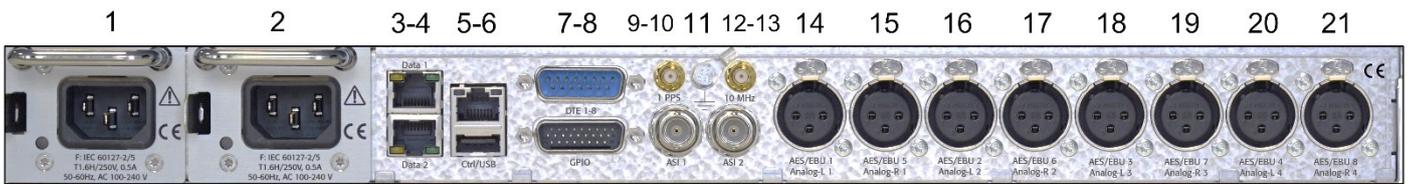# 9. Control Elements and Connectors

9.1.   Front Panel

1	Headphones	6.3 mm / 1/4" socket for the connection of headphones.
2	[Front]	9 pole D-Sub male connector; Serial RS-232C, only for device servicing purposes.
3	LCD screen	Illuminated, Liquid Crystal Display (LCD), graphical, 264x64 pixel.
4	[Warning] LED	LED indicator (red); lit if alarm is triggered.
5	[Input] LED	Will correspond to the sum of the alarm status for the inputs. If no input alarms are enabled, the LED will be off. If input alarms are enabled, the LED will be green, if all inputs are OK, yellow if one or more inputs are bad, but at least one is good, and red, if all inputs are bad.
6	[Output] LED	No function
7	[Power] LED	Activated (green) if both power supply cords are connected and the power supply is ok. Toggle (green/red) if only one power supply cord is connected and the power supply is ok.
8	Jog wheel	Jog wheel for the device operation via the LCD screen on the device. Turn the jog wheel to place the cursor on the desired menu entry and push the jog wheel to activate the highlighted menu entry.

9.2.   Back Panel

1-2	Left power supply unit; Right power supply unit	2x redundant standardized IEC hot-swappable power supply connector with integrated fuse holder; automatical switchover.
		Fuse ratings depending on mains supply voltage: 90-260 V,47-63 Hz: T1.6A, time lag type, 5x20 mm, 230 V
		Optional: redundant power supply 48VDC
		Combination of power supply 230 VAC and 48 VDC is possible.
3-4	[Data 1/2]	2x RJ-45 connectors; 10/100/1000 Base-T interface for two redundant outputs for data, audio and GPIO transmission via gigabit Ethernet.
5	[Ctrl]	RJ-45 connector; 10/100/1000 Base-T interface for control and monitoring the device via Ethernet. The device can communicate with the IP network and can be configured in an internet browser via the integrated web interface. The LEDs at the socket show the link status (green; active if a physical network connection exists) and the activity status (yellow, active if data communication is active).
6	[USB]	USB 2.0 interface for service, configuration and firmware.
7	[DTE 1-8]	15 pole D-Sub male connector for the serial RS-232C data communication, e.g. private data, MPEG ancillary data, UECP/RDS (acc. to TR 101 154). Use the supplied serial breakout cable (optional) to provide each output with a serial interface.
8	[GPIO]	26 pole sub-D male connector; Remote Control Inputs/Outputs for GPIO transmission; 16 inputs; 3+1 floating relays; switch contacts of the integrated relays.
9	[1 PPS]	(optional) SMA connector for SFN synchronization (GPS input)
11	[Grounding stud]	The stud can be used to connect a grounding system if necessary.
12	[10 MHz]	(optional) SMA connector for Time Synchronization
10,13	[ASI 1/2 OUT]	2x BNC connector; for the output of a DVB-ASI data stream (270 Mbps, MPEG2 TS)
14-21	[AES/EBU 1-8]	8x balanced XLR female socket; AES/EBU interface for input of the digital audio signal
15,17, 19,21	[Analog-R 1-4]	double function: input of the right channel of the analog audio signal
14,16, 18,20	[Analog-L 1-4]	double function: input of the left channel of the analog audio signal

10. Network Settings

✓ You have already connected the device to the network [Ctrl] and configured the access to the web interface (see page 16, section "First Steps").

10.1. TCP/IP: Configuration of the Ethernet interfaces

The MM08E has three Gigabit Ethernet RJ45 interfaces: one for configuration and two for data exchange.

NOTICE	
	False connection of the Ethernet interfaces will lead to incorrect operation
	Use the [Data 1/Data 2] connectors only for the data transfer.
	Use the [Ctrl] connector only for the access to the device via the web interface.

Under **Network Setting→TCP/IP** you can configure the Ethernet interfaces: Control interface to access the web interface of the device [block **Ctrl**], [block **DNS Server**] and both data interfaces [block **Data 1/Data 2**].

NOTE: The MM08E supports ADSL/VDSL connections by assigning static and dynamic IP addresses. To use a dynamic IP, a DynDNS account is needed.

The following parameters can be configured or changed (see Figure 5):

MAC address: The current MAC address is shown in the brackets after the block name (e.g. 00,11,99,00,6D,50)

VLAN: Support on request

IP Address: Individual address that is necessary to identify hardware in an IP network like the internet or intranet.

Netmask: Bit mask, which separates an IP address into a network part and a host part.

Gateway: Address of the local system that is used for the internet access (e.g. the router)

Primary: IP address of the primary Domain Name Service (DNS) server.

Secondary: IP address of the secondary Domain Name Service (DNS) server.

DHCP: Activate or deactivate the Dynamic Host Configuration Protocol which enables the device to get an IP address automatically.

Routing   Activate or deactivate "Routing" switch, which enables the DNS Server to send and to answer the requests over different Data Interfaces [Data 1] or [Data 2].

Activate "Routing" and select the Data Interface in the drop down menu "Routing Interface".
If "Routing" is deactivated, the requests will be sent to the interface that is connected to the same network as the DNS Server.

Figure 5: Network Settings - TCP/IP

The necessary address settings above depend on the individual network and should be assigned by the responsible network administrator if applicable.

⇒ Save the changed settings by clicking „Save" button.

10.2. Monitoring function: Configuration of SNMP

As part of the monitoring function, the device is capable to send SNMP traps to the defined IP addresses of the SNMP managers. It is also possible to readout device settings via SNMP Get.

This menu item is available under **Network Settings→SNMP** and is used to setup the IP addresses of the SNMP managers (see Figure 6).

Figure 6: Network Settings – SNMP

Additionally, access data (read community/write community) that is necessary for external SNMP requests to device can be configured here.

You can configure or change in this menu the following parameters for SNMP:

First manager: IP address of the first SNMP manager that receives SNMP traps. The trap sending to this address can also be deactivated by a checking "off" at "Send trap:".

Second manager: IP address of the second SNMP manager that receives SNMP traps. The trap sending to this address can also be deactivated by a checking "off" at "Send trap:".

Read community: SNMP access data for the external read SNMP access to the device.

Write community: SNMP access data for the external write SNMP access to the device.

⇒ Save the settings by clicking the „Save" button.

NOTE: In order for the SNMP manager tool to operate correctly, it requires the specific MIB files. These MIB files need to be compiled by the SNMP manager tool.

You can save the active MIB files under **System Settings→Global** in the "System information" block in the "MIB version" field.

NOTE: Each activated trap will be sent once at startup for initialization.

You can configure and activate the monitoring functions under **System Settings→Alarm**. More information about alarm settings you can find in section 11.6 on page 36 and 14.4 on page 51.

10.3. SNTP settings: Configuration of date and time

This menu item is available under **Network Settings→SNTP (Time)** and is used to enable the automatical synchronization of the date and time of the device with an external SNTP server (see Figure 7).

Figure 7: Network Settings – SNTP

In this menu you can activate the automatic synchronization of the device clock via SNTP by activating a virtual switch to "ON" and configure or change the following parameters:

1. SNTP Server IP	IP address of the first NTP server to be used.
2. SNTP Server IP	IP address of the second NTP server to be used.
Update interval [min. 30 sec]	Time interval for synchronizing the device clock with the NTP server in seconds.
Last synchronization	Information about the last synchronization.

> **NOTE:** Additionally, you can read out and <u>manually</u> set up the current date and time in the internal clock of the device under **System Settings→Time** (see section 14.9).

10.4. Set up Livewire configuration

To set up the Livewire connection, you need administrator rights. Log in to the "admin" account and open the menu "Livewire" under **Network Settings→Livewire** (see Figure 8).
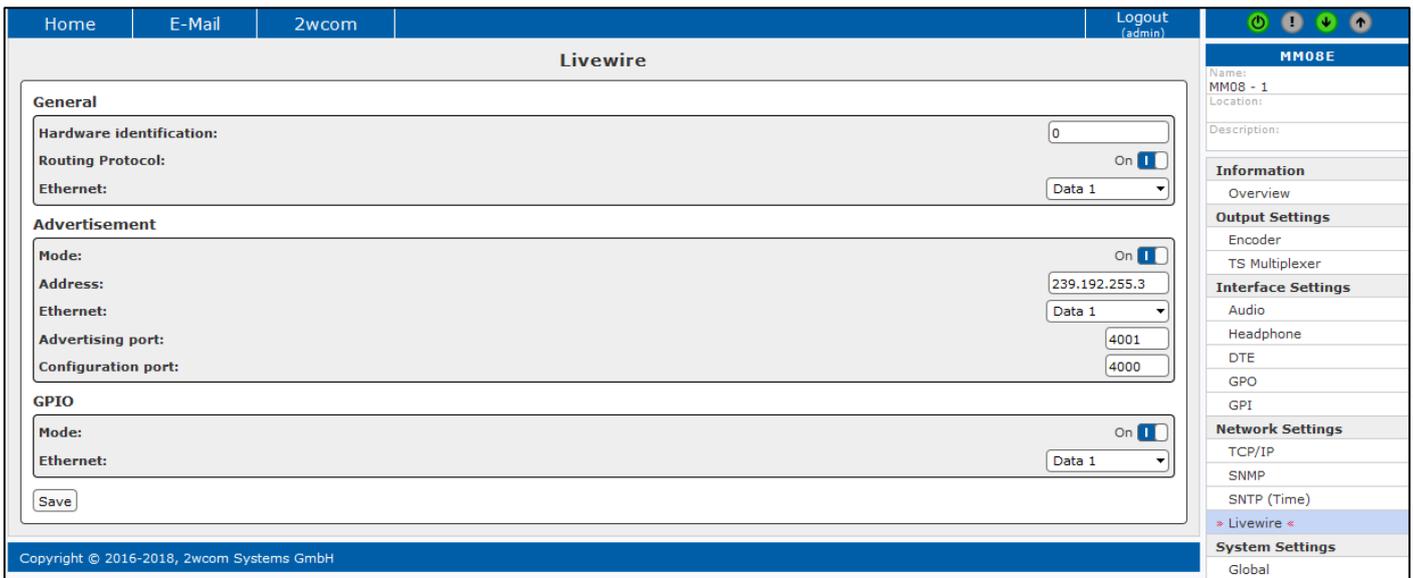
Figure 8: Livewire Settings

General settings for Livewire

Hardware identification:	If you use several devices, give the name for identification.
Routing Protocol:	You can activate routing protocol to control several devices.
Ethernet:	Select the interface for Livewire connection: *Data 1/2*

Advertisement

Activation of the mode:	Special setting for Livewire: announcing of the data streams in the network. Routing protocol should be activated for this mode.

GPIO

Activation of the mode:	Activates GPIO: if activated, the MM01 can receive commandos via Livewire for external GPO switch. Routing protocol should be activated for this mode. For more information about GPIO and Livewire see section 12.4.3 "GPO Switch" on page 45.

11. Encoder settings

✓ You have already connected the MM08E to the network 10/100/1000-Base-T via the [Ctrl] interface and configured the access to the web interface (see section 8.2).

Necessary steps for operating the MM08E as an encoder are:

1. Connect the encoder
2. Configure programs for encoder
3. Set up encoder input level
4. Set up FEC for encoder
5. Set up output streams for TS
6. Set up the monitoring and alarm control
7. View the encoder status

The following sections describe the separate steps for encoding:

11.1. Connect the encoder

For data distribution, connect the device as follows:

1. Use the 8 XLR jacks [Analog L/R IN]/[AES/EBU IN] to feed up to 4 analog and 8 digital audio signals to the encoder.

2. To output the 2x MPEG2 TS over ASI, use the [ASI 1-2 OUT] connectors.

3. To output the encoded signal over IP, use the [Data 1/Data 2] RJ-45 connectors for redundant distribution over IP.

NOTICE	
	False connection of the Ethernet interfaces will lead to incorrect operation
	Use the [Data 1/Data 2] connectors only for the data transfer.
	Use the [Ctrl] connector only for the access to the device via the web interface.

11.2. Configure programs for encoder

The MM08E is equipped with 8 parallel encoders that can operate at the same time.

NOTE: The current version of the MM08E is equipped with 4 analog and 8 digital input sources. The corresponding rights must be available (see section 14.3 "Set up rights" on page 50).

