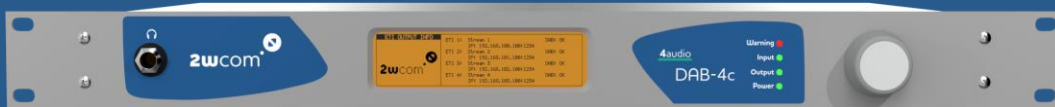


DAB-4c

User Manual



*Multi-format EDI/ETI and ETI/EDI converter
for up to 4 channels*

DAB-4c User Manual V2.2

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1 About this manual

You can download the latest version of this user manual here:

https://download.2wcom.com/products/DAB4c_NSJD/



1.1 References and hyperlinks in this PDF file

If you are reading this manual as a non-print version, please note that this PDF file contains bookmarks. You can navigate through the document via the content overview in your PDF viewing software if you enable bookmarks view.

All references to pages, sections, figures, and tables in the text identify a location within this PDF file. Click on the reference to jump to the referred passage in the text.

1.2 Tags and their meanings

The following signal words and signs warn you about risks and dangers:

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.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Describes precautions necessary to protect the equipment.
	Contains useful information for the user.



Warning of general danger situation



Warning of electric shock



Warning of hot surface



Warning of fire hazard

2 For your safety

The device conforms to the relevant European directives and is safely constructed. Nevertheless, some residual dangers remain. 2wcom Systems GmbH accepts no liability for any damage caused by non-observance of the safety instructions.

- Read through this user manual carefully before using the device. If you pass on the device, be sure to also include this user manual.
- Any improper use of the device and all actions on the device not described in this user manual are considered as misuse outside the statutory limits for liability of the manufacturer.
- Only operate the device if it is in a technically perfect condition. If the device or a part of it is defective, take the device out of operation. Do not repair the device yourself. In case of any damages, send the device to 2wcom immediately for inspection or dispose of it properly according to the regional disposal regulations.
- Keep the device away from unauthorized persons.



Danger from electric current!

- Plug the device into a grounded power socket only. Never remove the grounding wire/contact.
- Do not open the housing of the device by yourself. Do not 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 when your hands are wet.
- Never expose the device to liquids. If any liquid gets inside the housing, immediately disconnect the device completely from the power supply. Do not continue operating the device.



Fire hazard due to overheating or electric current!

- Ensure sufficient heat dissipation during operation. Avoid the following when installing the device:
 - Non-ventilated environment, e.g. a narrow shelf or built-in cabinet
 - Extremely warm or cold place
 - Direct exposure to sunlight
 - Too high or too low temperatures
 - Extremely wet or dusty environment
- Do not cover the ventilation openings of the device to avoid heat accumulation.
- Do not operate the device in the presence of flammable gases.
- Do not place objects with open flames, such as burning candles, on the device.
- Do not place any heavy objects on the supply cord. A damaged cord can lead to fire or electric shock hazards.
- When disconnecting the supply cord, always pull on the plug, never on the cable, to avoid cord damage.



Danger from explosive atmosphere!

- Do not use the device in an explosive environment.

**Warning of hot surface!**

The device may heat up greatly during normal operation despite an active cooling system.

- Do not touch the surfaces of the device during or shortly after operation.

**Risk of equipment damage!**

- Before each use, check the housing, the front panel, the cable and the power plug for visible damage and defects (e.g. scratches, cracks, wear and tear, damaged insulation, improper plug connections or extension cables).
- If the power cord is damaged, immediately disconnect the power plug. Never use the device with a damaged power cord.
- All damaged components must be replaced immediately.
- Only use a grounded three-wire power supply cord and plug that complies with the national regulations.
- Make sure that the power socket is next to the device and readily accessible to the user.
- 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.
- Do not use corrosive detergents on the device such as benzene, thinner, alcohol or acetone. Clean the surface of the device with a soft, dry cloth only.

3 Product overview

3.1 About the DAB-4c

The **DAB-4c** is a high-density and hybrid converter that allows broadcasters to switch over to DAB+. It enables broadcasters to operate DAB in expanded networks including EDI and ETI multiplexers as sources, to operate legacy ETI and EDI transmitters parallelly or to operate DAB in already existing infrastructures that were originally not intended for DAB—e.g. DVB-S/S2 or ASI.

Flexible in application: The device allows to receive data signals from legacy ETI and EDI multiplexers at the same time and to convert the signals to the respective EDI/ETI transmitters in the field. As a high-density solution, the device offers four ETI outputs and four ETI bidirectional interfaces (in/out) to increase the number of ETI outputs if e.g. ETI mirroring is needed. Moreover, it is equipped with two Ethernet data interfaces. For synchronization of all sites, the DAB-4c can use NTP servers, PTPv2 or an external 10 MHz signal. In case of failure, an internal recovery from the EDI stream by jitter removal assures an ongoing synchronized transmission.

High compatibility: An optional ASI interface (in/out) and an optional satellite tuner enable to cost-efficiently operate DAB in already existing distribution systems, or to optimize coverage and distribute programs to regions that are still lacking broadband IP. Moreover, the solution accords to specifications like ETSI EN 300 40, ETSI TS 102 563, EN 300 799 or ETSI TS 102 693 and supports Uni- / Multicast (IGMPv2/v3).

Transmission robustness: The device provides the possibility of seamless switching between two EDI or ETI sources (PFT Dual Streaming).

Smart management: The DAB-4c is fully configurable via web interface or remotely via SNMP trap (get & set). In addition, the device offers real-time statistics and monitoring of main DAB+ parameters. On-air monitoring at transmitter sites is made possible by an optional, integrable DAB tuner.

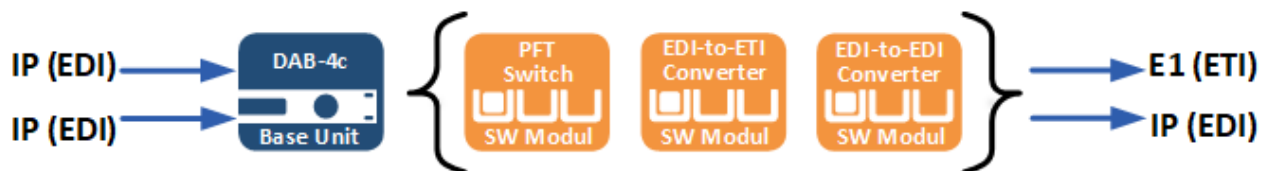
Possible configurations of the basic unit



EDI-to-ETI converter, Base Functionality



EDI-to-ETI converter with EDI PFT Seamless Switching



EDI-to-ETI converter with EDI PFT Seamless Switching and EDI-to-EDI



ETI-to-EDI converter, Base Functionality



TS Multiplexer, Base Functionality



SAT receiver + EDI-to-ETI converter



ETI-to-EDI converter with ETI Redundancy

3.2 Rights options

The following table displays an overview of the rights options that are available for your DAB-4c:

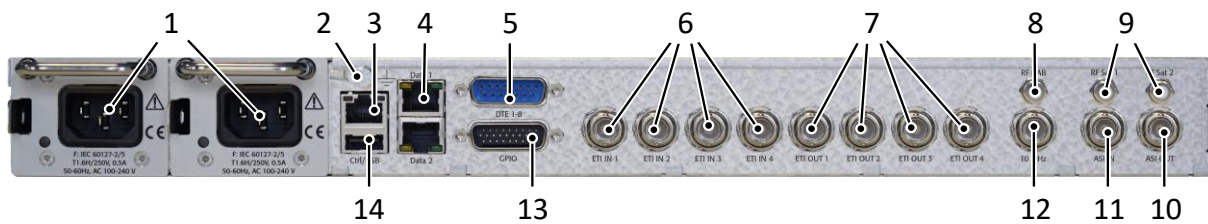
Right	Description
n Edi-to-Eti Converters	Number of EDI-to-ETI converters.
n Eti-to-Edi Converters	Number of ETI-to-EDI converters.
Edi-to-Edi	Option to use EDI outputs for EDI inputs
Edi IP input	Option to receive and decode an EDI input via Ethernet for redundancy purposes, e.g. main or backup.
Edi Pft Seamless Switching	Option to receive 2 IP streams for dual IP input
Additional backup	Option to use an additional backup source in case of failure.
Eti Mirroring	Option to use the ETI input interfaces as additional output interfaces by mirroring another output
Eti Switch	Option to automatically and seamlessly switch between two ETI input streams to one ETI output stream.
Sat Tuner	Right to receive EDI/ETI over SAT
Dab Tuner	Option to use a DAB tuner for monitoring
TS Encoder	Option to use transport stream over IP using UDP/RTP, unicast/multicast for encoders
SRT Encoder	Option to use SRT or RIST for encoders
TS Scientific Atlanta	Option to use the ARG (third party) mode to embed an ETI frame or IP EDI packets in a TS.
TS Data Piping	Option to use the pipe mode to embed data directly into a TS without an additional header.
TS Forwarding	Option to forward an entire TS stream to another device over IP.
SAT GSE	Option to use GSE decapsulation and GSE-IP forwarding.
ASI	Option to use an ASI output for DAB multiplex (MPEG2-TS).

3.3 Front panel



- 1 **Headphone:** 6.3 mm / 1/4" socket for the connection of headphones
- 2 **LCD Screen:** Illuminated LCD screen, graphical, 264x64 pixels
- 3 **[Warning] LED:** LED indicator; will be red if alarm is triggered
- 4 **[Input] LED:** LED indicator; will correspond to the sum of the alarm status for the inputs:
 - off if no input alarms are enabled
 - green if input alarms are enabled and all inputs are OK
 - yellow if one or more inputs are bad but at least one is good
 - red if all inputs are bad
- 5 **[Output] LED:** LED indicator; will correspond to the sum of the alarm status for the outputs.
 - off if no output alarms are enabled
 - green if output alarms output alarms are enabled and all outputs are OK
 - yellow if one or more outputs are bad, but at least one is good
 - red if all outputs are bad
- 6 **[Power] LED:** LED indicator:
 - green if all power supply cords are connected and the power supply is OK.
 - flashes (green/red) if only one power supply cord is connected and the power supply is OK (only when there is more than one power supply)
- 7 **Reset pin hole:** Recessed button for resetting the device (warm start and recovery mode)
- 8 **Jog wheel:** Jog wheel for the device operation via the LCD screen on the device

3.4 Back panel

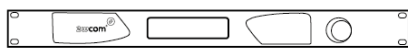


- 1 **Power supply unit:** Mains supply voltage IEC socket.
Optional redundant power supply through a second power supply unit:
- Option 1: standardized IEC hot-swappable power supply connector; 90-260 V, 47-63 Hz; automatic switchover.
- Option 2: power supply 48 V DC.
Combination of power supply 230 V AC and 48 V DC is possible
- 2 **Grounding stud:** This stud can be used to connect a grounding system if necessary.
- 3 **[Ctrl]:** RJ-45 connector, 10/100/1000 Base-T interface for controlling and monitoring the device via Ethernet.
The device can communicate with the IP network and can be configured via the integrated web interface using an internet browser.
The LEDs show the link status (green, active if a physical network connection exists) and the activity status (yellow, active if data communication is active).
- 4 **[Data]:** 2x RJ-45 connector; 10/100/1000 Base-T interface for two redundant outputs for data, audio and GPIO transmission via Ethernet.
- 5 **[DTE]:** 15 pole D-Sub male connector for serial RS-232C data communication, e.g. private data, MPEG ancillary data, UECP/RDS (acc. to TR 101 154). Use a serial breakout cable to provide each input with a serial interface.
- 6 **[ETI IN]:** (optional) 4x female BNC interface for ETI input. Optionally, these interfaces can be used as additional output interfaces by mirroring another output.
- 7 **[ETI OUT]:** 4x BNC female interface for ETI output.
- 8 **[RF DAB]:** (optional) BNC connector, unbalanced, RF input (50 Ω, 168-240 MHz, DAB Band III).
Input for DAB signal; DAB tuner.
- 9 **[RF Sat]:** (optional) F-type jack for input for the connection to the receiving LNB of the satellite antenna (IF: 950 MHz...2.150 MHz, L-band), input for MPEG TS (EDI MPE), GSE (EDI).
- 10 **[ASI OUT]:** BNC connector for the output of an DVB_ASI data stream (270 MHz) received via DVB-S/DVB-S2 tuner, ASI input or 1000Base-T.
- 11 **[ASI IN]:** BNC connector for the input of a DVB-ASI data stream (270 MHz) to be decoded by the device (EDI to ETI).
- 12 **[10 MHz]:** (optional) BNC connector for time synchronization.
- 13 **[GPIO]:** 26-pole D-Sub male connector; combined connector for inputs (GPI) and outputs (GPO).
- 14 **[USB]:** USB 2.0 interface for service, configuration and firmware.

