

Spectera

Bidirectional, wireless broadband ecosystem

PDF export of the original HTML manual

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1. Preface

PDF Export of the Original HTML Manual

This PDF document is an automatic export of an interactive set of HTML manuals. Some content and interactive elements may not be included in the PDF because they cannot be displayed in this format. In addition, automatically generated page breaks may cause related content to be slightly shifted. We can therefore only guarantee the completeness of the information in the HTML manual and recommend using it. You can find it in the Documentation Portal at www.sennheiser.com/documentation.

2. Product information

All information about the product, the scope of delivery and the available accessories.

Spectera System

Sensing Capabilities - Audio detection and transmission

Spectera devices (Base Station, DAD, SEK) build audio transmission system for professional use. Once paired, SEK mobile devices can transmit audio signals captured by a connected microphone over radio frequencies. Due to its bi-directionality, the SEK is able to receive audio signals from DAD and the sound comes out of the headphones, if any connected. Here how it works:

Transmission:

1. The microphone connected to the SEK picks up the sound and converts it into electrical signals.
2. The SEK then prepares these signals for transmission by amplifying and modifying them.
3. The signals are sent over radio waves to the DAD Antenna.
4. The DAD antenna changes the radio back into electrical signals and sent them to the Base Station for further audio processing.

Receiving:

1. The Base Station forward audio signals to the DAD Antenna.
2. These signals are then prepared for transmission by boosting and modifying them.
3. The signals are sent over radio waves to the SEK mobile devices.
4. The SEK changes the radio back into electrical signals and at a further stage, sound will be directed to connected headphones.

Base Station



Base Station | 1350 - 1525 MHz | Art. no. 509162

The license for the Base Station is available in the following versions:

Name	Art. no.	Frequency range	Certified Countries*
SPECTERA LIC (ZONE 01)	700 532	UHF (470 - 608 MHz, 630 - 698 MHz) 1G4 (1350 - 1400 MHz, 1492 - 1525 MHz)	EU + EFTA, United Kingdom, Turkey
SPECTERA LIC (ZONE 02)	700 533	UHF (470 - 608 MHz, 657 - 663 MHz) 1G4 (1435 - 1525 MHz Certification pending)	USA
SPECTERA LIC (ZONE 03)	700 534	UHF (470 - 608 MHz, 657 - 663 MHz)	Canada
SPECTERA LIC (ZONE 04)	700 535	UHF (470 - 534 MHz, 534 - 608 MHz, 630 - 698 MHz)	Singapore
SPECTERA LIC (ZONE 05)	700 536	UHF (470 - 608 MHz, 630 - 698 MHz) 1G4 (1350 - 1400 MHz)	South Africa
SPECTERA LIC (ZONE 06)	700 537	UHF (470 - 608 MHz, 630 - 694 MHz)	Malaysia, Qatar
SPECTERA LIC (ZONE 07)	700 538	UHF (470 - 510 MHz, 630 - 698 MHz)	Israel
SPECTERA LIC (ZONE 08)	700 539	UHF (487 - 608 MHz, 630 - 694 MHz)	Indonesia
SPECTERA LIC (ZONE 09)	700 540	UHF (470 - 608 MHz, 630 - 694 MHz) 1G4 (1350 - 1400 MHz)	United Arab Emirates
SPECTERA LIC (ZONE 10)	700 541	UHF (470 - 608 MHz, 630 - 698 MHz)	Philippines
SPECTERA LIC (ZONE 11)	700 542	UHF (520 - 608 MHz, 630 - 694 MHz)	Australia
SPECTERA LIC (ZONE 12)	700 543	UHF (510 - 606 MHz)	New Zealand

Name	Art. no.	Frequency range	Certified Countries*
SPECTERA LIC (ZONE 13)	700 544	UHF (479 - 565 MHz)	Hong Kong
SPECTERA LIC (ZONE 14)	700 728	UHF (470 - 608 MHz)	Egypt, Mexico
SPECTERA LIC (ZONE 15)	701 015	UHF (510 - 530 MHz, 630 - 698 MHz, 6 MHz Bandwidth)	Taiwan
SPECTERA LIC (ZONE 16)	701 016	UHF (470 - 608 MHz, 6 MHz Bandwidth)	Brazil
SPECTERA LIC (ZONE 17)	701 016	UHF (470 - 510 MHz, 630 - 698 MHz)	China

* It is the responsibility of the user to inform themselves about the current local regulatory and certification requirements and to comply with them using wireless systems.

i You can find more detailed information about the Base Station in the following sections:

- **Startup and operation**: Base Station
- **Specifications**: Base Station

Base Station ZMAN



Base Station ZMAN | 1350 - 1525 MHz | Art. no. 701011

The license for the Base Station ZMAN is available in the following versions:

Name	Art. no.	Frequency range	Certified Countries*
SPECTERA LIC (ZONE 01)	700 532	UHF (470 - 608 MHz, 630 - 698 MHz) 1G4 (1350 - 1400 MHz, 1492 - 1525 MHz)	EU + EFTA, United Kingdom, Turkey
SPECTERA LIC (ZONE 02)	700 533	UHF (470 - 608 MHz, 657 - 663 MHz) 1G4 (1435 - 1525 MHz Certification pending)	USA
SPECTERA LIC (ZONE 03)	700 534	UHF (470 - 608 MHz, 657 - 663 MHz)	Canada
SPECTERA LIC (ZONE 04)	700 535	UHF (470 - 534 MHz, 534 - 608 MHz, 630 - 698 MHz)	Singapore
SPECTERA LIC (ZONE 05)	700 536	UHF (470 - 608 MHz, 630 - 698 MHz) 1G4 (1350 - 1400 MHz)	South Africa
SPECTERA LIC (ZONE 06)	700 537	UHF (470 - 608 MHz, 630 - 694 MHz)	Malaysia, Qatar
SPECTERA LIC (ZONE 07)	700 538	UHF (470 - 510 MHz, 630 - 698 MHz)	Israel
SPECTERA LIC (ZONE 08)	700 539	UHF (487 - 608 MHz, 630 - 694 MHz)	Indonesia
SPECTERA LIC (ZONE 09)	700 540	UHF (470 - 608 MHz, 630 - 694 MHz) 1G4 (1350 - 1400 MHz)	United Arab Emirates
SPECTERA LIC (ZONE 10)	700 541	UHF (470 - 608 MHz, 630 - 698 MHz)	Philippines
SPECTERA LIC (ZONE 11)	700 542	UHF (520 - 608 MHz, 630 - 694 MHz)	Australia
SPECTERA LIC (ZONE 12)	700 543	UHF (510 - 606 MHz)	New Zealand

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SPECTERA LIC (ZONE 15)	701 015	UHF (510 - 530 MHz, 630 - 698 MHz, 6 MHz Bandwidth)	Taiwan
SPECTERA LIC (ZONE 16)	701 016	UHF (470 - 608 MHz, 6 MHz Bandwidth)	Brazil
SPECTERA LIC (ZONE 17)	701 016	UHF (470 - 510 MHz, 630 - 698 MHz)	China

* It is the responsibility of the user to inform themselves about the current local regulatory and certification requirements and to comply with them using wireless systems.

i You can find more detailed information about the Base Station ZMAN in the following sections:

- **Startup and operation**: Base Station ZMAN
- **Specifications**: Base Station ZMAN

WebUI

Information about supported devices, design, functionality and the main features of the software at a glance.

Spectera WebUI is a self-hosted, browser-based and user-friendly interface for the dedicated control and monitoring of Spectera devices.

The WebUI offers you an intuitive **Configuration** with essential remote control and monitoring functions, such as IEM volume, latency, audio level and settings, RF status, battery status and much more. The **Frequency Scan** provides a continuous spectrum scan via Spectera's innovative DAD antenna. Plus, the **Audio Levels view** shows all inputs and outputs of the connected interfaces on one page. All audio channels and links are summarized in the **Audio IO** view and can be easily adjusted.

Key Features

- Self-hosted, browser-based and user-friendly interface for the dedicated control and monitoring of Spectera devices.
- Online interface for full system management.
- A tool-tip provides contextual additional information that appears when hovering over an element with the mouse.
- Complete remote control and monitoring of all Spectera ecosystem components, including the Base Station, DAD antenna, and SEK bodypacks, all on a single page.
- Unprecedented remote control and monitoring capabilities, plus visibility of:
    - Interference Level (IF)
    - Receive Signal Strength Indication (RSSI)
    - Link Quality Input (LQI)
    - IEM settings (Interface, CH, Mode, Balance, Volume)
    - MIC settings (Mic/Line, Cable Emulation, Low Cut, Preamp Gain, Test Tone, Mode, CH)
- Continuous spectrum scanning via DAD antenna available.
- Regional license key for activating the Base Station.

> **i** You can find more detailed information about the WebUI in the following sections:
>
> - **Instruction manual**: WebUI
> - **Specifications**: WebUI

SEK



SEK (UHF) SEK (1G4)

The SEK is available in the following versions:

SEK UHF | 470 - 698 MHz | Art. no. 509164

SEK 1G4 | 1350 - 1525 MHz | Art. no. 509163

> **i** You can find more detailed information about the SEK in the following sections:
>
> - **Startup and operation**: SEK
> - **Specifications**: SEK

SKM



The SKM is available in the following versions:

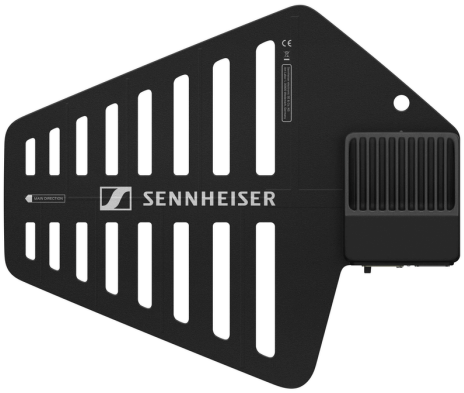
SKM UHF | 470 - 698 MHz | Art. no. 509166

SKM 1G4 | 1350 - 1525 MHz | Art. no. 509165

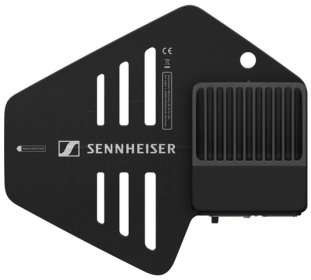
You can find more detailed information about the SKM in the following sections:

- **Startup and operation**: SKM
- **Specifications**: SKM

DAD



DAD (UHF)



DAD (1G4)

The Digital Antenna Directional (DAD) is available in the following versions:

DAD UHF | 470 - 698 MHz | Art. no. 509169

DAD 1G4 | 1350 - 1525 MHz | Art. no. 509170

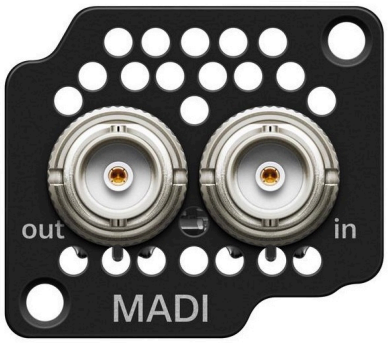
> **i** You can find more detailed information about the DAD in the following sections:
>
> - **Startup and operation**: DAD
> - **Specifications**: DAD

Accessories

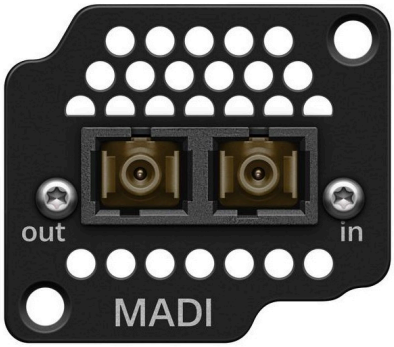
Accessories for the Base Station

MADI Cards

MADI Card (BNC) for Base Station | Art. no. 509293



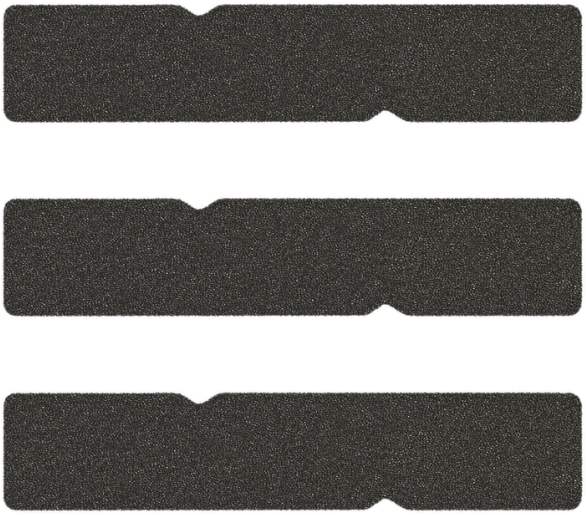
MADI Card (OM) for Base Station | Art. no. 509295



- See Installing slot-in cards

Spectera Filter set

Three exchangable **filters** for the Base Station | Art. no. 700073



- See Changing the fan filter

Accessories for the SEK

Spectera SEK Antenna

SEK Antenna (UHF) | 470 - 698 MHz | Art. no. 700066



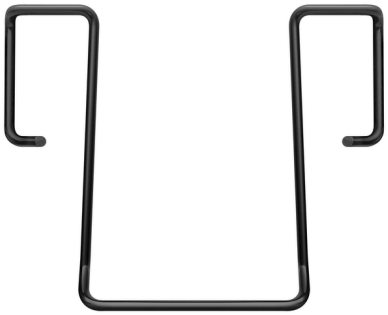
SEK Antenna (1G4) | 1350 - 1525 MHz | Art. no. 700067



- See Mounting the antenna

Spectera SEK Belt Clip

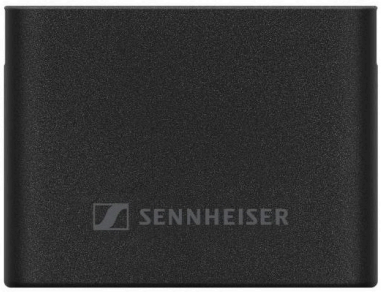
SEK Belt Clip | Art. no. 700071



- See Changing the belt clip

Spectera SEK Battery Cover

Exchangeable battery cover | Art. no. 700556



3-pin protective cap MIC/LINE

Exchangeable protective **cap** for the microphone / instrument 3-pin connector | Art. no. 700072



- See Using the protection cap

COM Button

Command adapter for SEK | Art. no. 701014



- See Connecting the COM Button
- See Operating the SEK with the COM Button

Accessories for the SKM

Command adapter with a push button

Spectera SKM COM | Art. no. 700701



- See Attaching the SKM COM

Accessories for the DAD

Optional cables for DAD



Antenna cable cat 5e | 10 m | Art. no. 700068

Antenna cable cat 5e | 25 m | Art. no. 700069

Antenna cable cat 5e | 50 m | Art. no. 700070

- See Connecting/disconnecting the antenna

CHG 70N-C network-enabled charger



CHG 70N-C | Charger | Art. no. 700332



CHG 70N-C + PSU KIT | CHG 70N-C charger with NT 12-35 CS power supply unit | Art. no. 700333

i You can find more detailed information about the CHG 70N-C in the following sections:

- **Startup and operation**: CHG 70N-C charger
- **Specifications**: CHG 70N-C charger | BA 70 rechargeable battery

BA 70 rechargeable battery and L 70 USB charger



BA 70 | Rechargeable battery | Art. no. 508860

L 70 USB | Charger | Art. no. 508861

EW-D CHARGING SET | L 70 USB charger with two BA 70 rechargeable batteries | Art. no. 508862

i You can find more detailed information about the BA 70 rechargeable battery and the L 70 USB charger in the following sections:

- **Startup and operation**: L 70 USB charger
- **Specifications**: L 70 USB charger | BA 70 rechargeable battery

Modular L 6000 charger

The L 6000 charger is used to charge the BA 60, BA 61, BA 62 and BA 70 rechargeable batteries.

The charging modules LM 6060 (for the BA 60), LM 6061 (for the BA 61), LM 6062 (for the BA 62) or LM 6070 (for the BA 70) are required to do so. The rechargeable batteries and charging modules are available separately.



- **L 6000 EU** | Article no. 507300

> **i** You can find more detailed information about the L 6000 charger and the LM 6060, LM 6061, LM 6062 and LM 6070 charging modules in the following sections:
>
> - **Installation** and **Operation**: Modular L 6000 charger
> - **Specifications**: Modular L 6000 charger and LM 6060 | LM 6061 | LM 6062 | LM 6070 charging modules

Delivery includes

- 1 L 6000 charger
- 1 mains cables (EU, UK, or US variant)
- 4 dummy caps including screws (preassembled)
- 4 rubber feet
- 1 quick guide
- 1 manual with safety instructions
- 1 manual with technical data and manufacturer declarations

Product overview

View with the charging modules and rechargeable batteries inserted:



View with the LM 6060 charging modules without rechargeable batteries inserted:



View with the LM 6061 charging modules without rechargeable batteries inserted:



Charging modules for L 6000 charger

The following **charging modules** are available for the **L 6000** charger:

LM 6060

The LM 6060 charging module is installed in the L 6000 charger to charge the BA 60 rechargeable battery.

LM 6060 | Article no. 507198



LM 6061

The LM 6061 charging module is installed in the L 6000 charger to charge the BA 61 rechargeable battery.

LM 6061 | Article no. 507199



LM 6062

The LM 6062 charging module is installed in the L 6000 charger to charge the BA 62 rechargeable battery.

LM 6062 | Article no. 508516



LM 6070

The LM 6070 charging module is installed in the L 6000 charger to charge the BA 70 rechargeable battery of the Evolution Wireless Digital series.

LM 6070 | Article no. 509457



3. Instruction manual

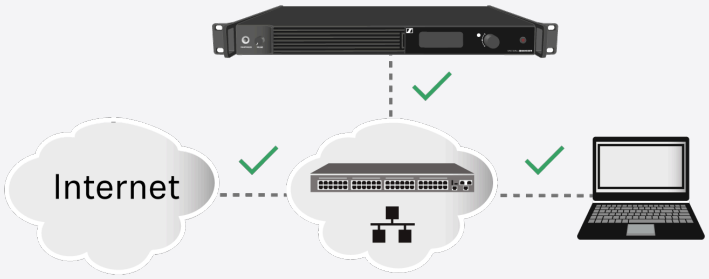
Detailed description of the start-up and operation of the hardware and the WebUI.

Important Information on License Activation

NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

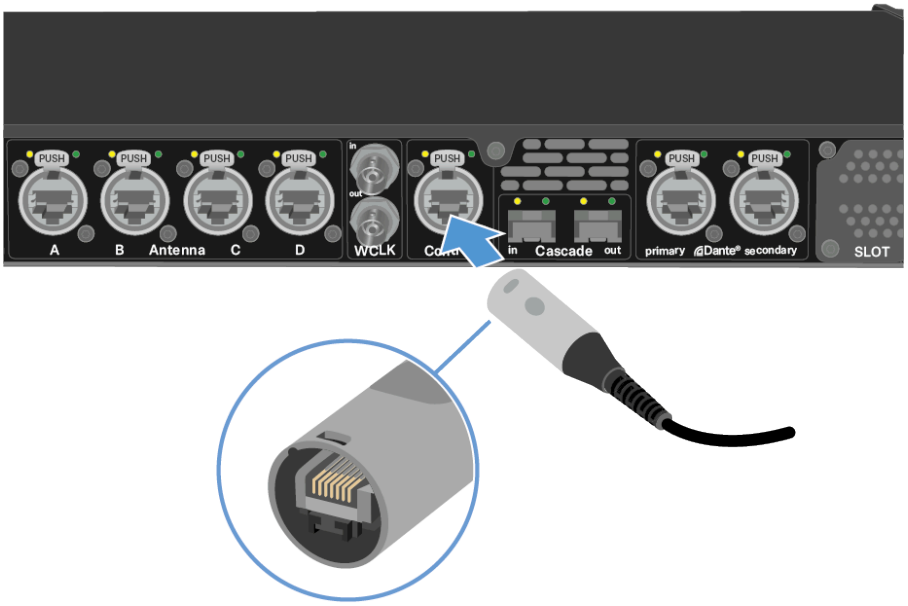
Quick start

All necessary information for activating the license and configuring the required ports of the device.

When starting up the Base Station for the first time, it is necessary to have a direct internet connection to activate the license. Additionally, certain ports must be enabled (especially for the organization/enterprise firewall) for communication between software and devices.

1. Connect the Base Station to a network:

- Plug one side of the network cable into the **Control** socket.



- Plug the other side of the network cable to a switch or router.
  - The Base Station has been connected to a network.

2. Enable necessary ports for activation:

- Please contact your IT administrator to provide Internet access to the License Server and any NTP server by opening the required network ports and to provide DNS settings via DHCP to the device.

Address	Port	Protocol	Type	Service	Usage
my.nalpeiron.com	80	HTTPS (TCP)	Unicast	Sennheiser License Server	Activation of devices
ANY (see list of **NTP servers**)	123	NTP	Unicast	NTP Time Server	Synchronize system time

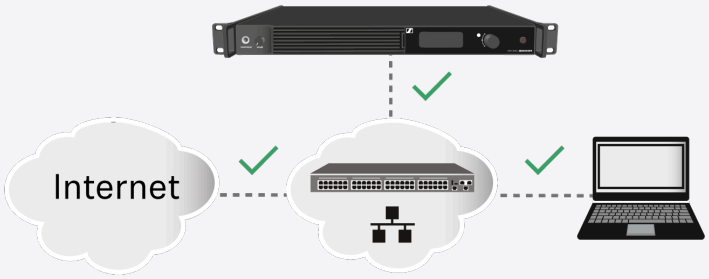
> **i** You can find the complete overview of all ports at **Ports, protocols and services.**

3. Ensure that the network has an Internet connection and activate the license:

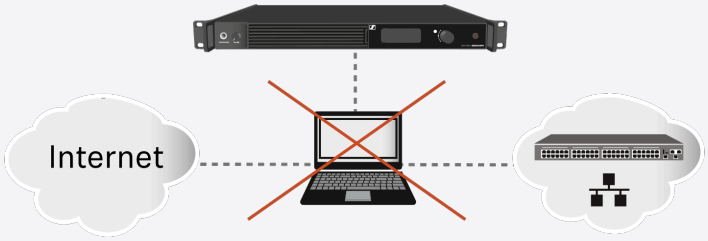
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

- If you want to activate a license via Spectera WebUI, follow the steps described here: Activating a license (WebUI).

Base Station

Get started

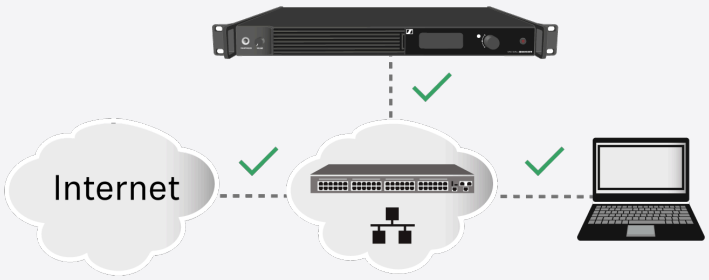
Get your Base Station ready to use in a few steps.

After unpacking the Base Station you must update the firmware **before** activating a licence.

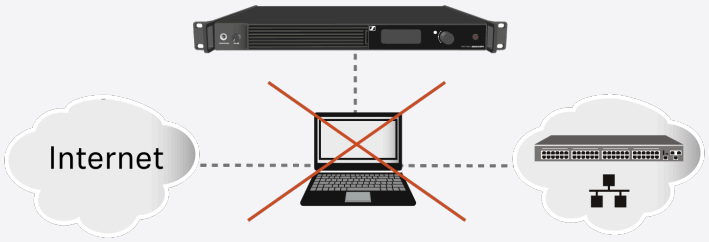
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.