If more than 4 channels are activated (Rights), no analog option is available.

To activate und to configure the unit as an encoder for audio over IP/ASI (ASI outputs only for TS):

1. Select **Output Settings→Encoder** in the web interface menu. The page Encoder appears:

Figure 9: Encoder Settings: Elementary Stream and TS as output type

2. Select the operation mode in the "Output Type" dropdown menu: *Elementary Stream (RTP/UDP)* or *Transportstream (RTP/UDP)* (global setting for all streams).

> **NOTE:** Only one mode is possible for the operation.
>
> In the "Elementary Stream" mode you can configure up to 100 destinations over [Data 1/2] interfaces for each stream (s. Figure 12).
>
> In the "Transportstream" (TS) mode you can send several programs in one multiplexed stream and send it over [Data 1/2] and/or [ASI 1/2] outputs. For configuration of up to 8 multiplexed streams see section 11.5 "Set up output streams for TS" on page 35.

3. Click the "Save" button to save the changes.

4. Click the "Edit" button in the block "Encoder" to activate and configure the source for each Encoder 1-8 (=Program 1-8). The page "Edit Encoder" appears (see Figure 10 for TS mode and Figure 11 for "Elementary Stream" mode).
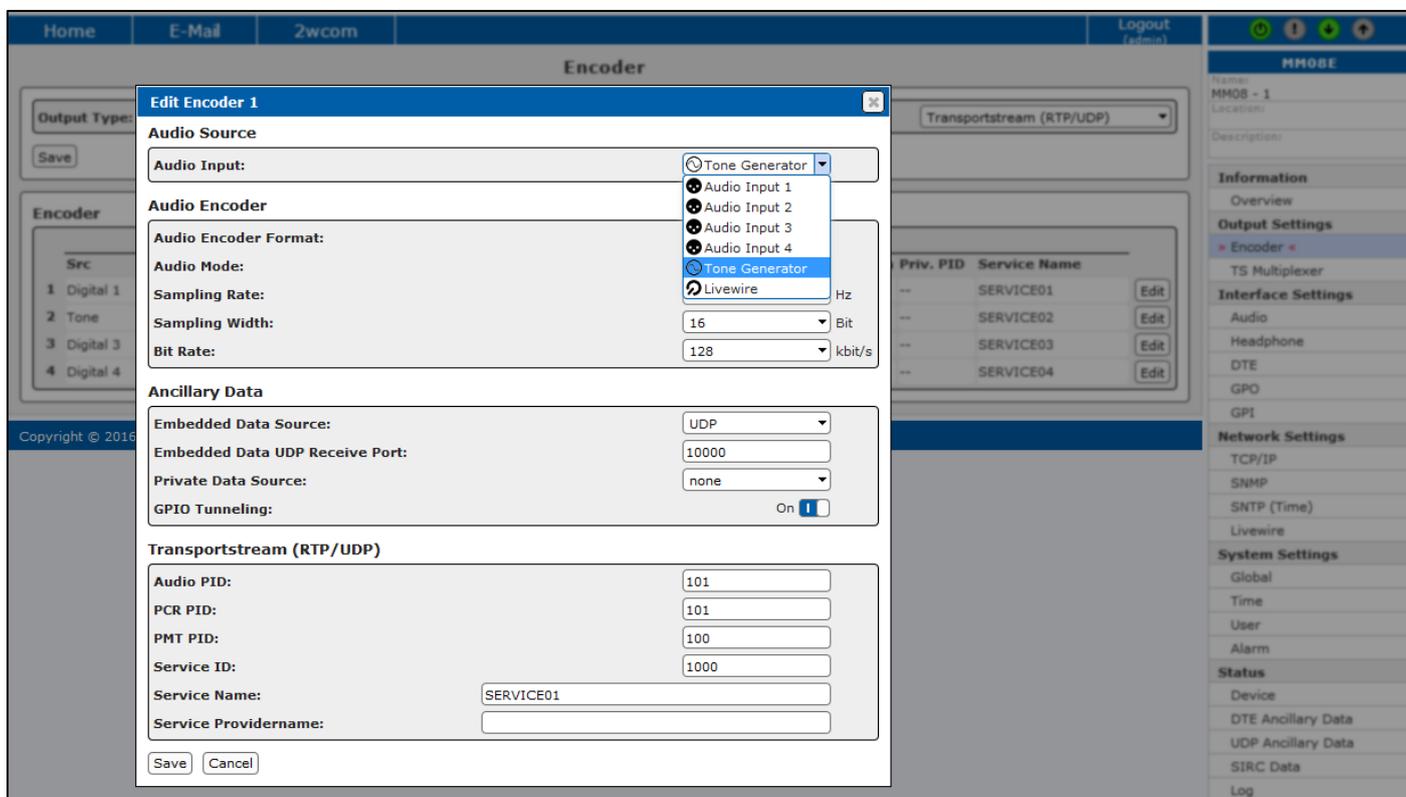

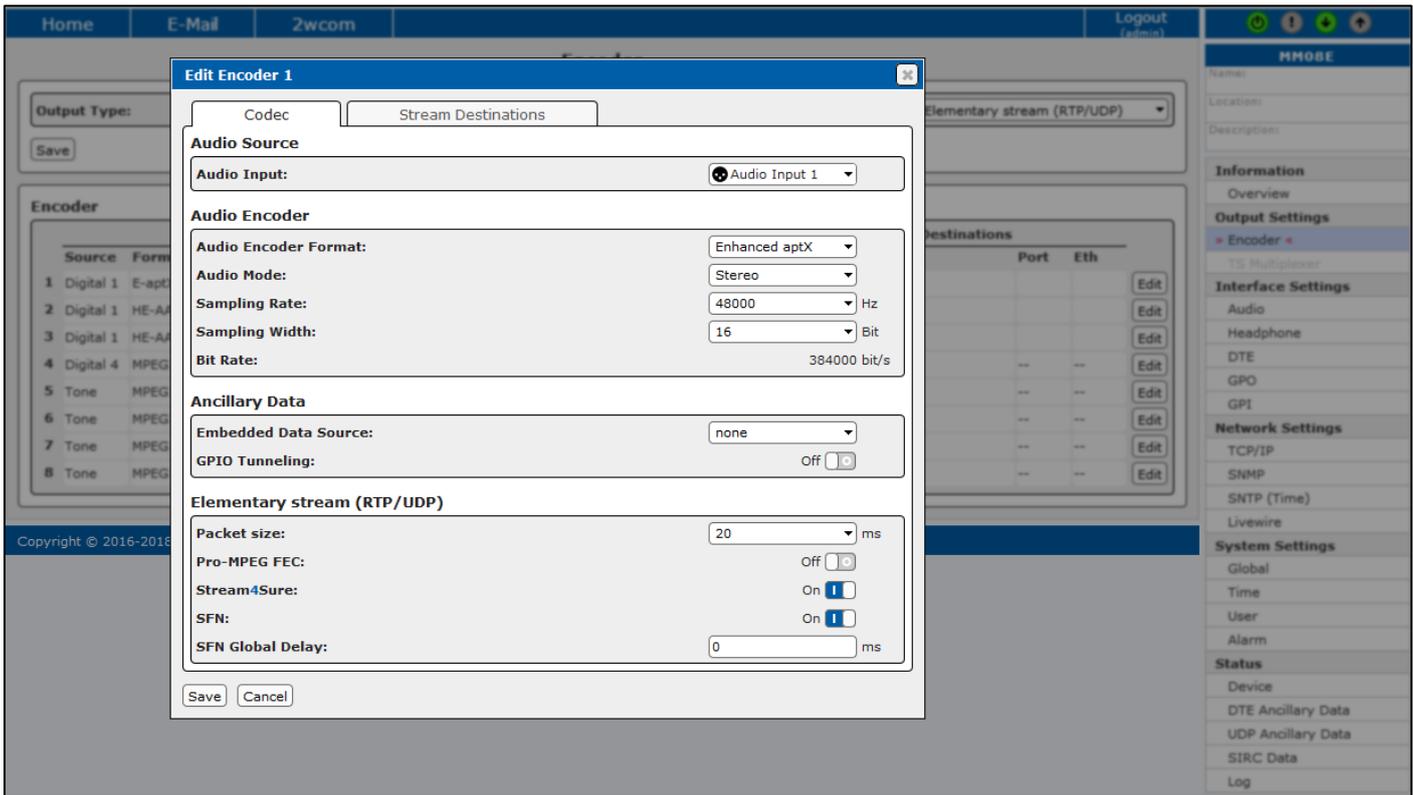*Figure 10: Encoder configuration – TS Mode*

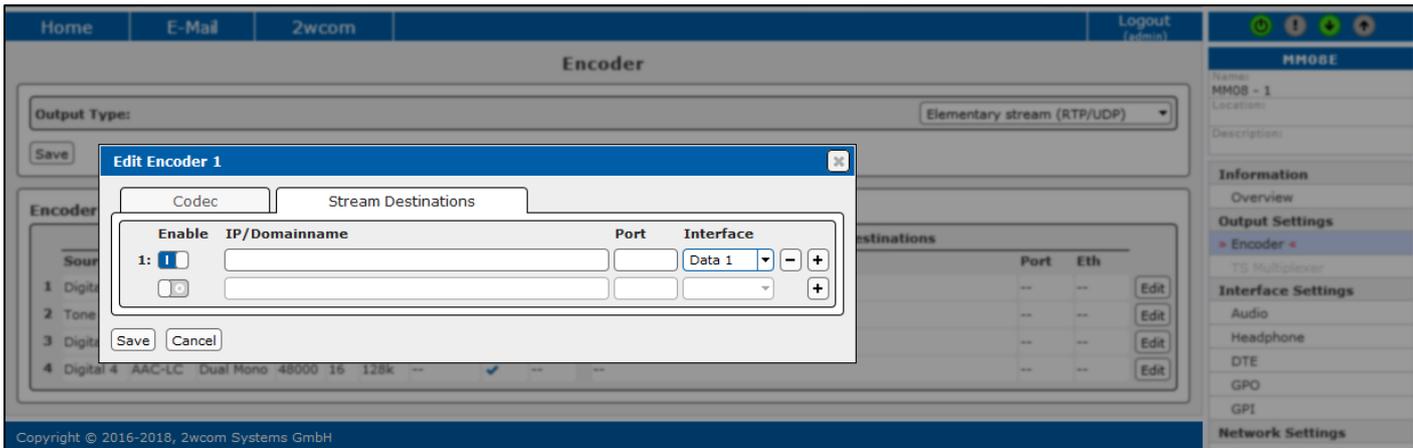*Figure 11: Codec Configuration – Elementary Stream Mode*

Figure 12: Stream Destinations Configuration – Elementary stream

5. Select the Audio Input (Analog/Digital Input 1-4 / Tone Generator as a test tone / Livewire).

   Note: The source for each Encoder 1-8 can be any Input 1-8. You can assign the **same** audio input to several encoders (also for **Stream4Sure**).
   For example, Encoder 1 **and** Encoder 2 can process an audio signal from audio input 1 (interface [AES/EBU 1/Analog-L/R 1], see section 9.2).

   Note: If more than 4 channels are activated (Rights), no analog option is available.

6. Choose the audio codec in the dropdown menu "Audio Encoder Format". For available formats see Figure 13.
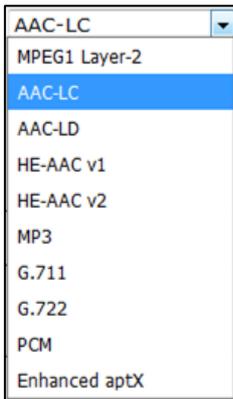
Figure 13: Audio Encoder Format

Figure 14: Audio Mode

7. Set up audio mode in the next dropdown menu; if applicable (see Figure 14).

8. Choose the desired value for **Sampling Rate**. You can set up the sampling rate in the range of 8000 … 48000 Hz.

9. Choose the desired value for **Sampling Width**. You can set up the sampling width in the range of 16 … 24 bit depending on the chosen audio format.

10. Choose the desired value for **Bit Rate** depending on the chosen audio format (32…576 kb/s).

11. To add the ancillary serial data to the data stream, choose the connected input DTE1-8 or UDP (and set the UDP Data Receive Port).

12. For GPIO switch between encoder and decoder activate the function "GPIO Tunneling" by selecting "ON" in the virtual switch "Activation" for the Encoder 1-8 (for more information see section 12.4.1 "GPIO Tunneling" on page 44).

13. Set up the configured output transport stream in the corresponded block (see Figure 15 or Figure 16).
    Note: Destinations are available only for "Elementary stream" mode. For TS mode define destinations under **Output Settings→TS Multiplexer** (see section 11.5).

    If MPEG1 Layer-2, MP3 and any AAC variant are set as the Audio Encoder Format in the "Elementary stream" mode, select the maximum RTP packet size in the dropdown menu "Maximum RTP Payload Size" (64…1450 Bytes). This setting is relevant for FEC (see section 11.3).