4 First steps

4.1 Checking the delivery contents

Use the following list to check the completeness of delivery. The delivery contents may vary in exceptional cases.



DAB-4c



Link to product data



Power cord



Network patch cable

4.2 Installing the device

For the device to operate safely, note the following regarding the location:

- Mount the device securely and stable in a 19-inch rack designed for this purpose.
- Avoid direct sunlight, direct proximity to radiators and air conditioners, dust, water and chemicals
- When setting up the device, make sure that it is placed at a suitable viewing angle to the displays and that the device has sufficient heat dissipation.

4.3 Connecting the device

Before connecting the device to the power supply, first connect the inputs and outputs of the device to the corresponding connectors:

1. Connect the signal inputs to [ETI IN].
2. Connect the signal outputs to [ETI OUT].
3. Connect a network patch cable to [Ctrl] and to your existing network.
4. Connect network patch cables to [Data] and to your existing network.
5. Optionally, connect the interfaces [DTE], [GPIO], [RF DAB], [RF Sat], [ASI IN/OUT] and [10 MHz].
 - ✓ You have connected the device. Continue with 4.4 Connecting the power supply.

4.4 Connecting the power supply

NOTICE Risk of equipment damage!

- Make sure that the device and the contained cords are compatible to the domestic line voltage and frequency!

Optionally, the device comes with 2 exchangeable plug-in power supply units which can be equipped with different redundant power supply connectors: either IEC sockets or Neutrik powerCON sockets.



If the device is equipped with a primary and a secondary power supply, then the primary power supply is used. If the primary power supply fails, then the device promptly switches to the secondary power supply and the status changes immediately on the **Device** status page. If the secondary power supply fails, then the device does not need to switch the power supply source and it takes at least 1 minute for the status to update on the **Device** status page.

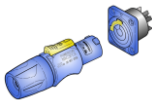
IEC socket



IEC socket: 230 V AC, 90-260 V AC, 47-63 Hz

- Connect the power supply cord fully to the IEC socket at the back panel of the device and to an independent mains power outlet.
 - ✓ You have connected the power supply to the device. The [Power] LED is green if both power supply cords are connected. The [Power] LED flashes green/red if only one power supply cord is connected.

Neutrik powerCON socket

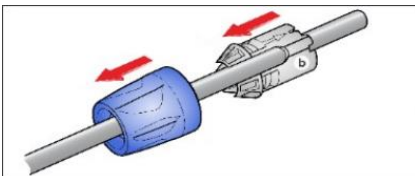


48 V DC Neutrik powerCON socket with aut. switchover (NAC3MPA 1) and Neutrik powerCON connector (NAC3FCA)

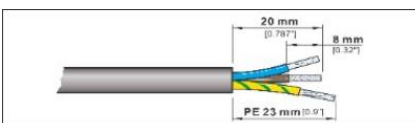
NOTE: The corresponding power cords are not part of the delivery contents!

The PowerCON device connector system is used to transmit supply voltages of 48 V DC to a device or between individual devices.

1. Slide the clamping sleeve and collet onto the cable.



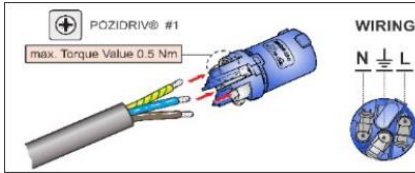
2. Remove part of the insulation.



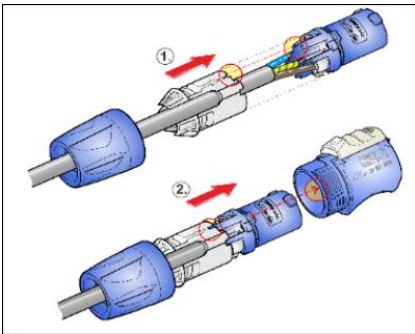
3. Insert the wires into the clamping holes on the inset and fasten them with screw and clamping plate using a screwdriver.



If you use 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 48 V, fasten the 0 V wire to **L** in the connector.



4. Push the inset and collet into the housing (observe guide ribs and guide slot).



5. Tighten the clamping sleeve with a wrench.
6. Connect the power supply cord fully to the powerCON socket at the back panel of the device and to an independent mains power outlet.
 - ✓ You have connected the power supply to the device. The [Power] LED is green if both power supply cords are connected. The [Power] LED flashes green/red if only one power supply cord is connected.

4.5 Configuring the network

NOTICE False connection of the Ethernet interfaces will lead to incorrect operation!

- Use the [Data] interfaces only for data transfer.
- Use the [Ctrl] interface only for the access to the device via the web interface and for SNMP.

To transfer data over IP and access the device via the web interface, you must connect the device to your IP network.

For the [Ctrl] interface, DHCP is enabled by default. When you connect the device to your DHCP-enabled network, it will automatically get the IP configuration for the [Ctrl] interface. To view the obtained IP address, turn the jog wheel to the left to see the "System Info" display. Here you will find the obtained IP address and further system information.

To connect the device to your IP network and change the IP setup via the LCD menu:

1. Push the jog wheel to enter the configuration menu.
2. Turn the jog wheel to focus the **Network** tab and push the jog wheel.
3. Push the jog wheel to enter the menu for the [Ctrl] interface.

4. Configure the settings for your existing IP network (IP address, netmask, gateway etc.). Consult the responsible network administrator if applicable.
5. Turn the jog wheel until the **Save** menu item is selected and push the jog wheel.
6. In the dialog window, select **Yes** to save the settings and restart the device.
 - ✓ The device is now connected to the IP network.

4.6 Accessing the web interface

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

Requirement: You have already connected the [Ctrl] interface to the network.

1. Access the web interface by entering the IP address of the device into a web browser.
 - A login screen appears.
2. Enter the username and password.
 - ✓ The main page of the web interface appears.

The default login data (case sensitive) are:

- For read-only access: **user / user**
- For full access: **manager / manager** or **admin / admin**



Change the login data as soon as possible to avoid unauthorized access to the DAB-4c and document the login data in a safe place.

4.7 General operation

4.7.1 Operation via web interface

The DAB-4c has an integrated web interface. You can make all configurations and operations using a web browser.

Note the following rules when operating the device via web interface:

- If you want to keep any changes made in the configuration of the device, click the corresponding **Save** button.

The changes in each block must be saved individually. If you changed data in several blocks or tabs, click the **Save** button under each block to save all changed data. Otherwise, any unsaved block will be reset to the previously saved status when leaving the page.
- If you do not want to keep the changes, leave the page without saving or reload the page.
- Use a decimal point as the decimal separator in numbers in the input fields (i.e. "6.5" for "six and a half").

4.7.2 Operation via LCD menu

Some basic functions of the device can be operated via the LCD menu and jog wheel.

The display has 2 main menus:

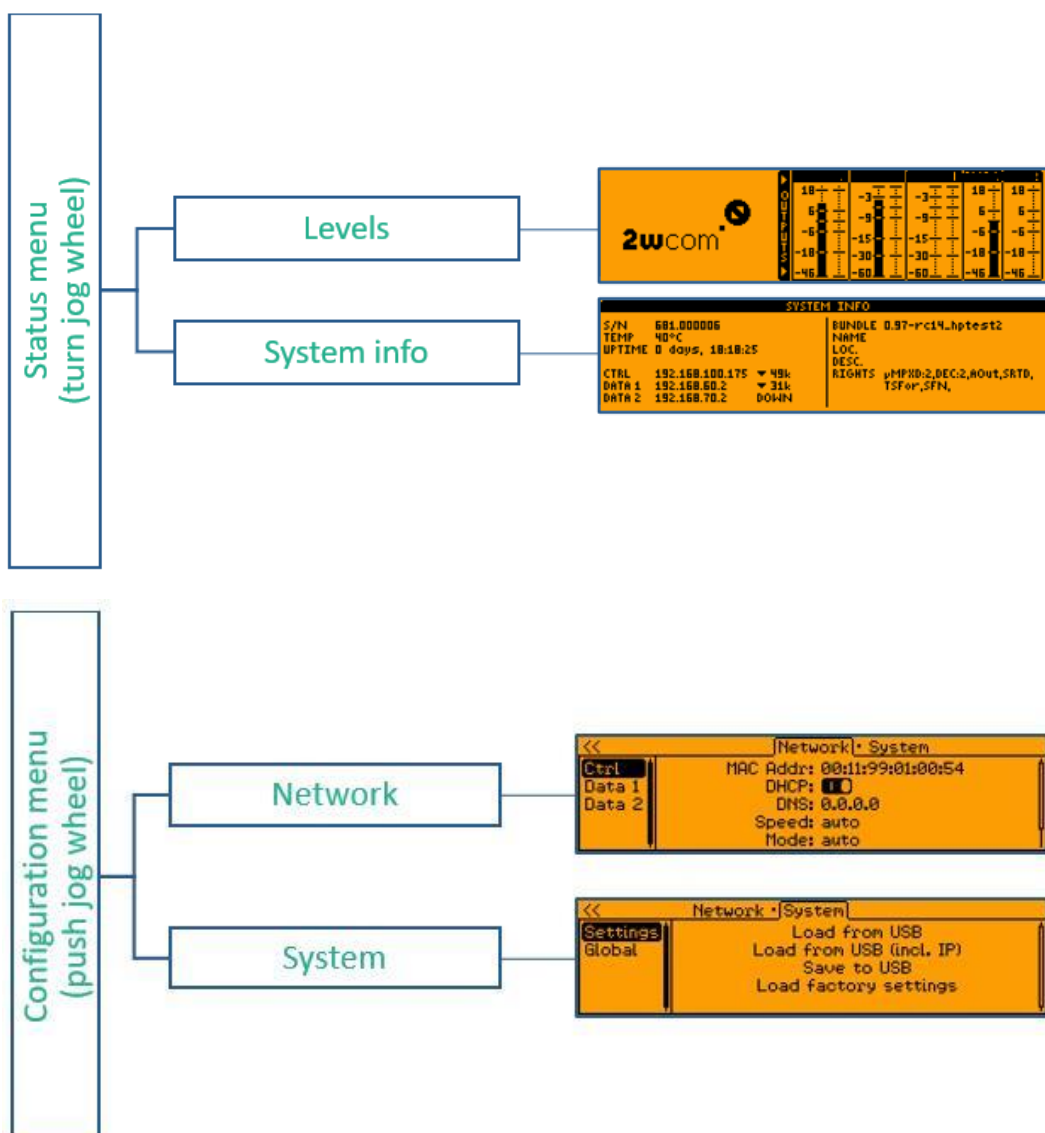
- Status menu (turn jog wheel left or right)
- Configuration menu (push jog wheel)

After a warm or cold start of the device, the display shows the default screen of the status menu. When you navigate in the LCD menu, the display returns to the Status Overview after few minutes of inactivity.

Note the following when operating the device via the LCD menu:

- To switch from the status menu to the configuration menu, push jog wheel.
- To move the focus in the menu structure, turn jog wheel.
- To open a menu tab, focus the tab and push jog wheel.
- To select a configurable menu entry, focus the entry and push jog wheel.
- To configure the selected menu entry, turn jog wheel.
- To confirm changes in a menu entry, push jog wheel.
- To return to the previous menu level, select <<.

Navigation structure



5 Network settings

5.1 Configuring the interface services

For each ethernet interface, you can select the services by which the interface can receive and send data.

Services

Interface services

	HTTP (Web)	HTTPS (Web)	SSH (SFTP)	SNMP	Ember+	Streaming Data
Ctrl:	☒	☒	☒	☒	☒	☒
Data 1:	☐	☐	☐	☐	☐	☐
Data 2:	☐	☐	☐	☐	☐	☒

SNMP: Only affects get and set commands, traps are not affected

Save

To select the supported services.

1. Navigate to the page **Services**.
2. For each individual interface, define which data can be received and sent.
3. Click **Save**.
 - ✓ The interfaces now only support the selected services.

5.2 TCP/IP: Configuring the ethernet interfaces

The DAB-4c has several Ethernet interfaces: 1 for configuration and the others for data exchange. Configure the interfaces for data transmission.