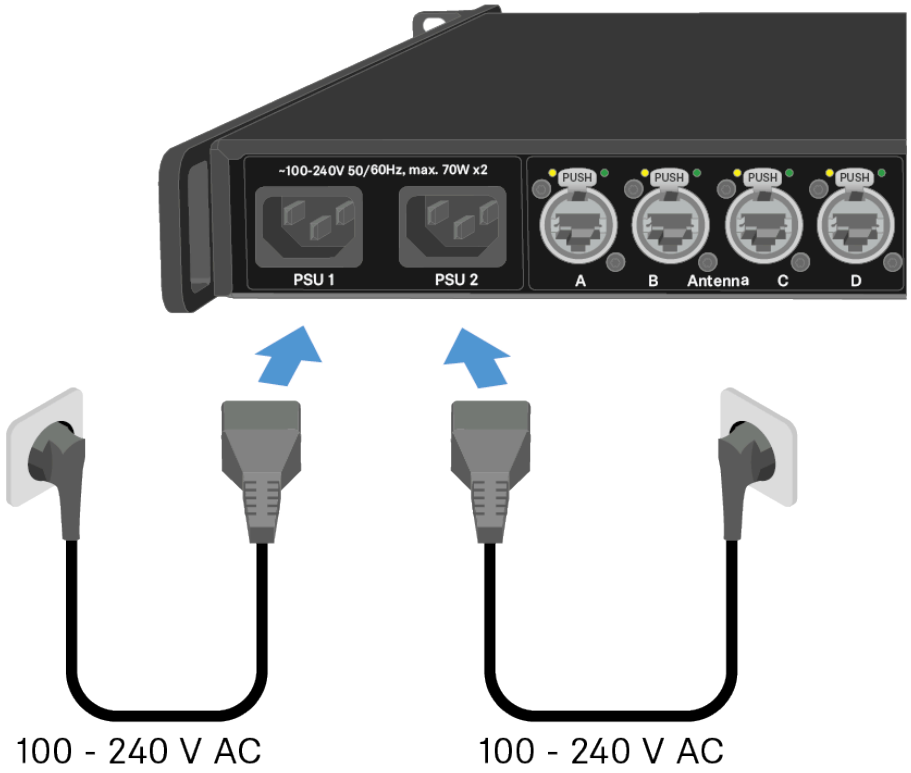
- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

To connect the Base Station to the power supply system:

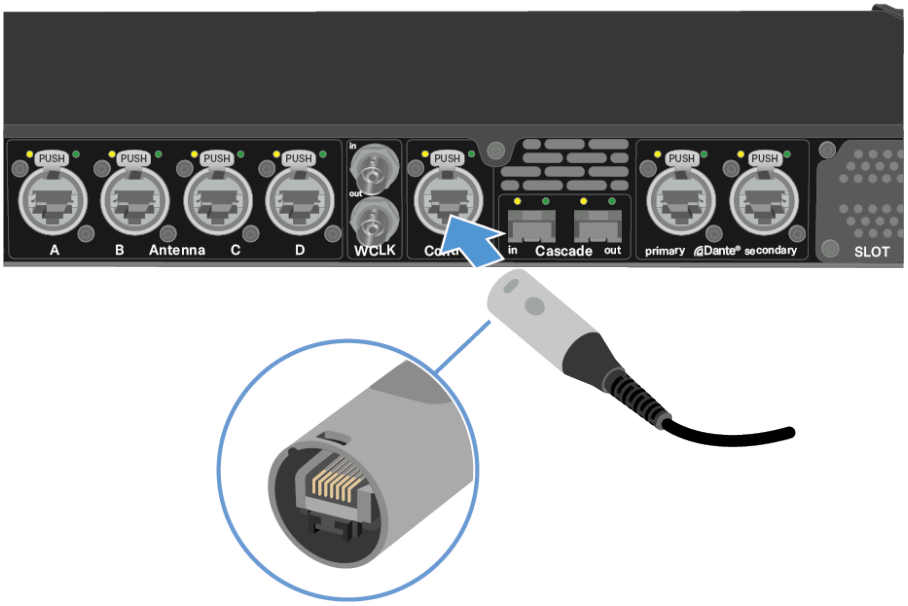
- Connect one mains cable to the power socket on the rear side of the Base Station.



- Connect one mains cable plug into a suitable wall socket.
  - The Base Station is connected to the power supply.

To connect the Base Station to a network:

- Plug one side of the network cable into the **Control** socket.



- Plug the other side of the network cable to a switch, router or directly to a computer.

> **i** The Base Station needs a direct Internet access!

✓ The Base Station has been connected to a network.

To update the firmware:

- To start the Spectera WebUI, enter the following URL into your browser: `https://deviceIP`.

> **i** The device IP can be found here: Network.

✓ In some cases the internet browser might have trouble showing the page.

✓ Your Base Station is up to date.

You can now add a licence, see Activating a license (general).

General information for the System

Here you can find general information for your use of the System.

> **i** A license has to be activated, otherwise you cannot use the Base Station.

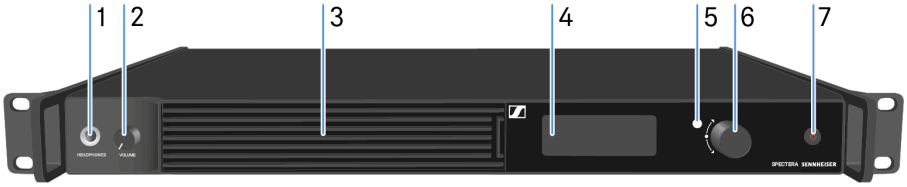
The Base Station has two independend RF channels. Both variants of the antenna (UHF and 1G4) can be connected to the Base Station at the same time.

You can pair up to 128 mobile devices to a Base Station within one RF channel.

> **i** Mobile devices can only be paired and operated with one Base Station at a time.

Product overview

Front



1 HEADPHONES socket

see Using the headphone output

2 VOLUME control for headphone

see Using the headphone output

3 Fan inlet with filter

see Changing the fan filter

4 Display for status information and operating menu

see Information on the display

5 LED to indicate the status

see Meaning of the LED

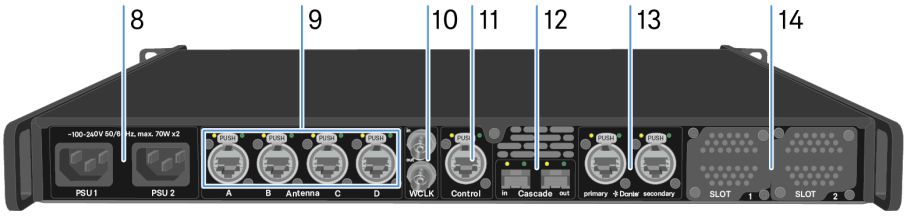
6 Jog-Dial **(UP/DOWN/SET)** for navigating the menu

see Navigating the menu

7 ON/OFF button

see Switching the Base Station on and into standby

Back



8 Power socket

see Connecting/disconnecting the Base Station to/from the power supply system

9 4x ruggedized RJ45 **Antenna** ports

see Connecting antennas

10 Word clock in/out

see Connecting word clock

11 ruggedized RJ45 **Control** port

see Connecting to a network

12 Cascade in/out

13 2x ruggedized RJ45 ports for **AoIP** primary | secondary

see Connecting audio via Dante®

14 Slot 1 | 2 for MADI Cards

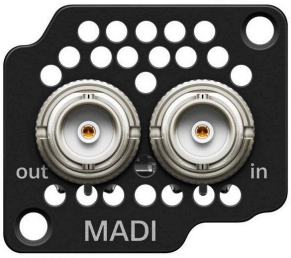
see Installing slot-in cards

Installing slot-in cards

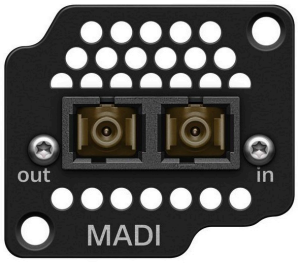
The same or different cards can be installed.

Two types of MADI Cards are available, see MADI Cards.

Madi CARD (BNC)



Madi CARD (OM)



CAUTION

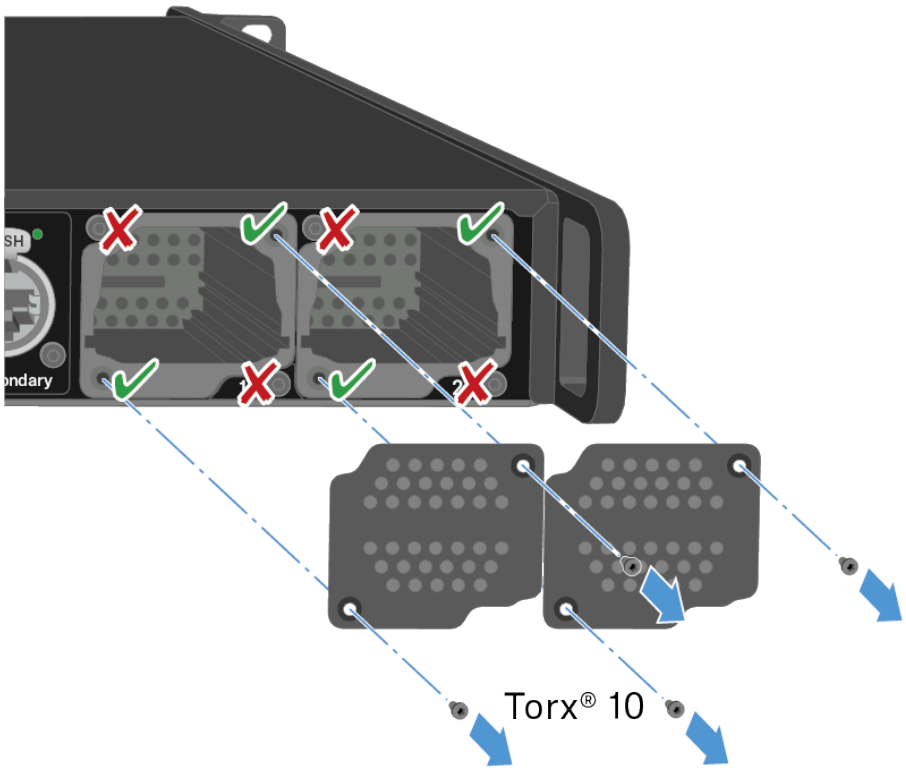
Improper handling of the device may result in its damage

Device contains sensitive electronics to electrostatic discharge (ESD).

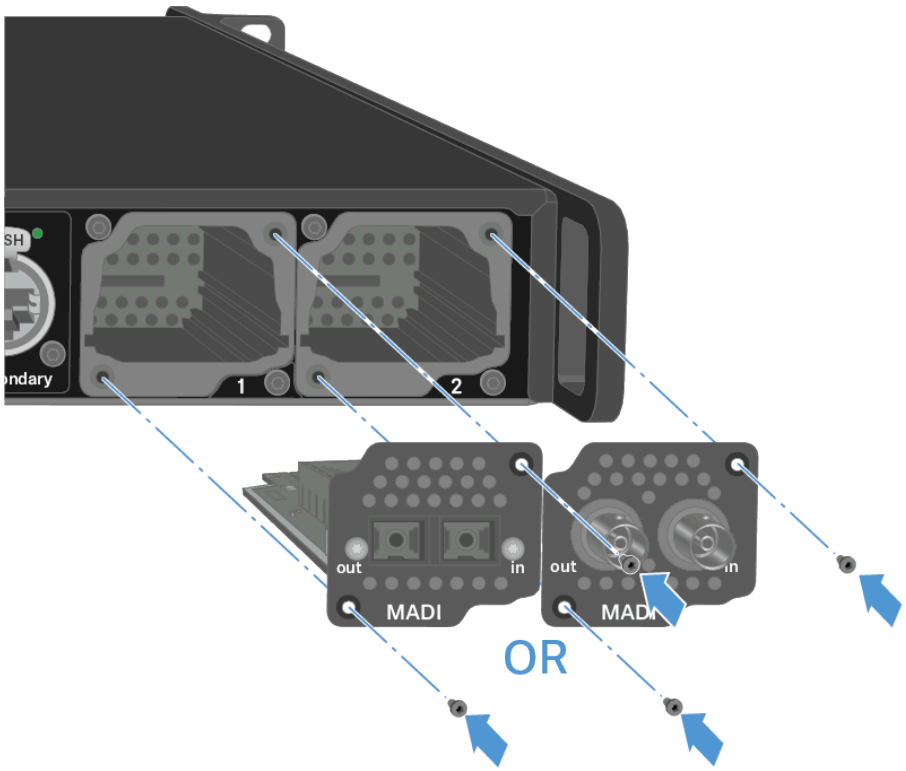
- Observe the precautionary measures for handling components at risk of electrostatic discharge and take appropriate protective measures when touching the device.

To install a MADI Card in the Base Station:

- Completely disconnect the Base Station from the power supply system. See Connecting/disconnecting the Base Station to/from the power supply system.
- Unscrew one of the dummy caps on the Base Station. To do so, you require a torx® 10 screwdriver.



- Fully slide the MADI Card into the open slot as shown in the figure.
  - The card can be inserted into the Base Station housing only in one direction. The lettering on the card must face upward.
- Tightly screw on the MADI card with max. 65 cNm +/-10%.



The MADI Cards can be used directly.

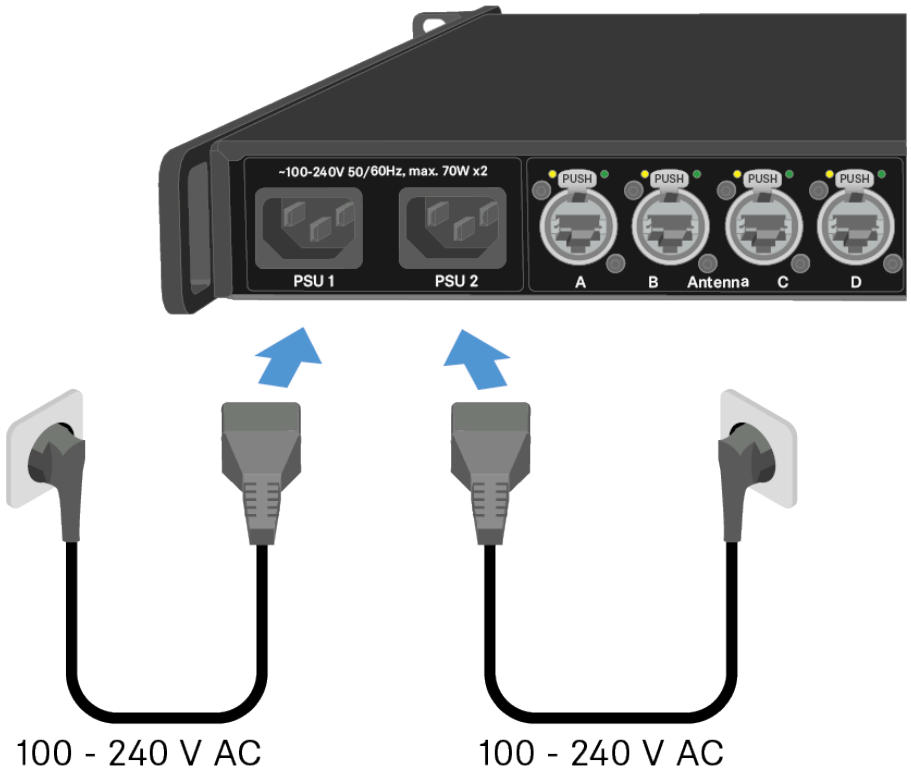
A MADI Card has been installed.

Connecting/disconnecting the Base Station to/from the power supply system

Optional for redundancy you can connect the Base Station with two cables. The optional cable is not included.

To connect the Base Station to the power supply system:

- Connect one mains cable to the power socket on the rear side of the Base Station.



- Connect one mains cable plug into a suitable wall socket.
  - The last state is restored: on or standby.
- For redundancy connect an other cable (not included) as well.
  - The Base Station is connected to the power supply.

To completely disconnect the Base Station from the power supply system:

- Unplug both mains cable plugs from the wall socket.
- Unplug both mains cable from the power socket on the rear side of the Base Station.
  - The Base Station is completely disconnected from the power supply.

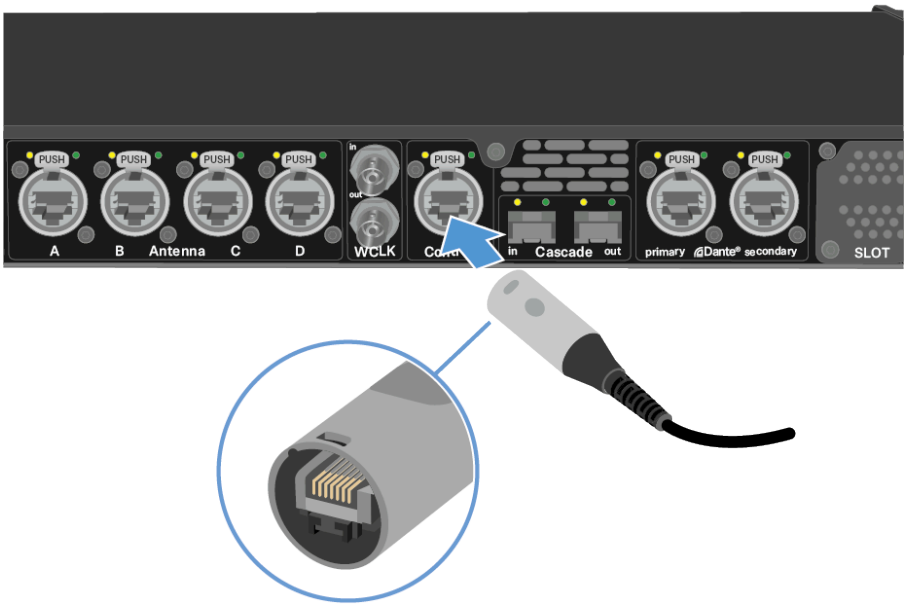
The Base Station has been connected/disconnected successfully.

Connecting to a network

Connect the Base Station to a network for monitoring and controlling.

To connect the Base Station to a network:

- Plug one side of the network cable into the **Control** socket.

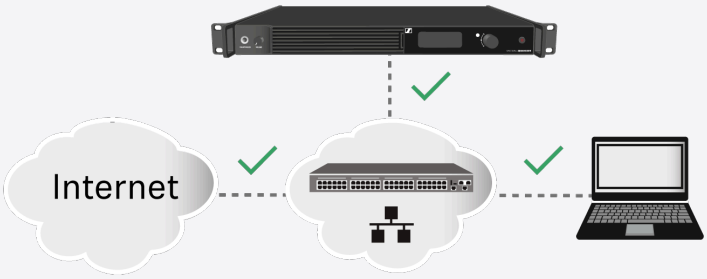


- Plug the other side of the network cable to a switch, router or directly to a computer.

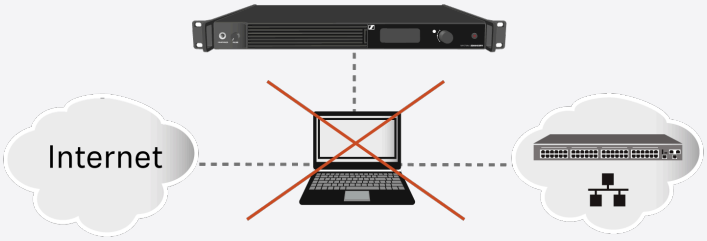
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

See Activating a license (general).

✓ The Base Station has been connected to a network.

You can monitor and control the Base Station via a network connection using Spectera WebUI.

To start the Spectera WebUI, enter the following URL into your browser: `https://deviceIP`.

ℹ The device IP can be found here: Network.

Connecting antennas

You can connect up to four antennas to the Base Station.

Recommandations regarding the antenna setup:

- Keep a distance more than 10 m (393.7") between the antenna and another antenna.
- Keep a distance more than 0.5 m (19.69") between the antenna and a wall.

The cable must

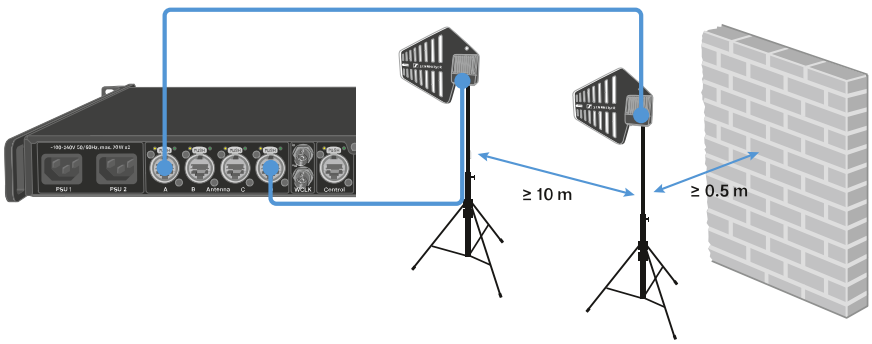
- be a CAT5e or higher,
- have ruggedized plugs and
- not extend 100 m (3937").

> **i** We recommend using a antenna cable cat 5e (see Accessories for the DAD).

> **i** Both variants (UHF and 1G4) can be connected to the Base Station at the same time.

To connect an antenna to the Base Station:

- Plug on side of the cable into one antenna port (A, B, C or D) at the rear side of the Base Station.
- Plug the other side of the cable into an antenna.



We recommend a distance greater than 10 m (393.7") for an optimal RF performance.

To disconnect an antenna from the Base Station:

- Hold down the push button.
- Unplug the cable from the Base Station.

✓ The Base Station has been connected to/disconnected from an antenna.

Antenna cable extension

Longer cable distances are possible with the use of fiber optic cables and media converters.

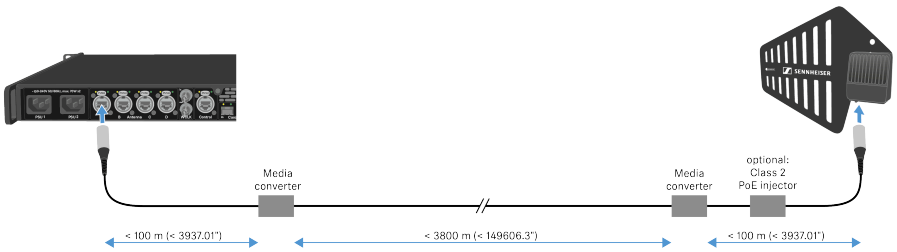
Sennheiser tested the recommend converters for a complete distance of 4 km (157480.31").

We only recommend the following converters for fully tested functionality:

- Base Station | Base Station ZMAN:

  ℹ Do not use converters with PoE to connect to the Base Station | Base Station ZMAN.

  - Lantronix M/GE-T-SFP-01
- DAD:
  - Lantronix M/GE-PSW-PSE-01 (with PoE only for DAD)
  - Lantronix M/GE-T-SFP-01 (needs a Class 2 PoE injector capable of supplying powering to the DAD (power consumption < 6.5 W))
  - Barnfind Technologies BarnColor 4xEth (with PoE only for DAD)
  - StarTech.com Industrial PoE Media Converter (Product ID: IMC1GSFP30W) (with PoE only for DAD)



ℹ The media converter must not have a switch function.

Connecting word clock

You can use the internal word clock on the Base Station or connect an external word clock.

You can also output the external word clock and cascade it up to 8 Base Stations.

The word clock output transmits only the external word clock that is connected via the word clock input. The internal word clock is not output via the word clock output.

> For more information about the word clock, see Word clock scenarios for digital audio.

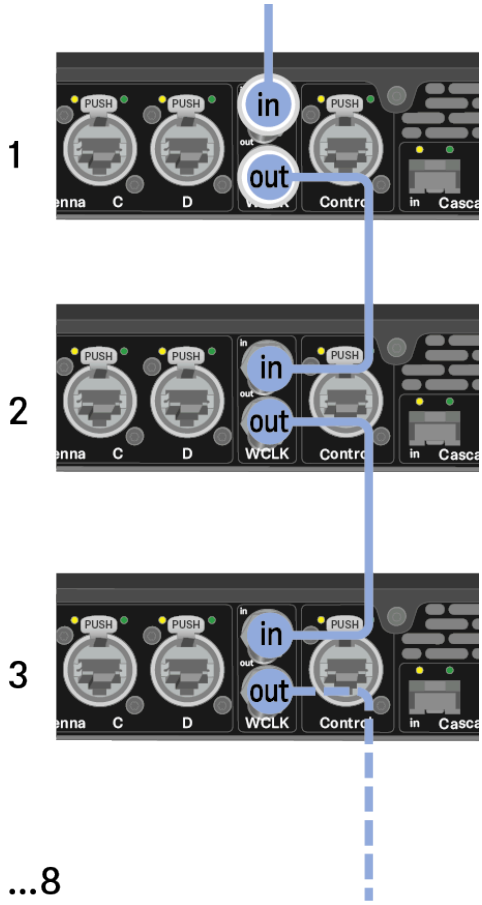
To connect an external word clock:

- Use a coaxial BNC cable (75 Ω) to connect the external word clock to the **word clock in** input.



To cascade the word clock:

- Connect the cable from the **word clock in** input of the next Base Station to the **word clock out** output of the previous Base Station.



✓ The Base Station has been connected to word clock.

Word clock scenarios for digital audio

The Base Station supports two clock rates: 48 kHz and 96 kHz.

You can use either the internal word clock on the Base Station or connect an external word clock.

An external word clock can also be forwarded to a downstream device via the word clock output. This feature allows you to cascade up to 8 Base Station devices.

i Note that only the word clock on the word clock input can be forwarded via the word clock output. The internal word clock is not forwarded via the word clock output.

Word clock with digital audio

If multiple devices with digital audio signals are connected in a production environment, their clock signals must be synchronized via a word clock, otherwise audio errors occur. The word clock of one device becomes the master. All of the other devices become slaves and synchronize with the master.

Dante®

The Audinate Brooklyn III Dante® interface installed in the Base Station should be understood as a standalone digital audio device with its own word clock and also has to be clocked either internally or externally.

> **i** You require the Dante Controller software from Audinate for these settings. You can access it using the link: Dante Controller.

Defining the master and slave

The Base Station word clock input, the Base Station internal word clock, the word clock of the Audinate Brooklyn III Dante® interface, or the Dante® network can be defined as the master.

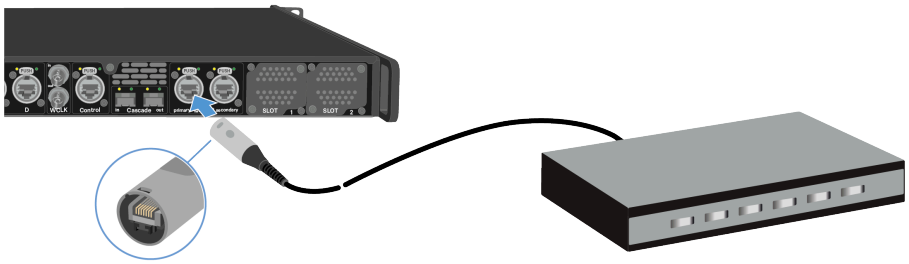
For WebUI see: Audio interfaces.

Connecting audio via Dante®

You can input and output audio via Dante®.

To connect audio via Dante®:

- Plug one side of a ruggedized RJ45 cable to the Dante® primary socket.