Figure 15: Transportstream (RTP/UDP) settings

Elementary stream (RTP/UDP)

Pro-MPEG FEC:	On
FEC Mode (Row x Col):	1 x 4
FEC column (L) port offset (0 if unused):	2
FEC row (D) port offset (0 if unused):	4

Figure 16: Elementary stream (RTP/UDP) Settings

14. If available, activate for Elementary Stream the option **Stream4Sure** by selecting "ON" in the virtual switch "Activation" (for more information about **Stream4Sure** see section "Introduction" on page 6).

15. Optional: Activate network synchronization for SFN, if available (see Figure 11).

NOTICE

For SFN Synchronization the device must be connected to a **1PPS** signal.
You can view the status of the 1PPS signal under **Status→SFN**.

The SFN mode is possible only with the sample rate of **48kHz**.

---

16. For SFN Synchronization set up "SFN Global Delay" – commando for all decoders, to wait for the defined time interval (miliseconds) before they simultaneously start to decode the distributed signal (for more information about the delay values see section 13 "Buffer Delay Management" on page 47).

NOTE: Input failure can be signaled by sending alarm via SNMP, LED or switching GPO. To set up alarm control for the inputs see section 11.6.

---

17. Click the "Save" button to save the changes or "Cancel" to restore the last settings.

11.3.   Set up encoder input level

For analog and digital input source you can set up the audio type and the input gain.

Follow the steps below:

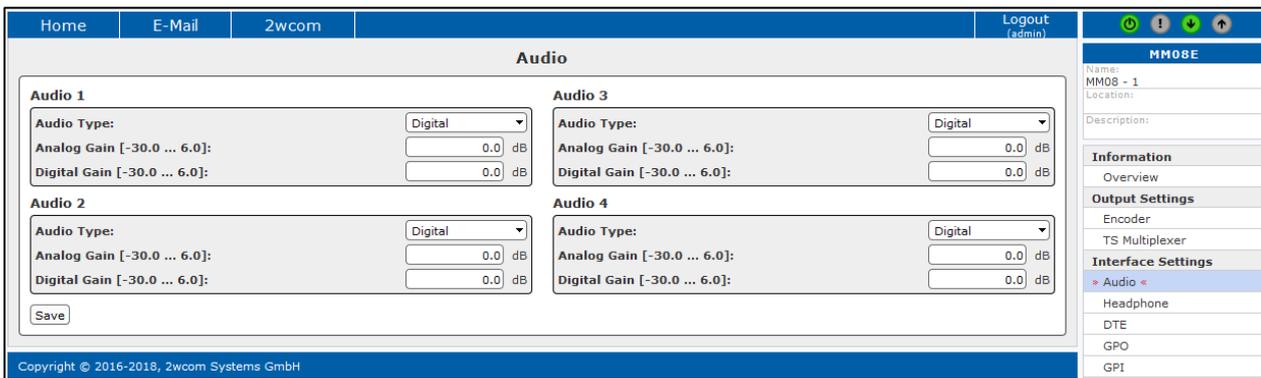1.   Select **Interface Settings→Audio** (s. Figure 17):

Figure 17: Audio input settings

2. Configure the audio/analog gain for each audio input in the "Audio 1-4" block:

    - **Type** of the audio input: Analog or Digital
    - **Gain Analog/Digital**: -30.0 dB – 6.0 dB

3. Click the "Save" button to save the settings.

    ⇒ The current level of the input gain is displayed on the display of the unit and in the user web interface under **Information→Overview** in the field "Audio Levels" (see Figure 23).

11.4. Set up FEC for encoder

The coder comes with Pro-MPEG FEC (Practice #3 release 2) to reduce packet loss and burst errors in IP data stream.

1. You can configure the Pro MPEG Forward Error Correction for each Encoder (see Figure 16).

2. Activate the Pro MPEG Forward Error Correction by selecting the checkbox "Pro-MPEG FEC Enable". The current menu window will be extended.

3. You can set up the following FEC parameters for the IP output: FEC mode, FEC column (L) port offset and FEC row (D) port offset.

    Note: Configure the FEC mode depending on the sample rate and the acceptable value for delay. To reduce the delay for FEC, reduce the maximum RTP packet size (see page 32). For more information about the delay values see section 13 "Buffer Delay Management" on page 47.

4. Enter zero for the *FEC column/row port offset*, if it is unused, or enter the OFFSET to the main destination port, where the data should be sent to. For example, if the main port is 5004, the value "2" for FEC column port offset means that the port is then 2006 (5004 + 2).

5. Click the „Save" button to save the changes.

    ⇒ Under **Information→Overview** you can call up the status of the FEC in the "Elementary Streams" block (see Figure 21 or Figure 22).

11.5. Set up output streams for TS

MM08E is able to output up to 8 multiplexed streams over IP at the same time. You can use both IP interfaces Data 1 and Data 2 as well as ASI 1 and ASI 2 outputs for the same stream content and the same destination as a redundancy or send different stream contents to the same or different destinations:

To each output stream (only for TS mode) you can assign up to 8 configured programs from section 11.2 and one of the Ethernet outputs Data 1 or Data 2 and ASI 1-2 outputs.

To set up output streams and destinations for TS mode:

1. Select **Output Settings→TS Multiplexer** in the web interface menu of the MM08E. The page *TS Multiplexer* appears:

Figure 18: Output streams configuration

2. Click the "Edit" button in the field **Multiplex 1-8** to configure the output streams. The page "Edit Multiplex 1-8" appears (see Figure 19).
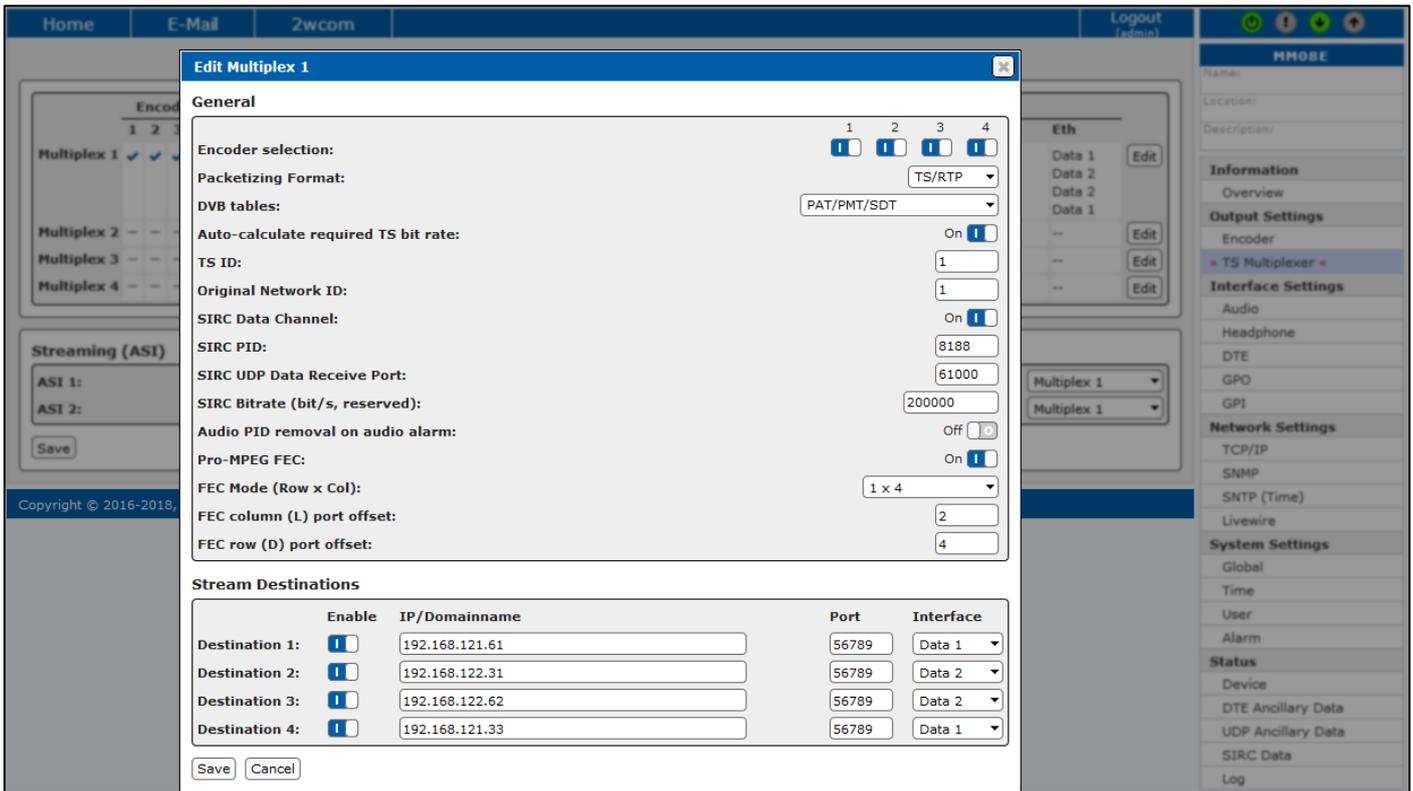
Figure 19: Edit output stream configuration

3. Choose programs 1-8 (Encoder 1-8) configured in section 11.2 by selecting "ON" in the virtual switch "Program selection".

    Note: In sum you can only assign as much programs to the multiplexed output streams as you have channels activated. So if you have 8 channels activated, you can assign e.g. 4 programs to Multiplex 1 and another 4 to Multiplex 2. Or you can assign 1 program to each Multiplex 1 to 8 and so on.

4. Set up the destination IP address, port number or Domain Name for the output stream. You can enable and configure up to 4 destinations (as a Backup).

5. Choose the Ethernet interface for the stream output: Data 1 or Data 2.

> **NOTE:** To configure the IP outputs Data 1/2 open the menu **Network Settings→TCP/IP** and see section 10.1.

---

6. Click the „Save" button to save the changes or „Reset" to restore the last settings.

11.6.   Set up monitoring and alarm control

The MM08E is able to monitor the encoding signal and to recognize errors in the inputs.

A triggered alarm is signaled by sending SNMP traps, activating of an available GPO and, if configured, of the "Warning" LED on the web interface page or on the front panel of the device.

The following alarm functions for audio inputs can be activated:

AES/EBU no signal	Alarm is triggered, if no signal is detected at the audio input [AES/EBU IN].
Silence detection	Alarm is triggered, if the device detects silence in the input of the left and/or right channel of the audio signal. You can set up the minimum value of the audio level; under that the alarm should be triggered.

To set up the monitoring and alarm function for each available audio input:

1. Open the configuration menu Audio Input 1-8 in the window Alarm under **System Settings→Alarm** in the web interface of the MM08E (Figure 20).
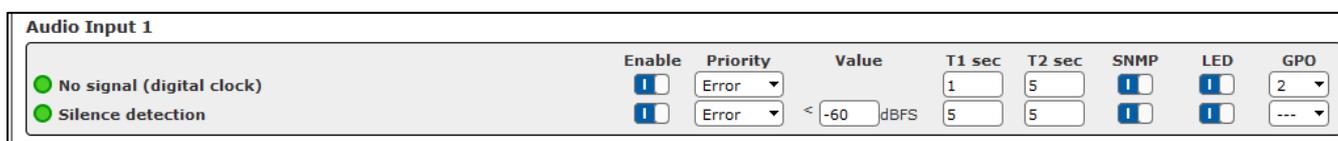

Figure 20: Alarm Settings – Indication of audio data in the audio inputs

> **The LED color means:**
>
> 🟢 **- Monitoring is activated, no alarm is triggered**
> ⚪ **- Monitoring is deactivated**
> 🔴 **- Monitoring is activated, alarm is triggered**

2. Enable each alarm function separately by activating the virtual switch "Enable" if this parameter should be monitored.

3. Select for each alarm function the severity level of the alarm in the dropdown menu "Priority":

Level/Code	Priority	Meaning
0	Emergency	System is unusable
1	Alert	Action must be taken immediately
2	Critical	Critical conditions
3	Error	Error conditions
4	Warning	Warning conditions
5	Notice	Normal but significant condition
6	Informational	Informational messages
7	Debug	Debug-level messages

Table 1: Alarm Priority

The value 0 or Priority Emergency is the most critical and emergent level. In case of an alarm, an error report with the priority of the error will be sent to the Network Operations Center (NOC). The responsible Second-Level-Support will decide by means of this information, how urgent is the alarming case and what measures are necessary.

4. Define for each monitoring function the delay time T1 (in seconds) for alarm trigger. The delay time from this defined value will be regarded by the system as "bad", so that after the delay time T1 an alarm will be set off.

5. Define for each monitoring function the delay time T2 (in seconds) for alarm end, how long a "good" signal for this parameter should be available, before the system switches off the alarm.

6. Enable checkbox "SNMP", if the alarm should be signaled by sending SNMP traps.

7. Enable checkbox "LED", if the alarm should be signaled by the Warning LED on the web interface page or on the front panel of the device.

8. Choose in the dropdown menu "GPO" one of the available GPOs that should switch to signal the alarm.

9. Click the „Save" button to save the changes.

11.7.   View the encoder status

You can call up the current status of the encoder and of the incoming audio data at any time on the web interface page or in the LCD menu of the device.