NOTICE False connection of the Ethernet interfaces will lead to incorrect operation!

- Use the [Data] interfaces only for data transfer.
- Use the [Ctrl] interface only for the access to the device via the web interface and for SNMP.

TCP/IP

DNS Server

Primary: Routing: ☐ OFF

Secondary: Routing Interface:

Save

Interface Settings

Link	Interface Name	Mac Address	VLAN	DHCP	IP Address	Subnetmask	Gateway	DNS Server	Speed
☒	Ctrl	00:11:99:01:13:39	☒ ON	☒ ON	192.168.100.183	255.255.240.0	192.168.96.1	0.0.0.0	Auto
☐	Data 1	00:11:99:01:13:3A	☐ OFF	☐ OFF	192.168.18.250	255.255.255.0	0.0.0.0	0.0.0.0	Auto
☐	Data 2	00:11:99:01:13:3B	☐ OFF	☐ OFF	192.168.170.183	255.255.255.0	192.168.170.1	0.0.0.0	Auto

Save

To configure the ethernet interfaces:

1. Navigate to the page **TCP/IP**.
2. Configure the parameters for the DNS Server, Ctrl and Data interfaces.



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

3. Click **Save**.
 - ✓ The ethernet interfaces are now configured.

Parameters

Primary	Enter the IP address of the primary domain name server (DNS).
Secondary	Enter the IP address of the secondary domain name server (DNS).
Routing	Enable the Routing, which enables the DNS server to send and answer the requests over different [Data] interfaces.
VLAN	Enable VLAN and enter a VLAN ID (1-4095).
Priority	Assign a priority (1-7) to this stream to add a priority code point (PCP) according to the IEEE 802.1Q specification. Select 0 to disable the priority and use best-effort delivery.
DHCP	Enable dynamic host configuration protocol (DHCP) which enables the device to get an IP address automatically.
IP Address	If DHCP is disabled, then assign an IP address to the interface.
Subnetmask	Enter the subnetmask for the IP address.
Gateway	Enter the address of the local system that is used for the internet access (e.g. the router).
DNS Server	Enter the IP address of the DNS server used.
Speed	Set the network connection speed in Mbps or select Auto .

5.3 SNMP: Configuring access data for external requests

You can configure access data (read community/write community) that is necessary for external SNMP requests to the DAB-4c.

SNMP (Simple Network Management Protocol) is a protocol used for managing and monitoring network devices. SNMP requests can be used to retrieve information such as the DAB-4c's current settings and performance metrics. This information can be used to diagnose problems and optimize network performance. SNMP requests can also be used to configure the DAB-4c remotely, allowing administrators to adjust settings.

SNMP

EMBER

REST API

Settings

Protocol version: SNMPv2c

Read/Write Community

1. Read community:

2. Read community:

1. Write community:

2. Write community:

MIB File

Version:

Download: [SNMP MIB](#)

Trap Configuration

Location of table indices (reboot needed): OID (default)

Trap Manager

	Enable	Version	IP / Domain Name	Interface	VLAN	Port
1	☐ OFF	V2		ctrl	--	162
2	☐ OFF	V2		ctrl	--	162
3	☐ OFF	V2		ctrl	--	162
4	☐ OFF	V2		ctrl	--	162



For the SNMP manager tool to operate correctly, it requires the specific MIB files. These MIB files must be compiled by your SNMP manager tool. You can save the MIB files in the block **MIB File**.

1. Navigate to the page **External APIs**.
2. Click on the tab **SNMP**.
3. Select the protocol version in the block **SNMP Protocol**.
4. Configure the parameters in the block **Read/Write Community** or **SNMP3 / Security**. The parameters differ depending on the selected protocol version.
5. Click **Save**.
 - ✓ You have configured the access data for external SNMP requests.

Parameters

Read Community	Enter SNMP access data for the external read-only SNMP access to the device.
Write Community	Enter SNMP access data for the external write SNMP access to the device.
Read/Write user	Enter user name and password for the external write SNMP access to the device.
Read/Write user	Enter user name and password for the external read-only SNMP access to the device.
Security protocols	Select an authentication protocol and a privacy protocol.

5.4 SNMP: Configuring trap managers

As part of the monitoring function, the device can send SNMP traps to the defined IP addresses of the SNMP managers. SNMP traps are messages that are sent from a network device to a central management system when a specific event or condition occurs. SNMP traps are used as a means of notifying network administrators of important events, such as errors or performance issues, allowing them to take corrective action as needed. You can also readout the settings via SNMP Get.

SNMP

EMBER

REST API

Settings

Protocol version: SNMPv2c

Read/Write Community

1. Read community:

2. Read community:

1. Write community:

2. Write community:

MIB File

Version:

Download: [SNMP MIB](#)

Trap Configuration

Location of table indices (reboot needed): OID (default)

Trap Manager

	Enable	Version	IP / Domain Name	Interface	VLAN	Port
1	☐ off	V2		ctrl	--	162
2	☐ off	V2		ctrl	--	162
3	☐ off	V2		ctrl	--	162
4	☐ off	V2		ctrl	--	162



For the SNMP manager tool to operate correctly, it requires the specific MIB files. These MIB files must be compiled by your SNMP manager tool. You can save the MIB files in the block **MIB File**.

1. Navigate to the page **External APIs**.
2. Click on the tab **SNMP**.
3. Select the protocol version in the block **SNMP Protocol**.

4. Select the location of the table indices in the block **Trap Configuration**: OID or OID plus additional index.
5. Configure the parameters in the block **Trap Manager**.
6. Click **Save**.
 - ✓ You have configured the trap managers. If you changed the location of table indices, the DAB-4c must reboot. Each enabled trap is sent once at startup for initialization.

Parameters

Version	Select the format version of the SNMP traps.
IP or Domain Name	Enter the IP address or domain name of the trap receiver.
Port	Enter the port number.

5.5 Ember+: Configuring access for monitoring

As part of the monitoring and remote-control function, the device is capable to be controlled via the Ember+ protocol.



The screenshot shows a web interface titled "EMBER+" with a "Settings" section. It contains four configuration fields: "Mode:" with a dropdown menu set to "UDP & TCP"; "Timeout (0 = disabled):" with a text input set to "0" and a "SEC" label; "Interface:" with a dropdown menu set to "Ctrl"; and "Port:" with a text input set to "9000". A green "Save" button is located at the bottom left of the settings area.

1. Navigate to the page **External APIs**.
2. Click on the tab **Ember+**.
3. Configure the parameters in the block **Settings**.
4. Click **Save**.
 - ✓ You have configured the Ember+ access.

Parameters

Mode	Select the mode from the dropdown menu.
Timeout	Enter the value for interval in seconds for a timeout.
Interface	Select an Ethernet interface from the dropdown menu.
Port	Enter the port number for the connection.

5.6 NTP: Synchronizing date and time

The DAB-4c can automatically synchronize its date and time with an external NTP (Network Time Protocol) server. The configurable parameters on this page may differ depending on the activated rights.

1. Navigate to the page **NTP**.
2. Configure the parameters.
3. Click **Save**.
 - ✓ You have synchronized the date and time with an external NTP server.

Parameters

Synchronization	Start or stop the synchronization with the NTP server.
Bind to interface	To bind the NTP synchronization to a specific IP interface, set the switch to ON . Select the [data] interface and VLAN.
QoS DSCP	Select the quality of service (QoS). The selected packet will be prioritized.
NTP Quality Rating	Select the quality of the NTP server. Low: Event logging, device time synchronization. Medium: For NTP servers that are accessed through the Internet and are used as External Clock source. High: For Stratum 1 NTP servers that are connected locally and are used as External Clock source. (SPN) For Medium and High settings, NTP will be rated as valid once the clock discipline algorithm has converged to acceptable RMS offset and skew values. For the Low setting, NTP becomes valid much quicker with reduced accuracy, however it will increase over time.
Enable expert settings	Set the switch to ON to show further parameters.
1. NTP Server	Enter the IP address or network name of the first NTP server to be used.
2.-4. NTP Server	Enter the IP addresses or network names of the 2nd, 3rd and 4th NTP servers to be used.

6 Converter settings

6.1 Input source settings

6.1.1 Creating input source profiles for IP EDI

You can create an input source profile and use it for converting.

Input Source	Description	Source Interface
IP EDI	EDI Stream over IP	[Data]

To create a new configuration profile for an input source:

1. Navigate to the page **EDI-to-ETI**.
2. In the block **Input Sources**, select the input source for which you want to create a configuration profile.
3. To create a configuration profile, click .
4. To set up the new configuration profile, click **Edit**.
5. Configure the parameters.
6. Click **Save**.
 - ✓ You have created an input source profile. Continue with 6.2 Assigning an input source to a converter.

IP EDI

Name	Enter the name of the stream for better reference.
Reordering depth	This function transforms the variable delay into a fixed delay. It holds the first packet received for a period of time before it sends it out. This time period is necessary for reordering the packets. Select the value for this holding period in ms.
PFT Seamless Switching	Set the switch to ON to enable PFT seamless switching. This allows the DAB-4c to receive two streams for dual streaming. If this function is enabled, enter the IP parameters for the second stream.
Paneda Multiplexer	Set the switch to ON to receive the dual stream from a Paneda multiplexer.
IP type	Select Unicast/Multicast.
Multicast IP	Enter the IP for Multicast, if selected as IP type.
Port	Specify the port number.
Source Specific Multicast	Set the switch to ON to enable sourcing specific multicast.
Source Multicast IP	Enter the IP for sourcing specific multicast.
IP interface	Select the interface for the input signal.
Mute Input	Set the switch to ON to mute the stream. The stream will still be received but not processed.
Fallback	You can optionally configure an additional EDI input as a fallback for an IP EDI input source. You can control the switch between a Primary EDI Input and Fallback EDI Input Source via the Switch Criteria. Switching between a Primary EDI Input and a Fallback EDI Input is only possible if the corresponding Switch Criteria are active. This switch is not seamless. You can also select a fallback option for the second EDI input if dual streaming is enabled.

With activated dual streaming and additionally activated fallback for both EDI Input sources, four streams can be received at the same time.

6.1.2 Creating input source profiles for E1 ETI

You can create an input source profile and use it for converting.

Input Source	Description	Source Interface
E1 ETI	ETI – Standardized input stream from a DAB, DAB+, T-DMB multiplexer over a standardized link (E1)	[ETI IN]

To create a new configuration profile for an input source:

1. Navigate to the page **ETI-to-EDI**.
2. In the block **Input Sources**, select the input source for which you want to create a configuration profile.
3. To create a configuration profile, click .
4. To set up the new configuration profile, click **Edit**.
5. Configure the parameters.
6. Click **Save**.
 - ✓ You have created an input source profile. Continue with 6.2 Assigning an input source to a converter.

E1 ETI

Name Enter the name of the input profile for better reference.

6.1.3 Creating input source profiles for TS/SAT

You can create an input source profile and use it for converting.

Input Source	Description	Source Interface
 TS/SAT	TS/SAT – Transport stream over satellite (optional: <i>Sat Tuner</i> right)	[RF Sat]

To create a new configuration profile for an input source:

1. Navigate to the page **EDI-to-ETI**.
2. In the block **Input Sources**, select the input source for which you want to create a configuration profile.
3. To create a configuration profile, click .
4. To set up the new configuration profile, click **Edit**.
5. Configure the parameters.
6. Click **Save**.
7. Create a demux configuration that uses this input source profile as a source. (See 6.1.4 Creating demux configurations)
 - ✓ You have created an input source profile. Continue with 6.2 Assigning an input source to a converter.

Parameters

Name Enter the name of the stream for better reference.

RF input Select the RF input to be used.

DVB standard Select the DVB standard.

Modulation	Select the modulation type of the signal to be received.
Frequency input method	Choose whether you want to enter the L-Band frequency or the transponder frequency and LNB data. The transponder frequency will be automatically translated into the corresponding L-Band frequency.
L-Band Frequency	Enter the L-Band frequency of the channel to be received.
Transponder Frequency	Enter the transponder frequency of the channel to be received. Click LNB Config to enter the LNB information.
Symbol rate	Enter the symbol rate used by the transponder.
Roll-Off	Select the roll-off factor used by the receiver filter.
Polarization	Select either horizontal or vertical polarization used by the transponder.
Frequency Range	22 kHz signal used to tell the LNB via Digital Satellite Equipment Control (DiSEqC) to pass on lower band (22 kHz off) or upper band (22 kHz on) signals.
Pilot Mode	If the standard DBV-S2 is used, then select whether a pilot tone is used or not. If unknown, select Auto .
FEC	Select the FEC settings used by the transponder. If unknown, select Auto . This may result in slightly increased tuning times.