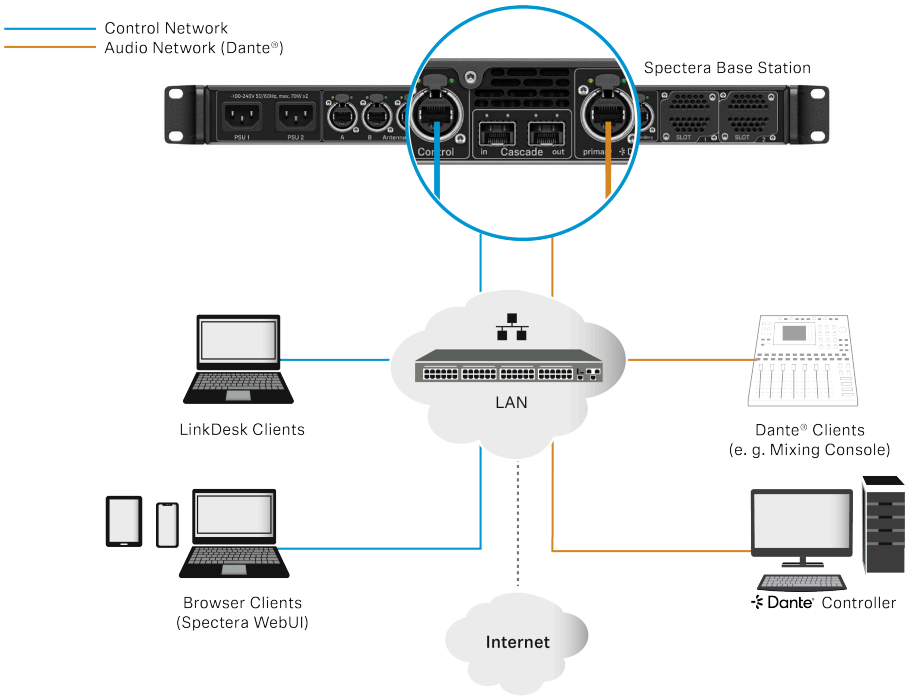
- Plug the other side into a router.
- Download the Dante® Controller.
  This is typically a host computer (PC or Mac), with the Dante® Controller software application installed. This application configures and controls all the Dante® devices and audio streams inside the network.

> **i** Information about the Dante Controller and the Dante® network protocol settings is available on the Audinate website: audinate.com.

✓ The Base Station can input and output audio via Dante®.

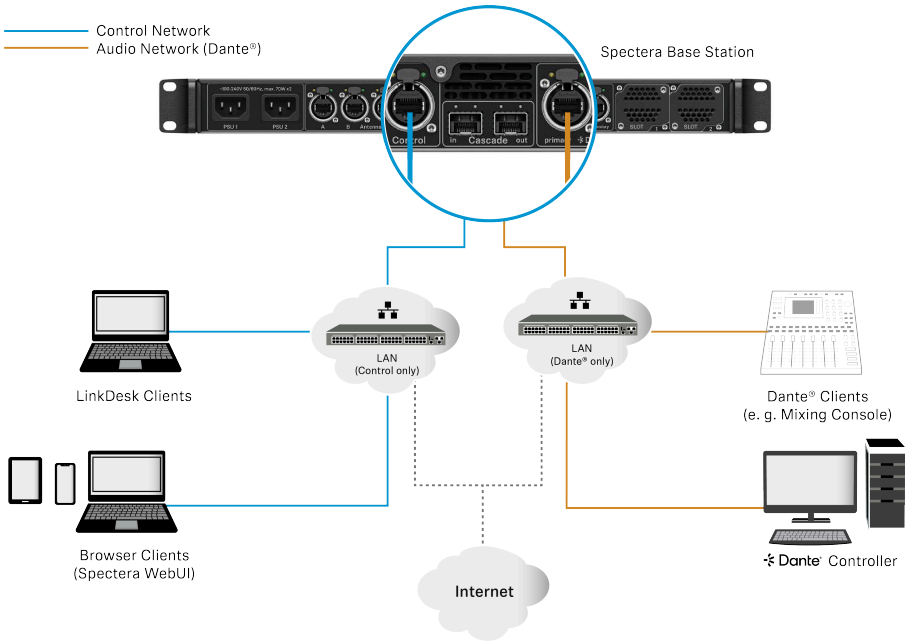
Shared network mode

In Shared Network Mode both networks for Control and Dante® are using the same physical network infrastructure.



Split Network Mode

In Split Network Mode both networks for Control and Dante® are using different physical network infrastructure.

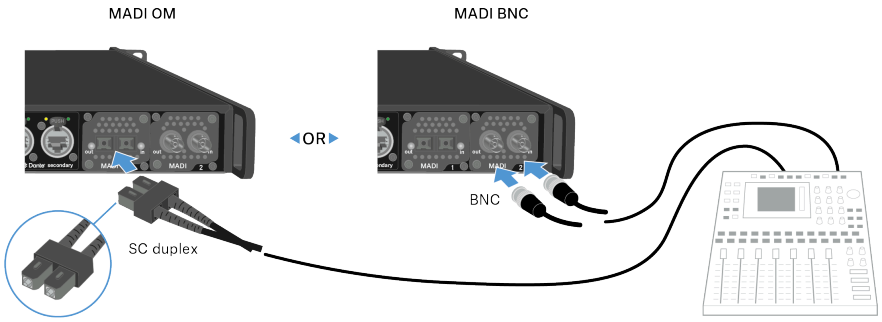


For more information, please refer to the **Network guide**.

Connecting audio via MADI

To connect audio via MADI:

- Plug one side of the (BNC or OM) cable to the installed MADI card.



- Plug the other side of the cable to a mixing console.

✓ The Base Station can input and output audio via MADI.

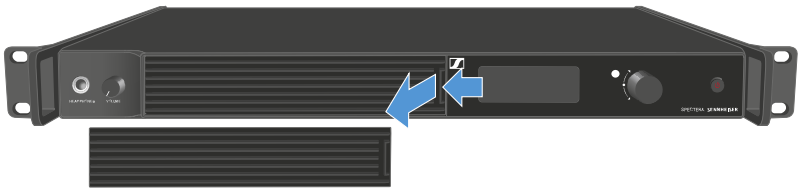
Changing the fan filter

The filter protects the fans from dust.

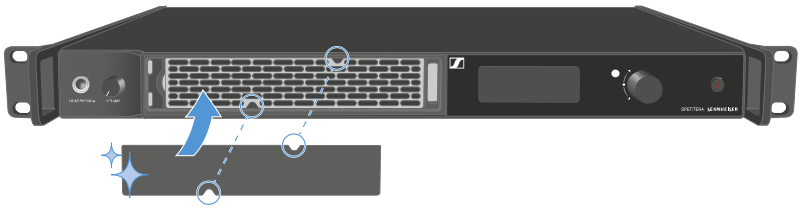
> **i** Check the filter from time to time and replace it to ensure safe operation and sufficient cooling.

To change the filter:

- Switch the Base Station into standby. See Switching the Base Station on and into standby.
- Push down the release and pull the cover forward at the same time.



- Remove the filter and dispose it properly.
- Place a new filter in the Base Station.
  Information about new filter can be found here: Spectera Filter set.
- Make sure that the recesses match those in the device.



- Slide the cover into the left side.



- On the right side, press the cover firmly until you hear it click into place.



✓ The filter has been replaced.

Installing the Base Station in a rack

You can install the Base Station in any conventional 19" rack. The rack mounting angles are already attached to the device.

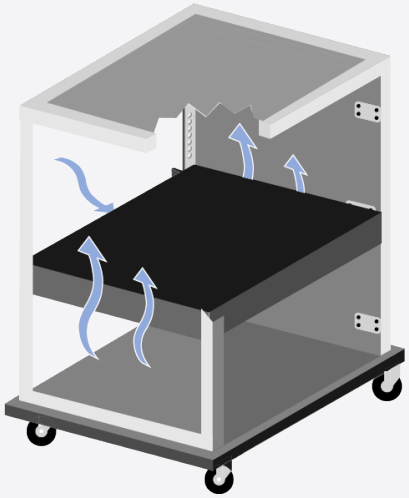
Always observe the following information during rack mounting.

NOTICE

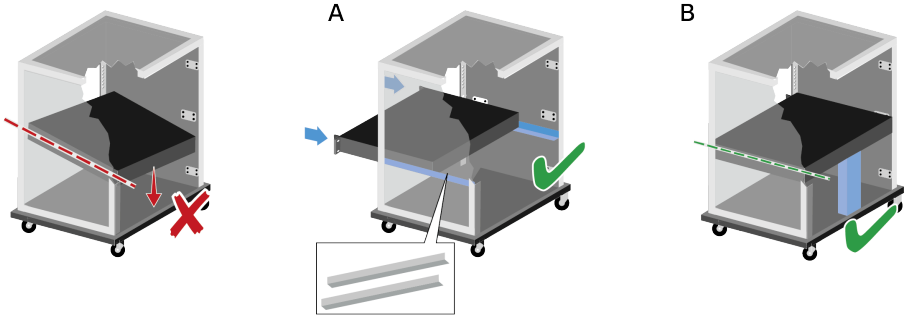
Material damages caused by devices overheating

When there is insufficient ventilation, the devices mounted in the rack may overheat.

- Ensure that there is sufficient ventilation in the rack, particularly if several devices are installed.
- If necessary, install a fan in the rack.



- Support the Base Station after installation in the rack.



Due to the weight and depth of the device, there is a risk that it may break off in the rack and become damaged as a result.

Version A

- Use special rack mounting rails.
- The design of the rack used must be suitable for the installation of these mounting rails.

Version B

- Use a suitable object to support the device on the rear side.
- Ensure that this object cannot become loose.

✓ The Base Station has been installed in a rack.

Switching the Base Station on and into standby

> **i** The Base Station cannot be switched off. You have to disconnect it from the power supply, see Connecting/disconnecting the Base Station to/from the power supply system.

To switch the Base Station on:

- Short-press the **ON/OFF** button.
  - ✓ The Sennheiser Logo appears in the display and the Base Station is booting.
    When booting is done, the power button LED lights up white.

To switch the Base Station into standby:

- Long-press the **ON/OFF** button.
  - ✓ The display and the LED go off. The **ON/OFF** button pulses white.

    The DAD goes off.

✓ The Base Station has been switched on/into standby.

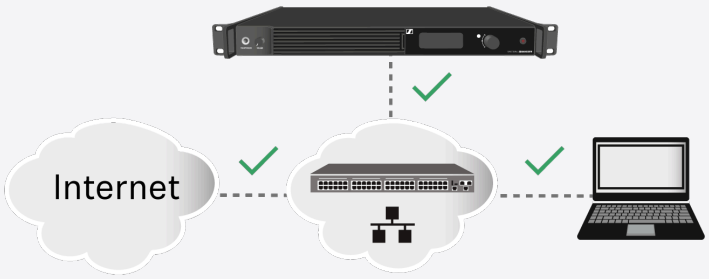
Activating a license (general)

i A license has to be activated, otherwise you cannot use the Base Station.

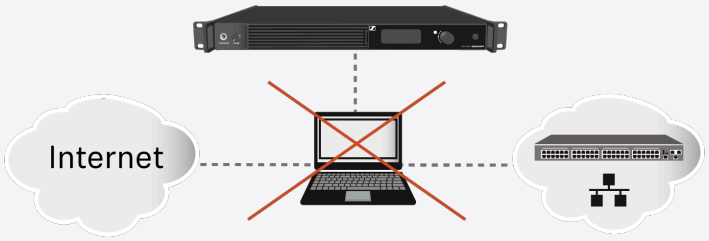
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

The license specifies the country-specific frequency ranges and the RF power.

You can activate a license via Spectera WebUI.

Only one license per Base Station is possible.

To activate a license:

- Connect the Base Station to the power supply, see Connecting/disconnecting the Base Station to/from the power supply system.
- Connect the Base Station to a network via a switch or router, see Connecting to a network.

The Base Station needs a direct Internet access!

- Connect a computer to the same switch or router.
- If you want to activate a license via Spectera WebUI, follow the steps described here: Activating a license (WebUI).
- Check the product page sennheiser.com/base-station for the latest firmware.

A license has been activated.

Using the headphone output

You can use the headphone output on the front of the Base Station (6.35 mm jack) to listen to the audio signals of the channels.

i First you have to set up audio links in Spectera WebUI.

WARNING



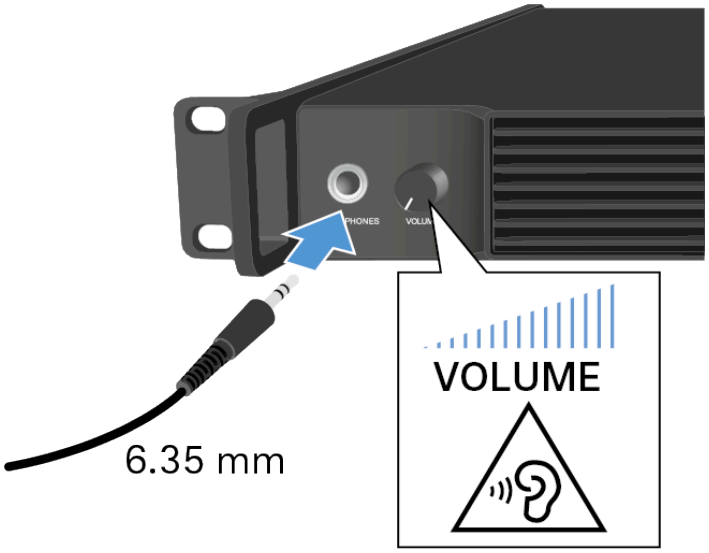
Danger due to high volume levels

Volume levels that are too high may damage your hearing.

- Turn down the volume of the headphone output before you put on the headphone.

To listen to an audio source:

- Connect the headphone to the **HEADPHONES** socket.



- You can select the audio source here: Headphone.
- Control the volume by turning the **VOLUME** control next to the **HEADPHONES** socket.

✓ You can now listen to the selected audio source.

Meaning of the LED

The LED on the front of the Base Station indicates the following information.



The LED is off:

- Base Station is in standby.



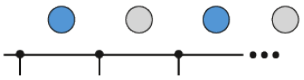
The LED is green:

- Base Station is on and one or both RF channels are active.



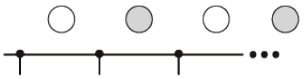
The LED is yellow:

- One or both RF channels are muted.



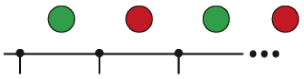
The LED is flashing blue:

- Paring is enabled.



The LED is flashing white:

- The Base Station is identified.



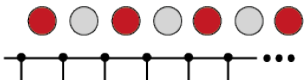
The LED is flashing green and red:

- Firmware update is in progress.



The LED is red:

- Base Station is working, but shows a warning on the display.



The LED is flashing red quickly:

- Error. Base Station is not working and shows a warning on the display.

Information on the display

Basic information are shown on the display.

The display goes into screen saver after some time.

You can wake up the display by pressing or turning the jog-dial.

The display shows the operating menu, which can be used to configure a few settings (see Menu structure).

> More options and other parameters are available in Spectera WebUI!

To navigate the menu, see Navigating the menu.

Status messages

In certain situations, status messages may appear on the display.

	**Error** - The temperature is critical. The audio processing stopped. Cool down the Base Station.
	**Warning** - The temperature is high. Check the ventilation to avoid audio interruption.
	**Warning** - The temperature is low. The Base Station is heating up. Please stand by.

Navigating the menu

Use the jog-dial to navigate through the operating menu.



Press the jog dial



- Calls up a menu item
- Changes to a submenu
- Saves settings

Turn the jog dial



- Changes to the previous or next menu item
- Changes the setting of a menu item

Menu structure

In the Base Station menu, you can configure a few settings.

> More options and other parameters are available in Spectera WebUI!

The following settings can be changed:

Mute/Unmute the RF-Channels

- Main menu

Change the IP mode

- Network

Select the audio source for the headphone

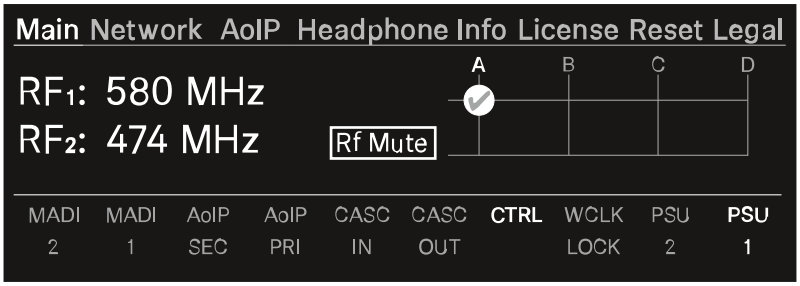
- Headphone

Reset the Base Station

- Reset

Main menu

In this menu item, you can view information about connections.



In the upper part you can view information about the RF channel:

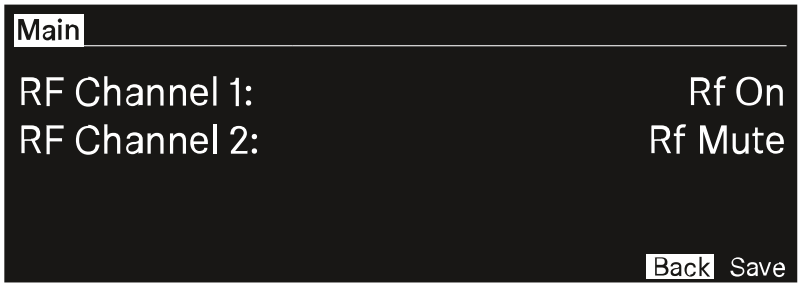
- The selected frequency
- The state of the antenna (mute, active)
- Which antenna port is used for the RF channel.

In the lower part you can view information about the used connection:

- Connected ports are highlighted.
- The order corresponds to the ports on the back.

To mute/unmute the RF channel:

- Press the jog-dial.
  - The RF Status menu opens.

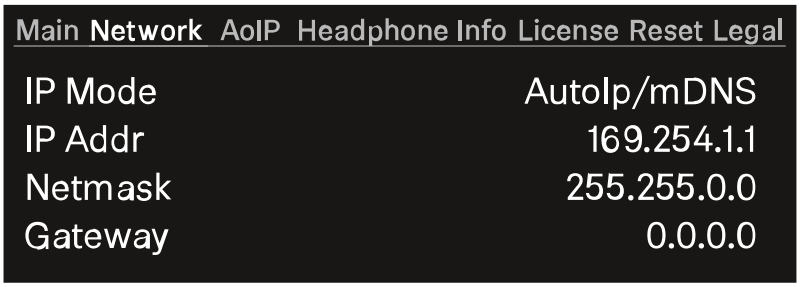


- Rotate and press the jog-dial to change the settings.
  You can select between Rf on and Rf Mute.
- Confirm by selecting Save or discard the changes by selecting Back.

✓ The RF Channels have been muted/unmuted.

Network

In this menu item, you can configure the settings for the network connection.



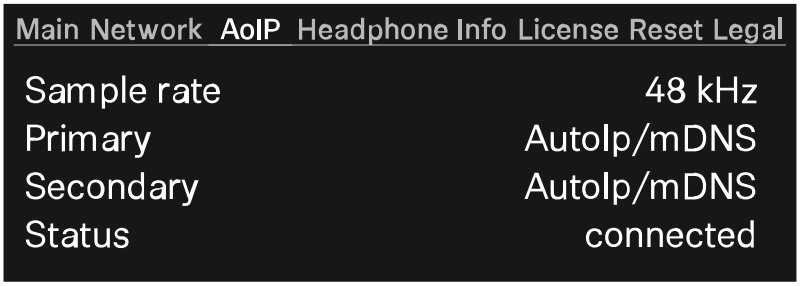
You can make the following settings here:

IP Mode

- Manual
  - You can change the IP Address, the Netmask and the Gateway.
- Manual/mDNS
  - You can change the IP Address, the Netmask and the Gateway.
- AutoIp
  - You can **not** change the IP Address, the Netmask and the Gateway.
- AutoIp/mDNS
  - You can **not** change the IP Address, the Netmask and the Gateway.

AoIP

In this menu item, you can view information about the two AoIP connections.



The following information are displayed:

- Sampling rate
- IP mode for Primary
- IP mode for Secondary
- Status

To display a AoIP connection:

- ▶ Press the jog-dial to change the AoIP connection.
- ▶ Rotate the jog-dial to change between Primary and Secondary.



- ▶ Press the jog-dial to enter the setting.

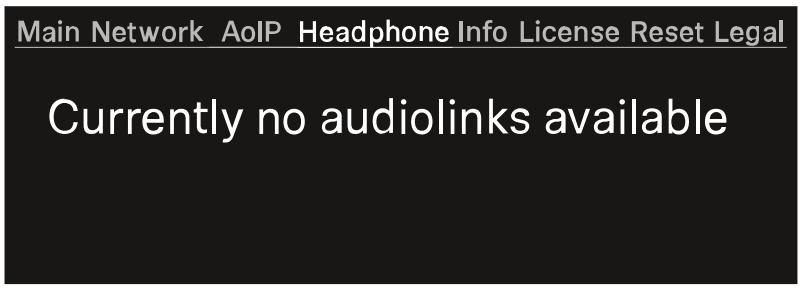
✓ The selected AoIP connection is displayed.

Headphone

In this menu item, you can select the headphone output.

You have to set up audio links via Spectera WebUI for the mobile devices.

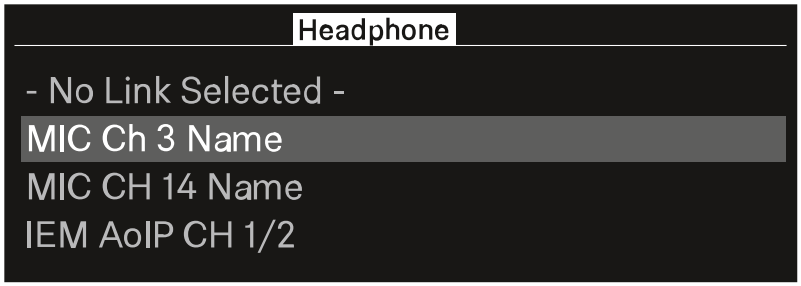
If no audio link is set this note will appear:



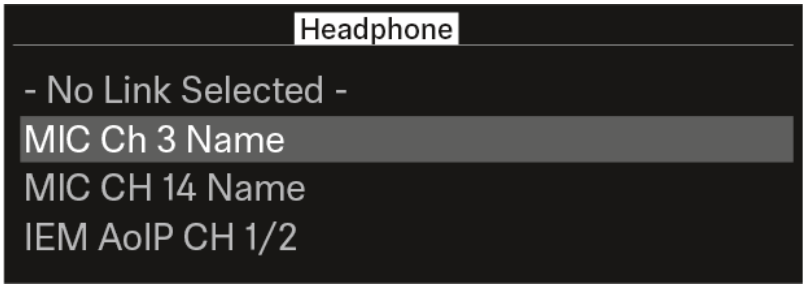
ℹ First you have to set up audio links in Spectera WebUI.

To select an audio link:

- Press the jog-dial to enter the headphone menu.
  Each audio output will be shown independent.
  - ✓ The created audio links appear.

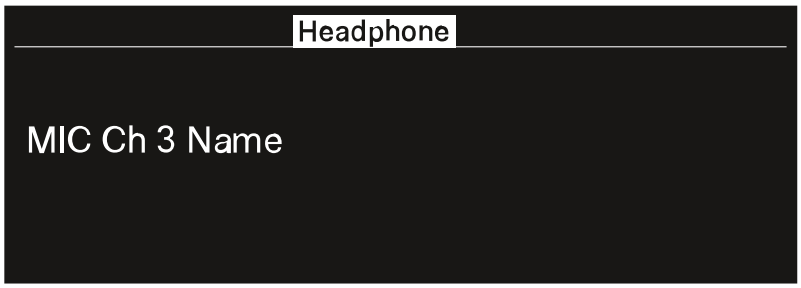


- Turn the jog-dial to select the wanted audio link.
  - ✓ The name of the selected link pulses two times.



- Press the jog-dial to return to the main menu.

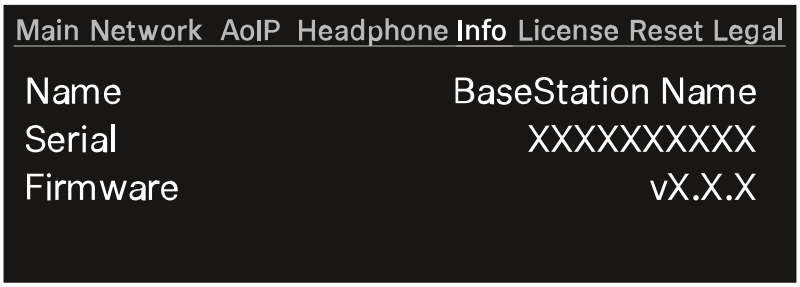
The selected link appears.



You can now listen to the selected audio link.

Info

In this menu item, general information can be shown here.



Name: The name of the Base Station.

Serial: The serial number of the Base Station.

Firmware: The installed firmware version.

License

In this menu item, information about the license can be shown here.

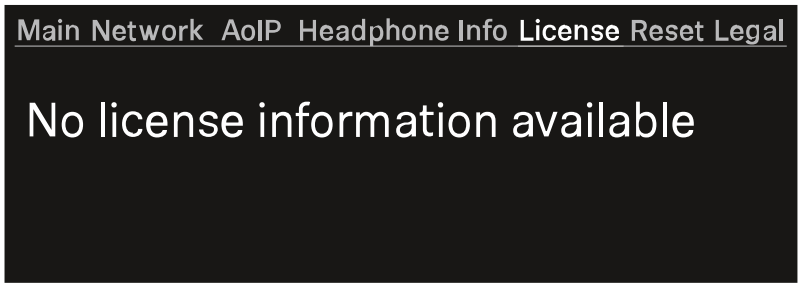
> ℹ A license has to be activated, otherwise you cannot use the Base Station.