1. Under **Information→Overview** you can see the details of the configured parameters of the encoding signal in *Encoder* field (see Figure 21).

Encoder

	Input	Format	Mode	SR	SW	BR	Ancillary	GPIO	PID	PCR PID	PMT PID	Priv. Data	Priv. PID	Service Name
1	Digital 1	MPEG1 L2	Dual Mono	48000	16	128k	@:10000	✔	101	101	100	--	--	SERVICE01
2	Tone	AAC-LC	Dual Mono	48000	16	128k	--	✔	201	201	200	--	--	SERVICE02
3	Digital 3	AAC-LC	Dual Mono	48000	16	128k	--	✔	301	301	300	--	--	SERVICE03
4	Digital 4	AAC-LC	Dual Mono	48000	16	128k	--	✔	401	401	400	--	--	SERVICE04

Transport Streams

	Encoder 1 2 3 4				Format	TS ID	BR	FEC	IP	Port	Eth	BR
Multiplex 1	✔ ✔ ✔ ✔				TS/RTP	1	Auto	1x4	192.168.121.61	56789	Data 1	11.208M
									192.168.122.31	56789	Data 2	
									192.168.122.62	56789	Data 2	
									192.168.121.33	56789	Data 1	
Multiplex 2	– – – –				TS/RTP	100	Auto	--	--	--	--	--
Multiplex 3	– – – –				TS/RTP	100	Auto	--	--	--	--	--
Multiplex 4	– – – –				TS/RTP	100	Auto	--	--	--	--	--

ASI Output 1

Output	Multiplex 1
Bitrate	1.188800 Mbit/s

ASI Output 2

Output	Multiplex 1
Bitrate	1.188800 Mbit/s

Figure 21: System Information – Encoder State (Output type: Transport stream)

Encoder / Elementary Streams

	Source	Format	Mode	SR	SW	BR	Ancillary	GPIO	FEC	IP	Port	Eth	BR
1	Digital 1	MPEG1 L2	Dual Mono	48000	16	128k	@:10000	✔	--	--	--	--	--
2	Tone	AAC-LC	Dual Mono	48000	16	128k	--	✔	--	--	--	--	--
3	Digital 3	AAC-LC	Dual Mono	48000	16	128k	--	✔	--	--	--	--	--
4	Digital 4	AAC-LC	Dual Mono	48000	16	128k	--	✔	--	--	--	--	--

Figure 22: System Information – Encoder State (Output type: Elementary stream)

2. The following Abbreviations are used for the configured coder parameters:

   – SR – Sampling Rate
   – SW – Sampling Width
   – BR – Bit Rate
   – FEC – Forward Error Correction

3. In the "Stream Destinations" block you can view the current settings of the output streams. The following Abbreviations are used for the configured coder parameters:

   – Eth – activated Ethernet output Data 1/2
   – BR – Bit Rate

4. The current level of the inputs is displayed on the display of the unit and in the web interface under **Information→Overview** in the field "Audio Levels" (see Figure 23).
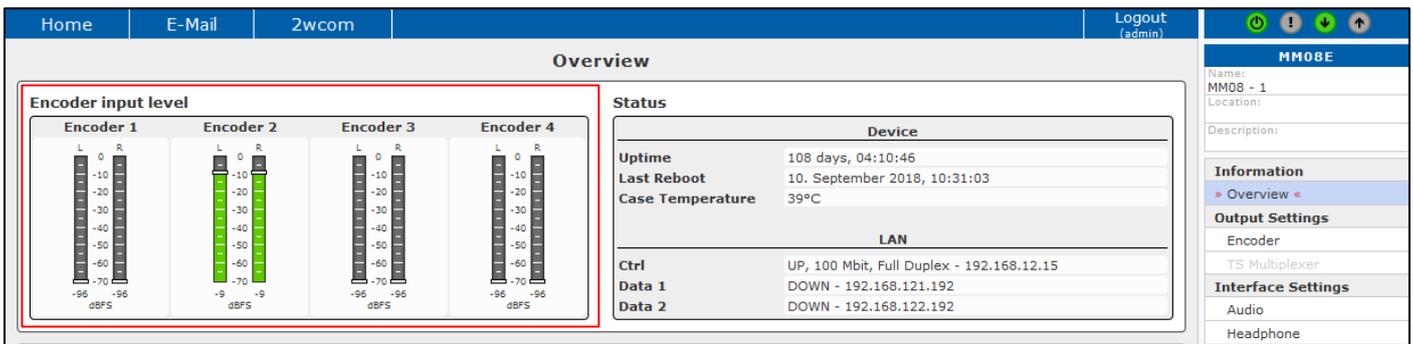
Figure 23: Overview – Audio level
Green color – The level is under the recommended maximum of -9dB
Red color – The level is above the recommended maximum of -9dB

5. Under **Status→UDP Ancillary Data** you can view the status of the encoder for the UDP Ancillary Data:
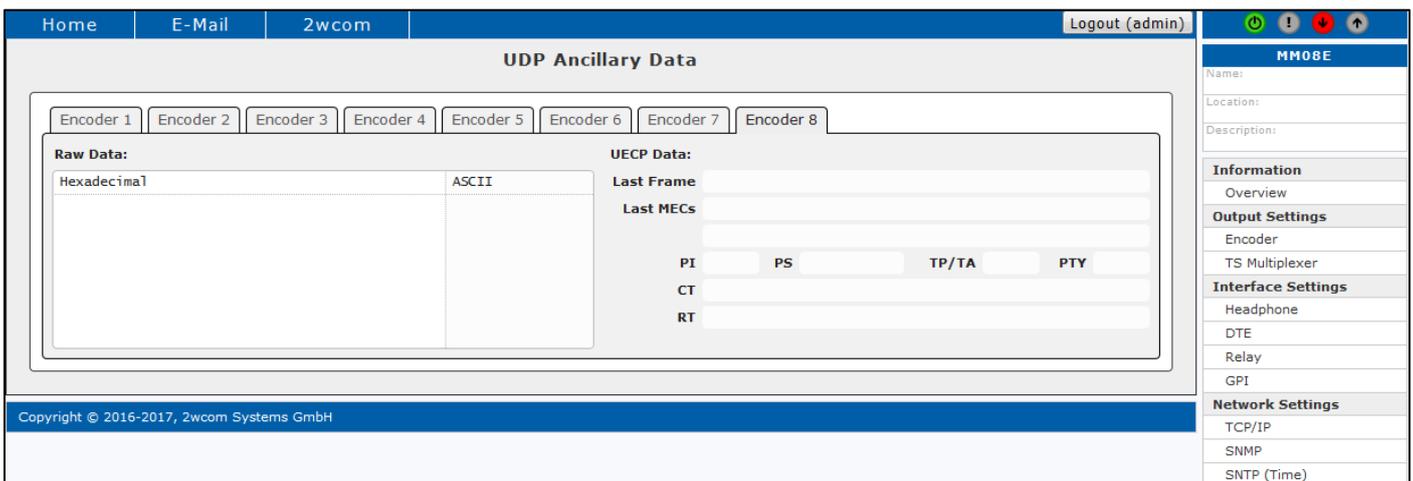
Figure 24: Status - UDP Ancillary Data

6. Under **Status→SIRC Data** you can view the status of SIRC Data Input (2wcom Satellite In-Band Remote Control), if available.
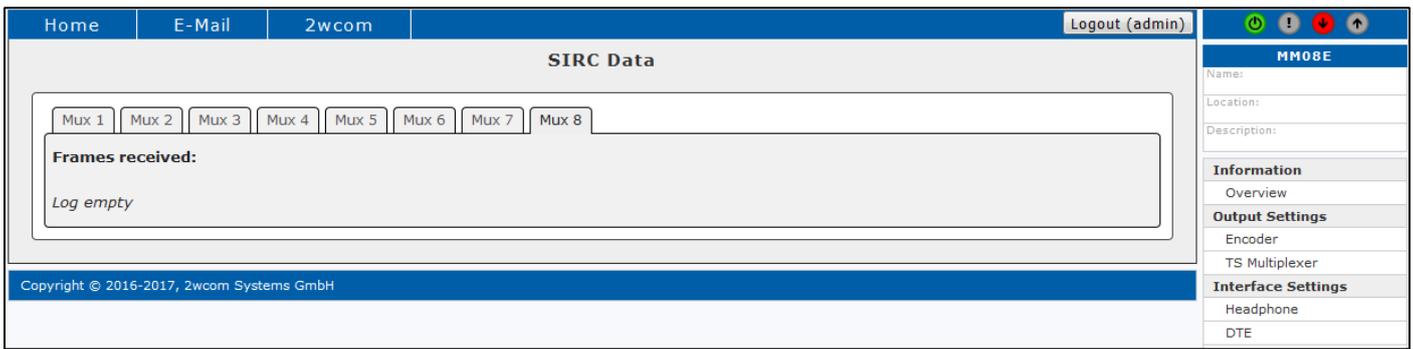
Figure 25: Status – SIRC Data

7. Under **Status➔Log** you can call up information about the encoder status, device operation, data distribution and errors since the last event log deleting. A list with a description of the events with the timestamps is displayed in this menu (see section 14.5 "View the log" on page 52, Figure 40).

> **NOTE:** Configure alarm monitoring under **System Settings➔Alarm** (see section 11.6). If the alarm monitoring for any parameter is deactivated, no information about the corresponding error will be shown in the log.
>
> To reverse the GPOs and see the status of the switched GPO in case of a triggered alarm, open the menu **Interface Settings➔GPO** and see section 0.

12. Interface Settings

12.1. Headphone

Under **Interface Settings→Headphone** in the web interface of the MM08E you can configure the headphone interface.

You can monitor the incoming audio signal of one of the available inputs over headphone or set it mute (see Figure 26).
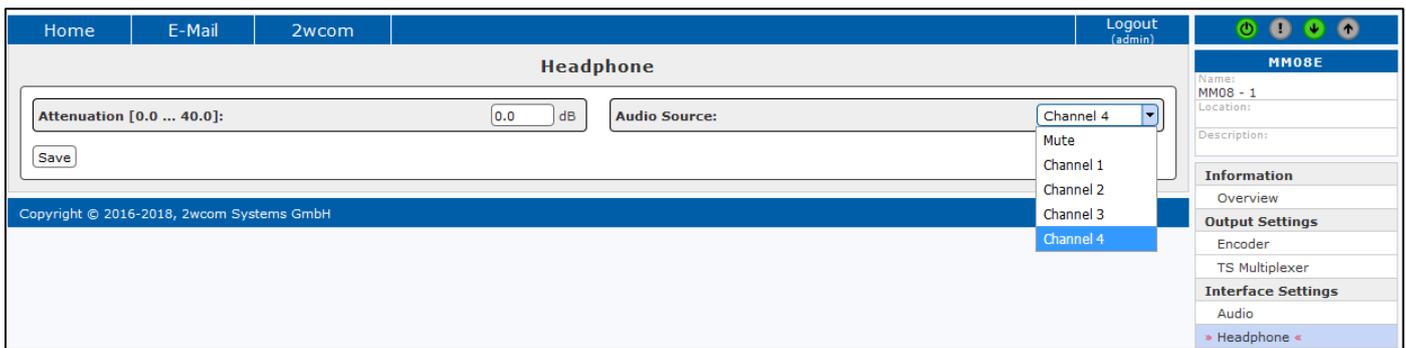
Figure 26: Interface Settings - Headphone

12.2. DTE

The MM08E unit is equipped with a 15 pole male D-Sub connector for data communication.

The pin assignment of the DTE interface is defined in the MM08E as follows:

Pin D-Sub	Function
1	RX0
2	RX1
3	RX2
4	RX3
5	RX4
6	RX5
7	RX6
8	RX7
9-15	GND

Table 2: DTE1-8: Pin configuration

You can configure the serial RS-232 interfaces [DTE 1-8] under **Interface Settings→DTE** (see Figure 27). To connect the serial interfaces, use the serial breakout cable (optional).
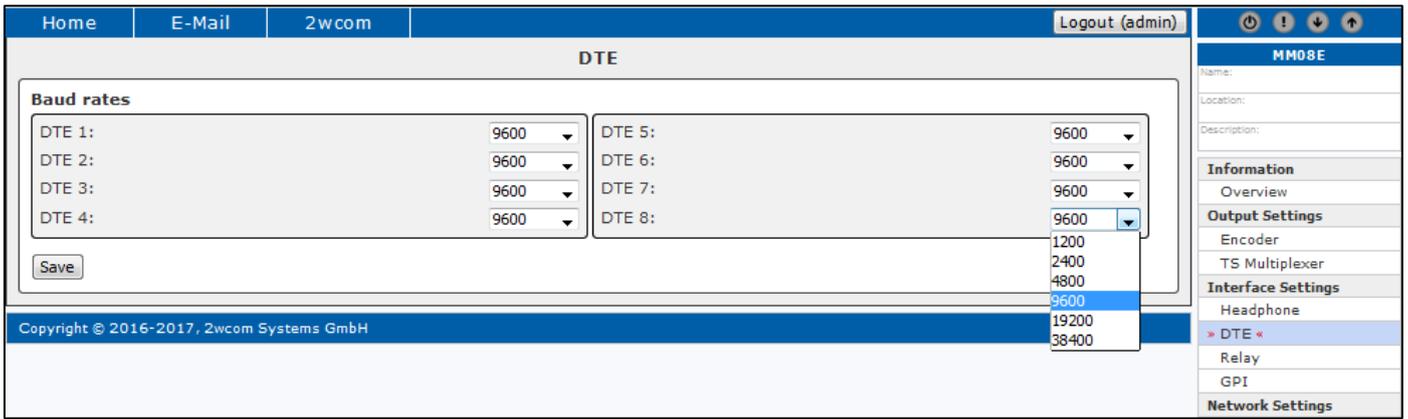
Figure 27: Interface Settings for DTE 1-8 outputs

Configurable settings are the baud rate for DTE 1-8.