6.1.4 Creating demux configurations

To use an input source profile that is TS-based, you must first create a corresponding demux configuration.

1. Navigate to the page **EDI-to-ETI**.
2. In the block **Input Sources**, select the tab of a TS-based input source.
3. In the block **Demux Configurations**, select the tab **Audio** to use the audio and optionally the ancillary data of a stream. Select the tab **Data** to only use the ancillary data of a stream.
4. To create a new demux configuration, click .
5. To configure the demux configuration, click **Edit**.
6. Configure the parameters.
7. Click **Save**.
 - ✓ You have created a demux configuration. Continue with 6.2 Assigning an input source to a converter.

Parameters

TS source	Select the source for the demultiplexer configuration profile in the dropdown menu.
Name	Enter the name of the stream for better reference.
Configuration mode	Select the configuration mode. Select the service and audio track for the mode Service from list . Enter the specific audio PID for the mode Manual/PID .
Encapsulation mode	Select an encapsulation mode: Multiprotocol Encapsulation or Packetized Elementary Stream.
MPE	If MPE is set as encapsulation mode, then configure the corresponding IP parameters.
Reordering depth	This function transforms the variable delay into a fixed delay. It holds the first packet received for a period of time before it sends it out. This time period is necessary for reordering the packets. Select the value for this holding period in ms.

6.2 Assigning an input source to a converter

The DAB-4c is equipped with converters that can operate at the same time. One input can be the source for several converters.

To assign input source to a converter:

- **Prerequisite:** You have already created configuration profiles for the input sources you want to use.
- 1. Navigate to the **EDI-to-ETI/EDI or ETI-to-EDI** page.
- 2. In the block **Source Assignment**, assign an input source profile to each converter by selecting it in the dropdown menu. Alternatively, drag/drop the input source profile into this field.
- 3. Select an input source profile as a backup source for redundant streaming in case of failure. This function is only available if the right *Additional Backup* is activated.
- 4. Select the Converter IP EDI FEC Level for the output stream.
- 5. To be able to control the converters using SNMP or Ember+ commands, enable the switch **Activation on Command**.
- 6. Click **Save**.
 - ✓ You have activated and configured the converters.

6.3 Setting up converter outputs

You can activate and configure output streams for each converter.

To set up a converter output:

1. Navigate to the page **EDI-to-ETI/EDI or ETI-to-EDI**.
2. In the block **Outputs**, select the tab (if applicable) of the output you want to set up.
3. Click (+) to create a new configuration profile for a converter output.
4. To set up the new profile, click **Edit**.
 - A dialog window opens.
5. Edit the output settings. A description for the individual settings for each output is given in the following sections.
6. Click **Save**.
 - ✓ You have set up a converter output.

IP EDI Output



This option is only available if the right *EDI-to-EDI* or *ETI-to-EDI* is activated.

Activation

To activate this output, set the switch to **ON**.

Converter	Select the converter. The same converter can be assigned to several outputs.
Name	Enter a name for this output for better reference.
IP type	Select Unicast/Multicast.
Multicast IP	Enter the IP for Multicast, if selected as IP type.
Port	Specify the port number.
IP interface	Select the interface for the output.

E1 ETI Output



This option is only available if the right *EDI-to-ETI* is activated.

Activation	To activate this output, set the switch to ON .
Converter	Select the converter. The same converter can be assigned to several outputs.
Name	Enter a name for this output for better reference.
Frame delay	Select the frame delay for this output. The ETI frame delay defines the duration for which the ETI frames for the output over E1 ETI are buffered.
Format	Select the E1 ETI format.
Clock source	Select either internal or external clock source.
NTP clock rate change	Select either default or slow rate change. Slow rate change keeps the rate change below 2 μ s/s. This setting is essential for DAB transmitters of the first generation.

6.4 Naming the converters

You can assign customized names to the converters for a more user-friendly experience. This allows you to easily identify and manage your converters based on your individual preferences.

The left screenshot shows the 'General' tab of the Converter Settings. It features two sections: 'EDI-to-ETI/EDI Assignment' and 'ETI-to-EDI Assignment'. Each section has a table with columns for Name Converter 1, Name Converter 2, Name Converter 3, Name Converter 4, Name Main Level, and Name Backup Level. The 'Name Converter 1' and 'Name Converter 2' fields are highlighted with red boxes. A 'Save' button is at the bottom left.

The right screenshot shows the 'EDI → ETI/EDI' tab. It includes an 'Input Sources' table with columns for Name, Input, Modulation, Frequency, Polarization, Range (23MHz), Symbol Rate, and FEC. Below this is a 'Demux Configurations' table with columns for GS Source, Name, IP, Port, and Recording Depth. At the bottom is a 'Source Assignment' section with a table for Converter1, Converter2, Converter3, and Converter4, each with a dropdown menu and a switch. A 'Save' button is at the bottom left.

To name the converters:

1. Navigate to the **General** page.
2. Enter your custom names for the converters and for the main and backup levels.
3. Select **Save**.
 - ✓ Your custom converter names are now displayed on the **Overview** page and on the converter pages.

6.5 Configuring the TS Multiplexer

The DAB-4c is able to output up to 8 multiplexed streams over IP at the same time. One multiplexed stream can contain up to 16 programs. To each program, you can add up to 16 payload contents. You can use the IP interfaces [Data] redundantly for the same stream content and the same destination or send different stream contents to the same or different destinations.

6.5.1 Setting up a Multiplex with payload content

Prerequisite: You have already configured the input sources.

Prerequisite: You have already assigned input sources the converters.

To set up a multiplexed stream with payload:

1. Navigate to the page **TS Multiplexer**.
2. To create a new Multiplex, click **+**.
 - A new tab with TS settings appears.
3. In the block **General**, configure the general TS parameters.
4. To add a new service to the TS payload content, click **Add Service**.
5. To add audio to the stream, select an available converter or input source in the dropdown menu **Payload**. Alternatively, drag and drop the source encoder from the block **Payload sources**.
6. ETI can be forwarded uncompressed (raw data, 2.048 mbps E1 data) and it can also be processed into compressed format to save bandwidth. This feature enables compatibility with the 2wcom FlexXtract+/FlexNsert+. If you want to use the compressed format, select the **Compressed** mode in the block **Payload sources**.
7. Select the mode for the payload content: PES, MPE, ARG (Scientific Atlanta), or Pipe. The ARG mode is only available if the right *TS Scientific Atlanta* is activated.
The Pipe, PES and ARG modes are usually used with ETI frames as the payload source. In Pipe mode, data is embedded directly into the TS without additional headers. PES mode involves adding a PES header to the data within the TS. In ARG mode, the data is embedded according to the Scientific Atlanta third-party schema. MPE mode is usually used with IP packets as the payload source.
8. Specify the service ID, service name, service provider name, PMT PID, PCR PID, and PID for the corresponding program.
9. To add another payload to the content, click **Add Payload**.
10. Click **Save**.
 - ✓ You have set up a multiplexed stream. Continue with 6.5.2 Setting up Multiplex outputs.

Parameters

Encoding standard	Select the encoding format: DVB or ATSC.
MPEG TS tables	Select MPEG TS tables as needed for the multiplexing process.
Auto-calculate required TS bit rate	Enable this option to automatically calculate the required Transport stream bit rate based on the selected settings.
Bit rate	If auto-calculated TS bit rate is disabled, enter the bit rate manually.
Audio bitrate priority	Select a priority for the audio bitrate: low latency or low bitrate overhead.
Private data mode	Set the mode for handling private data within the multiplexed stream: Elementary stream (ES) or TS adaption.
Network ID	Enter the network ID to identify the network where the multiplexed data will be transmitted.

Original Network ID	Enter the original network ID to indicates the network in which the TS stream was originally created.
Transport Stream ID	Assign a Transport Stream ID to identify the specific Transport Stream being used.
Network name	Enter the name of the network where the multiplexed data will be transmitted.
Audio PID removal on bad input	Enable or disable the removal of PIDs in case the input is bad.

6.5.2 Setting up Multiplex outputs

For each TS Multiplex, you can create and save up to 32 destination streams.

To set up Multiplex outputs:

1. Navigate to the page **TS Multiplexer**.
2. In the block Multiplexer Outputs, click on the tab of the output you want to set up.
3. To create a new output, click .
4. To configure the output, click **Edit**.
 - A dialog window opens.
5. Configure the parameters.
6. Click **Save**.
 - ✓ The DAB-4c now outputs multiplexed streams.

TS/IP output parameters



This option is only available if the right *TS Encoder* is activated.

Activation	Enable this output stream.
Name	Enter the name of the stream for better reference.
Domain name/IP	Enter the IP of the destination.
Port	Specify the port number of the destination.
Multicast TTL	TTL (Time to Live) for multicast packets.
IP interface	Select the [Data] interface for the output.
Mode	Select the mode of the output stream in the dropdown menu: RTP or UDP. NOTE: Besides the RTP, the RTCP packets are also generated for the encoder output and are sent in 5 s intervals. RTP allows reordering packets by means of sequence numbers.
RTCP output	Enable or disable Real-Time Control Protocol (RTCP) output, which is used for monitoring and controlling the stream.
Send delay	Enter the send delay, that the encoder should wait in order to send Audio over IP as an offset stream for redundancy.
RIST	Enable RIST to recover lost packets by resending them.
Bandwidth limiting	If RIST is enabled, set a bandwidth limit to control the data rate of the TS stream.
FEC Mode	Configure the FEC mode depending on the sample rate and the acceptable value for delay. NOTE: Enable Pro-MPEG FEC in the corresponding decoder.
FEC column (L)/ FEC row (D) port offset	Enter the offset to the main destination port 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).

If you do not want to use this offset, enter "0".

Dual Streaming

Enable or disable dual streaming. If dual streaming is enabled, the menu will expand. Set up the connection for dual streaming in the expanded menu. For the Ethernet input, you can select the same or a different source.

NOTE: Enable dual streaming in the corresponding decoder.

TS/SRT output parameters



This option is only available if the rights *TS Encoder* and *SRT Encoder* are activated.

Activation	Enable this output stream.
Name	Enter the name of the stream for better reference.
Mode	Select either caller or listener mode.
Host	Enter the host domain of the SRT destination.
Auto-configure source port	Activate automatic configuration of the source port.
Source port	If auto-configuration is disabled, enter the source port number manually (relevant for e.g. firewall)
Destination port	Enter the port number of the destination.
IP interface	Select the [Data] interface for the output
Latency	Define the time interval for the latency before the DAB-4c starts to output the SRT stream.
Encryption	Enable SRT encryption. The type of AES encryption determines the length of the key (passphrase). AES-128 uses a 16-character (128-bit) passphrase, AES-192 uses a 24-character (192-bit) and AES-256 uses a 32-character (256-bit) passphrase.
Passphrase	Define a password used to secure the SRT stream. NOTE: The same encryption key should be set for this input TS in the corresponding decoder.

6.6 Defining switch criteria

The DAB-4c can automatically switch between alternative sources as a redundancy solution in case of failure. The device receives and processes all enabled input sources but only outputs the signal of the highest priority (main source – backup) that is error-free.

You can enable the following switch criteria for input sources. The availability of switch criteria depends on the selected input source.

No input data	The DAB-4c will switch to the next input source if no signal is available in the activated IP input [Data].
Packet loss	The DAB-4c will switch to the next input source if packet errors are detected in the input signal over the activated IP input [Data].
Fallback input - No data	The DAB-4c will switch to the next input source if no signal is available for the multicast fallback.
No converter output	The DAB-4c will switch to the next input source if the converter does not output any data.

To define global switch criteria for each audio input type:

1. Navigate to the page **Switch Criteria**.
2. Click on the tab of the input source for which you want to define switch criteria.
3. If any of the listed criteria should be monitored, enable the corresponding switch.
4. In the field **Value**, enter the threshold above or below which the input source should be switched.
5. For each enabled criterion, define the delay time **T1** for switching release. After this delay time, the input source switches to the next backup source.
6. For each enabled criterion, define the delay time **T2** for switching end. After this delay time, the input source switches back to the previous source, if its signal is good.
7. Click **Save**.
 - ✓ The DAB-4c now automatically switches to the next good input source. For some switch criteria, you can set an alarm (see 8.1 Setting up alarms).