You can activate a license via Spectera WebUI.

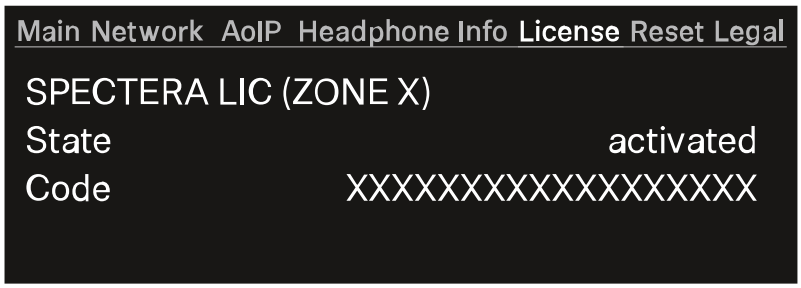
Only one license per Base Station is possible.

The license specifies the country-specific frequency ranges and the RF power.

No license is activated:



A license is activated



Name of the purchased license:

- Spectera LIC (ZONE 01)
- ...
- Spectera LIC (ZONE XX)

State: Status of the license.

- activated
- unknown

Code:

- The activated license number has 18 digits.
- n/a

Reset

In this menu item, you can reset the Base Station to its factory settings.

NOTICE

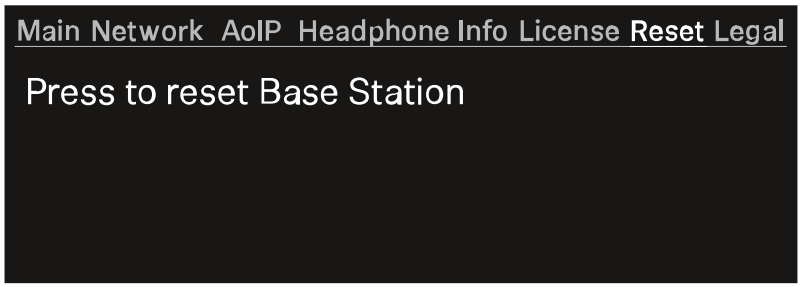
Data loss during the factory reset

All audio devices will be unpaired and all audio routes will be deleted.

All settings (including the device password) are reset to the default values. The license remains activated.

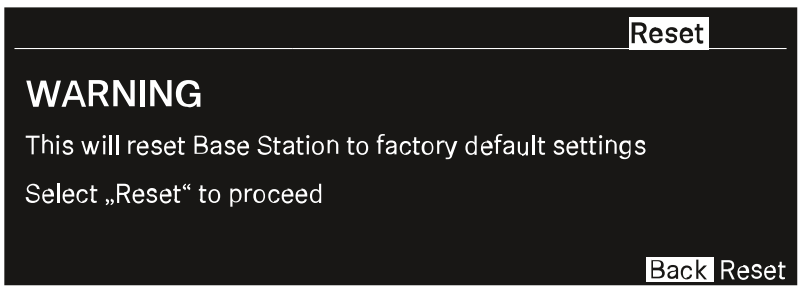
After the reset, the device is restarted automatically.

- Do not reset the Base Station during an active live audio transmission.



To reset the Base Station to its factory default settings using the device:

- On the Base Station, rotate the jog-dial and navigate to the menu **Reset**.
- Press the jog-dial to enter the menu.
  - A warning will appear.



- Rotate the jog-dial to **Reset**.
- Press the jog-dial again.

The Base Station will be set back to factory settings and reboot.

> After rebooting, check the IP address as it may have changed.

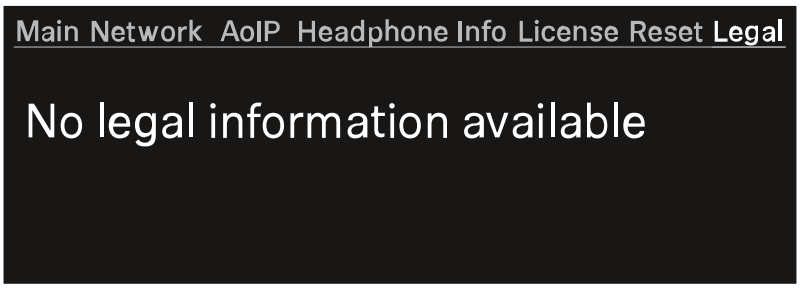
The Base Station has been reset to its factory default settings.

Legal

In this menu item, legal information can be shown.

Legal information about the Base Station and connected antennas are displayed depending on the activated license.

If no label are available, the display shows:



Updating the Base Station

You can update the firmware of the Base Station via Spectera WebUI.

All Spectera devices must use the same firmware. The Base Station determines the firmware version.

Please note that firmware versions are not backward compatible.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

To update the firmware:

- If you want to update the Base Station via Spectera WebUI, follow the steps described here: Updating the firmware (Base Station).

  The LED is flashing green and red during the update.

  When the update is installed, the Base Station restarts.

  The update will be installed on the connected antennas automatically.

The firmware has been updated.

The new firmware is distributed to the other devices via the Base Station.

Base Station ZMAN

Get started

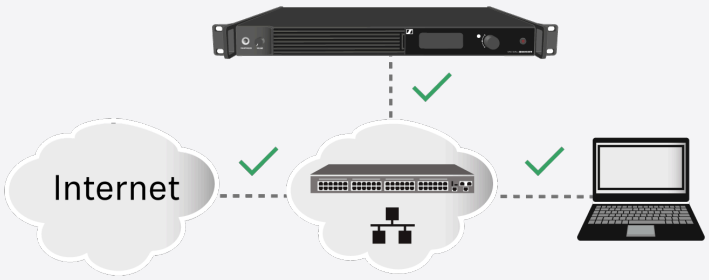
Get your Base Station ZMAN ready to use in a few steps.

After unpacking the Base Station ZMAN you must update the firmware **before** activating a licence.

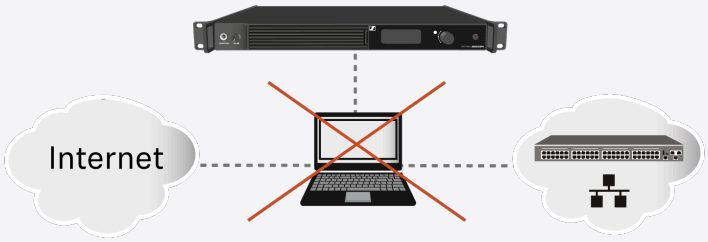
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station ZMAN using the 18-digit license code, a direct Internet connection is required.



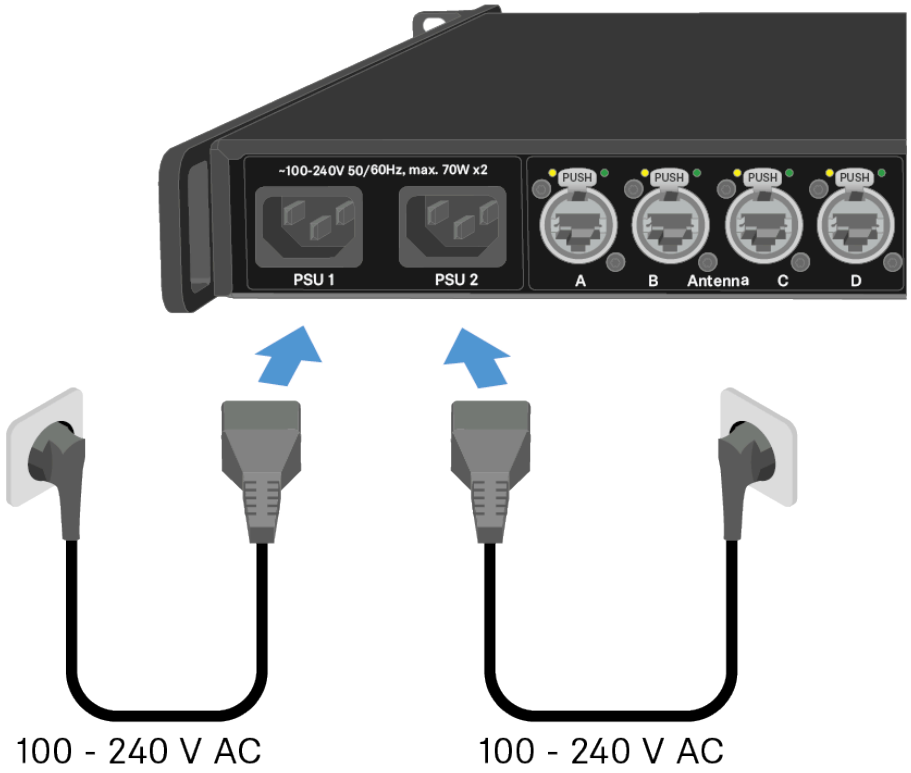
- Please connect your Base Station ZMAN directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

To connect the Base Station ZMAN to the power supply system:

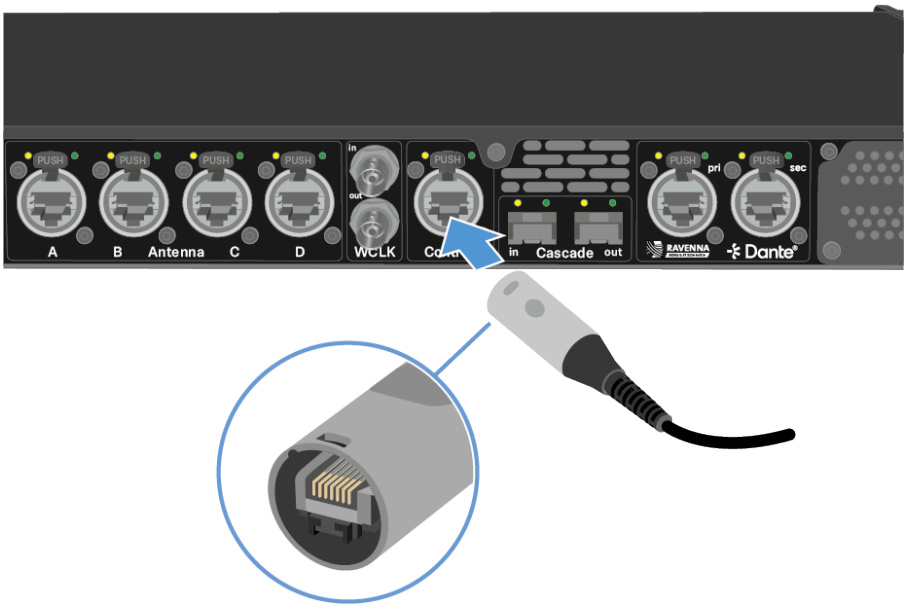
- Connect one mains cable to the power socket on the rear side of the Base Station.



- Connect one mains cable plug into a suitable wall socket.
  - The Base Station ZMAN is connected to the power supply.

To connect the Base Station ZMAN to a network:

- Plug one side of the network cable into the **Control** socket.



- Plug the other side of the network cable to a switch, router or directly to a computer.

> The Base Station ZMAN needs a direct Internet access!

✓ The Base Station ZMAN has been connected to a network.

To update the firmware:

- To start the Spectera WebUI, enter the following URL into your browser: `https://deviceIP`.

> The device IP can be found here: Network.

✓ In some cases the internet browser might have trouble showing the page.

✓ Your Base Station ZMAN is up to date.

You can now add a licence, see Activating a license (general).

General information for the System

Here you can find general information for your use of the System.

> **i** A license has to be activated, otherwise you cannot use the Base Station ZMAN.

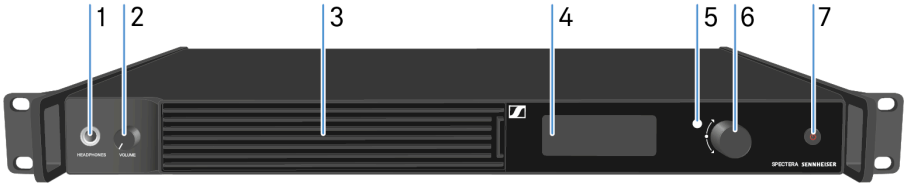
The Base Station ZMAN has two independend RF channels. Both variants of the antenna (UHF and 1G4) can be connected to the Base Station ZMAN at the same time.

You can pair up to 128 mobile devices to a Base Station within one RF channel.

> **i** Mobile devices can only be paired and operated with one Base Station at a time.

Product overview

Front



1 HEADPHONES socket

see Using the headphone output

2 VOLUME control for headphone

see Using the headphone output

3 Fan inlet with filter

see Changing the fan filter

4 Display for status information and operating menu

see Information on the display

5 LED to indicate the status

see Meaning of the LED

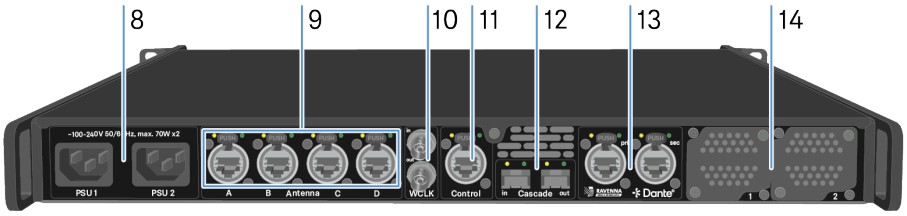
6 Jog-Dial **(UP/DOWN/SET)** for navigating the menu

see Navigating the menu

7 ON/OFF button

see Switching the Base Station ZMAN on and into standby

Back



8 Power socket

see Connecting/disconnecting the Base Station ZMAN to/from the power supply system

9 4x ruggedized RJ45 **Antenna** ports

see Connecting antennas

10 Word clock in/out

see Connecting word clock

11 ruggedized RJ45 **Control** port

see Connecting to a network

12 Cascade in/out

13 2x ruggedized RJ45 ports for **AoIP** primary | secondary

see Connecting audio via AoIP

14 Slot 1 | 2 for MADI Cards

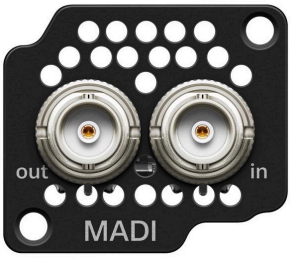
see Installing slot-in cards

Installing slot-in cards

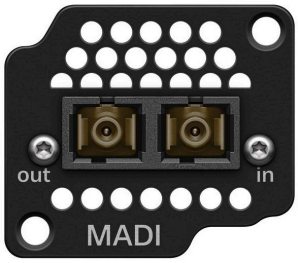
The same or different cards can be installed.

Two types of MADI Cards are available, see MADI Cards.

Madi CARD (BNC)



Madi CARD (OM)



CAUTION

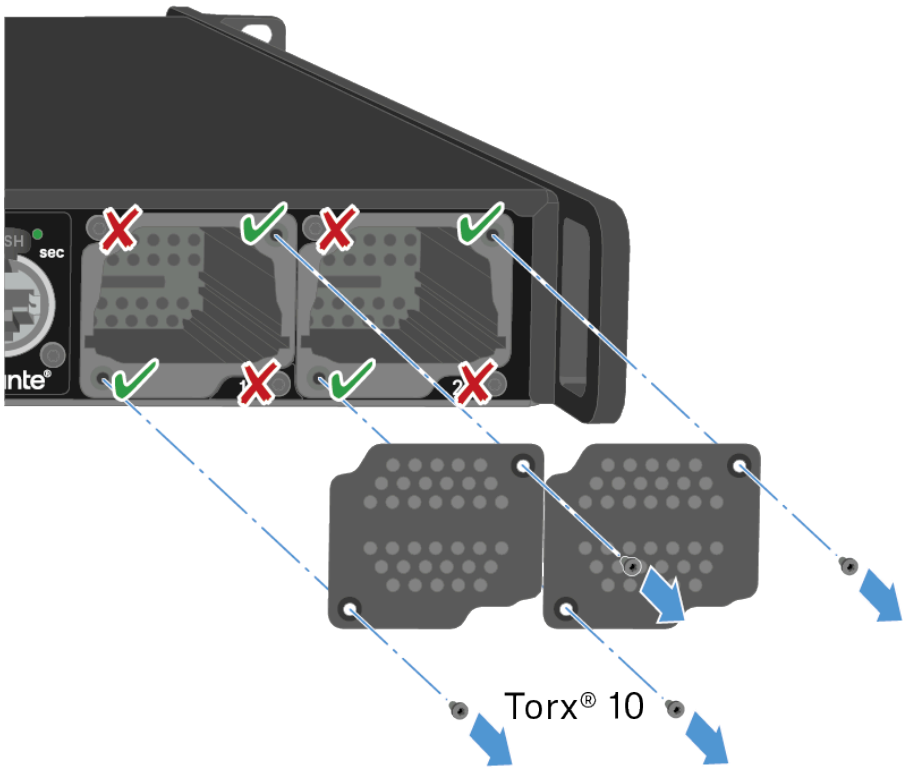
Improper handling of the device may result in its damage

Device contains sensitive electronics to electrostatic discharge (ESD).

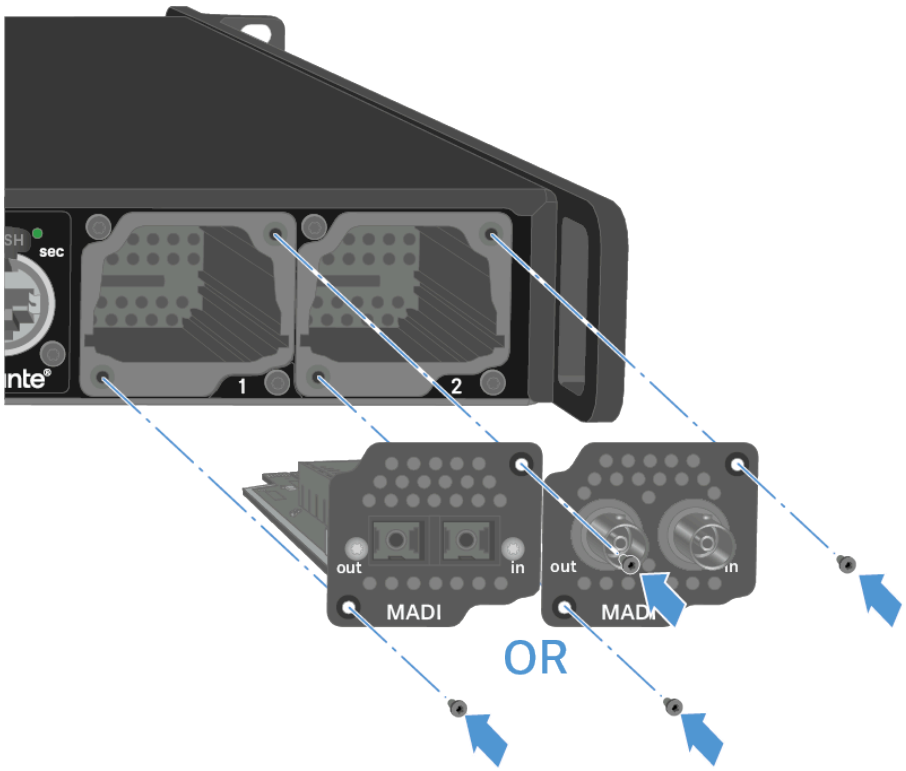
- Observe the precautionary measures for handling components at risk of electrostatic discharge and take appropriate protective measures when touching the device.

To install a MADI Card in the Base Station ZMAN:

- Completely disconnect the Base Station ZMAN from the power supply system. See Connecting/disconnecting the Base Station ZMAN to/from the power supply system.
- Unscrew one of the dummy caps on the Base Station ZMAN. To do so, you require a torx® 10 screwdriver.



- Fully slide the MADI Card into the open slot as shown in the figure.
  - The card can be inserted into the Base Station ZMAN housing only in one direction. The lettering on the card must face upward.
- Tightly screw on the MADI card with max. 65 cNm +/-10%.



The MADI Cards can be used directly.

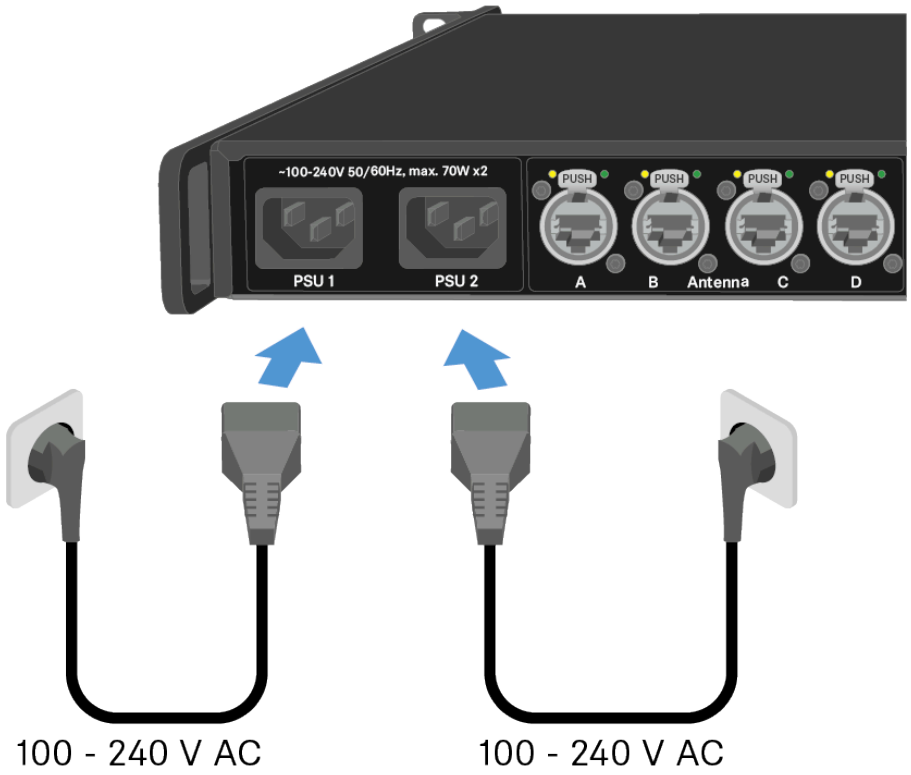
A MADI Card has been installed.

Connecting/disconnecting the Base Station ZMAN to/from the power supply system

Optional for redundancy you can connect the Base Station ZMAN with two cables. The optional cable is not included.

To connect the Base Station ZMAN to the power supply system:

- Connect one mains cable to the power socket on the rear side of the Base Station.



- Connect one mains cable plug into a suitable wall socket.
  - The last state is restored: on or standby.
- For redundancy connect an other cable (not included) as well.
  - The Base Station ZMAN is connected to the power supply.

To completely disconnect the Base Station ZMAN from the power supply system:

- Unplug both mains cable plugs from the wall socket.
- Unplug both mains cable from the power socket on the rear side of the Base Station ZMAN.
  - The Base Station ZMAN is completely disconnected from the power supply.

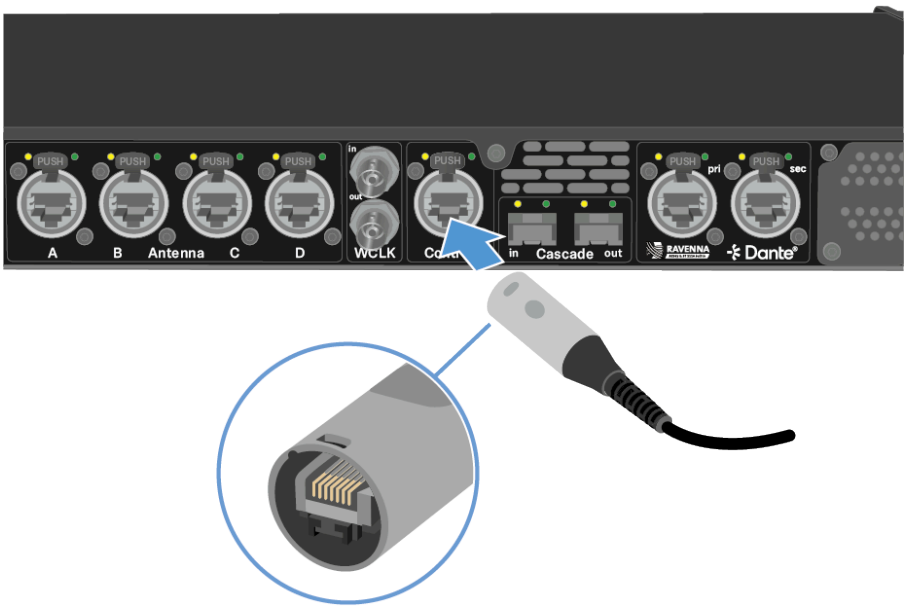
The Base Station ZMAN has been connected/disconnected successfully.

Connecting to a network

Connect the Base Station ZMAN to a network for monitoring and controlling.

To connect the Base Station ZMAN to a network:

- Plug one side of the network cable into the **Control** socket.

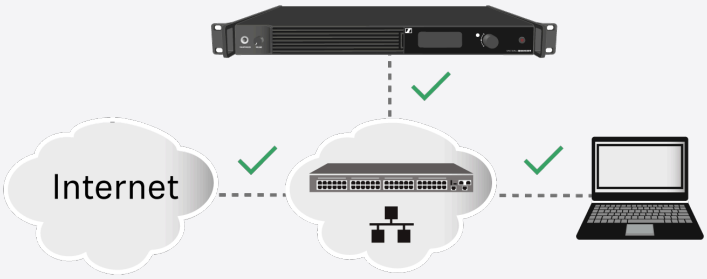


- Plug the other side of the network cable to a switch, router or directly to a computer.