Possible baud rates: 1200, 2400, 4800, 9600, 19200, 38400 baud.

⇒ Save the settings by clicking the „Save" button.
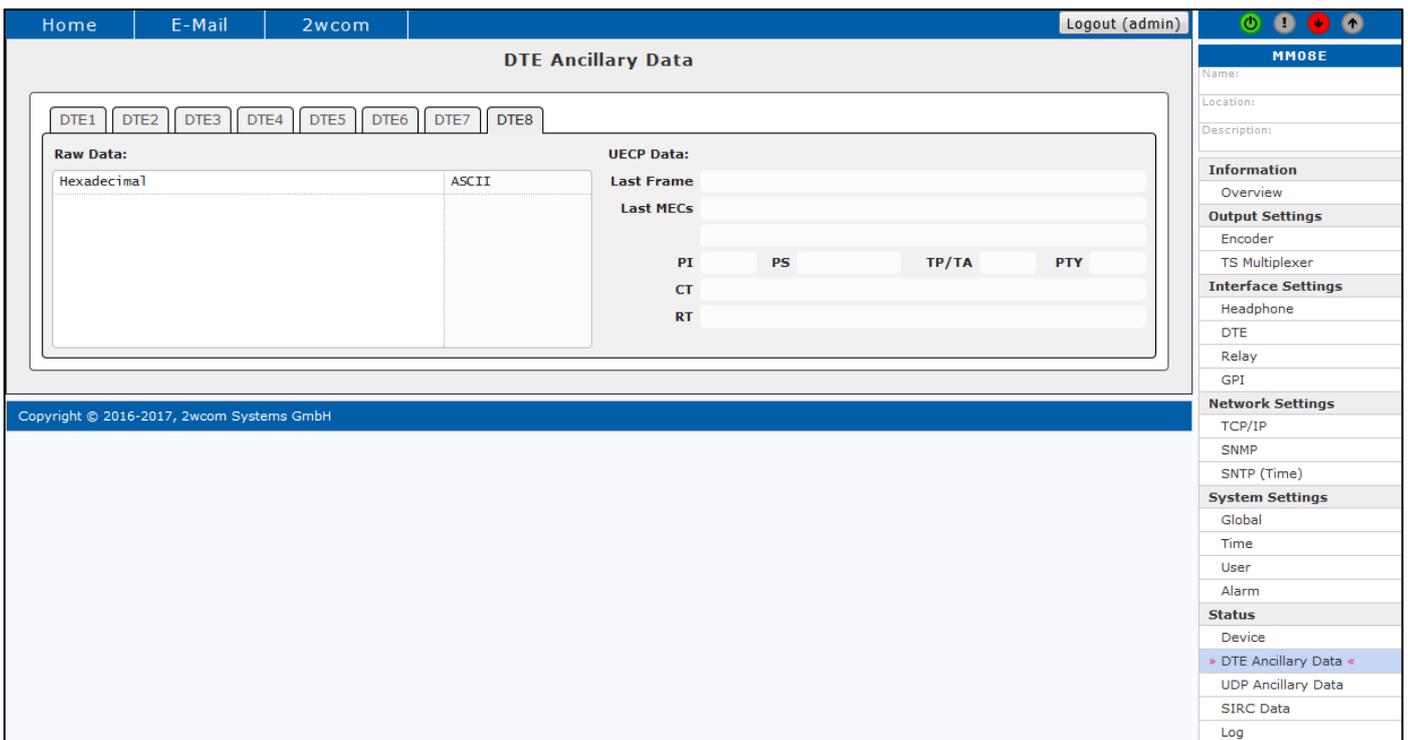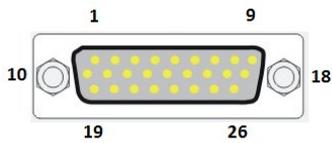⇒ To view the status of the 8 Data Interfaces, open the menu **Status→DTE Data**:

Figure 28: Status of the Data Interfaces

12.3. GPO

The MM08E unit is equipped with a 26 pole D-sub male connector with 4 floating relay contacts. The relays can be used for alerts of the monitoring function.

GPIO

D-Sub male connector, high density, 26 pole

Table 3 displays the scheme of the possible switch contacts:

Relay No.	Switch contacts	Switch type
1	1,10	SPST, NO (Form A)
2	11,19	SPST, NO (Form A)
3	2,20	SPST, NO (Form A)
4		SPDT (Form C)

Table 3: Relay Output – switch contacts
      SPST   a simple on-off switch: single pole, single throw
      SPDT   single pole, double throw
      NO   normally open

NOTICE	
	The relay contacts have maximum rating of 0.5 A at 30 V DC.

You can set up the alarm parameters and assign the GPOs to different ways of alarm trigger under **System Settings→Alarm** in the web interface of the device. For more information about alarm settings see section 11.6 "Set up monitoring and alarm control" on page 36.

You can view the current state of the relays and invert the relay contacts under **Interface Settings→GPO** (see Figure 29).
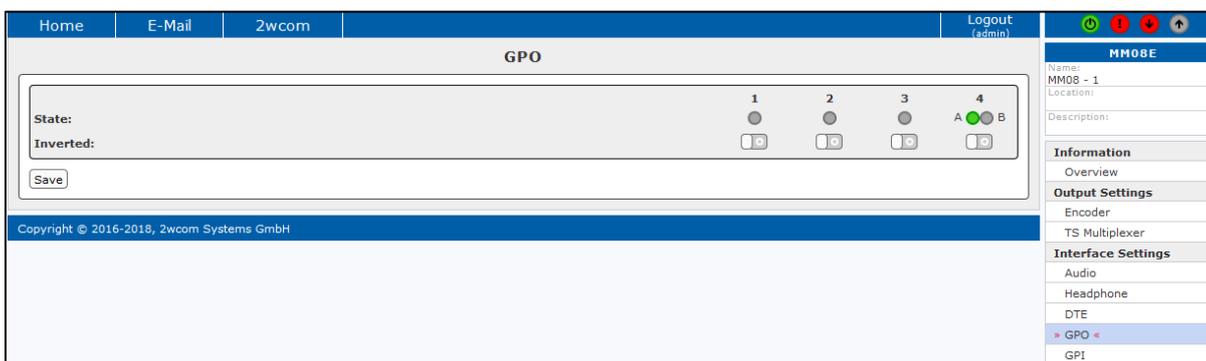
Figure 29: Interface Settings – GPO status

       🟢 ***- ON***
       ⚫ ***- OFF***

Relays 1-3 are normal switchers, whereas relay 4 is a changeover relay (position A/B). The state of a relay is ON if the alarm, which is assigned to this relay, is triggered.

12.4. GPI

The MM08E is equipped with 16 GPIO inputs.
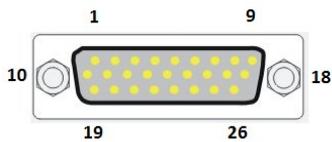
D-Sub male connector, high
density, 26 pole

GPIO

Table 4 displays the scheme of the pin assignment in the GPI contacts:

GPI No.	Control Pin No.
1	13
2	22
3	4
4	14
5	23
6	5
7	15
8	24
9	6
10	16
11	25
12	7
13	17
14	26
15	8
16	18

Table 4: GPI – Pin assignment

To actuate a GPI, pull the corresponding control pin electrically to ground (pin 9). The control current is less than 5 mA.

NOTICE	
	Voltage on inputs must not be negative or exceeding +0.7 V!

You can view the current state of the inputs under **Interface Settings→GPI** (see Figure 32).

12.4.1. GPIO Tunneling

If you enable "GPIO tunneling" mode in the menu "Edit Encoder"-"Ancillary Data" (see step 13. in section 11.2 "Configure programs for encoder" on page 32), an actuation of a GPI activates a corresponding GPO in the destination device for example for relay switch (GPI1→GPO1, GPI2→GP02,… as shown in Figure 30).
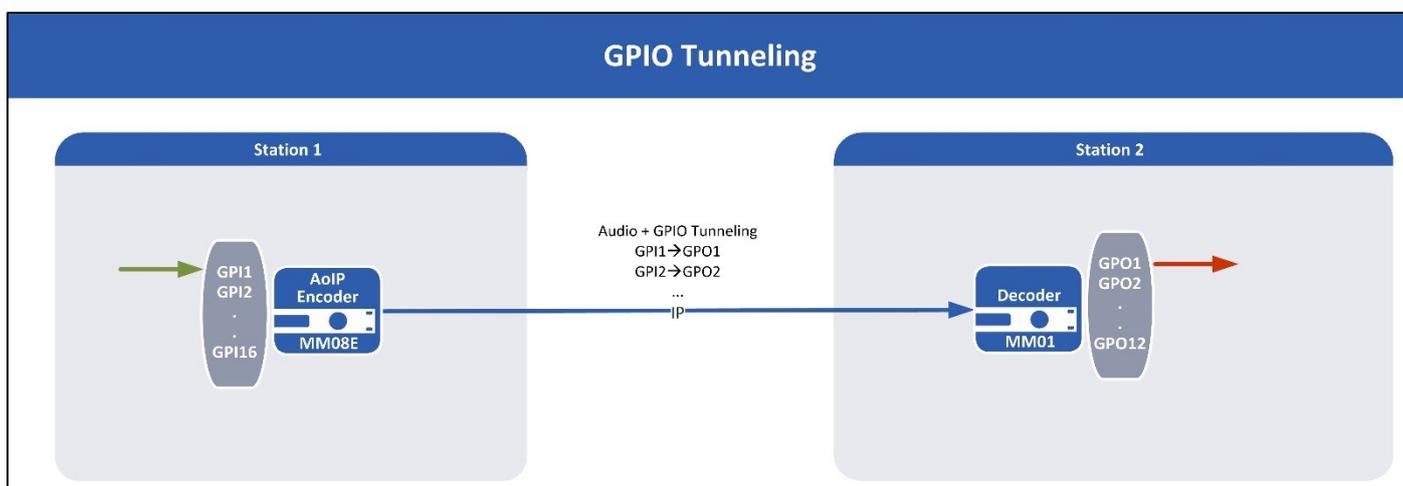
Figure 30: GPIO Tunneling

12.4.2. Alarm over GPO

Under **System Settings→Alarm** you can configure monitoring and alarm functions of some operation processes and use an available GPO for alarm signaling (see section 11.6 "Set up monitoring and alarm control" on page 36).