To define individual switch criteria for a specific input source:

1. Navigate to the page EDI-to-ETI/EDI or ETI-to-EDI.
2. Click **Edit** on the input source for which you want to define individual switch criteria.
3. Select the **Switch criteria** tab.
4. Toggle the switch **Override global switch criteria**.
5. Define the individual switch criteria.
6. Click **Save**.
 - ✓ The switch criteria for this input source now override the global switch criteria.



On the page EDI-to-ETI/EDI or ETI-to-EDI, the switch criteria scope (SCS) of an input source is indicated with  for global and with  for individual.

6.7 Forwarding a TS stream



SAT IP forwarding is only available if the rights *Sat Tuner* and *TS Forwarding* are enabled.
GSE forwarding is only available if the rights *Sat Tuner*, *TS Forwarding*, and *SAT GSE* are enabled.

You can forward a SAT IP stream to another device over IP with MPE or GSE. This is useful to forward specific content within the TS stream with a designated PID, such as a particular program.

TS Forwarding

Output Configuration

Active	TS Source	Name	Domain name / IP	Port	Interface	Delay	FEC
1 	SAT (RF1)	To MPX-2c	192.168.100.175	5004	Data 1	—	—

MPE Forwarding

Active	TS Source	Name	PID	IP	Port	Interface
	SAT (RF1)		101	0.0.0.0	5004	Data 1

Prerequisite: You are receiving a TS/SAT stream over [RF 1] or [RF 2].

To forward a TS stream to another device:

1. Navigate to the page **SAT IP Forwarding**.
2. To create a new entry for TS forwarding, click  in the block **Output Configuration**.
3. Click **Edit**.
4. Configure the parameters for MPE forwarding and GSE forwarding.
5. Click **Save**.
 - ✓ The TS stream is now being forwarded over IP. Active TS forwarding is displayed on the page **Overview**.

Parameters MPE forwarding

Activation	To activate this output, set the switch to ON .
TS Source	Select the TS source. The same source can be assigned to several outputs.
Name	Enter the name of the stream for better reference.
Mode	Choose whether you want to manually enter the MPE PID and MPE IP address or want to select them from a list.
PID	Enter the MPE PID of the stream.
MPE IP address	Enter the MPE IP address.
MPE port	Enter the MPE port number.
IP interface	Select the IP interface to be used for this output.

Parameters GSE forwarding

Activation	To activate this output, set the switch to ON .
TS Source	Select the TS source. The same source can be assigned to several outputs.
Name	Enter the name of the stream for better reference.
IP address	Enter the IP address.
Port	Enter the port number.
IP interface	Select the IP interface to be used for this output.

7 Interface settings

7.1 Configuring ETI interface settings

Per default, the 4 [ETI IN/MON] interfaces are used as inputs but they can be switched to outputs if needed. If configured as outputs, then each [ETI IN/MON] interface mirrors its corresponding output interface—i.e. [ETI IN/MON 1] mirrors [ETI OUT 1], [ETI IN/MON 2] mirrors [ETI OUT 2] and so forth.



This option is only available if the right *Eti Mirroring* is activated.

To change the settings for the [ETI IN/MON] interfaces:

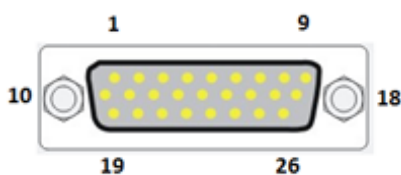
1. Navigate to the page **ETI**.
2. In the block ETI/MON Settings, select for each [ETI IN/MON] interface whether it is to be used as an input or as an output.
3. Click **Save**.
 - ✓ If an [ETI IN/MON] interface is configured to mirror its corresponding [ETI OUT] interface, then this information is now displayed on the **Overview** page.



Optionally, the device comes with 4 Power Down Relays. The Power Down Relays must be set manually using DIP switches on the circuit board. If they are activated, then the data that is received at the ETI IN interface are forwarded to the corresponding ETI MON interface if the device is switched off. If you want have the position of the DIP switches changed to activate or deactivate this function, refer to your 2wcom contact person. Do not set the DIP switches yourself as opening the device without permission from 2wcom voids the warranty.

7.2 Viewing the GPI status

The DAB-4c is equipped with 8 GPI contacts housed in the same 26-pole D-sub male connector as the GPOs. The inputs can be used for remote control (in combination with remote control software).



NOTICE

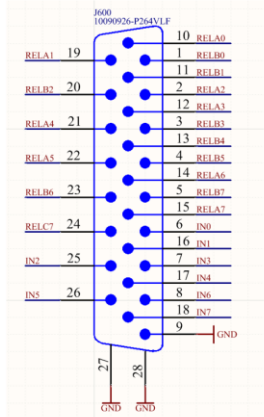
Risk of equipment damage!



- The voltage on GPI contacts must not be negative or exceed +0.7 V

The table below displays the scheme of possible GPI contacts:

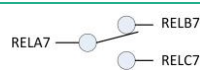
GPI No.	Control Pin No.
1	IN0
2	IN1
3	IN2
4	IN3
5	IN4
6	IN5
7	IN6
8	IN7

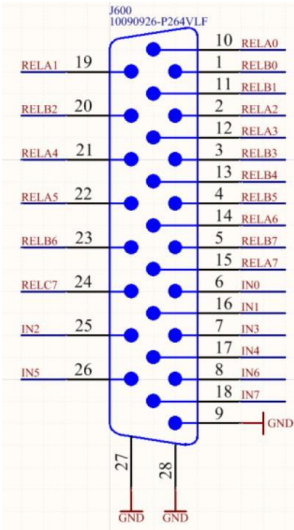


- To actuate a GPI, pull the corresponding control pin electrically to ground (pin 9). The resulting control current is less than 5 mA.
- To view the status of the GPIs, navigate to the page **GPI**.

7.3 Configuring GPO settings

The DAB-4c features 8 GPOs: 7 SPST relays (form A) and 1 SPDT relay (form C). You can use the relays for alarms of the monitoring function. For more information, see 8.1 Setting up alarms.

GPO No.	Switch contacts	Switch type
1	RELA0, RELB0	SPST, NO
2	RELA1, RELB1	SPST, NO
3	RELA2, RELB2	SPST, NO
4	RELA3, RELB3	SPST, NO
5	RELA4, RELB4	SPST, NO
6	RELA5, RELB5	SPST, NO
7		SPDT



SPST: a simple on/off switch: single pole, single throw

SPDT: single pole, double throw

NO: normally open

NOTICE

Risk of equipment damage!



- The relay contacts have a maximum load of 0.5 A at 30 V DC. Do not exceed these values.

To configure the GPO settings and view the status of the GPOs:

1. Navigate to the page **GPO**.
2. To invert a GPO, enable the corresponding switch.
3. Select the source for the GPO switch in the field **Source**. Only GPOs that are selected for the source **Alarm** can be used to indicate a triggered alarm.
4. If you set GPIO Tunneling as the source, then select the audio to be used for this function.
5. Click **Save**.
 - ✓ You have configured the GPO settings.

The screenshot shows the 'GPO' configuration page. At the top, it says 'GPO' and 'State / Configuration'. Below this, there are 7 columns representing GPOs, numbered 1 to 7. Each column has three rows: 'State', 'Inverted', and 'Source'.
- GPO 1: State is ON (green dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 2: State is OFF (grey dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 3: State is OFF (grey dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 4: State is OFF (grey dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 5: State is OFF (grey dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 6: State is OFF (grey dot), Inverted is OFF (switch to the left), Source is Alarm.
- GPO 7: State is ON (green dot), Inverted is OFF (switch to the left), Source is Alarm. There is also a small 'A B' indicator next to the state dot.
At the bottom left, there is a green 'Save' button.

The virtual LED **State** indicates the status of the GPOs (green: ON, grey: OFF). The state of a relay is ON if the alarm which is assigned to this relay is triggered.

8 System settings

8.1 Setting up alarms

You can set several alarms that trigger in case of defined events. You can monitor the following:

Temperature	Alarm is triggered if the device temperature exceeds the configured value.
Power failure	Alarm is triggered in case of an error in a power supply unit.
LAN Link	Alarm is triggered in case of an error in Ethernet data communication.
PTP clock status	Alarm is triggered if PTP signal is not present.
NTP clock status	Alarm is triggered if NTP server is available.
10 MHz clock status	Alarm is triggered if 10 MHz signal is not present.
Packet loss rate	Alarm is triggered if the packet loss rate exceeds the set value.
Output error	Alarm is triggered in case of an output error.
ETI output status	Alarm is triggered if no signal is detected in the ETI output.
ETI output - clock switch	Alarm is triggered if the clock source of an ETI output switches.
ETI input	Alarm is triggered if no signal is detected in the ETI input.

To set up alarms:

1. Navigate to the page **Alarm**.
2. For each alarm, configure the corresponding parameters.
3. Click **Save**.
 - ✓ Enabled alarms will now be saved in a log entry and signaled over SNMP, LED or GPO if triggered.

Parameters

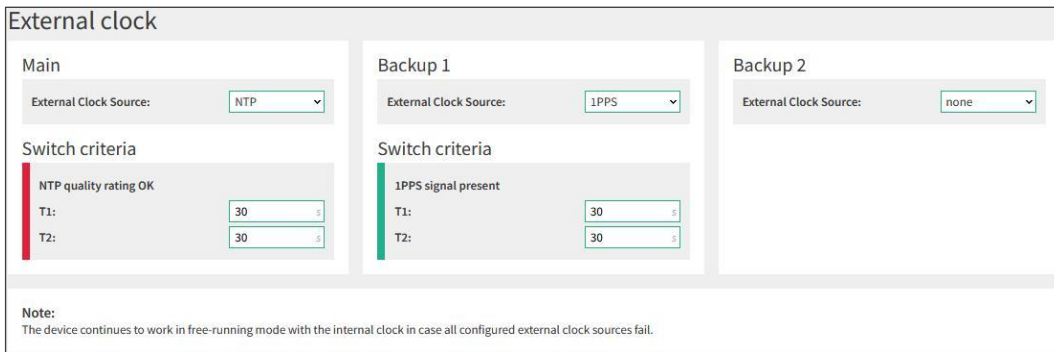
Enable	Enable or disable an alarm.
Priority	Select the priority of the alarm message.
Values	Enter the value below or above which the alarm triggers.
T1	Set the delay time for alarm trigger.
T2	Set the delay time for alarm end.
SNMP, LED, GPO	Enable the corresponding switch if the alarm should be signaled by SNMP traps, an LED or GPO switch. The corresponding GPO must be activated for the source "Alarm" (see 7.3 Configuring GPO settings).

8.2 Using an external clock source



This option is only available if either of the rights *SFN* or *SPN* is enabled or if the device is equipped with a GPS module.

You can synchronize the DAB-4c with an external clock. Precise synchronization of time across devices on a network is critical to avoid audio distortion or loss of quality. By using an external clock source, audio codecs can ensure that they are operating with the same timebase, allowing them to maintain a consistent audio stream. By keeping all devices synchronized to an external clock source, audio codecs can ensure that their output remains high-quality and reliable. You can configure 1 main and up to 2 backup clocks.



External clock

Main	Backup 1	Backup 2
External Clock Source: NTP	External Clock Source: 1PPS	External Clock Source: none
Switch criteria NTP quality rating OK T1: 30 s T2: 30 s	Switch criteria 1PPS signal present T1: 30 s T2: 30 s	

Note:
The device continues to work in free-running mode with the internal clock in case all configured external clock sources fail.

To synchronize the DAB-4c with an external clock:

1. Navigate to the page **External Clock**.
2. Select an external clock source for the main and backup clock sources.
3. Configure the parameters for the main and backup clock sources.
4. Configure the switch criteria for the main and backup source. The configurable criteria may vary depending on the selected clock source.
T1 is the delay time for alarm trigger. **T2** is the delay time for alarm end.
5. Click **Save**.
 - ✓ The DAB-4c is now synchronized with an external clock. You can view the status information of the external clock on the page **Overview**.



In case all configured external clock sources fail, the device will continue to work in free-running mode using the internal clock.

8.3 Entering device information

For better identification of the DAB-4c, you can enter device-specific data.

1. Navigate to the page **Global**.
2. Configure the parameters in the block **System info**.
3. Click **Save**.
 - ✓ The saved information is now displayed in the banner.