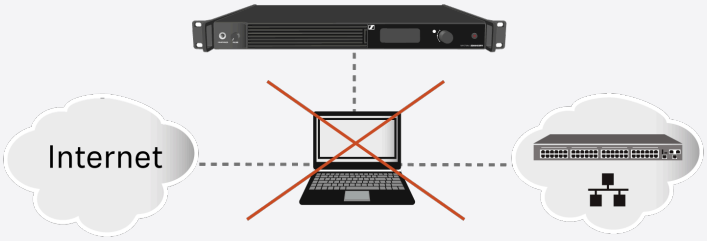
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station ZMAN using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station ZMAN directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

See Activating a license (general).

✓ The Base Station ZMAN has been connected to a network.

You can monitor and control the Base Station ZMAN via a network connection using Spectera WebUI.

To start the Spectera WebUI, enter the following URL into your browser: `https://deviceIP`.

ℹ The device IP can be found here: Network.

Connecting antennas

You can connect up to four antennas to the Base Station ZMAN.

Recommandations regarding the antenna setup:

- Keep a distance more than 10 m (393.7") between the antenna and another antenna.
- Keep a distance more than 0.5 m (19.69") between the antenna and a wall.

The cable must

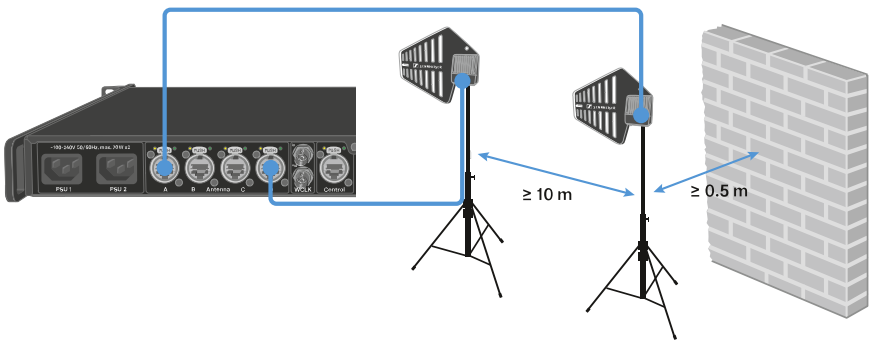
- be a CAT5e or higher,
- have ruggedized plugs and
- not extend 100 m (3937").

> **i** We recommend using a antenna cable cat 5e (see Accessories for the DAD).

> **i** Both variants (UHF and 1G4) can be connected to the Base Station ZMAN at the same time.

To connect an antenna to the Base Station ZMAN:

- ▶ Plug on side of the cable into one antenna port (A, B, C or D) at the rear side of the Base Station ZMAN.
- ▶ Plug the other side of the cable into an antenna.



We recommend a distance greater than 10 m (393.7") for an optimal RF performance.

To disconnect an antenna from the Base Station ZMAN:

- ▶ Hold down the push button.
- ▶ Unplug the cable from the Base Station ZMAN.

✓ The Base Station ZMAN has been connected to/disconnected from an antenna.

Antenna cable extension

Longer cable distances are possible with the use of fiber optic cables and media converters.

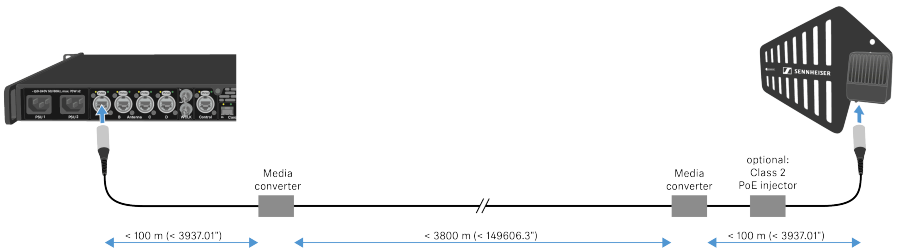
Sennheiser tested the recommend converters for a complete distance of 4 km (157480.31").

We only recommend the following converters for fully tested functionality:

- Base Station | Base Station ZMAN:

  ℹ Do not use converters with PoE to connect to the Base Station | Base Station ZMAN.

  - Lantronix M/GE-T-SFP-01
- DAD:
  - Lantronix M/GE-PSW-PSE-01 (with PoE only for DAD)
  - Lantronix M/GE-T-SFP-01 (needs a Class 2 PoE injector capable of supplying powering to the DAD (power consumption < 6.5 W))
  - Barnfind Technologies BarnColor 4xEth (with PoE only for DAD)
  - StarTech.com Industrial PoE Media Converter (Product ID: IMC1GSFP30W) (with PoE only for DAD)



ℹ The media converter must not have a switch function.

Connecting word clock

You can use the internal word clock on the Base Station ZMAN or connect an external word clock.

You can also output the external word clock and cascade it up to 8 Base Station ZMANs.

The word clock output transmits only the external word clock that is connected via the word clock input. The internal word clock is not output via the word clock output.

> For more information about the word clock, see Word clock scenarios for digital audio.

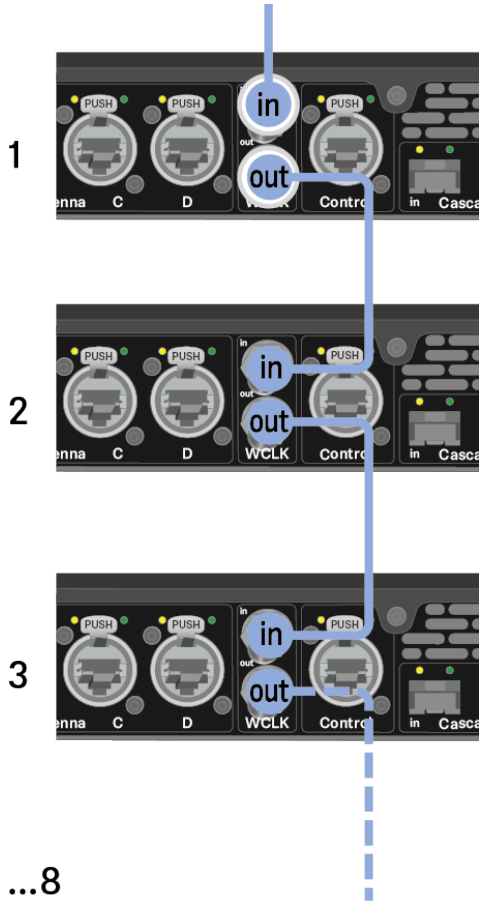
To connect an external word clock:

- Use a coaxial BNC cable (75 Ω) to connect the external word clock to the **word clock in** input.



To cascade the word clock:

- Connect the cable from the **word clock in** input of the next Base Station ZMAN to the **word clock out** output of the previous Base Station ZMAN.



✓ The Base Station ZMAN has been connected to word clock.

Word clock scenarios for digital audio

The Base Station ZMAN supports two clock rates: 48 kHz and 96 kHz.

You can use either the internal word clock on the Base Station ZMAN or connect an external word clock.

An external word clock can also be forwarded to a downstream device via the word clock output. This feature allows you to cascade up to 8 Base Station ZMAN devices.

i Note that only the word clock on the word clock input can be forwarded via the word clock output. The internal word clock is not forwarded via the word clock output.

Word clock with digital audio

If multiple devices with digital audio signals are connected in a production environment, their clock signals must be synchronized via a word clock, otherwise audio errors occur. The word clock of one device becomes the master. All of the other devices become slaves and synchronize with the master.

AoIP

The Merging ZMAN Ravenna interface installed in the Base Station ZMAN should be understood as a standalone digital audio device with its own word clock and also has to be clocked either internally or externally.

> **i** You require the ANEMAN-Software from Neumann for these settings. Enter ANEMAN in the search fild of the download section: ANEMAN Software.

Defining the master and slave

The Base Station ZMAN word clock input, the Base Station ZMAN internal word clock or the word clock of the Merging ZMAN Ravenna interface can be defined as the master.

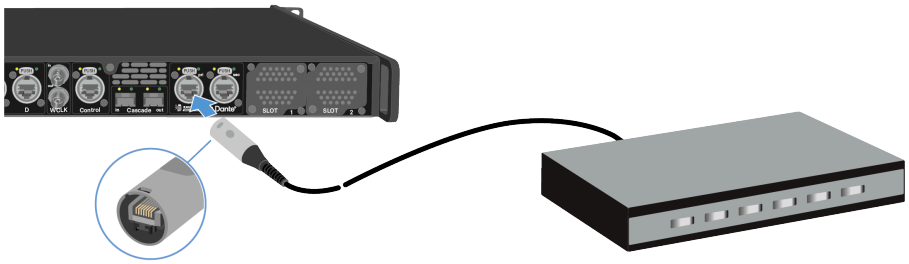
For WebUI see: Audio interfaces.

Connecting audio via AoIP

You can input and output audio via AoIP.

To connect audio via AoIP:

- Plug one side of a ruggedized RJ45 cable to the AoIP primary socket.



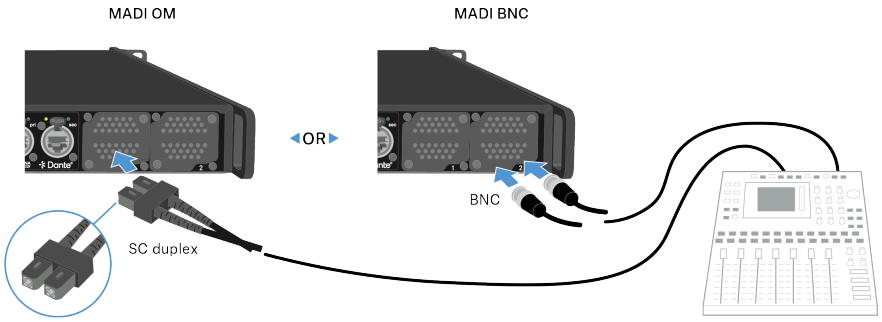
- Plug the other side into a router.
- Download the ANEMAN software.
  This is typically a host computer (PC or Mac), with the ANEMAN software application installed. This application configures and controls all the ZMAN modules and audio streams inside the network.

✓ The Base Station ZMAN can input and output audio via AoIP.

Connecting audio via MADI

To connect audio via MADI:

- Plug one side of the (BNC or OM) cable to the installed MADI card.



- Plug the other side of the cable to a mixing console.

✓ The Base Station ZMAN can input and output audio via MADI.

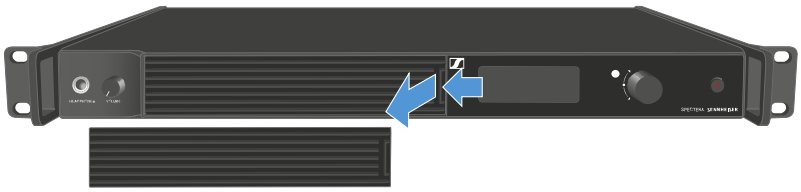
Changing the fan filter

The filter protects the fans from dust.

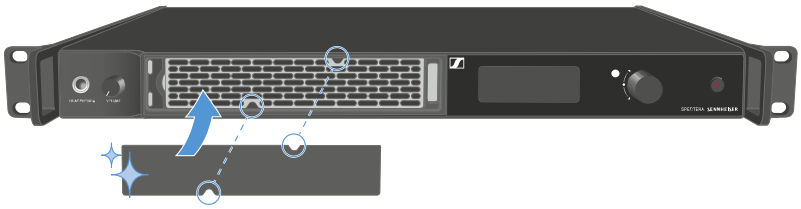
> Check the filter from time to time and replace it to ensure safe operation and sufficient cooling.

To change the filter:

- Switch the Base Station ZMAN into standby. See Switching the Base Station ZMAN on and into standby.
- Push down the release and pull the cover forward at the same time.



- Remove the filter and dispose it properly.
- Place a new filter in the Base Station ZMAN.
  Information about new filter can be found here: Spectera Filter set.
- Make sure that the recesses match those in the device.



- Slide the cover into the left side.



- On the right side, press the cover firmly until you hear it click into place.



✓ The filter has been replaced.

Installing the Base Station ZMAN in a rack

You can install the Base Station ZMAN in any conventional 19" rack. The rack mounting angles are already attached to the device.

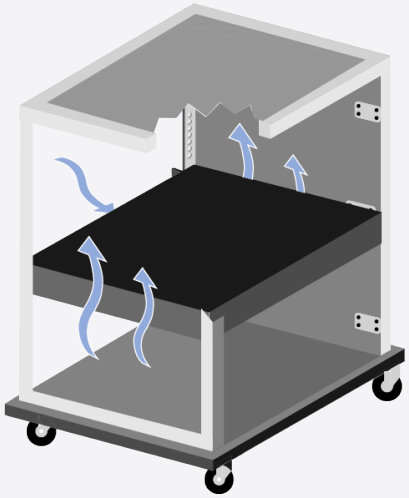
Always observe the following information during rack mounting.

NOTICE

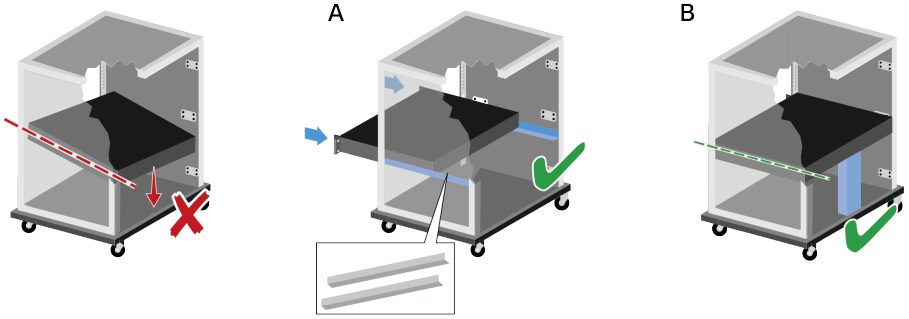
Material damages caused by devices overheating

When there is insufficient ventilation, the devices mounted in the rack may overheat.

- Ensure that there is sufficient ventilation in the rack, particularly if several devices are installed.
- If necessary, install a fan in the rack.



- Support the Base Station ZMAN after installation in the rack.



Due to the weight and depth of the device, there is a risk that it may break off in the rack and become damaged as a result.

Version A

- Use special rack mounting rails.
- The design of the rack used must be suitable for the installation of these mounting rails.

Version B

- Use a suitable object to support the device on the rear side.
- Ensure that this object cannot become loose.

✓ The Base Station ZMAN has been installed in a rack.

Switching the Base Station ZMAN on and into standby

> The Base Station ZMAN cannot be switched off. You have to disconnect it from the power supply, see Connecting/disconnecting the Base Station ZMAN to/from the power supply system.

To switch the Base Station ZMAN on:

- Short-press the **ON/OFF** button.
  - The Sennheiser Logo appears in the display and the Base Station ZMAN is booting. When booting is done, the power button LED lights up white.

To switch the Base Station ZMAN into standby:

- Long-press the **ON/OFF** button.
  - The display and the LED go off. The **ON/OFF** button pulses white.

  The DAD goes off.

✓ The Base Station ZMAN has been switched on/into standby.

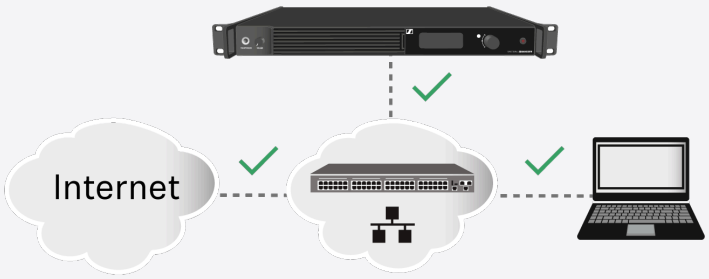
Activating a license (general)

i A license has to be activated, otherwise you cannot use the Base Station ZMAN.

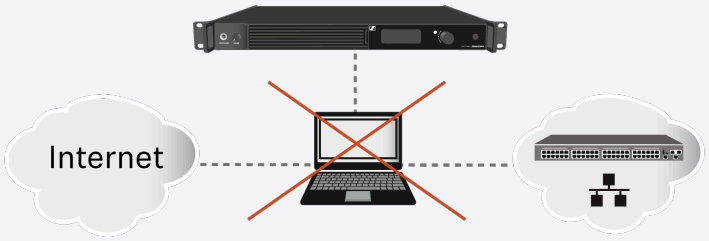
NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station ZMAN using the 18-digit license code, a direct Internet connection is required.



- Please connect your Base Station ZMAN directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

The license specifies the country-specific frequency ranges and the RF power.

You can activate a license via Spectera WebUI.

Only one license per Base Station ZMAN is possible.

To activate a license:

- Connect the Base Station ZMAN to the power supply, see Connecting/disconnecting the Base Station ZMAN to/from the power supply system.
- Connect the Base Station ZMAN to a network via a switch or router, see Connecting to a network.

The Base Station ZMAN needs a direct Internet access!

- Connect a computer to the same switch or router.
- If you want to activate a license via Spectera WebUI, follow the steps described here: Activating a license (WebUI).
- Check the product page sennheiser.com/base-station for the latest firmware.

A license has been activated.

Using the headphone output

You can use the headphone output on the front of the Base Station ZMAN (6.35 mm jack) to listen to the audio signals of the channels.

ℹ First you have to set up audio links in Spectera WebUI.

WARNING

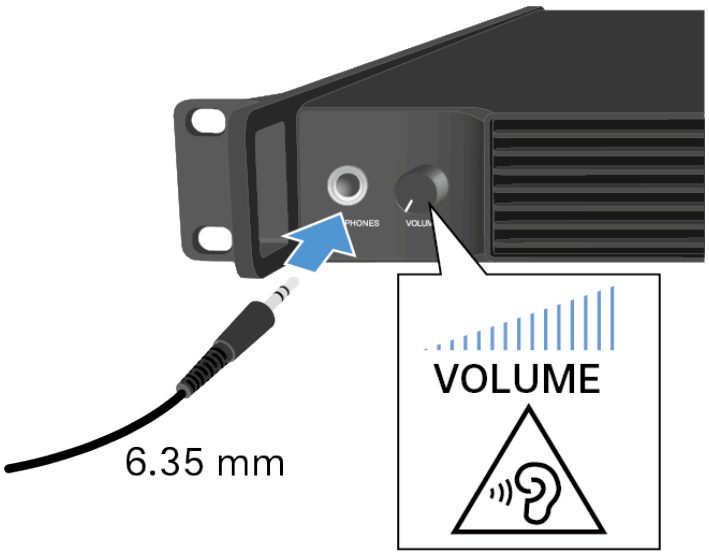
Danger due to high volume levels

Volume levels that are too high may damage your hearing.

- Turn down the volume of the headphone output before you put on the headphone.

To listen to an audio source:

- Connect the headphone to the **HEADPHONES** socket.



- You can select the audio source here: Headphone.
- Control the volume by turning the **VOLUME** control next to the **HEADPHONES** socket.

✓ You can now listen to the selected audio source.

Accessing the ZMAN module

Access the ZMAN module to update firmware and configure advanced settings.

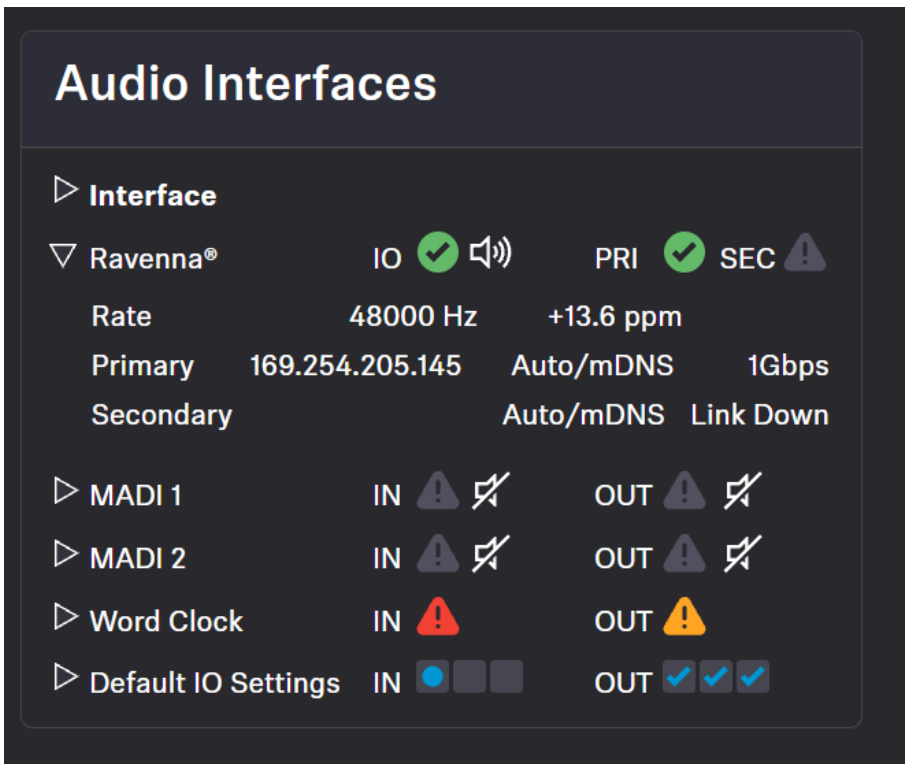
> **i** Download the latest firmware version for the ZMAN module from sennheiser.com/base-station.

You can find detailed documentation for the ZMAN module here: Ravenna Advanced User Guide.

> **i** The instructions are written for HAPI, but they also apply to the ZMAN module.

To access the ZMAN module:

- Additionally connect the RJ45 socket **AoIP** (primary or secondary) to a laptop.
- Read out the IP address in the WebUI.



- Enter the IP in your browser.



You can update the ZMAN module.

To access the advanced settings:

- Enter the following URL in your browser: `IP/advanced/index.html`.



You can configure additional settings of the ZMAN module.

The ZMAN module can be accessed.

Meaning of the LED

The LED on the front of the Base Station ZMAN indicates the following information.



The LED is off:

- Base Station ZMAN is in standby.



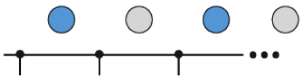
The LED is green:

- Base Station ZMAN is on and one or both RF channels are active.



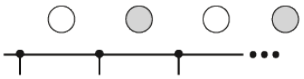
The LED is yellow:

- One or both RF channels are muted.



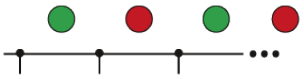
The LED is flashing blue:

- Paring is enabled.



The LED is flashing white:

- The Base Station ZMAN is identified.



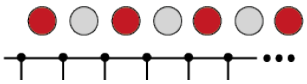
The LED is flashing green and red:

- Firmware update is in progress.



The LED is red:

- Base Station ZMAN is working, but shows a warning on the display.



The LED is flashing red quickly:

- Error. Base Station ZMAN is not working and shows a warning on the display.

Information on the display

Basic information are shown on the display.

The display goes into screen saver after some time.

You can wake up the display by pressing or turning the jog-dial.

The display shows the operating menu, which can be used to configure a few settings (see Menu structure).

> **i** More options and other parameters are available in Spectera WebUI!

To navigate the menu, see Navigating the menu.

Status messages

In certain situations, status messages may appear on the display.

	**Error** - The temperature is critical. The audio processing stopped. Cool down the Base Station ZMAN.
	**Warning** - The temperature is high. Check the ventilation to avoid audio interruption.
	**Warning** - The temperature is low. The Base Station ZMAN is heating up. Please stand by.

Navigating the menu

Use the jog-dial to navigate through the operating menu.



Press the jog dial



- Calls up a menu item
- Changes to a submenu
- Saves settings

Turn the jog dial



- Changes to the previous or next menu item
- Changes the setting of a menu item

Menu structure

In the Base Station ZMAN menu, you can configure a few settings.

> More options and other parameters are available in Spectera WebUI!

The following settings can be changed:

Mute/Unmute the RF-Channels

- Main menu

Change the IP mode

- Network

Select the audio source for the headphone

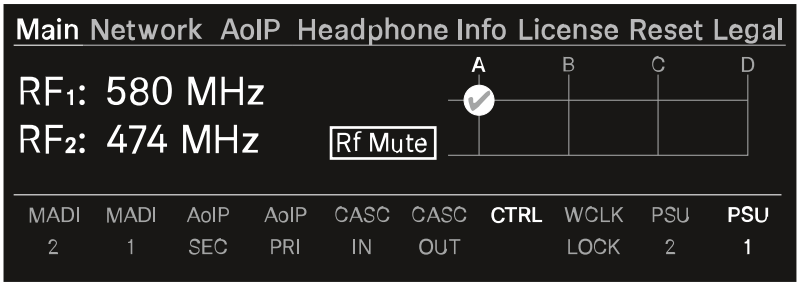
- Headphone

Reset the Base Station ZMAN

- Reset

Main menu

In this menu item, you can view information about connections.



In the upper part you can view information about the RF channel:

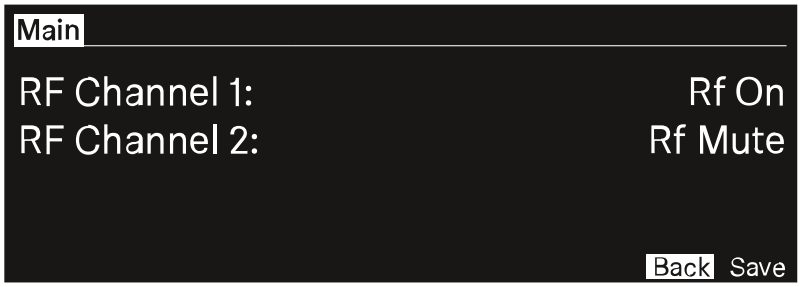
- The selected frequency
- The state of the antenna (mute, active)
- Which antenna port is used for the RF channel.