An example in Figure 31 shows a case of failure, when a triggered alarm activates a configured GPO (in the example GPO4).
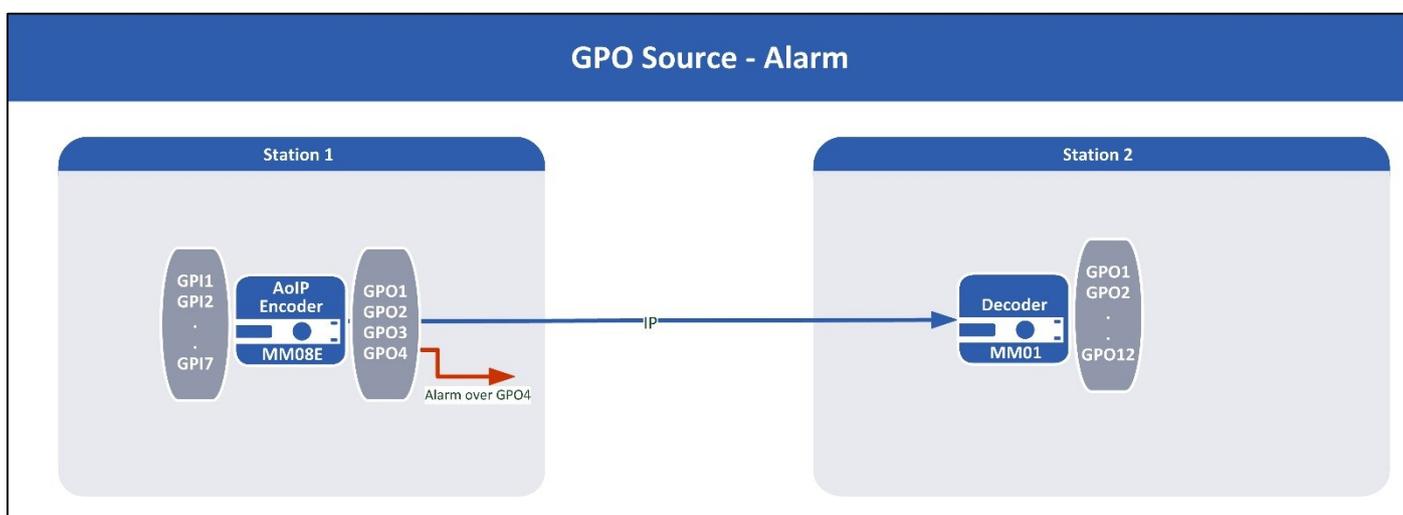

Figure 31: Alarm trigger over GPO

12.4.3. GPO Switch over Livewire

A GPO of the encoder can be switched over Livewire. In this case, the GPI stays unactuated and cannot forward the GPO switching information to the destination device (decoder, e.g. MM01). To solve this problem and to enable a GPIO Forwarding, change the source of switching information for the GPI to a GPO under **Interface Settings→GPI** (see Figure 32). However, the MM08E device is equipped with 16 GPIs and only 4 physical GPOs (1-4). That is why, 12 additional virtual

GPOs (5-16) are available in the source configuration of the GPI. The configured GPI will then switch the corresponding GPO in the destination device via GPIO tunneling or Livewire.
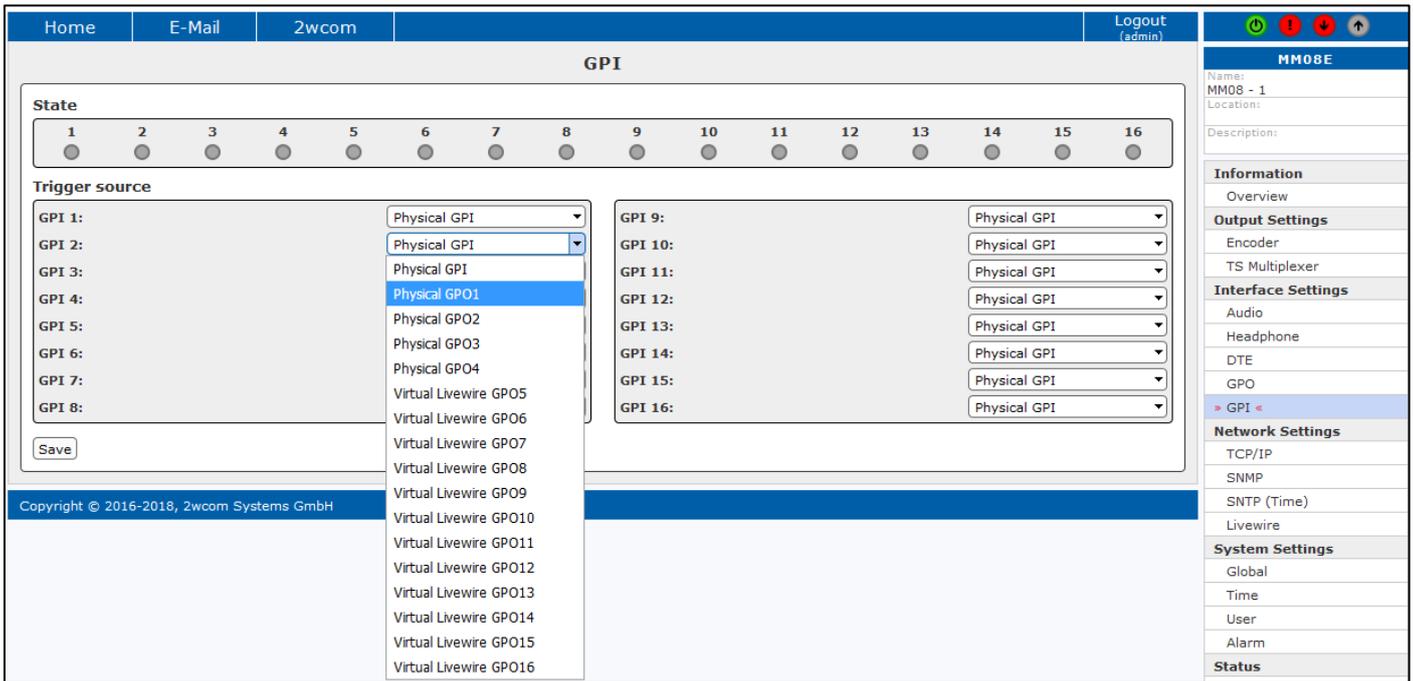

Figure 32: Interface Settings – GPI

🟢 - ON
⚪ - OFF

An example in Figure 33 shows a case, when GPO1 is switched by Livewire input and is rooted to the GPI2 for the further GPIO tunneling. This configuration is done in Figure 32: GPO1 is set as a source for GPI2.
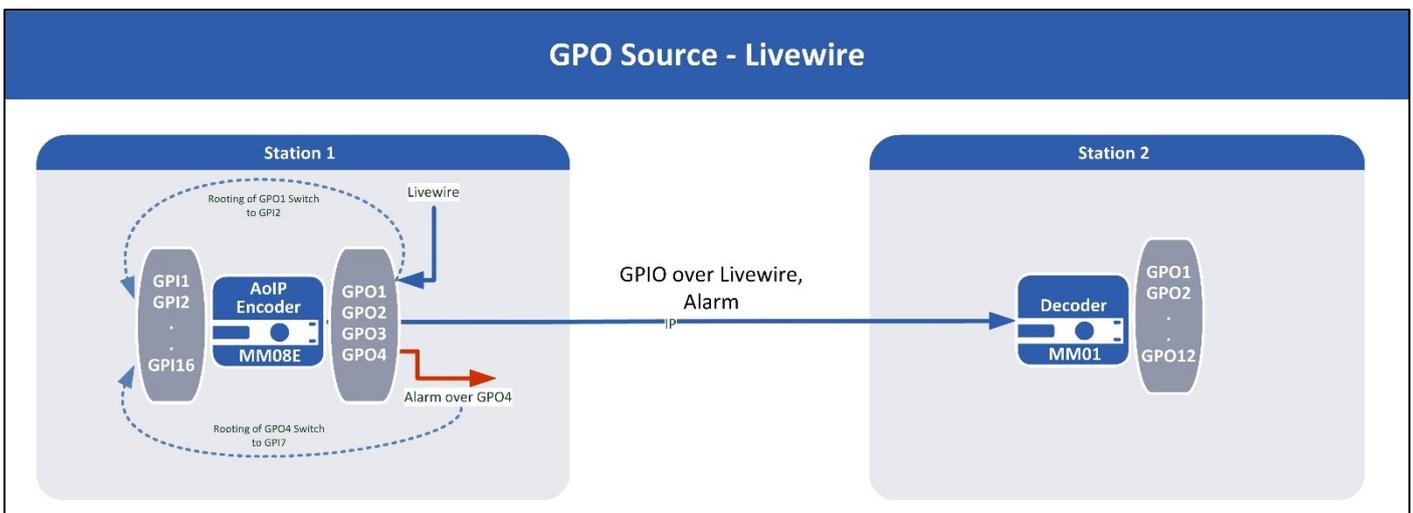

Figure 33: External GPO Switch – over Livewire

To activate a GPO for Livewire, enable the "GPIO" mode in the Livewire configuration menu under **Network Settings→Livewire** (see section 10.4 "Set up Livewire configuration" on page 26).

13. Buffer Delay Management

When using the MM08E there are different stages where delay is introduced by processing or for security (i.e. FEC or dejitter buffer). For uninhibited operation, the user needs to make sure, that delay settings are in a safe area.

13.1. Basic delay setup

Delay is calculated in the following matter for a basic setup:

Encoder processing delay + transmission delay on IP network + decoder processing delay

Encoder delay typically is <5ms, transmission delay on IP network can vary by a large degree, depending on the network employed. Decoder processing delay needs to be broken down into multiple stages:

Dejitter/ Reorder or FEC output delay + additional delay + decoder processing delay

When no FEC is used a Dejitter / Reorder buffer can be used which will add delay in the length it is setup to. When FEC is used, there is a minimum delay that is required for safe operation (in the length of two full FEC matrices), anything on top of that is used for additional dejittering reordering of the input stream, as the FEC also includes this task as well. If the user setting is too small, it is overwritten internally, to ensure safe operation. The current active setting can always be seen in **Status→IP**. The user can use the additional delay setting to further delay the output up to 1000ms and the decoder will also have a small delay of <5ms.

FEC / Samplerate	132kHz	144kHz	176kHz	192kHz
4/2 CR	44ms	40ms	33ms	30ms
5/5 CR	136ms	125ms	102ms	94ms
10/4 CR	218ms	200ms	164ms	150ms
5/20 CR	545ms	500ms	409ms	375ms
20/5 CR	545ms	500ms	409ms	375ms
Expert mode	L*D*5,45 ms	L*D*5 ms	L*D*4,09 ms	L*D*3,75 ms

Table 5: Minimum FEC delays sizes

## 13.2. Delay configuration for SFN Operation

When the MM08E is used in SFN mode, the user needs to take extra precautions to ensure safe operation. It is recommended to have at least 100ms spare time after dejitter / reorder or FEC output delay. So a user must carefully select settings that ensure this:

SFN global delay – encoder processing delay – transmission delay on IP network – Dejitter / Reorder or FEC output delay >= 100ms

Three examples, demonstrating safe, unsafe and incorrect setups for SFN operation:
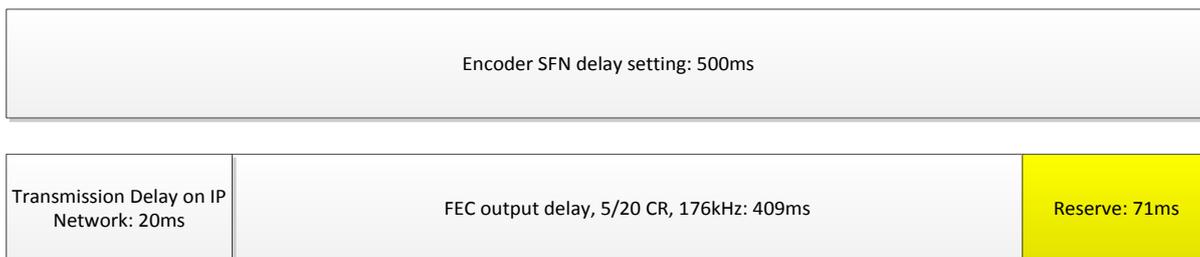
Example 1

This is a safe example setup with lots of spare time for SFN operation. The global SFN delay is set to 750ms, the network consume about 50ms and the decoder stores 250ms of IP data to dejitter / reorder purposes, which will leave 450ms that the decoder can buffer, before data needs to be put out.
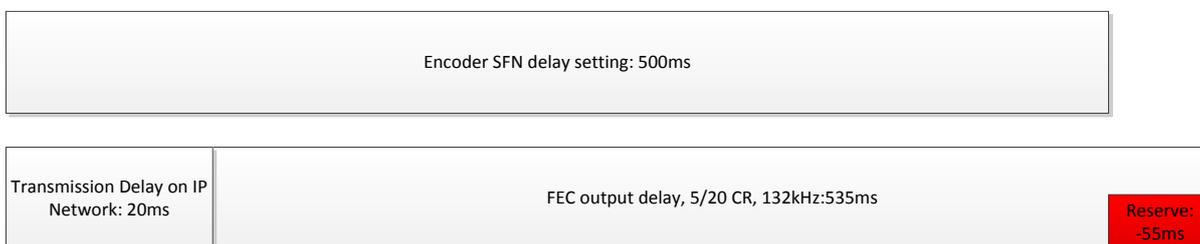
Encoder SFN delay setting: 750ms

Transmission Delay on IP Network: 50ms	Decoder Dejitter / Reorder delay: 250ms	Reserve: 450ms
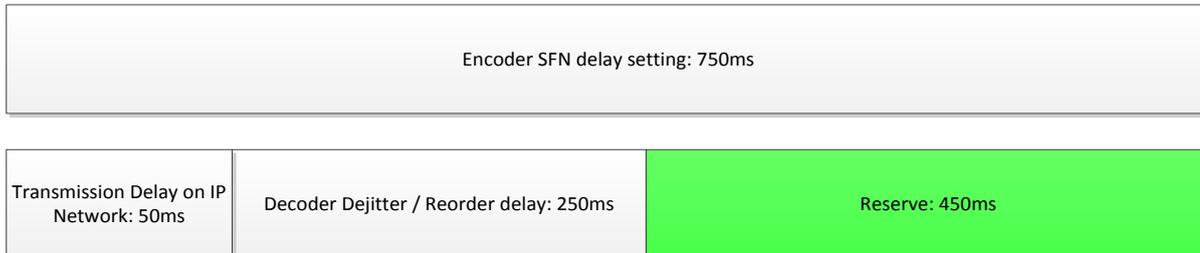
Example 2

This example shows settings that will still work in almost all cases, but are more prone to problems introduced by the IP network (rerouting, congestion, etc.) which might add unwanted additional delay for a short period of time, that might lead to decoder buffer depletion and service interruption.