Parameters

Name	Enter the name of the device for better reference.
Location	Enter the location of the device.
Description	Enter further important information on the device.

8.4 Setting up session timeout

Session timeout is a security feature that automatically logs out the user after a period of inactivity. You can define the period of inactivity or disable session timeout.

1. Navigate to the page **Global**.
2. In the field **Session timeout**, enter the value in minutes for the period of inactivity necessary to automatically log out the user. Enter "0" to disable this function.
3. Click **Save**.
 - ✓ You will now be automatically logged out after the set period of inactivity.

8.5 Changing the title of the browser tab

You can change the title of the browser tab to display the information you need for better reference.

1. Navigate to the page **Global**.
2. In the field **Browser Tab Title**, enter the information you want to display. You can use variables for specific information. Variables will update automatically if the corresponding information changes. View the possible variables by hovering over the input field.
3. Click **Save**.
 - ✓ The title of the browser now displays the configured information.

8.6 Updating the firmware with a file

You can upload ARM firmware stored locally or from a TFTP server to the device.

1. Navigate to the page **Global**.
2. In the block **Firmware** update, click **Browse/Drop file**.
3. Select the firmware file you want to upload.
4. Click **Upload** to upload the firmware file. The upload may take a while. Do not interrupt this process.
5. After a successful upload, follow the prompt to restart the device.
 - ✓ After the restart of the device, the new firmware is active.

8.7 Checking for updates

You can check for updates and install them, if available. You can also view the release notes and details about the available updates. Additionally, it is possible to download the firmware file to install at a later point of time.

To install an available update:

1. In the menu **Support**, click **Check for updates**.
 - The window **Available Firmware Versions** opens.
2. Select the update you want to install.
 - The dialog window **Firmware Update** opens.
3. Click **Yes, update now**. The update may take a while. Do not interrupt this process. Since the device reboots during this process, you will be logged out.
 - ✓ The firmware is now updated.



In the window **Available Firmware Versions**, firmware bundles that are newer than the currently installed one are marked with ★. Important updates are marked with !. Click **Open** to view the change notes and details about a bundle version. To download a firmware bundle for later installation, click



In the window **Available Firmware Versions**, you can enable an **automatic update check** every 24 hours. If a new update is available, it will be indicated by the ★ icon next to the **Check for Updates** menu item. You can also enable a notification dialog that informs you of any new updates.

8.8 Setting up rights

Some functions of the DAB-4c are optional. To use these functions, you must activate additional rights by uploading a rights file. To receive rights files, please contact your 2wcom sales representative.

1. Navigate to the page **Global**.
2. In the block **Rights**, click **Browse/Drop file**.
3. Select the rights file (*.2wcom_key) you want to upload.
4. Click **Upload**. The upload may take a few minutes. Do not interrupt this process.
5. After a successful upload, follow the prompt to restart the device.
 - ✓ The new rights will be active after restart. You can view the current rights in the block **System information**.

8.9 Uploading and activating an SSL certificate

An SSL certificate is a digital certificate that provides authentication for a website and enables an encrypted connection.

To upload and activate an SSL certificate:

1. Navigate to the page **Global**.
2. In the block **SSL-Certificate**, click **Browse/Drop file**.
3. Select the SSL certificate file (*.pem) you want to upload.
4. Click **Upload**. The upload may take a while. Do not interrupt this process.
 - ✓ You have uploaded an SSL certificate.

8.10 Saving settings to a local file

You can download the current settings and save them as a file. You can upload this file later to restore the settings or upload it to another device to copy the settings.

1. Navigate to the page **Global**.
2. In the block **Settings download**, click **Generate**.
 - A file is being created. This may take a few seconds.
 - The download option with the time and date of file creation appears.
3. Click **Download**.
4. Save the file to a location of your choice.
5. Click **Save**.
 - ✓ You have saved settings to a local file. To upload and activate the settings stored locally, see 8.11 Loading settings from a file.

8.11 Loading settings from a file

You can upload a settings file to restore previous settings or copy the settings from another device. You can do this either via the web interface or the LCD menu. You can load the settings either without or including IP settings such as IP addresses and VLANs. This enables you to easily swap out a device. Note that if you load settings including IP via the web interface, you will lose the connection to the device due to the new IP address. For information on how to generate a settings file, see 8.10 Saving settings to a local file.

To load a settings file via the web interface:

1. Navigate to the page **Global**.
2. In the block **Settings update**, click **Browse/Drop file**.
3. Select the settings file you want to upload.
4. Click **Upload** to upload the settings file. The file upload may take a while. Do not interrupt this process.
 - ✓ The new settings are now active. If you chose to also load the IP settings, the device now has a new IP address.

To load a settings file via the LCD menu:

1. Insert a USB stick with the settings file into the [USB] port.
2. Use the jog wheel to select **Config menu** → **System** → **Load settings from USB** or **Load settings from USB (incl. IP)**.
3. Select the settings file you want to upload.
4. Select **Upload**. The file upload may take a while. Do not interrupt this process.
 - ✓ The new settings are now active. If you chose to also load the IP settings, the device now has a new IP address.

8.12 Generating and downloading a diagnostic report

In case of any problems or failures, you can generate and download a diagnostic report to send to 2wcom.

To generate and download a diagnostic report:

1. Navigate to the page **Global**.
2. In the block **Diagnostic Report**, select the time period for which the device captures all activities.
3. Click **Generate**. A file is being created. This may take a while. Do not interrupt this process.
 - The download option with the time and date of file creation appears.
4. Click **Download**.
5. Save the file to a location of your choice.
 - ✓ You have generated and downloaded a diagnostic report.

8.13 Uploading a debug script

To identify a specific error, you can upload a debug script that you have received from 2wcom. Depending on the expected error, the debug script monitors extra status information and records the incoming data. When the error occurs, the recording stops and a debug.log file is generated which contains all information that 2wcom needs to fix it.

To upload a debug script:

1. Navigate to the page **Global**.
2. In the block **Debug Report**, click **Browse/Drop file**.
3. Select the debug script file (*.upd) you want to upload.
4. Click **Upload**. The upload may take a while. Do not interrupt this process.
5. To start the debugging process, click **Start**. This may take a while. Do not interrupt this process.

- When an error occurs, the script is automatically stopped. A download link for the debug.log file appears.
- 6. To download the debug.log file, click on the link.
- 7. Send the file to your 2wcom contact person.
 - ✓ 2wcom can now identify the error and determine further action.

8.14 Rebooting the device

To reboot the device:

1. Navigate to the page **Global**.
2. In the block **Control**, click **Now** in the field **Reboot Device**.
 - ✓ The device restarts. After the restart, you will have to log in again.

8.15 Restoring factory settings

Restoring the factory settings will delete all configurations that were made by a user except for the IP address of the CTRL interface. This also applies to the access accounts.

To reset the device to factory settings:

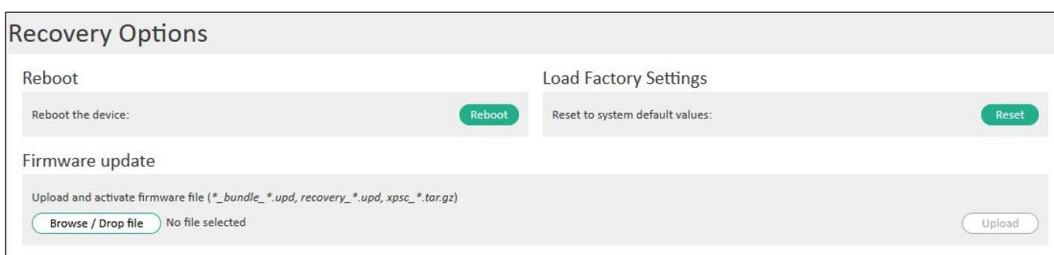
1. Navigate to the page **Global**.
2. In the block **Control**, click **Now** in the field **Load Factory Settings**.
 - ✓ You have restored the factory settings.



8.16 Accessing the recovery mode via reset pin hole

If you cannot access the DAB-4c via the web interface, you can reboot the device using the reset pin hole. You can also use the reset pin hole to access the recovery mode in which you can flash the device or restore factory settings.

- To restart the device, press the reset button for a second.
- 1. To access the recovery mode, press the reset button for a few seconds until all LEDs on the front panel turn off and only power LED starts flashing quickly.
 - The device starts in recovery mode.
- 2. Access the recovery web interface by entering the IP address of the device into a web browser. In recovery mode, you can upload and activate firmware, reset the system to factory settings or reboot the device.



3. After flashing or resetting the device, reboot the device by clicking **Reboot**.

- ✓ After a few seconds, the device will be ready for operation.

8.17 Setting the time and date

You can set the time, time zone and date of the internal clock.

1. Navigate to the page **Time**.
2. In the block **Local time**, select the present time zone in the dropdown menus.
3. Click **Save**.
4. In the block **Time and date settings**, enter the current date and time.
5. Click **Save**.
 - ✓ You have set the time and date. The current time and date of the internal clock is shown in the field **Present local date and time**.

8.18 Changing login data

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). The user account SFTP service is used only for the access from an external SFTP client for uploading audio files and saving them in the internal storage.

Change the login data after the first login to the web interface.

The default login data for the first login are (case sensitive):

- Guest account: "guest" / "guest"
- Manager account: "manager" / "manager"
- Admin account: "admin" / "admin"
- FTP service: "sftpuser" / "sftpuser"

To change the login data:

1. Log in as an admin.
2. Change the login data for an account in the corresponding block and repeat the new password.
3. Click **Save**.
 - ✓ You have changed the login data.

8.19 Adapting the access for user accounts

You can configure the access to certain web interface pages for the manager and guest accounts.

Prerequisite: You are logged in as an admin.

To adapt the access for manager and guest accounts each individual DAB-4c menu:

1. Navigate to the page **User**.
2. Click on the tab **Menu Access**.
3. Enable or disable the access to the separate menus by setting the corresponding switch to either **ON** or **OFF**.
4. Click **Save**.
 - ✓ The new access configuration is now active.

9 Status information

9.1 Status LEDs

The DAB-4c is equipped with 4 status LEDs on the banner of the web interface that display the status of the inputs, outputs, power supply and alarms.



The following table displays the meaning of each LED:

LED	Color	Meaning
Power		All supply cords are connected and the power supply is OK.
		Toggles (green/red) if only one power supply is connected or OK.
Warning		LED is off if no alarms are triggered.
		At least one alarm is triggered.
Input		No input monitoring alarms are enabled.
		Input monitoring alarms are enabled and all inputs are OK.
		One or more inputs are bad, but at least one is good.
		All inputs are bad.
Output		No decoder output monitoring alarms are enabled.
		Output monitoring alarms are enabled and all outputs are OK.
		One or more outputs are bad, but at least one is good.
		All outputs are bad.

9.2 General overview

The page **Overview** gives general information on the status of your DAB-4c. The appearance of this page might differ depending on the activated rights and built in modules.

Overview

Status

Serial Number 620.000002	Bundle Version 1.20-beta6	Temperature 44 °C	Ctrl UP, 1 Gbit, 192.168.100.135	Rx 89k	Tx 58k	Data 1 UP, 1 Gbit, 10.3.4.10	Rx 1.673M	Tx 0
Uptime 6 days, 06:09:17	Last boot 05. May 2022, 06:59:11					Data 2 UP, 1 Gbit, 10.50.0.16	Rx 1.680M	Tx 0

EDI-to-ETI/EDI **ETI-to-EDI** **TS Multiplexer** **External Clock**

Converter 1 Main

Name
Input EDI Streams

1. IP Address : Port
239.199.10.1:1234

2. IP Address : Port
239.199.10.2:1234

Converter 2
None

Converter 3
None

Converter 4
None

Details - Converter 1 [Reset Counters](#)

Main Source

Name
Input EDI Streams

EDI Input 1 Primary

IP Address 239.199.10.1	UDP Port 1234	Interface Data 1	Datarate 1.569 Mbit/s	Jitter 1 ms	FEC 22	Timed Out 0
Packet Loss Rate 0 %	Missed 67870	Buffer Level 96 ms	Late IP Packets 28	Jitter Late 333 ms	Jitter Late Max. 334 ms	
PFT Src Addr 0	Sync Status Master					

EDI Input 2 Primary

IP Address 239.199.10.2	UDP Port 1234	Interface Data 2	Datarate 1.569 Mbit/s	Jitter 0 ms	FEC 28	Timed Out 0
Packet Loss Rate 0 %	Missed 23292	Buffer Level 96 ms	Late IP Packets 33	Jitter Late 152 ms	Jitter Late Max. 334 ms	
PFT Src Addr 0	Sync Status Slave, PFT Pseq Diff. +2 ms					

Converter Input EDI

Sync Lost 216	FEC Level 1	Missed 2381	Packet Loss Rate 0 %	Frames Corr. 186	Frames Uncorr. 199
------------------	----------------	----------------	-------------------------	---------------------	-----------------------

Converter Output ETI/EDI

Ensemble Label 2wcom	Subch. 10	FIC 1	DAB Mode 1
Frame Length 3596	Frame Cnt Error 43	LI TIST 0	
CRC EOH Errors 0	CRC EOF Errors 0	Error Field 0	

ETI Outputs

ETI Output 1

Clock Source
Internal Recovered

Buffer Underrun / AIS
64

Frame Cnt Error
72

Buffer Level
312 ms

Clock Pull
3.27 PPM

Transmitter Comp. Delay
939.528 ms

Output Accuracy
~1.619 ms

The block **Status** gives general device-specific information as well as information on the ethernet interfaces.