In the lower part you can view information about the used connection:

- Connected ports are highlighted.
- The order corresponds to the ports on the back.

To mute/unmute the RF channel:

- Press the jog-dial.
  - The RF Status menu opens.

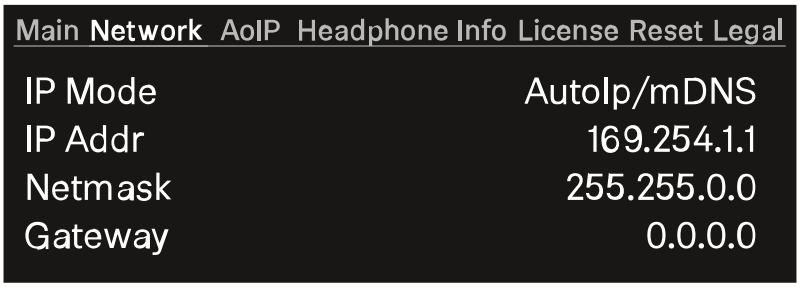


- Rotate and press the jog-dial to change the settings.
  You can select between Rf on and Rf Mute.
- Confirm by selecting Save or discard the changes by selecting Back.

✓ The RF Channels have been muted/unmuted.

Network

In this menu item, you can configure the settings for the network connection.



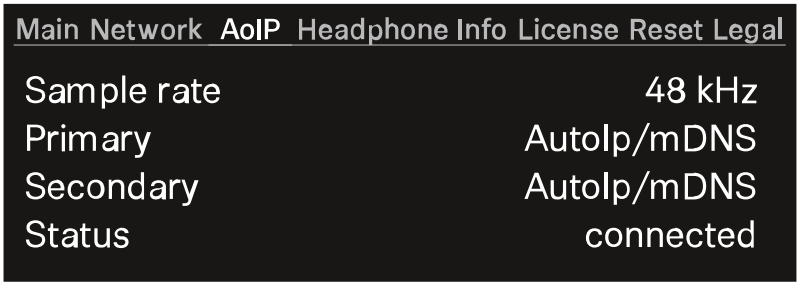
You can make the following settings here:

IP Mode

- Manual
  - You can change the IP Address, the Netmask and the Gateway.
- Manual/mDNS
  - You can change the IP Address, the Netmask and the Gateway.
- AutoIp
  - You can **not** change the IP Address, the Netmask and the Gateway.
- AutoIp/mDNS
  - You can **not** change the IP Address, the Netmask and the Gateway.

Dante

In this menu item, you can view information about the two Dante® connections.



The following information are displayed:

- Sampling rate
- IP mode for Primary
- IP mode for Secondary
- Status

To display a Dante® connection:

- ▶ Press the jog-dial to change the Dante® connection.
- ▶ Rotate the jog-dial to change between Primary and Secondary.



- ▶ Press the jog-dial to enter the setting.

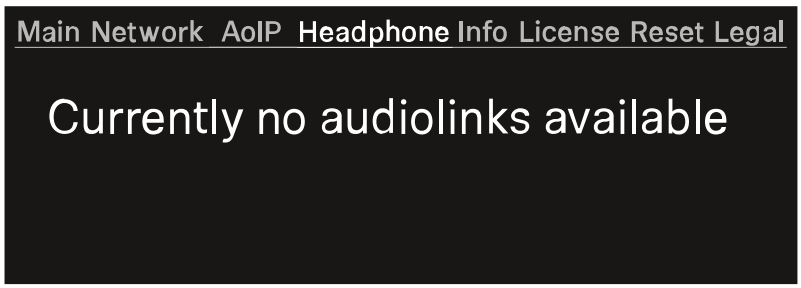
✓ The selected Dante® connection is displayed.

Headphone

In this menu item, you can select the headphone output.

You have to set up audio links via Spectera WebUI for the mobile devices.

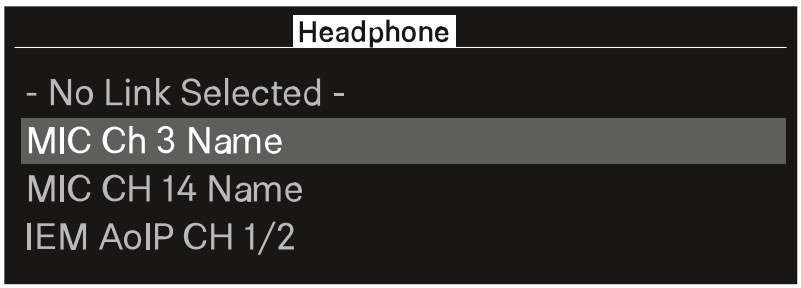
If no audio link is set this note will appear:



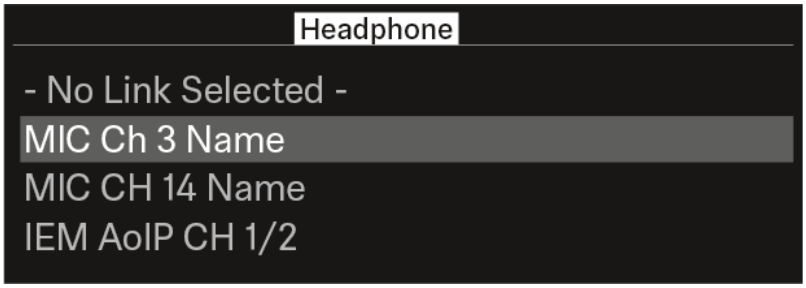
ℹ First you have to set up audio links in Spectera WebUI.

To select an audio link:

- Press the jog-dial to enter the headphone menu.
  Each audio output will be shown independent.
  - ✓ The created audio links appear.

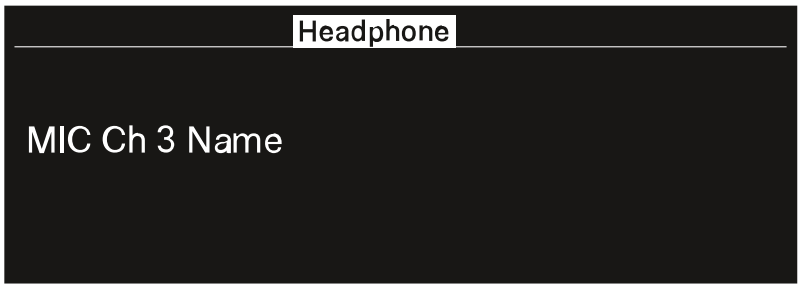


- Turn the jog-dial to select the wanted audio link.
  - ✓ The name of the selected link pulses two times.



- Press the jog-dial to return to the main menu.

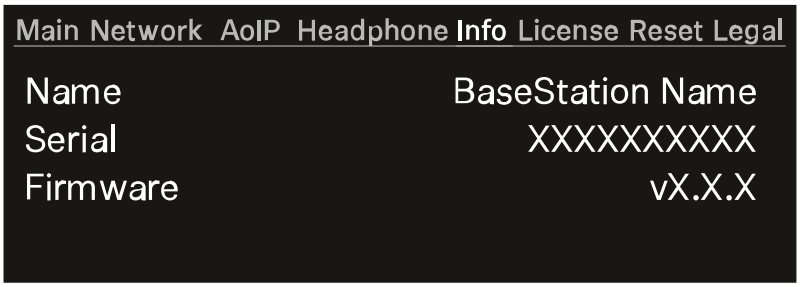
The selected link appears.



You can now listen to the selected audio link.

Info

In this menu item, general information can be shown here.



Name: The name of the Base Station ZMAN.

Serial: The serial number of the Base Station ZMAN.

Firmware: The installed firmware version.

License

In this menu item, information about the license can be shown here.

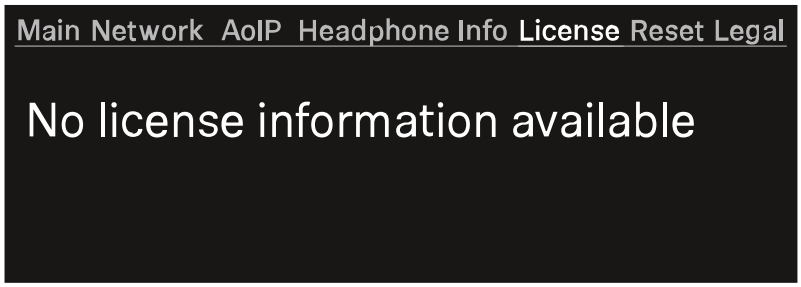
> ℹ A license has to be activated, otherwise you cannot use the Base Station ZMAN.

You can activate a license via Spectera WebUI.

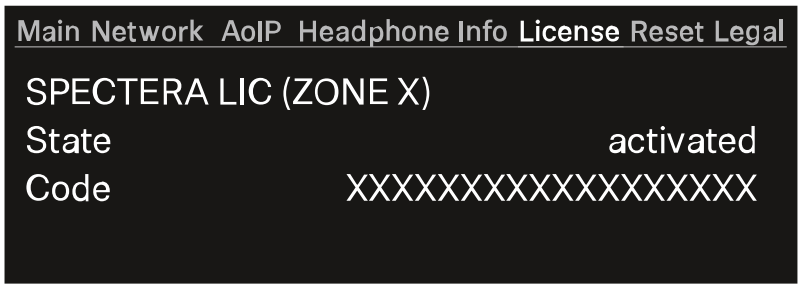
Only one license per Base Station ZMAN is possible.

The license specifies the country-specific frequency ranges and the RF power.

No license is activated:



A license is activated



Name of the purchased license:

- Spectera LIC (ZONE 01)
- ...
- Spectera LIC (ZONE XX)

State: Status of the license.

- activated
- unknown

Code:

- The activated license number has 18 digits.
- n/a

Reset

In this menu item, you can reset the Base Station ZMAN to its factory settings.

NOTICE

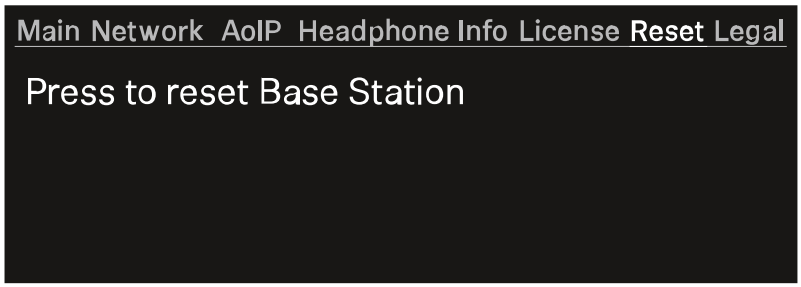
Data loss during the factory reset

All audio devices will be unpaired and all audio routes will be deleted.

All settings (including the device password) are reset to the default values. The license remains activated.

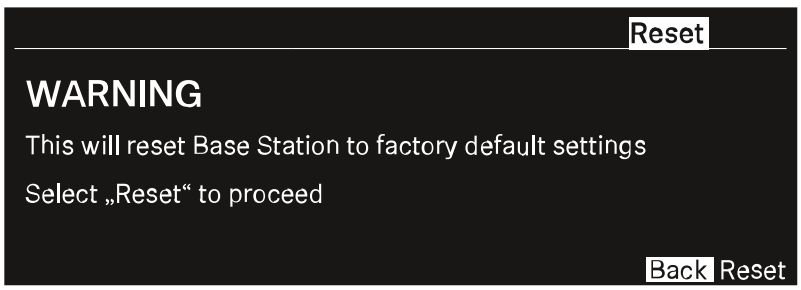
After the reset, the device is restarted automatically.

- Do not reset the Base Station during an active live audio transmission.



To reset the Base Station ZMAN to its factory default settings using the device:

- On the Base Station ZMAN, rotate the jog-dial and navigate to the menu **Reset**.
- Press the jog-dial to enter the menu.
  - A warning will appear.



- Rotate the jog-dial to **Reset**.
- Press the jog-dial again.

The Base Station ZMAN will be set back to factory settings and reboot.

> After rebooting, check the IP address as it may have changed.

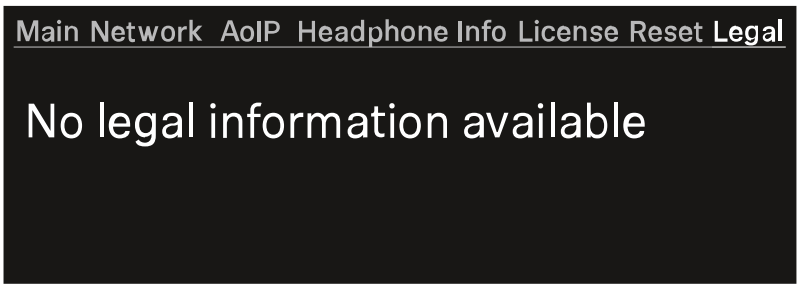
The Base Station ZMAN has been reset to its factory default settings.

Legal

In this menu item, legal information can be shown.

Legal information about the Base Station ZMAN and connected antennas are displayed depending on the activated license.

If no label are available, the display shows:



Updating the Base Station ZMAN

You can update the firmware of the Base Station ZMAN via Spectera WebUI.

All Spectera devices must use the same firmware. The Base Station ZMAN determines the firmware version.

Please note that firmware versions are not backward compatible.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

To update the firmware:

- If you want to update the Base Station ZMAN via Spectera WebUI, follow the steps described here: Updating the firmware (Base Station).

  ✓ The LED is flashing green and red during the update.

  When the update is installed, the Base Station ZMAN restarts.

  The update will be installed on the connected antennas automatically.

✓ The firmware has been updated.

The new firmware is distributed to the other devices via the Base Station ZMAN.

WebUI

Detailed description of the WebUI navigation and configuration.

> Please navigate to the desired chapters by clicking on the related information.

Getting started

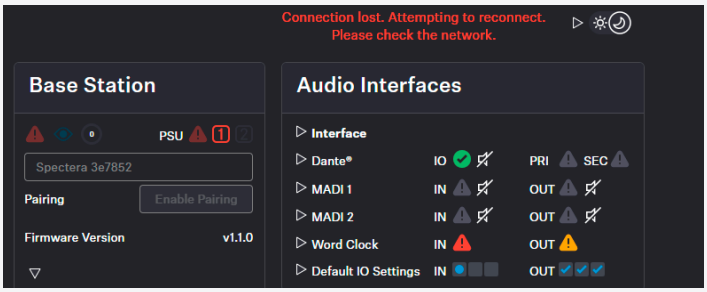
Start your basic configuration with the recommended steps.

When setting up the WebUI for the first time, we recommend following these first steps to successfully configure the system from the outset:

- Identifying Base Station via IP
- Claiming single device (WebUI)
- Activating a license (WebUI)
- Enabling/disabling data collection
- Enabling solo control
- Configuring RF channels
- Assigning an antenna to an RF channel
- Scanning the RF frequency
- Pairing/unpairing mobile devices
- Selecting the default audio input/output source
- Selecting audio link mode (Mic/Line)
- Selecting audio link mode (IEM)
- Assigning an RF channel
- Selecting the Mic/Line input

> Operational data is collected to continuously improve the stability and functionality of Spectera. The data is pseudonymized to ensure there is no direct personal reference. Tracking can be disabled in the settings (see chapter Enabling/disabling data collection).

> If the connection to the device is lost (no power supply or no network connection), the live status will be displayed based on an error message.



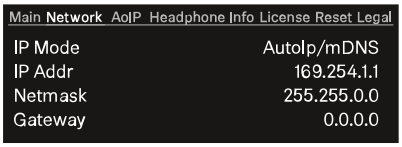
Identifying Base Station via IP

In order to add a Base Station, its IP address is required.

You can read the IP address on the display of the device.

To identify the IP of your Base Station:

- On the Base Station, rotate the jog-dial and navigate to the menu **Network**.
- Press the jog-dial to enter the menu.
  - The network data will be displayed.



- Note the displayed IP of your device.

✓ The IP address of your Base Station has been identified.

Claiming single device (WebUI)

Instructions for claiming a single device in Spectera WebUI.

To claim your Base Station:

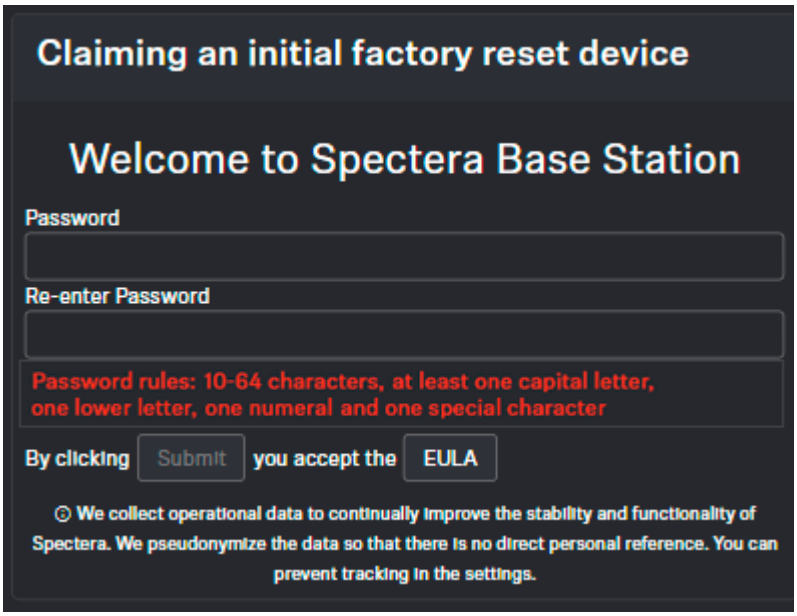
- Enter the following URL into your browser: `https://deviceIP/specterawebui/index.html`.

  > **i** Since the certificate is unknown to your browser, a security warning is displayed the first time you run the application. The security warning depends on the browser you are using.

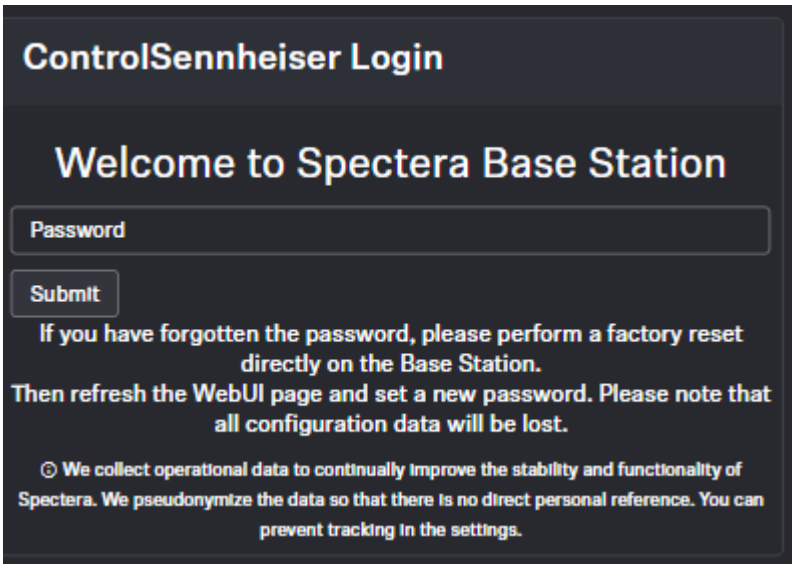
- Depending on your browser, click on **Advanced** and then on:
  - **Continue to localhost (unsafe)** (Microsoft Edge)
  - **Proceed to localhost (unsafe)** (Google Chrome)
  - **Accept the Risk and Continue** (Firefox)
  - or similar (other browsers).

  ✓ The WebUI displays the following options depending on the state of the device:

  - If the device is in a factory default state and the original password is still assigned, it will be automatically detected and applied. Next, a new password has to be set:



  - If the device was previously claimed by another Sennheiser LinkDesk or Spectera WebUI instance, the previously set password must be entered:



> **i** If you cannot remember the previously set password, please perform a factory reset of the device. After the reset, the default password for Spectera will be automatically applied by the software.

- Set a new device password (if you are logging in for the first time) or enter the password you have already assigned for authentication (if you have already logged in).
- Click on **Submit**.

✓ Your Base Station has been claimed successfully.

Activating a license (WebUI)

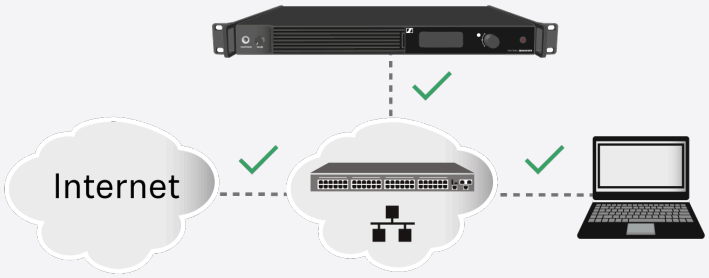
Under Entitlement, you can enter and activate the current license for the frequency spectrum.

i The purchased license (included in the product) is only valid for the region for which the product was designed and approved. The license may not be used in other regions.

NOTICE

License activation requires a direct Internet connection to the device

In order to activate the Base Station using the 18-digit license code, a direct Internet connection is required.

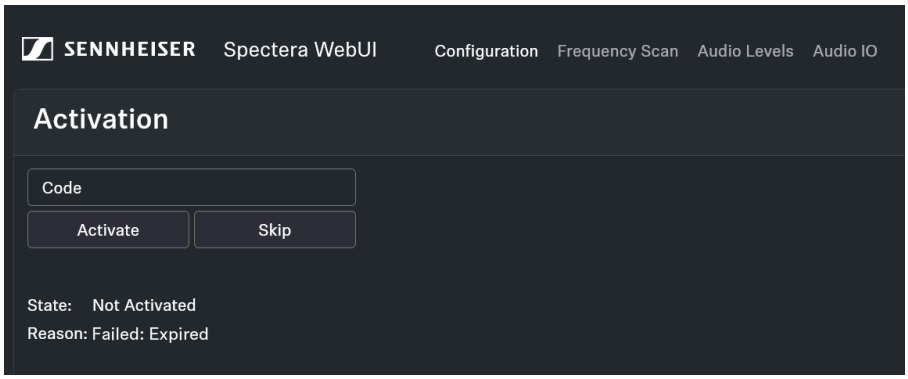


- Please connect your Base Station directly to a network with Internet access via a switch or router. For more information, refer to the chapter Connecting to a network.
- Direct connections via laptop etc. are not supported for activation!



- The Internet is only required once for activation.

When you start the device for the first time, your license key is requested.



To activate the license:

- Enter the acquired license and click on **Activate** or on **Skip** to proceed with activation later.

✓ Your license has been activated.

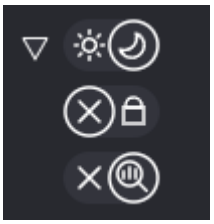
Enabling/disabling data collection

Spectera collects operational data to enhance stability and functionality.

The data is pseudonymized to ensure there is no direct personal reference.

To enable/disable data collection:

- On the start page, navigate to the top navigation at the top right.
- Click on the triangle to expand the settings.



- Click on:
  - the X to stop data collection
  - the magnifying glass to enable data collection.

✓ Data collection has been enabled/disabled.

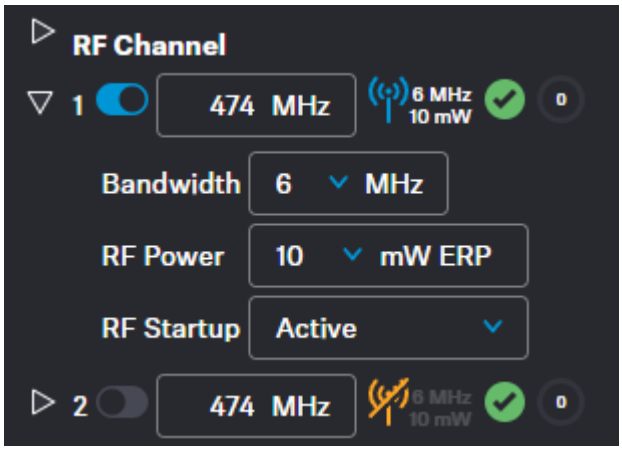
Configuring RF channels

Here you can find out how to configure the RF channel correctly from the outset.

> The current local permissions are displayed when the frequency is selected.

To configure an RF channel:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
- For channel RF1, enter the frequency under **1** and confirm with **ENTER**.



- Next, select the **Bandwidth** and the **RF Power** for your location.
  - The applicability of your settings is indicated by an icon:
    - green: applicable
    - red: not applicable
- Under **RF Startup**, select the mute option for the configured RF channel:
  - Active
  - Muted
  - Last state = When switching on or leaving standby mode, the last used RF state is restored
  - The RF Channel has been assigned to the operating antenna.

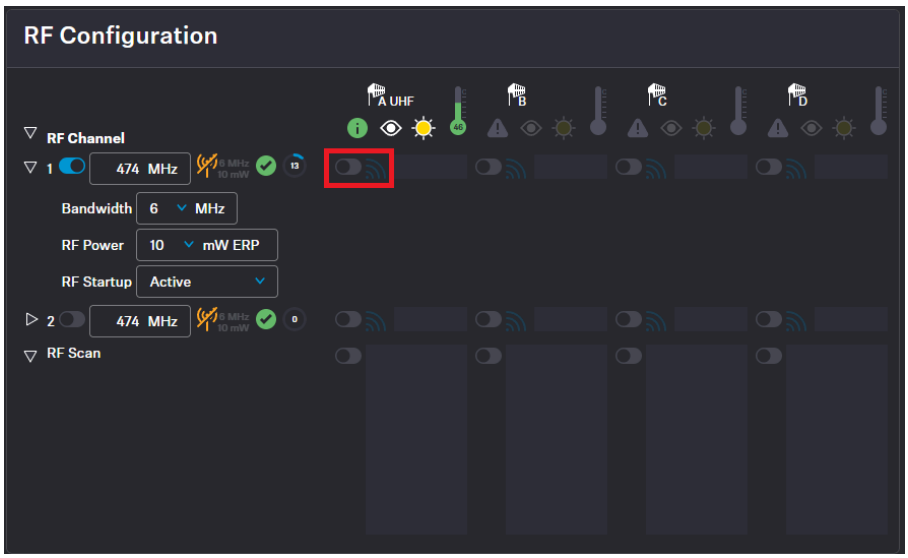
> The RF Channel has been configured.