Encoder SFN delay setting: 500ms

Transmission Delay on IP Network: 20ms	FEC output delay, 5/20 CR, 176kHz: 409ms	Reserve: 71ms

Example 3

This example shows, how incorrect delay settings can break SFN operation and move the playout accidentally into the next PPS cycle.

Encoder SFN delay setting: 500ms

Transmission Delay on IP Network: 20ms	FEC output delay, 5/20 CR, 132kHz:535ms	Reserve: -55ms

14. Device Settings

14.1. Enter the device information

To enter the name and description of the device for identification:

1. Open the window *Global* under **System Settings→Global**.

2. Enter the identification information of the device in the **System parameter** field (see Figure 34).
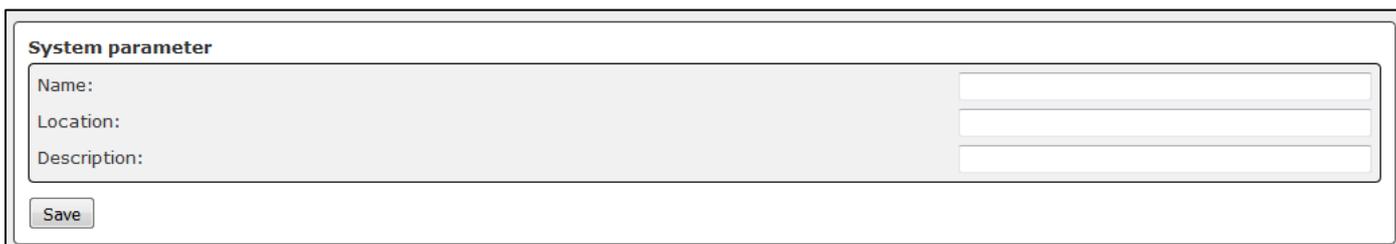
Figure 34: Global System Settings – System parameter

3. Click the „Save" button to save the changes or the „Reset" button to restore the last settings.

⇒ The saved information is always displayed in the web interface above the main menu.

14.2. View the system information

On the web interface, you can view general settings of the device and current system information like uptime, serial number, firmware version, the temperature etc.

To view the system information:

1. Open the window *Global* under **System Settings→Global** (see Figure 38 on page 51).

2. The device information is displayed in the "System information" field (see Figure 35).

Figure 35: Global System Settings – System information

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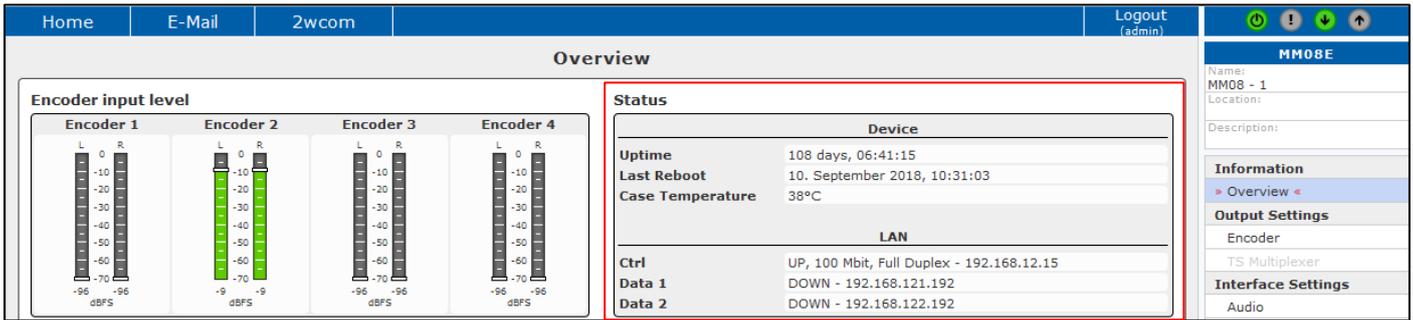3. To view the status of the device, open the field **Status** under **Information→Overview**.

Figure 36: Information – status of the device

4. To view the current status of the device and the status of both power supply units, open the window *Device Status* under **Status→Device**:
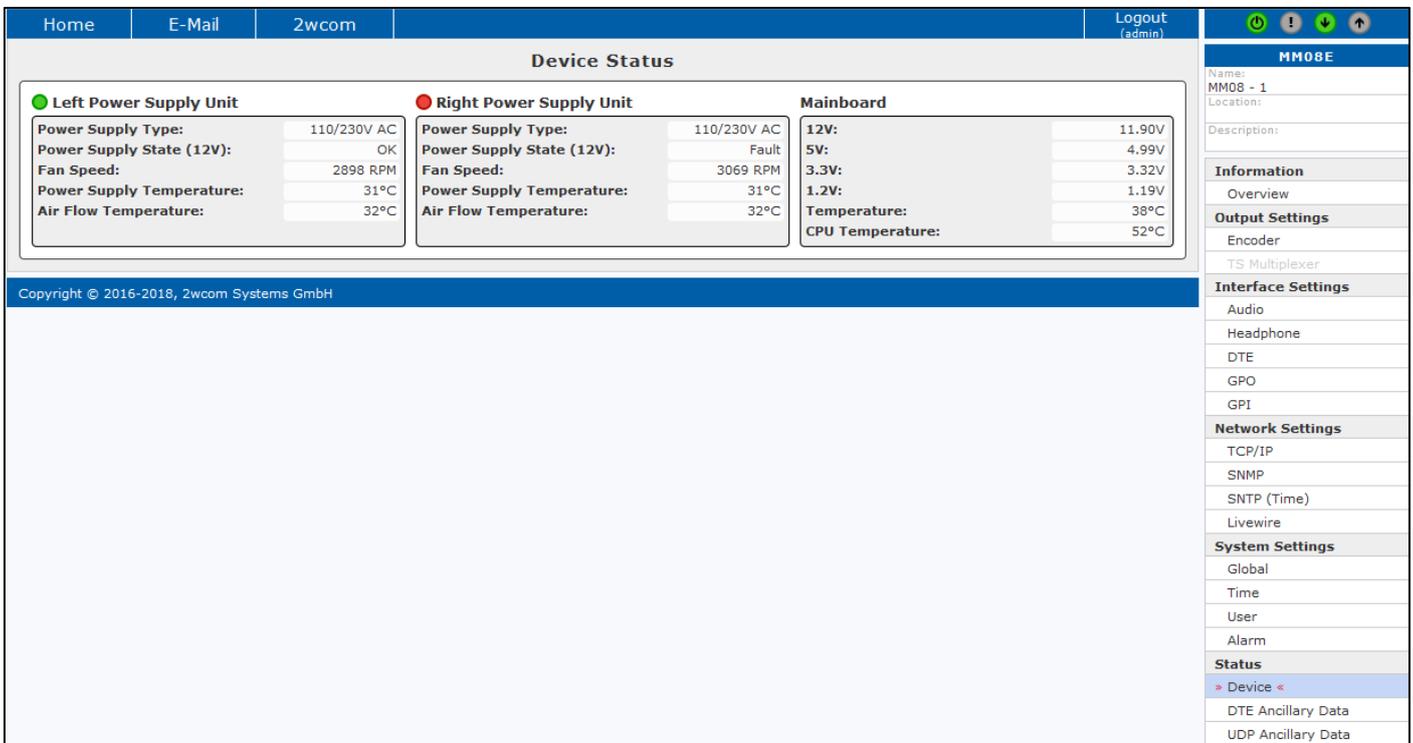

Figure 37: Status – Current electric potential of the device and power supply status

14.3. Set up rights

Some functions are optional such as 4 or 8 Channels, E-aptX, AAC and other. To use these functions, additional rights must be set.

To upload and activate a rights file stored locally:

1. Open the window *Global* under **System Settings→Global**.
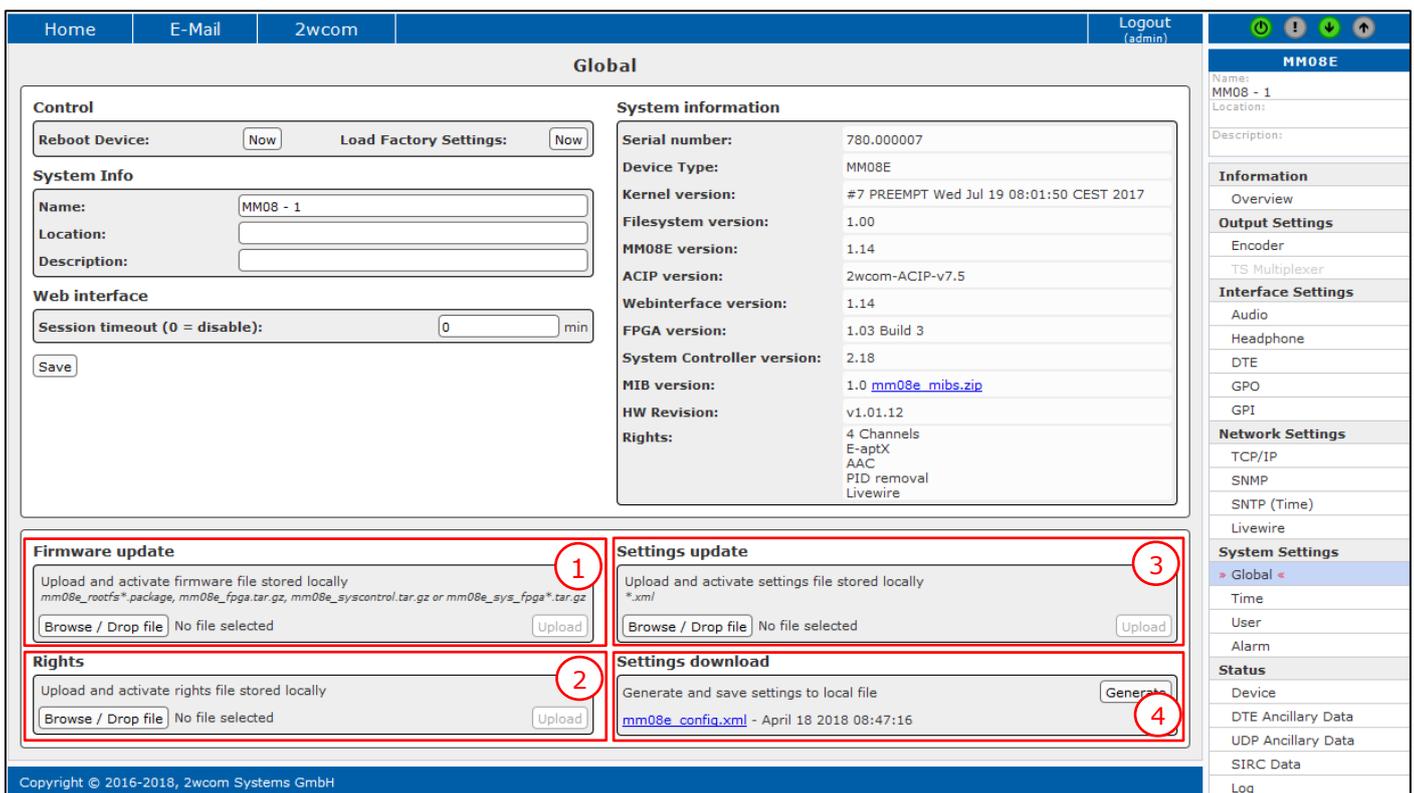
Figure 38: System Settings - Global

2. Click the Browse button in the **Rights** field (see #2 in Figure 38 on page 51).
   The "Open file" dialog of your system software will be displayed.

3. Choose the rights file in your browser.

4. Click the "Upload" button to upload and to activate rights file. The file upload can take longer and may not be interrupted.

5. Follow the prompt to restart the device after successful upload

⇒ The new rights will be activated after the restart of the device.
⇒ You can view the active rights in the same menu in the "System information" block in the "Rights" field.

14.4. Set up the alarm control of the device

To set up the monitoring and alarm function for the device:

1. Open the configuration field **Device** in the window *Alarm* under **System Settings→Alarm** in the web interface of the MM08E (see Figure 39).

Figure 39: Alarm Settings – Monitoring of the device

The LED color means:

⬤ - Monitoring is activated, no alarm is released
⬤ - Monitoring is deactivated
⬤ - Monitoring is activated, alarm is released

2. For the further settings follow the same instructions as described in section 11.6 „Set up monitoring and alarm control" on page 36.

14.5. View the log

The unit records the important system events such as cold start, warm start, firmware update, error messages etc. in a "Log".

To view and to edit the log:

1. Open the window *Log* under **Status→Log** in the end of the menu (see Figure 40).

Figure 40: Status – Log

2. For more information about the priority of the messages see Table 1.

3. To save the list of messages as log file, click the „Download" button and choose the archive location on the directory tree and confirm the choice.

4. To clear the log, click the „Clear" button and confirm the choice.

14.6. Upload and activate settings stored locally

MM08E is able to store and load all settings through the web interface to any local storage.

To upload settings stored locally:

1. Open the window *Global* under **System Settings→Global**.

2. Click the Browse button in the **Settings update** field (see **#**3 in Figure 38 on page 51). The "Open file" dialog of your system software will be displayed.