The tabs **EDI-to-ETI/EDI** and **ETI-to-EDI** show the status of the converters. The bar on the left of each converter panel indicates its status:

Green = the main source is ok.

Orange = the main source is not ok and a backup source is used.

Red = errors in all sources used for this converter.

Grey = converter is not enabled.

- Click on a converter for more details.
- Click on the arrow next to a panel heading to view further details, if applicable.
- Click on the arrow on the side of an input panel to show the Fallback or SAT Tuner, if it is configured.
- To restart all counters, click **Reset Counters**.

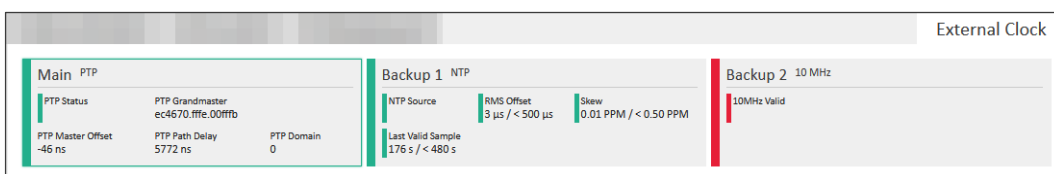
The following terms and abbreviations are used on this page:

Term / Abbreviation	Description
Jitter	The jitter value gives information on the fluctuation of the offset. For example, if the offset fluctuates between +1 ms and -1 ms, then the jitter is 2 ms).
Timed Out	Counter for number of packets that have not arrived in the time set as the reordering buffer. Due to that the Output Buffer might also run empty and cause a buffer underrun. In this case, output errors might happen due to very bursty traffic behavior and the dejitter buffer cannot work as expected.

Late	The Late counter increases if consecutive IP packets arrive later than 48 ms after the previous ones. This does not mean that the transmission is affected.
Packet Loss Rate	PLR is the fraction of the total transmitted packets that did not arrive at the receiver.
Missed	Counter for missed packets since last counter reset.
PFT Src Addr	The PFT source address of the multiplexer is displayed if the Paneda Multiplexer is activated for PFT seamless switch.
Sync Status	The sync status gives information on the dual stream and its differential delay.
Buffer Level	The actual buffer level of the configured reordering buffer.
Jitter Late	The actual last jitter when the Late counter has increased.
Jitter Late Max.	The overall highest jitter when the Late counter has increased.
Frames Corr.	Counter for number of frames that were corrected.
Frames Uncorr.	Counter for number of frames that were not corrected.
FEC Level	Level of Forward Error Correction.
Subch.	Counter for the available audio subchannels in the ETI signal.
FIC	Shows if a DAB Fast Information Channel is present or not.
Frame Cnt Error	The Frame Cnt Error counter increases if the ETI Frame Continuity is lost.
Buffer Underrun/AIS	Error counter: If the buffer runs empty and there are no valid data at the ETI output, then an AIS (alarm identification signaling for E1) is sent.
Sync Lost	Error counter for EDI input.

External Clock Status

If an external clock is used, then it is displayed as  on the page **Overview**. The tab **External Clock** gives quick status information on the external clock. This block shows the active clock source and the configured backup sources as well as their status information. For more information on the NTP servers, see 9.4 NTP Status.



TS Multiplexer status

The Tab **TS Multiplexer** on the page **Overview** gives a detailed overview on the status of the enabled multiplex outputs.

- To see more details on the configured programs in one multiplex, click on the corresponding Multiplex.
- To see more details on the payload of a program, click on the corresponding program.

The screenshot displays the 'TS Multiplexer' tab in the 2wcom interface. At the top, there are tabs for 'EDI-to-ETI/EDI', 'ETI-to-EDI', 'TS Multiplexer', and 'External Clock'. The 'TS Multiplexer' tab is active, showing a summary for 'Multiplex 1' with a service count of 2, TS ID of 100, and TS Bitrate of 5.771 Mbit/s. Below this, there are two sections: 'Details - Multiplex 1' and 'Details - Test EDI A'. The 'Details - Test EDI A' section shows a table with columns for Service ID, PMT PID, PCR PID, PID, and EDI Input 1. The table lists two entries: 'Test EDI A' and 'Test EDI B'. Below the table, there is a 'Source' section with a table showing the status of various streams, including 'Test Stream A'. The table has columns for No, Name, Domain / IP, Port, Eth, Delay, FEC, Bitrate, Packets/s, Max size, Receiver Address, Lost, and Jitter. The 'Test Stream A' entry shows a domain/IP of 239.232.13.201, port 4000, and a bitrate of 6.380M.

System Information

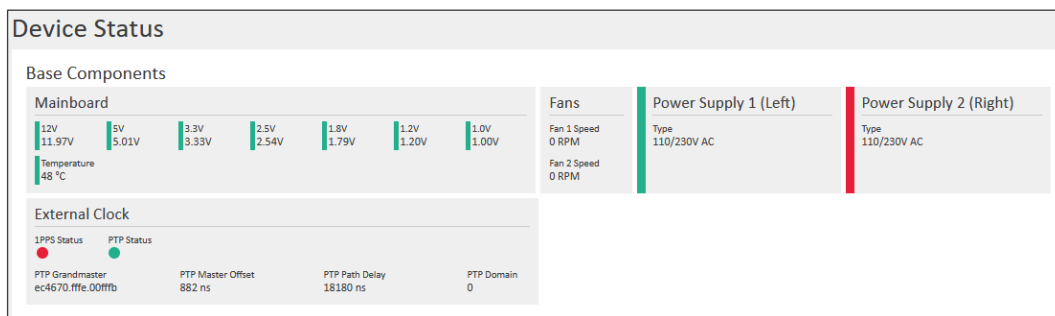
The page **Global** gives specific information on the device, such as the uptime and time of the last boot, serial number, activated rights and software version. The current version of your DAB-4c is the **Bundle Version**.

System information	
Present local date and time:	30. August 2021, 11:36:11
Last boot:	24. August 2021, 13:42:05
Uptime:	5 days, 21:54:06
Serial number:	620.000047
Bundle version:	1.16
File/Recovery system version:	2.03 / 2.00
App version:	1.16.1
Webinterface version:	1.67
FPGA version:	1.04b16 / 0
System Controller version:	1.05
SNMP MIB version:	2.1 (SNMP MIB)
HW Revision XPS/IF:	1.02 / 1.10
Rights:	4 Edi-to-Eti Converter, 4 Eti-to-Edi Converters, Edi-to-Edi, Edi Pft Seamless Switching, Additional Backup, Eti Mirroring
Missing rights:	Eti Switch, Sat Tuner, Dab Tuner, Asi
Open source acknowledgements:	Link

9.3 Device status

The page **Device** gives information on the current status of the hardware.

- The block **Mainboard** displays the voltages on the mainboard and the device temperature.
- The block **Fans** displays the speed of the fans.
- The blocks **Power Supply** display the status and type of the left and right power supplies. The colored bar indicates the status: green - ok, red - no power. If only one power supply module is built in, the only one block is displayed on this page.
- The block **Expansion Modules** displays built-in hardware options. If no expansion modules are built in, this block is not shown.

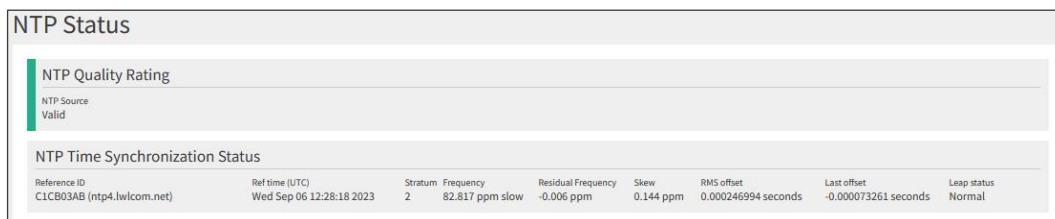


9.4 NTP Status

Navigate to the page **NTP Status** to view the status of the NTP servers used for time synchronization.

The first block gives information on the quality of the current synchronization. The DAB-4c always uses the best available source. The quality status of the current NTP server synchronization is displayed via a color-coded bar:

- green = the quality is good
- red = at least one of the listed data is bad



The list below explains the data that is displayed in this block:

NTP Source	States whether an NTP source is available.
Reference ID	The reference ID and IP address of the server to which the computer is currently synchronized.
Ref time (UTC)	The time (UTC) at which the last measurement from the reference source was processed.
Stratum	The stratum value indicates how many levels away the NTP server is from the primary reference source. Lower stratum values indicate a closer and more accurate clock source.
Frequency	The rate by which the clock would be wrong if it were not corrected.
Residual Frequency	Difference between what should be frequency according to the measurements from the reference source and the frequency that is currently used.
Skew	The frequency offset to the clock standard.

RMS Offset	The root-mean-square offset is a long-term average offset to the currently estimated time.
Last offset	The time (UTC) at which the last measurement from the reference source was processed.
Leap status	Normal: no leap second. Insert second: leap second will be inserted at the end of the month. Delete second: leap second will be deleted at the end of the month. Not synchronized: unknown status (no valid measurement was made).

The block **NTP Server Status** lists all NTP servers and gives detailed information on them. The status of the NTP server source is displayed via a color-coded bar:

- green = current best
- orange = combined
- red = not combined

NTP Server Status											
NTP Server 1											
Source State	Name/IP address	Stratum	Poll	Reach	LastRx	Measured Offset	Adjusted Offset	Estimated Error	Frequency	Freq. Skew	Standard Deviation
Current best	ntp4.lwlcom.net	1	100 s	377	578	-201us	-275us	+/- 2921us	-0.068	0.162	218us
NTP Server 2											
Source State	Name/IP address	Stratum	Poll	Reach	LastRx	Measured Offset	Adjusted Offset	Estimated Error	Frequency	Freq. Skew	Standard Deviation
Not combined	mail.sebi.org	2	100 s	377	577	-792us	-792us	+/- 34ms	-0.180	0.281	141us
NTP Server 3											
Source State	Name/IP address	Stratum	Poll	Reach	LastRx	Measured Offset	Adjusted Offset	Estimated Error	Frequency	Freq. Skew	Standard Deviation
Combined	time.cloudflare.com	3	100 s	377	532	-276us	-276us	+/- 5891us	-0.039	0.255	206us
NTP Server 4											
Source State	Name/IP address	Stratum	Poll	Reach	LastRx	Measured Offset	Adjusted Offset	Estimated Error	Frequency	Freq. Skew	Standard Deviation
Not combined	217.160.114.150	2	100 s	377	171	-2939us	-2939us	+/- 86ms	+0.265	0.448	560us

The list below explains the data that is displayed in this block. For more information, visit chrony.tuxfamily.org/doc/4.1/chronyc.html

Source State	Current best: the best source which is currently selected for synchronization Combined: other sources selected for synchronization which are combined with the best source. Not combined: any other source.
Name/IP address	The name or the IP address of the source
Stratum	The stratum value indicates how many levels away the NTP server is from the primary reference source. Lower stratum values indicate a closer and more accurate clock source.
Poll	Polling interval, which is the frequency at which the device queries the NTP server for time updates.
Reach	Indicates the reachability of the NTP server. This is a bitmask value that shows how successfully the device has been able to reach and communicate with the server.
LastRx (Last Receive)	Shows how long ago the last good sample was received from the source.
Measured Offset	The measured time difference between the local clock and the NTP server's clock at the time of synchronization.
Adjusted Offset	This value represents the measured offset after any corrections or adjustments have been applied to align the local clock with the NTP server's time.
Estimated Error	The total worst-case timing error accumulated between the stratum 1 server and the client.
Frequency	This is the estimated residual frequency for the server.
Frequency Skew	The frequency offset to the clock standard.
Standard Deviation	This is the estimated sample standard deviation.