Assigning an antenna to an RF channel

You can choose between up to four connected antennas to assign them to your two possible RF channels.

> i For additional reliability in terms of redundancy or to extend your range, you can assign up to four antennas per channel and use them simultaneously.

The antennas can be assigned and unassigned, e.g. to perform an RF scan or to switch between the configured RF channels.



To assign an antenna for an RF channel:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
- In your RF channel row, click on the toggle switch next to the utilization and interference icon .
  - The toggle switch turns blue . The antenna has been assigned to the RF channel and any potential interference is indicated by the icon.



✓ The antenna has been assigned to a specific RF channel.

Scanning the RF frequency

You can run a frequency scan to check the current frequency situation in your surrounding area.

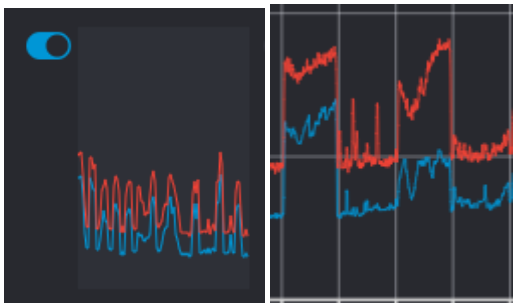
The frequency scan provides an overview of the frequency situation in your location. You can save the antenna configuration as a .csv info file. This file can be used as a backup file to recapitulate your settings or as local frequency information for your specific environment. You can scan the frequencies of all antennas connected to the Base Station.

The scan can be initiated:

- via the RF configuration tab to see a small extract without any details or
- via the Frequency Scan tab for a detailed overview of the frequency situation.

The scan results will be displayed in two different curves:

- **Peak** (red) = Maximum value
- **RMS** (blue) = Average power or strength



Please note that the antenna must not be assigned to an RF channel before scanning (see Assigning an antenna to an RF channel).

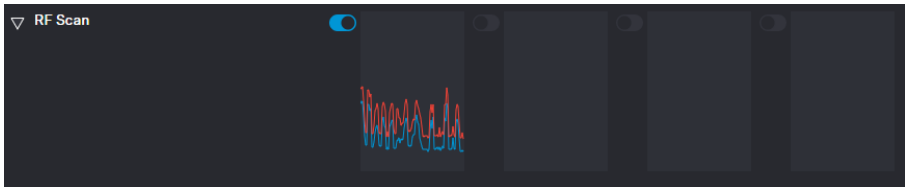
To scan the RF frequency via the RF configuration tab:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
  - Under the **RF Scan** drop-down menu, there are four toggle switches that enable and disable the scan function for each connected antenna.



- Click on the toggle switch of the antenna to be scanned in order to start an immediate scan.

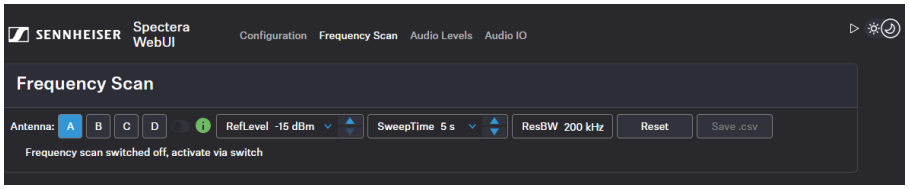
✓ The square is highlighted with a blue dot and the scan result is displayed in a small frequency curve after approx. 5 seconds.



▶ In order to view the results,
- click on the small frequency icon or
- navigate to **Frequency Scan** in the top bar.

To scan the RF frequency via the Frequency Scan tab:

▶ In the top bar, navigate to the tab **Frequency Scan**.



▶ Select your antenna to be scanned and adjust your desired settings.

▶ Switch on the toggle to start the scan.

✓ The frequency scan is started and the result is displayed in a detailed frequency diagram. Supported frequency ranges are shown in green and unsupported ranges in gray.

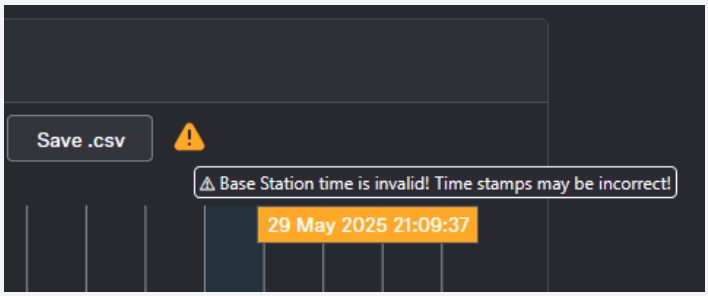


To reset a scan:

- Click on **Reset**.
  - The current scan will be reset.

To save the scan results as `.csv`:

- Click on **Save.csv**.
  - The antenna configuration has been downloaded locally to your computer as a `.csv` file.

> **i** If a ⚠ appears after **Save.csv**, the time on the Base Station is invalid.
>
> 
>
>
> Connect the Base Station to the Internet to get the correct time.

✓ The frequency of your connected antenna has been scanned.

Pairing/unpairing mobile devices

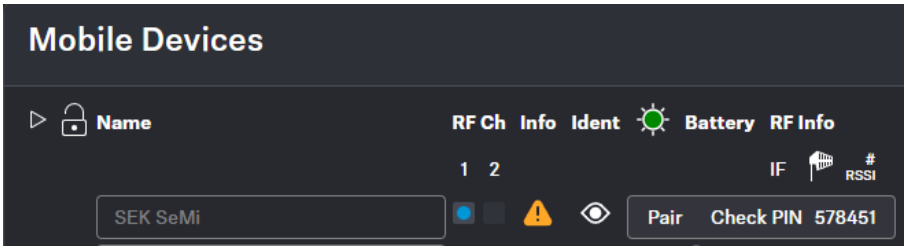
In the WebUI, you can pair up to 128 mobile devices to a Base Station within one RF channel.

Mobile devices can only be paired and operated with one Base Station at a time. If a mobile device is to be used with another Base Station, it must first be paired again.

> **i** Please unmute at least one RF channel before pairing if this was not done automatically.

To pair a mobile device:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Click on **Enable Pairing**.
  - The Base Station starts the pairing process for 300 seconds.
- Switch on your mobile device and activate **Pairing Mode** if it has not been activated automatically (Switching the SEK on and off/Switching the SKM on and off).
  - After a few seconds, the available mobile devices are displayed in the list below under **Mobile Devices**. A verification PIN is displayed on the mobile device and in the WebUI.



- Verify the PIN on the mobile device and click on **Pair**.
  - The mobile device has been paired successfully. The device state color changes to:
    - green (successfully paired)
    - gray (assigned RF channel not on air)
    - yellow (firmware mismatch) or
    - red (unconnected, no RF channel selected, not available)

To unpair a mobile device:

To unpair a paired device, the audio links must first be deactivated.

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Click on the button **Unpair** > **Confirm** in the line of the mobile device to be unpaired.
  The mobile device has been successfully unpaired.

The mobile devices have been successfully paired/unpaired.

Selecting the default audio input/output source

You can select the default source for the audio input and output of your audio interface.

To select the default input interface:

- In the top bar, navigate to **Configuration RF** > **Audio Interfaces**.
- Select the input interface under **Default IO Settings**.
  - The default input interface has been selected.



To select the clock source output:

- Select the desired setting for the clock source under:
  - **MADI 1**
  - **MADI 2**
  - **Word Clock BNC**
  - The clock source output has been selected.

The audio interfaces have been selected.

Selecting audio link mode (Mic/Line)

You can select the audio mode for your Mic/Line link.

> Please note that the bandwidth utilization varies depending on the link mode.

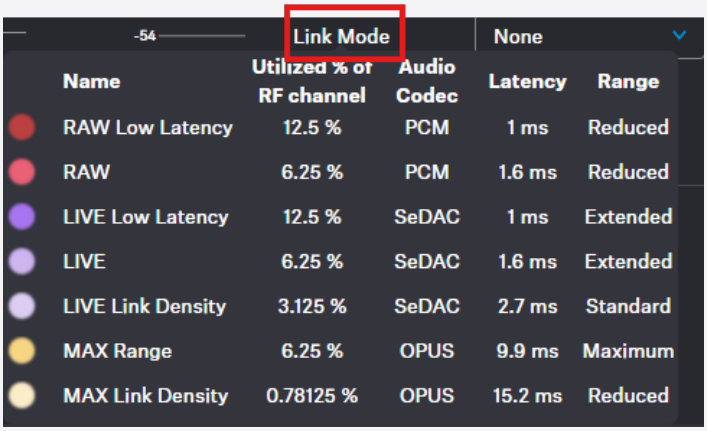
The following modes are available:

- Max Range
- Max Link Density
- Live Link Density
- LIVE
- Live Low Latency
- RAW
- RAW Live Low Latency

To select the audio mode:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the audio mode from the drop-down list **Link Mode**.

> Hover your mouse over the word **Link Mode** to display a tabular listing of possible modes.



Name	Utilized % of RF channel	Audio Codec	Latency	Range
RAW Low Latency	12.5 %	PCM	1 ms	Reduced
RAW	6.25 %	PCM	1.6 ms	Reduced
LIVE Low Latency	12.5 %	SeDAC	1 ms	Extended
LIVE	6.25 %	SeDAC	1.6 ms	Extended
LIVE Link Density	3.125 %	SeDAC	2.7 ms	Standard
MAX Range	6.25 %	OPUS	9.9 ms	Maximum
MAX Link Density	0.78125 %	OPUS	15.2 ms	Reduced

✓ The audio mode has been selected.

Selecting audio link mode (IEM)

You can select the audio mode for your IEM link.

> Please note that the bandwidth utilization varies depending on the link mode.

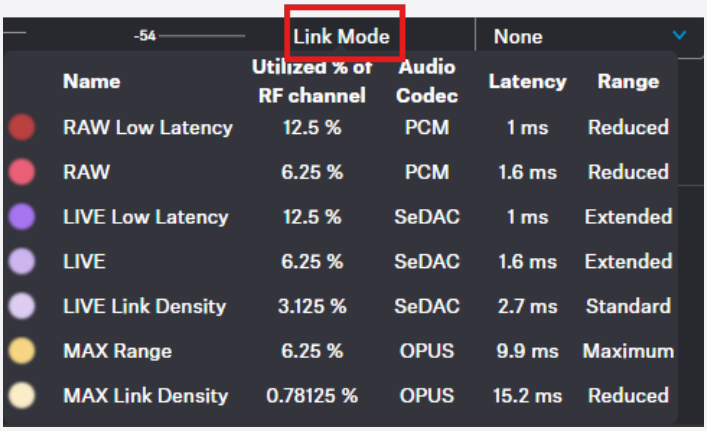
The following modes are available:

- Max Range
- Max Link Density
- Live Link Density Range
- Live Link Density Range
- Live Low Latency
- Live Ultra Low Latency

To select the audio mode:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the audio mode from the drop-down list **Link Mode**.

> Hover your mouse over the word **Link Mode** to display a tabular listing of possible modes.



Name	Utilized % of RF channel	Audio Codec	Latency	Range
RAW Low Latency	12.5 %	PCM	1 ms	Reduced
RAW	6.25 %	PCM	1.6 ms	Reduced
LIVE Low Latency	12.5 %	SeDAC	1 ms	Extended
LIVE	6.25 %	SeDAC	1.6 ms	Extended
LIVE Link Density	3.125 %	SeDAC	2.7 ms	Standard
MAX Range	6.25 %	OPUS	9.9 ms	Maximum
MAX Link Density	0.78125 %	OPUS	15.2 ms	Reduced

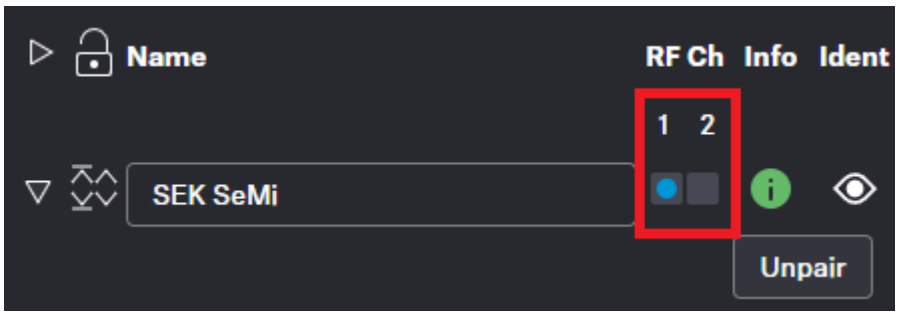
✓ The audio mode has been selected.

Assigning an RF channel

You can assign a configured RF channel to your mobile device.

To assign the RF channel:

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Select your configured channel under **RF Ch**.



> To change the RF channel, you must first deactivate the audio Link Mode and the audio Channels.

- Enable the toggle switch of the configured RF channel.

The RF channel has been assigned to your mobile device.

Selecting the Mic/Line input

You can select the audio input as the signal source for your Mic/Line link.

> **i** For a smooth system configuration, we recommend first selecting the link modes and afterwards assigning the channels:
>
> - Selecting audio link mode (Mic/Line)
> - Selecting audio link mode (IEM)
> - Adding/removing an audio channel (Mic/Line)
> - Selecting an audio channel (IEM link)
> - Selecting the IEM audio interface

> **i** You can route audio links to several channels. Routing can be performed easily via the routing matrix (see Audio inputs and outputs).

The following input signals are available:

- Auto (unknown)
- Mic
- Line

> **i** The automatic mic/line detection is based on power consumption and is optimized for use with Sennheiser microphones. Because third-party microphones vary widely, reliable detection cannot always be ensured.

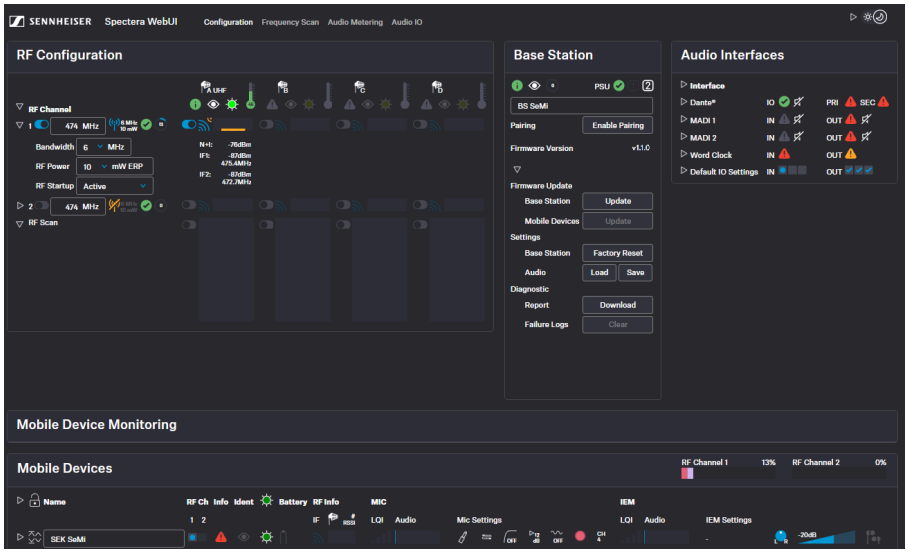
To choose the audio input:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the audio input from the drop-down list **Mic/Line**.

✓ The audio input has been selected.

Configuration

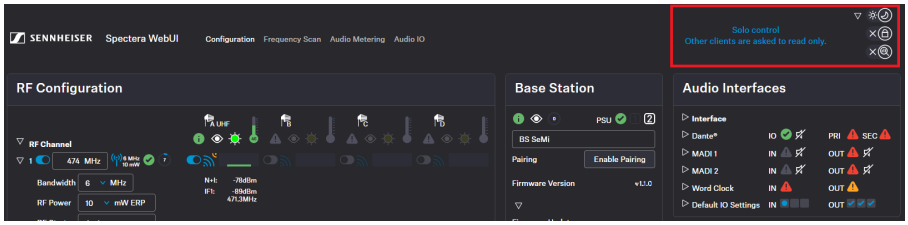
Under Configuration, you can set the essential settings for the RF channel, antenna, Base Station and mobile devices.



> Please navigate to the desired chapters by clicking on the related information.

General settings

Overview of the general settings and messages.



You can find the following settings in the top right corner:

- Dark / light mode (see Enabling dark theme)
- Solo control (see Enabling solo control)
- Data collection (see Enabling/disabling data collection)

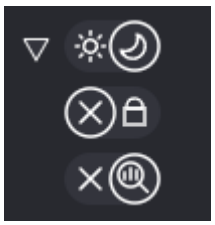
Messages can be found here as well (see General messages).

Enabling dark theme

You can enable a dark theme for the WebUI surface.

To enable the dark theme:

- On the start page, navigate to the top navigation bar at the top right.
- Click the triangle to expand the settings.



- Click:
  - the  to enable the dark theme.
  - the  to enable the light theme.

✓ The dark theme has been enabled.

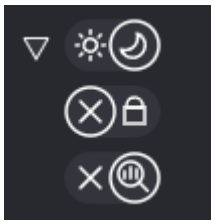
Enabling solo control

You can enable solo control to restrict configuration changes to a single user.

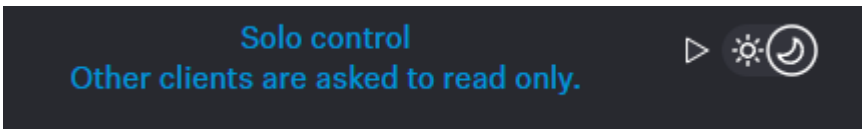
If solo control is enabled, other users cannot change the settings and have read-only access.

To enable or disable solo control:

- On the start page, navigate to the top navigation bar at the top right.
- Click the triangle to expand the settings.



- Click:
  - the lock to enable solo control



  - the X to disable solo control.

✓ Solo control has been enabled or disabled.

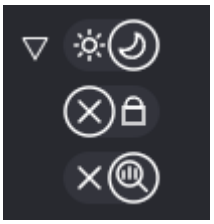
Enabling/disabling data collection

Spectera collects operational data to enhance stability and functionality.

The data is pseudonymized to ensure there is no direct personal reference.

To enable/disable data collection:

- On the start page, navigate to the top navigation at the top right.
- Click on the triangle to expand the settings.



- Click on:
  - the X to stop data collection
  - the magnifying glass to enable data collection.

✓ Data collection has been enabled/disabled.

General messages

Overview of the general messages.

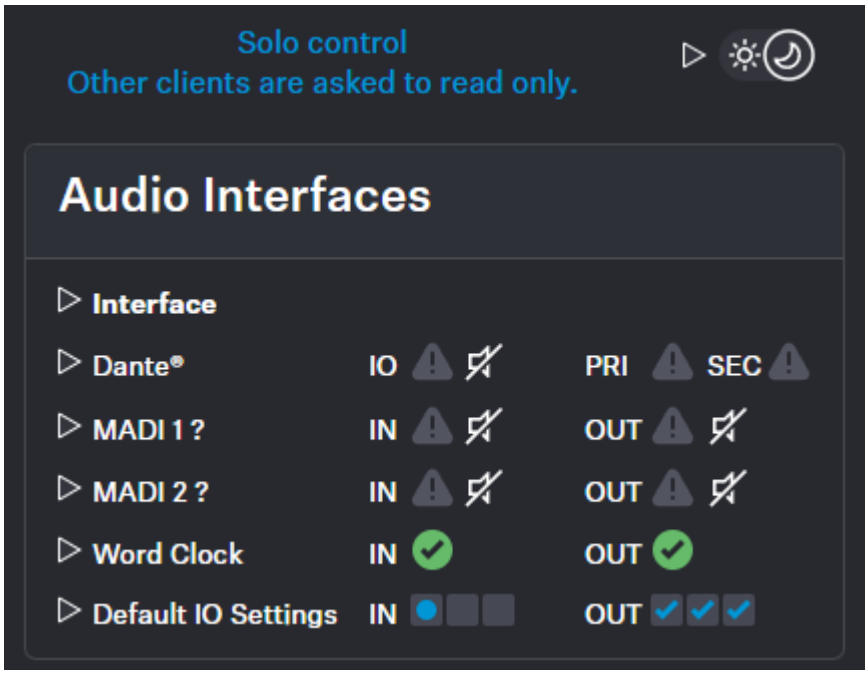
The messages can appear on the top right corner.

Connection is lost

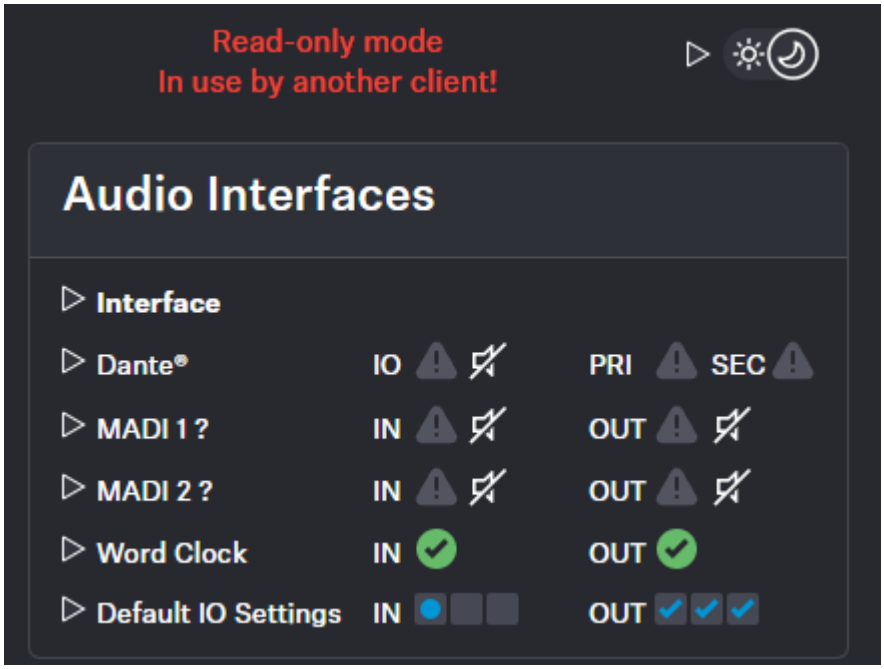


Solo control and read-only mode

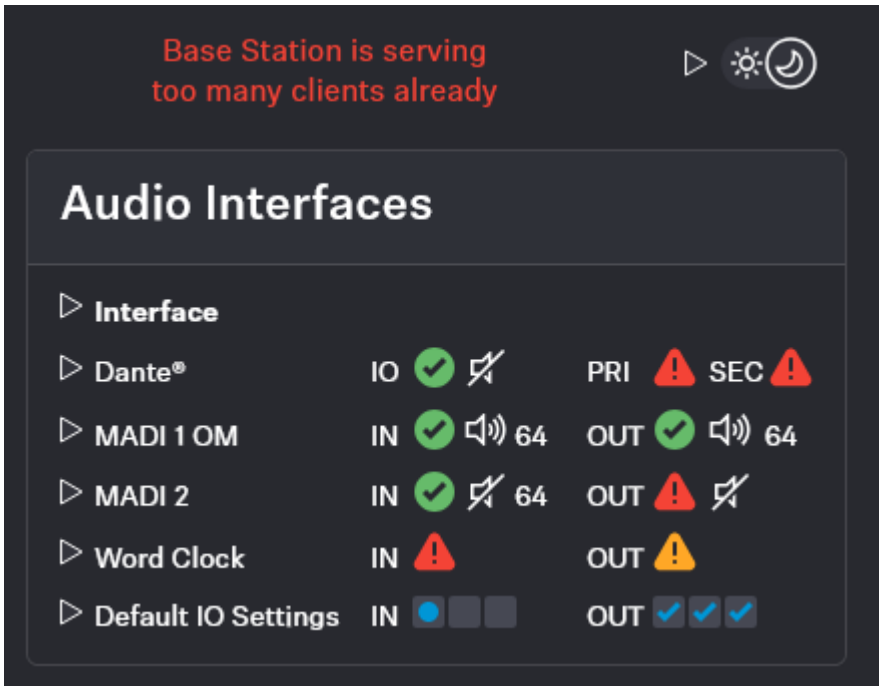
If you enabled solo control:



If you have read-only mode:



If to many clients accessing the WebUI:


Base Station is serving
too many clients already
Audio Interfaces
Interface
Dante®
IO
PRI
SEC
MADI 1 OM
IN
64
OUT
64
MADI 2
IN
64
OUT
Word Clock
IN
OUT
Default IO Settings
IN
OUT

RF configuration

Here you can set up your RF channel and check the status of local permissions, your connected antenna, and any potential frequency interference in the surrounding area.



RF Channel

- Display of two possible configurable RF channels **RfC 1** and **RfC 2**
- Display of the antenna (A-D) assigned to the RF channel

Frequency

- Settings for frequency of the RF channel
- The input is accepted via the **ENTER** key

> The input cannot be accepted by switching with **TAB** .

- Status indication of the RF channel with current settings

- Permission indication for local country based on RF channel settings
  -  Valid properties acc. to the license and local regulations
  -  Invalid properties acc. to the license and local regulations

    > The frequency and bandwidth must comply with local regulations.

-  Capacity utilization of the entire RF bandwidth in %

Bandwidth

- Settings for bandwidth of the RF channel

> The input cannot be accepted by switching with
> **TAB**
> .