3. Choose the settings file in your browser.

4. Click the „Upload" button to upload the file. The file upload can take longer and may not be interrupted.

5. Follow the prompt to restart the device after successful upload.

⇒ The new settings will be activated after the restart of the device.

14.7.   Save settings to local file

You can download the current settings and save them as a file.

To save settings to local file:

1.   Open the window *Global* under **System Settings→Global**.

2.   Click the „Generate" button in the **Settings download** field to start the generation of a settings file (see **#**4 in Figure 38 on page 51).

3.   A link to that file will be shown. Right-click on it to save it to a location of your choice.

   ⇒   The saved settings can be uploaded in the "Settings update" field (see section 14.3).

14.8.   Upload and activate firmware stored locally

You can upload an ARM firmware stored locally or directly from an USB.

To upload and to activate the new firmware:

1.   Open the window *Global* under **System Settings→Global**.

2.   Click the Browse button in the **Firmware update** field (see **#**1 in Figure 38 on page 51). The "Open file" dialog of your system software will be displayed.
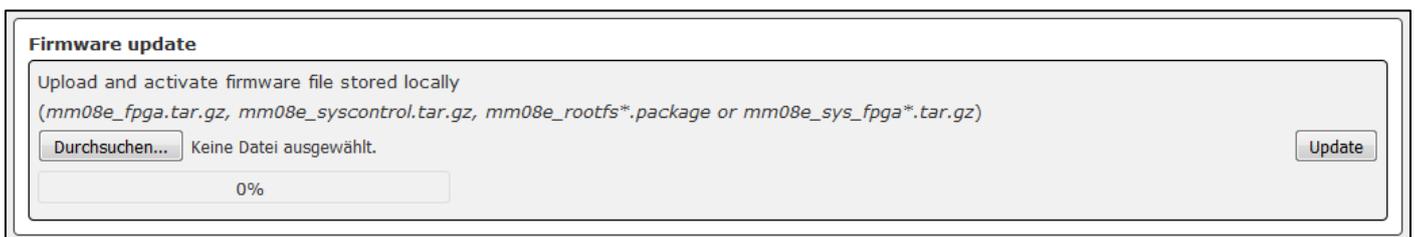
Figure 41: Global System Settings – Firmware update

3.   Choose the firmware file.

4.   Click the „Update" button, to start the file upload in the web browser. The file upload can take longer and may not be interrupted.

5.   Follow the prompt to restart the device after successful upload.

   ⇒   The new firmware will be activated after the restart of the device.

14.9.   Set up time

You can set up or change manually the present local time zone and date of the internal clock of the device.

To set up the internal clock of the device:

1. Open the window *Time* under **System Settings→Time** (see Figure 42).
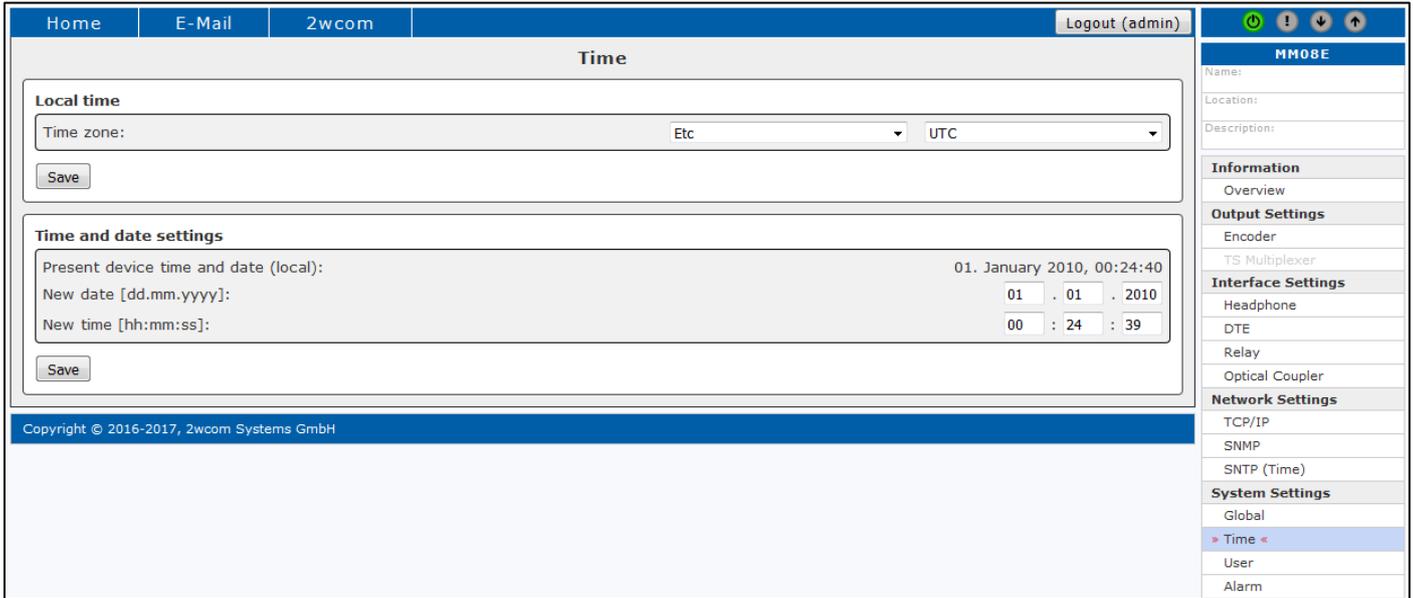
Figure 42: System Settings – Time

2. Choose the current time zone of the device in the **Time zone** field in the dropdown menu.

3. Click the „Save" button to save the changes or the „Reset" button to restore the last settings.

4. In the **Time and date settings** field, set up the internal time in the 24h format and the datum.

5. Click the „Save" button to save the changes or the "Reset" button to restore the last settings.

14.10. Configure user accounts

The default accounts are a read-only access (Guest account), a full access without a permission to manage the user accounts (Manager account) and a full access (Admin account). Change the login data for the access after the first login to the web interface. To change the login data:

1. Open the window **User settings** under **System Settings→User**.

2. Change the login data for the full access in the **Admin account** field and repeat the new password.

3. Click the „Save" button to save the changes or the „Reset" button to restore the last settings.

4. Change the login data in the **Manager account** and **Guest account** field and repeat the new passwords.

5. Click the „Save" button to save the changes or the „Reset" button to restore the last settings.

> **NOTE:** Consider the sensitive case while entering a new password!

14.11. Set up the session timeout

To set up the session timeout for the web interface of the device:

1. Open the window *Global* under **System Settings→Global**.

2. Enter the value in min for the session timeout in the **Web interface** field:

Figure 43: Session timeout for the web interface

3. Enter "zero" to deactivate the function.

4. Click the „Save" button to save the changes.

    ⇒ The current user will be automatically logged out after the configured period of inactivity (session timeout).

14.12. Reboot the device

To reboot the device:

1. Open the window *Global* under **System Settings→Global** (see Figure 38 on page 51).

2. Click the „Reboot" button in the last field of the web page to reboot the device (see Figure 44).

Figure 44: Global System Settings – Reboot the device

    ⇒ The device restarts.

14.13. Restore factory settings

NOTICE	
	CAUTION: If you restore factory settings, all saved configurations made earlier by user will be deleted except for the IP address! This applies also for the access accounts!

To reset the device to the factory settings:

1. Open the window *Global* under **System Settings→Global** (see Figure 38 on page 51).

2. In the "Control" block click „Now" in the **Load Factory Settings** field to restore factory settings.

15. Maintenance and servicing

Maintenance

No special maintenance is necessary on the device. Dust can be removed with a dry duster. For cleaning use only neutral, non-corrosive detergents applied to a cloth - not the device.

Servicing

The modules of the device are complex and should be serviced only by authorized personnel.

NOTICE
You can exchange one of the two plug-in power supply units in the MM08E during ongoing operation if one power supply unit fails. The current information about the operation of the both power supply units you can view over the web interface of the device under **System Settings→Global** (see Figure 37 on page 50).

The MM08E is equipped with a left and right plug-in power supply unit that are independent from each other. You can exchange one of them in the MM08E **during ongoing operation** if one power supply unit fails. To unplug the defect power supply unit, just pull out carefully the plug housing. Exchange the defect power supply unit by an intact power supply unit.

The 2wcom Systems GmbH is equipped with special measurement and repair kits. Therefore a repair by the user is not intended.

Calibration

Due to the design and construction of the device, no calibration is necessary.

16. Troubleshooting

The following chart is designed to help you to correct minor problems with the use of the device prior to contact our service department (report failures by email to *contact@2wcom.com* or fax to +49 461-662830-11).

Read also the entire manual carefully, as this often helps in understanding and fixing typical problems.

Problem	Possible Cause	Solution
Device does not turn on	• Power cable is improperly connected • Mains supply failure • Blown fuse	• Check supply cord • Make sure that the power plug at the device is fully inserted • Check mains supply • Replace fuse by same type • Replace one of the plug-in power supply units (see section 16)
Device cannot be operated via Ethernet	• Network cable not connected • IP address / TCP port is not known. • A device with the same IP address was connected a few minutes before. Then the ARP table still assigns the old MAC address to the IP address.	• Connect the network cable. • Use the default address 192.168.14.250. If the address was changed and is not known please see page 32. • Usually the ARP table is refreshed automatically after a few minutes by the operation system. For an instant access to the device please reset the ARP table of your computer e.g. by entering "arp –d" in the Windows Command Prompt.

For a support request to 2wcom team, please write the serial number of the device. The sticker with the serial number is normally on the rear side of the device: „S/N xxx.xxxxxx".

Rear view MM08E - DVB Audio IP Encoder

MM08E - DVB Audio IP Encoder – Technical Details

Audio encoder

Codecs

Standard	MPEG 1/2 Layer 2, 3
	MPEG 2/4 AAC LC/LD, HEv1&v2
	Linear PCM
Optional:	E-aptX
	ask for other codecs
Sample Rates	32 kHz, 44.1 kHz, 48 kHz

Interfaces

Audio

Digital (in)	8x Stereo AES/EBU, 110 Ω
	balanced integrated XLR
Analogue (in)	4x Stereo L/R, <20 Ω
	balanced integrated XLR
Livewire	4x AES67 via RTP/UDP
Headphone (out)	L/R, <10 Ω, 6.3 mm
Gain	-32...+6 dB
Dynamic range	16 Bit, >89 dB
	24 Bit >130 dB
Frequency response	0.1 dB; 20 Hz .. 20 kHz
Total harmonic distortion (THD)	Digital: < 0.00002 %
	Analogue: < 0.002 %
Signal to noise ratio - SNR	Digital: > 120 dB
(CCIR weighted, QPEAK)	Analogue: > 83 dB

Ethernet

Data	Audio, serial data and GPIO transmission, Controlling and Setup functions
Connector	3x RJ45 (2x data, 1x ctrl)
Type	Auto Switching
	10/100/1000 BASE-T
Protocol	RTP/RTCP/UDP, IGMP, ICMP, DHCP, HTTP, SNMPv2c, NTP, TCP

ASI

Data	MPEG2 TS
Connector	2x BNC 270 Mbps

Serial

Interface	9x RS-232C (1 front, 8 rear) Sub D-15
Data	Private data, MPEG ancillary data, UECP/RDS (acc. to TR 101 154)e
Transmission rate	1200 to 115200 baud, asynchronous
USB	1x USB 2.0 Interface for service, configuration and firmware

Time Synchronization (on request)

1PPS, 10 MHz	SMA connector

Contact closure

Inputs	16x
	26 pole sub-D male
Outputs	3+1 floating relays
	3 Relays SPST (Form A)
	1 Relay SPDT (Form C)
	(for DC: max. 30 V, 0.5 A)
	26 pole sub-D male

Control & monitor

User interface	Integrated WebGUI, LCDisplay
Protocols	HTTP, SNMPv2c, UDP, RTCP, FTP, ICMP, IGMP, NTP
USB	USB 2.0 Interface for service, configuration and firmware updates

Front panel

LCDisplay	Graphical, 264x64 pixel
Jog wheel	Impulse, Enter button
4 Duo LEDs	Power, Input, Output, Warning
RS-232C (Front)	1x serial interface for setup data and setup function

General data

Power consumption	40 VA
Case dimensions	19", 1 HU, depth: 310 mm, width: 424 mm, front panel: 484 mm
Weight	<5 kg
Housing	steel plate (aluminum-zinc coated)
Operating temp. range	0...+45°C
Storage temp. range	-40...+70°C

Power supply

230 VAC (standard)	1x internal, 90...260 VAC, 47...63 Hz
48 VDC (alternative)	1x internal 40...60 VDC
	Neutrik powerCON

Power supply options

red. 230 VAC (hot swapping)	1x internal, 90...260 VAC, 47...63 Hz aut. switchover
red. 48 VDC (hot swapping)	1x internal 40...60 VDC
	Neutrik powerCON, aut. switchover
Languages	English

Version 07.12.2017
These data are subject to modifications and amendments.
Errors excepted

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