9.5 Hardware Oscillator Status

Navigate to the page **HW Oscillator** to view the status of the hardware oscillator's calibration. This page displays the calibration status as the offset in reference with different reference sources.

For the NTP clock control, the currently valid reference value is set as the initial value. This increases the accuracy of the NTP clock control. If NTP is present, then it is used as the reference value. Only if NTP is not present, then the 10 MHz signal is used as reference. The current offset of the ETI clock to the external 10 MHz clock is displayed in the block **Ext. 10MHz - HW Osc. Offset**.

HW Oscillator Status					
HW Oscillator Calibration					
Calibration Status - Reference Ext. 10MHz		Calibration Status - Reference NTP		Ext. 10MHz - HW Osc. Offset	
Calibration measured at Tue Dec 01 08:06:46 2020	Offset 1.30 PPM	Calibration measured at Mon Aug 30 01:25:40 2021	Offset 1.45 PPM	Last measured at Not set	Offset 0.00 PPM

9.6 Log

The **event log** is a record of significant system events, such as system restarts and error messages, which are crucial for monitoring the performance of the device. These events have an alarm priority and may require immediate attention or action to resolve issues or ensure proper operation. See also: 8.1 Setting up alarms.

Event Log					
Extended Log volatile					
Filter: Example: Cold Start OK		Operations: '&' for AND, ' ' for OR		States: OK, FAIL	
		Auto Refresh ☒		Download Clear	
No	Time	Priority	State	Message	
887	2023-09-07 11:06:03	Informational		Successful login as Admin from 192.168.96.90	
886	2023-09-06 13:15:14	Informational		Successful login as Admin from 192.168.99.120	
885	2023-09-06 08:16:55	Informational		Successful login as Admin from 192.168.99.120	
884	2023-09-05 14:07:24	Informational		Successful login as Admin from 192.168.96.90	
883	2023-09-05 12:40:30	Informational	OK	BNC Input 1: Silence Detection (Ref: 0.0, Level: 5.0 [dBu])	
882	2023-09-05 12:40:02	Emergency	FAIL	BNC Input 1: Silence Detection (Ref: 0.0, Level: -11.9 [dBu])	

The **extended log** contains less critical information compared to the event log and is primarily intended to provide insights into general events. The log entries in the extended log are informational and do not carry alarm priorities, they are volatile and do not persist over restarts.

Event Log					
Extended Log volatile					
Filter: Example: RtpMissedPkt&SSRC:0x7ee9fcdcf		Operations: '&' for AND, ' ' for OR		States: OK, FAIL	
		Auto Refresh ☒		Download	
No	Time	Source	Type	Message	
54	2023-09-05 16:33:50	Default	RtpRxTimedOut	RTP Rx stream timed out from IP 192.168.101.72:52238, SSRC:0x00000000	
53	2023-09-05 16:00:09	Default	RtpUnrecoveredPkt	RTP Rx 1 packet(s) unrecovered (eq. 3ms), 1st missed SEQ:36339	
52	2023-09-05 16:00:09	Default	RtpMissedPkt	RTP Rx 1 packet(s) missed, 1st missed SEQ:36339 (from 192.168.101.72:52238)	
51	2023-09-05 15:21:27	Default	RtpRxStart	Start RTP Rx from IP 192.168.101.72:52238, SSRC:0x00000000	
50	2023-09-05 15:21:27	Default	RtpRxStart	Start RTP Rx from IP, SSRC:0x65ebd7cc	
49	2023-09-05 15:21:11	Default	RtpRxTimedOut	RTP Rx stream timed out from IP 192.168.101.72:52238, SSRC:0x00000000	
48	2023-09-05 15:21:00	Default	RtpRxStart	Start RTP Rx from IP 192.168.101.72:52238, SSRC:0x00000000	

- To automatically refresh the page and immediately see new entries, toggle the switch **Auto Refresh**.
- To sort the log entries, click on the column header of the parameter by which you want to sort the entries. To reverse the order, click that header again.
- To search for a specific entry, enter a term into the search bar.
- To save the list to a log file, click **Download**.
- To delete all log entries, click **Clear**. Confirm your choice in the dialog window.

9.7 Priority of alarm messages

Priority	ID/Code	Definition
Emergency	0	System is unusable
Alert	1	Actions must be taken immediately
Critical	2	Critical condition
Error	3	Error condition
Warning	4	Warning condition
Notice	5	Normal but significant condition
Informational	6	Informative message
Debug	7	Debug-level message

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 the alarming case is and what measures are necessary. The event will be recorded in a log entry.

10 Further information

10.1 Maintenance and disposal

No special maintenance is necessary on the device. Do not use corrosive detergents on the device such as benzene, thinner, alcohol or acetone.

Remove dust on the housing of the device with a soft, dry cloth.

Electrical appliances do not belong in domestic waste. Dispose of the device in an environmentally friendly manner via suitable collection systems in accordance to the local regulations.

10.2 Troubleshooting, support and warranty

More often than not, it is only a small detail that has been overlooked and leads to a problem. Therefore, read the entire user manual carefully, as this will help you to understand, prevent and eliminate typical problems. Use the following table to self-check common error sources prior to contacting our support.

Report failures by email to support@2wcom.com. For a support request to 2wcom, please have the serial number of the device ready. You can find the serial number of your device on the page **Global** and on the sticker on the rear side of the device: "S/N xxx.xxxxxx".

For information on the warranty of 2wcom products, visit <https://www.2wcom.com/terms-and-conditions/>.

Problem	Possible Causes	Solution
Device does not turn on	- Power cable is connected improperly - Mains supply failure - Blown fuse	- Check power supply cord. - Make sure that the power plug is fully inserted. - Check mains supply. - Replace fuse by same type.
Device is not accessible via Ethernet	- Network cable is not connected - IP address/TCP port is unknown - A device with the same IP address was connected a few minutes before. Thus, the ARP table still assigns the old MAC address to the IP address.	- Connect the network cable. - Check IP address obtained from DHCP via LCD menu. - The operation system refreshes the ARP table every few minutes. For an instant access to the device, reset the ARP table of your computer, e.g. by entering <code>arp-d</code> in the Windows command prompt.
Device does not respond		- Reboot the device. - Update the software.

10.3 Manufacturer

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11 Technical details



Technical details (1/4)

In- and outputs

RF / SAT (optional)

Input	F-jack female
Data	MPEG TS (EDI MPE) MPEG TS (ETI SC/PC, MC/PC) GSE (EDI)
Frequency	950 – 2.150 MHz
Input level	-75 – -20 dBm
LNB control	13 V vertical, 18 V horizontal 0 kHz low band, 22kHz high band
RF-DAB (optional)	1 unbalanced, BNC (optional)
Impedance	50 Ω
Frequency range	168 – 240 MHz (DAB Band III)
RF sensitivity	10 dB μ V
Max. RF input	100 dB μ V

ASI

Data	MPEG TS (ETI)
Connector	BNC 270 Mbps
EDI to ETI	4x EDI/ETI converter
ETI to EDI	4x ETI/EDI converter
EDI to EDI	4x EDI level converter



Technical details (2/4)

SAT

	Basic Single Tuner (optional)	Dual Tuner (optional)
Connector RF1	F connector female (input)	F connector female (input)
Connector RF2	F connector female (loop-through)	F connector female (2 nd input)
Frequency range	950 ... 2.150 MHz, step 1 kHz All LNB oscillator frequencies possible	950 ... 2.150 MHz, step 1 kHz All LNB oscillator frequencies possible
Input level, impedance	-75 – -20 dBm, 75 Ω	-75 – -20 dBm, 75 Ω
LNB Control	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band	13 V vertical, 18 V horizontal, off 0 kHz low band, 22kHz high band
Noise figure	Typical 6dB, max. 12 dB	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	QPSK CCM VITERBI and Reed-Solomon decoder 1/2, 2/3, 3/4, 5/6, 6/7, 7/8
DVB-S2 demodulation/ Decoding	QPSK and 8PSK CCM LDPC and BCH decoder	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	0.128 ... 45 MSym/s	1 – 45 MSym/s
Data processing	MPEG TS (EDI MPE); MPEG TS (ETI SC/PC, MC/PC); GSE (EDI)*	MPEG TS (EDI MPE) MPEG TS (ETI SC/PC, MC/PC)
PL scrambling	ID 0 – 262144	ID 0 – 262144
IF Filter bandwidth	Automatic selection	Automatic selection
MPEG decoding	according to ETSI TR 101 154	according to ETSI TR 101 154



Technical details (3/4)

Interfaces

ETI

ETI in	4x BNC E1/ETI in
ETI out	4x BNC E1/ETI out

Ethernet

Data	EDI, 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	EDI, UDP, IGMP, ICMP, DHCP, HTTPS, FTPS, SNMP, NTP, PTPv2

Serial

Interface	8x RS-232C (rear) Sub D-15
Data	Private data, MPEG ancillary data, UECF/RDS (acc. to TR 101 154)e
Transmission rate	1200 to 115200 baud, asynchronous
USB	1x USB 2.0 interface

Time synchronization (optional)

PTPv2	Network synchronization according to IEEE 1588-2008
10MHz	BNC connector

Internal storage (optional)

Size	7 GB (optional 1000 GB)
Type	eMMC (optional SSD)

Contact closure

Inputs	8x 26 pole sub-D male
Outputs	7+1 floating relays 7 relays SPST (Form A) 1 relay SPDT (Form C) (for DC: max. 30 V, 1 A, 10W) 26 pole sub-D male



Technical details (4/4)

Front panel

Display: LCD	Graphical, 264x64 pixel
Jog wheel	Impulse, enter button
4 Duo LEDs	Power, input, output, warning

Advanced processing functions (optional)

Modulation/symbol rate	32 APSK (0.064 .. 38 MSym/s)
Modulation type	VCM, ACM
Transport stream processing	Single and multiple transport stream / single and multiple generic stream (GSE)
Modulation/symbol rate	32 APSK (0.064 .. 38 MSym/s)

All tuners

IF filter bandwidth	Automatic selection
---------------------	---------------------

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)
Standard DC (optional)	1 internal (Neutrik powerCON) voltage range -40 – -60 VDC (nominal -48 VDC)
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) DC: -40 – -60 VDC (nominal -48 VDC)
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) DC: -40 – -60 VDC (nominal -48 VDC)

12 Certificates and declarations



EC declaration of conformity

The manufacturer

2wcom Systems GmbH
Am Sophienhof 8
24941 Flensburg
Germany

hereby confirms that the product:

DAB-4c

in its conception, construction and form put into circulation is in accordance with all the relevant essential health and safety requirements of the following EC/EU directives as amended and the national laws and regulations adopting these directives:

- | | |
|---|---------------------|
| • Audio/video, information and communication technology equipment - Part 1: Safety requirements | EN IEC 62368-1:2018 |
| • Electromagnetic Compatibility (EMC) Directive | 2014/30/EU |
| • Low Voltage (LVD) Directive | 2014/35/EU |
| • Radio Equipment Directive (RED) | 2014/53/EU |
| • Restriction of Hazardous Substances (RoHS 2) Directive | 2011/65/EU |

This EC-declaration of conformity is the result of a test, which was accomplished in accordance with the standards EN 301489-1:2020-06, EN 300422-1:2022-05, EN 300422-2:2017-07, EN 55011:2022-05, EN 55032:2022-08, EN 55035/A11:2022-06, EN 61000-3-2:2019-12, EN 61000-3-3:2023-02, EN 61000-4-2:2009-12, EN 61000-4-3:2021-11, EN 61000-4-4:2013-04, EN 61000-4-5:2019-03, EN 61000-4-6:2014-08, EN 61000-4-11:2020, EN 61000-4-16:2016-10, EN IEC 63000:2018.

This declaration is no longer valid if the machine is modified without our consent.

2wcom Systems GmbH

January 10, 2024