> The frequency and bandwidth must comply with local regulations. Permission is displayed via the icons  (valid) and  (invalid).

RF Power

- Setting for the transition power of the transmitter

> The frequency and bandwidth must comply with local regulations. Permission is displayed via the icons  (valid) and  (invalid).

RF Startup

- Settings for the first RF start after switching off the device or when waking up the device after it has been in standby mode.

Antenna

-  Display of available antennas (A-D)
-  Readiness status of the RF channel
  -  green (successfully paired and ready)
  -  gray (assigned RF channel not on air)
  -  yellow (high temperature or packet jitter)
  -  red (error, for example: PoE malfunction, critical temperature)
  -  red flashing (unconnected: antenna is configured but not connected)
-  Identification button for configured antenna (flashes white 3x)
-  LED color of the antenna LED (color can be changed for the states connected or muted individually)
-  Current antenna temperature (switch between Celsius and Fahrenheit)
-  Indication for active RF
-  Frequency indication without any interference
-  Frequency indication with interference in the surrounding area

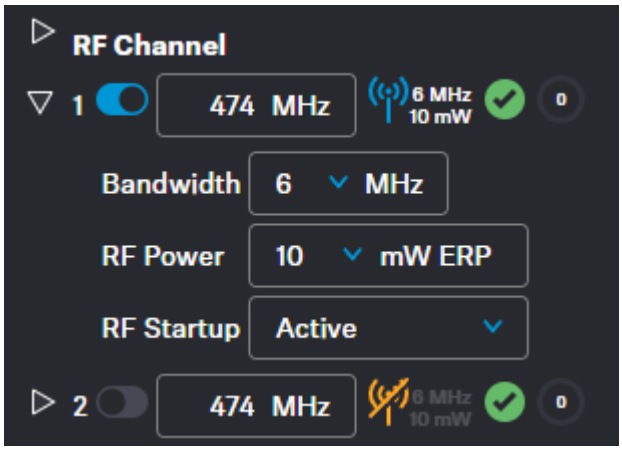
Configuring RF channels

Here you can find out how to configure the RF channel correctly from the outset.

> **i** The current local permissions are displayed when the frequency is selected.

To configure an RF channel:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
- For channel RF1, enter the frequency under **1** and confirm with **ENTER**.



- Next, select the **Bandwidth** and the **RF Power** for your location.
  - The applicability of your settings is indicated by an icon:
    - green: applicable
    - red: not applicable
- Under **RF Startup**, select the mute option for the configured RF channel:
  - Active
  - Muted
  - Last state = When switching on or leaving standby mode, the last used RF state is restored
  - The RF Channel has been assigned to the operating antenna.

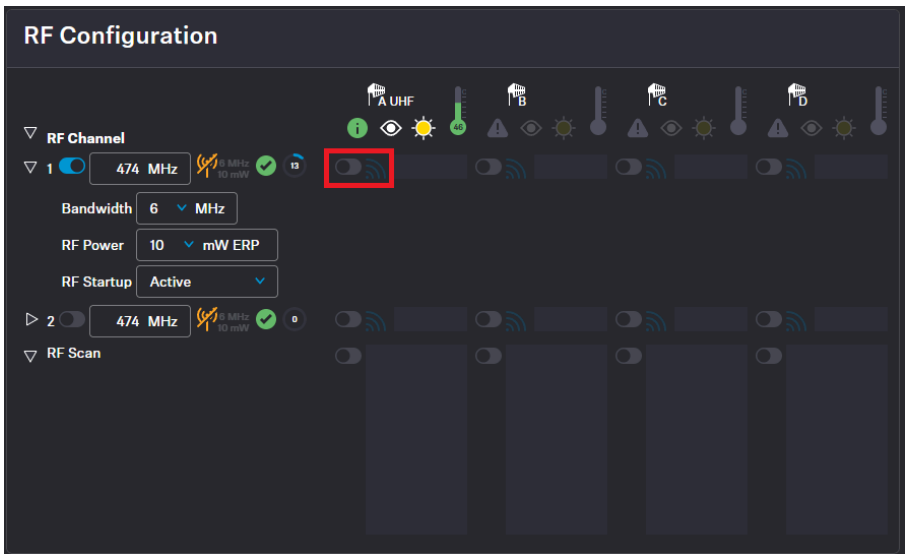
✓ The RF Channel has been configured.

Assigning an antenna to an RF channel

You can choose between up to four connected antennas to assign them to your two possible RF channels.

> i For additional reliability in terms of redundancy or to extend your range, you can assign up to four antennas per channel and use them simultaneously.

The antennas can be assigned and unassigned, e.g. to perform an RF scan or to switch between the configured RF channels.



To assign an antenna for an RF channel:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
- In your RF channel row, click on the toggle switch next to the utilization and interference icon .
  - The toggle switch turns blue . The antenna has been assigned to the RF channel and any potential interference is indicated by the icon.



✓ The antenna has been assigned to a specific RF channel.

Scanning the RF frequency

You can run a frequency scan to check the current frequency situation in your surrounding area.

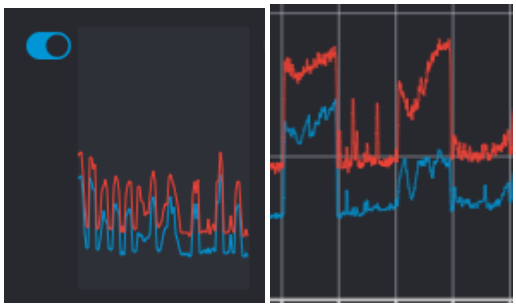
The frequency scan provides an overview of the frequency situation in your location. You can save the antenna configuration as a .csv info file. This file can be used as a backup file to recapitulate your settings or as local frequency information for your specific environment. You can scan the frequencies of all antennas connected to the Base Station.

The scan can be initiated:

- via the RF configuration tab to see a small extract without any details or
- via the Frequency Scan tab for a detailed overview of the frequency situation.

The scan results will be displayed in two different curves:

- **Peak** (red) = Maximum value
- **RMS** (blue) = Average power or strength



Please note that the antenna must not be assigned to an RF channel before scanning (see Assigning an antenna to an RF channel).

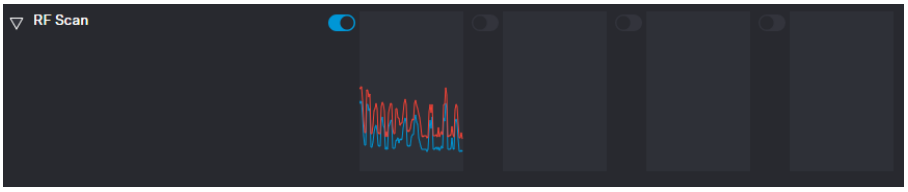
To scan the RF frequency via the RF configuration tab:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
  - Under the **RF Scan** drop-down menu, there are four toggle switches that enable and disable the scan function for each connected antenna.



- Click on the toggle switch of the antenna to be scanned in order to start an immediate scan.

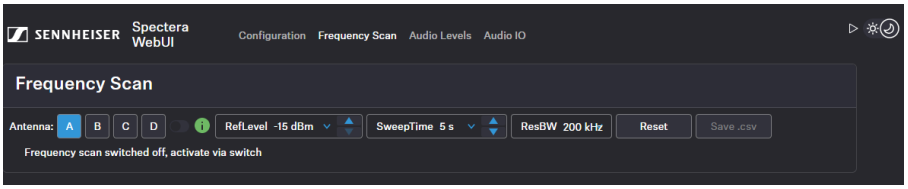
✓ The square is highlighted with a blue dot and the scan result is displayed in a small frequency curve after approx. 5 seconds.



▶ In order to view the results,
- click on the small frequency icon or
- navigate to **Frequency Scan** in the top bar.

To scan the RF frequency via the Frequency Scan tab:

▶ In the top bar, navigate to the tab **Frequency Scan**.



▶ Select your antenna to be scanned and adjust your desired settings.

▶ Switch on the toggle to start the scan.

✓ The frequency scan is started and the result is displayed in a detailed frequency diagram. Supported frequency ranges are shown in green and unsupported ranges in gray.

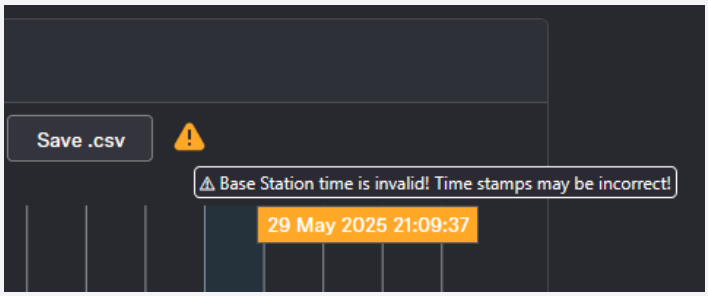


To reset a scan:

- Click on **Reset**.
  - The current scan will be reset.

To save the scan results as `.csv`:

- Click on **Save.csv**.
  - The antenna configuration has been downloaded locally to your computer as a `.csv` file.

> **i** If a ⚠ appears after **Save.csv**, the time on the Base Station is invalid.
>
> 
>
>
> Connect the Base Station to the Internet to get the correct time.

✓ The frequency of your connected antenna has been scanned.

Managing the AFTRCC e-key for 1G4 in the US only

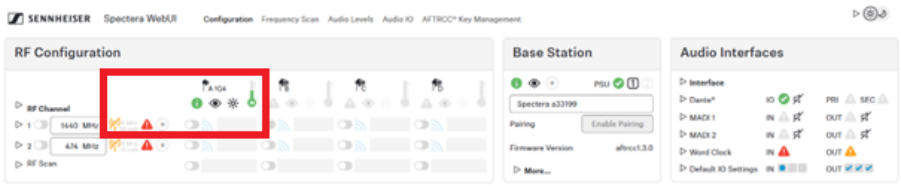
Configure your Spectera system to use an e-key for compliant operation.

Prerequisites

- Spectera Base Station
- DAD 1G4
- SEK 1G4
- Laptop
- Internet connection
- Bootstrapped and activated Spectera system
- Spectera US license (Zone 02)

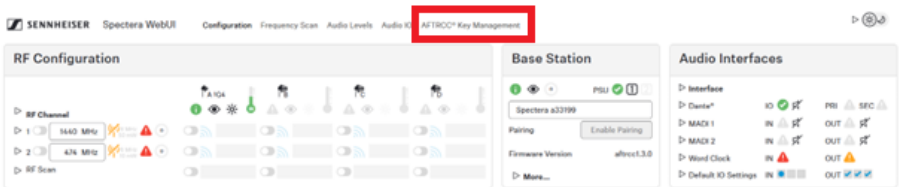
To set up the basics:

- Switch the Base Station on.
- Connect your laptop via network to the control port of the Base Station.
- Connect the DAD 1G4 to the Base Station.
- Get the IP adress from the display.
- Start the WebUI in your browser by entering **https://deviceIP**.
- Log in to the WebUI.
  - You can see one 1G4 antenna connected, but it cannot be enabled (indicated by a red triangle).



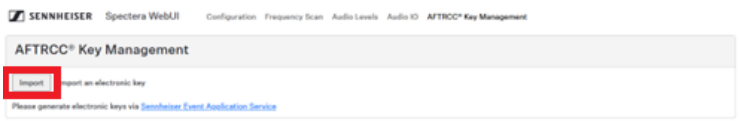
To open the AFTRCC key management:

- Open the AFTRCC Key Management tab at the top.

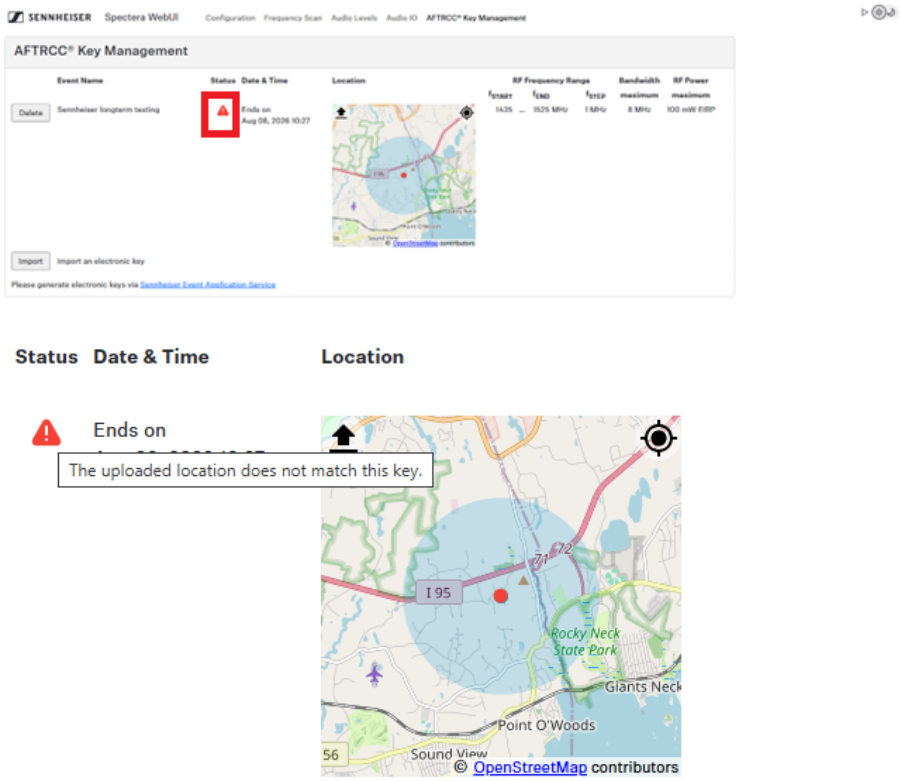


> This tab is only availabe with a licence zone 02 in the USA.

- Click on **Import** and select the e-key from your file system.



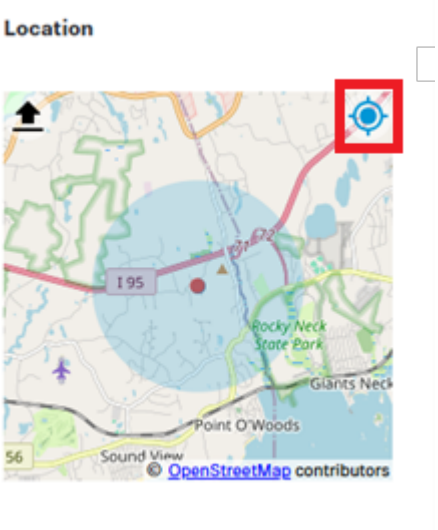
  A red triangle shows information about why it is not working.



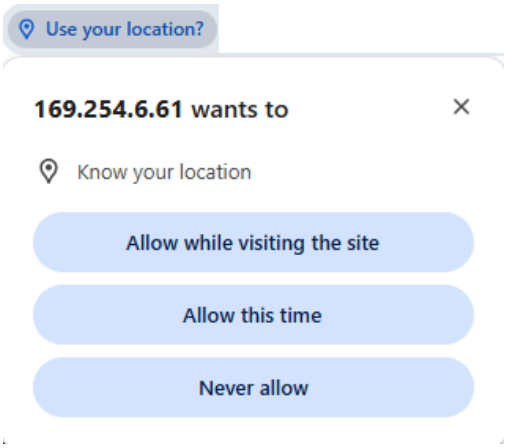
- Make sure that your Spectera system is connected to the Internet and can get the current valid time and date.
  The Base Station can maintain valid time and date for up to two weeks, when neither internet connection nor mains power is available.

To update and upload the location:

- Press the localization icon in the map.



- If the system asks for access to the location service, grant it.

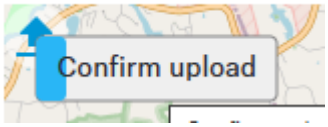


> **i** Sometimes the browser localization needs some time after granting access to location service. You can press the localization icon again to improve accuracy.

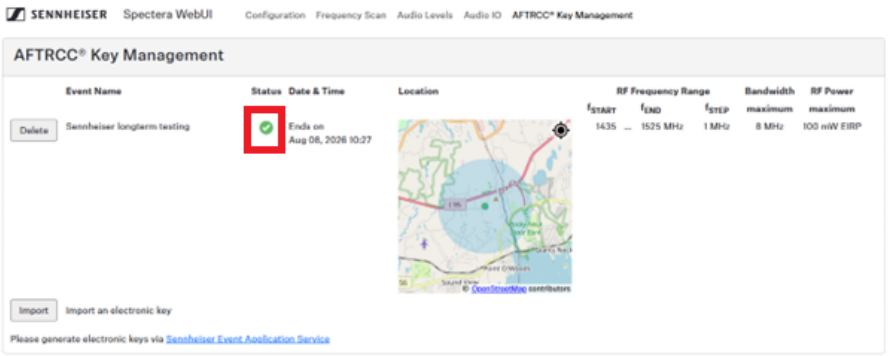
- Upload your location by pressing the upload button in the map.



- Click the confirmation button. You hereby confirm, that the current shown location is correct.

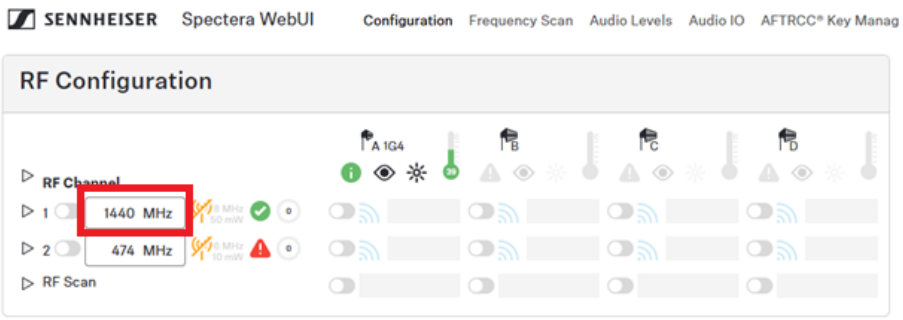


The status changes to green, if all the necessary prerequisites are met (time, date and location).

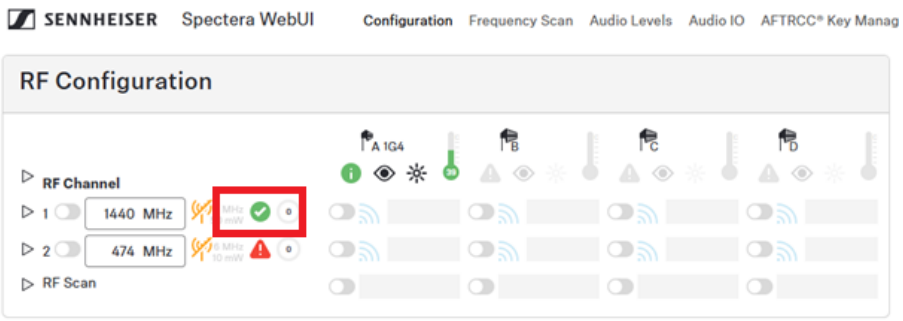


To configure and enable the RF channel:

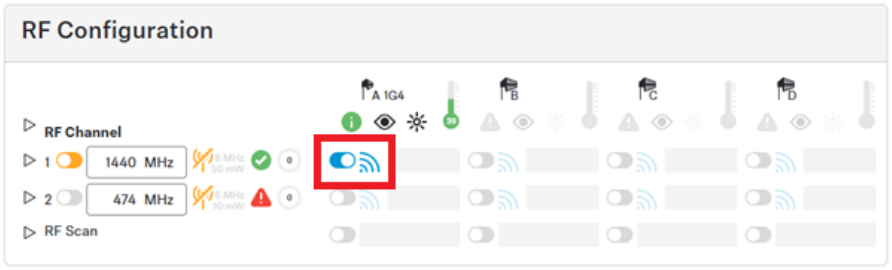
- Open the Configuration tab at the top.
- Configure the frequency of the RF channel to one valid frequency as defined in the e-key.



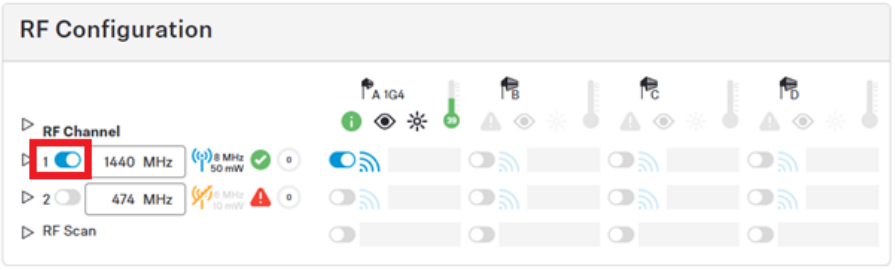
- Check if the RF channel can be used as configured.



- Enable the antenna.



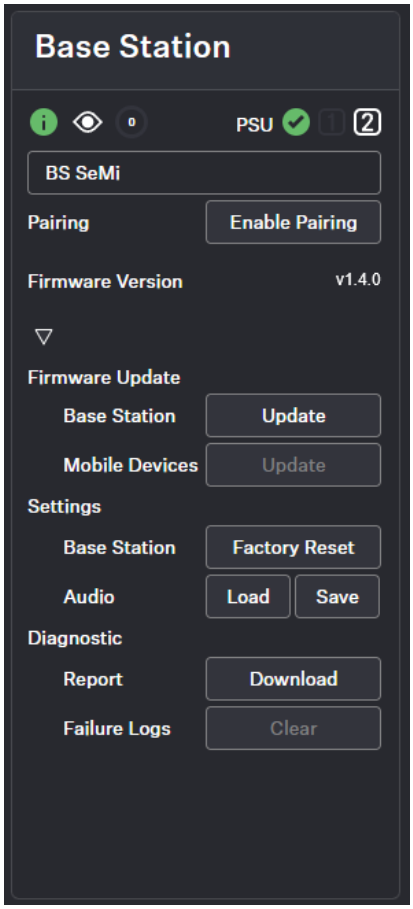
- Enable the RF channel.



✓ The system is now working within the parameters of the e-key.

Base Station

Here, you can check the basic settings of the Base Station and easily perform tasks such as firmware updates, walk tests, or restoring it to factory settings.



General

- Device state color
- Identify button (see Identifying the Base Station)
- Indication for pending actions
- Connection status and number of connected power supply units
- Name of your Base Station (see Changing the device name)

Enable Pairing

- Triggers the Pairing function of the Base Station for 300 sec. (see Pairing/unpairing mobile devices)

Firmware Update

- Base Station
  - Update service for the Base Station (see Updating the firmware (Base Station))
- Mobile Devices
  - Update service for mobile devices (see Updating the firmware (mobile devices))

Settings

- Base Station
  - Factory Reset - resets the Base Station to the factory defaults (see Resetting the Base Station)
- Audio
  - Saving/loading audio settings as `.json` file (Saving/loading audio settings)

Diagnostic

- **Report**: Provides archived support information of the product as a download.

  > The automatically generated file contains basic information about the product and the last saved product configuration before a potential failure. In case of support, this file should be saved and sent to the support team.

- **Failure Logs**: Deletes all error messages saved under "Report" that occurred during runtime.

Changing the device name

You can change the device name for your Base Station.

> For security reasons, please do not enter any sensitive personal data as the device name.

To change the device name:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Edit the name under **Name** and confirm with **ENTER**.

  The name is immediately transmitted to the Base Station and saved.

The device name has been changed.

Updating the firmware (Base Station)

The firmware version of the Base Station can be downloaded and updated manually.

The firmware version for the Base Station also includes the latest versions for the antennas and the mobile devices. While the antennas are updated automatically, the updates for the mobile devices must be started explicitly.

ℹ Please download the latest firmware version for your Base Station under: sennheiser.com/spectera-base-station.

NOTICE

Data loss during firmware update

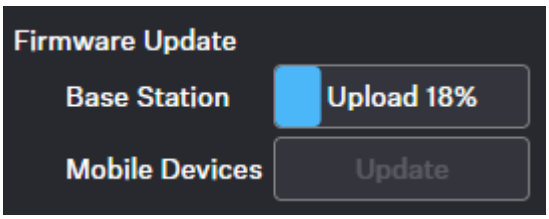
The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

To update your Base Station firmware:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Under **Firmware Update** > **Base Station** click on **Update**.
  - A new upload window opens.
- Select the manually downloaded `.sennpkg` file.
  - The firmware file has been selected. The firmware starts the update automatically. The update process is indicated by the current percentage value.



ℹ After the successful update, the Base Station restarts and automatically begins the update on the connected antennas. Please refresh your browser after the entire update process.

The firmware has been updated once the update is installed.

Updating the firmware (mobile devices)

The update of the firmware version of mobile devices can be initiated using the Update button.

The latest firmware version for the mobile devices will be delivered with the latest firmware version of the Base Station. To update to a new version, the update process must be initialized individually.

> **i** Please note that firmware versions are not backward compatible. The latest compatible version is included in the firmware update package for the Base Station.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

To update your mobile device firmware:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Under **Firmware Update** > **Mobile Devices** click on **Update**.
  - The update process will start automatically and show the progress as a percentage 

. After a successful update, the mobile device is restarted and paired automatically.

> **i** The firmware update is a disruptive process. The mobile devices will update and reboot in sequence. This process will take roughly 20 seconds: during this time audio will be lost. Please stay in reach of the Base Station, do not remove the battery from the mobile devices during the process and do not close the application.

✓ The firmware has been updated.

Resetting the Base Station

You can reset the Base Station to the factory settings remotely.

> You can also reset the Base Station to the factory settings directly via the device.

NOTICE

Loss of data after resetting to factory settings

All settings are reset to the factory settings!

All devices will be unpaired and all audio routes will be deleted!

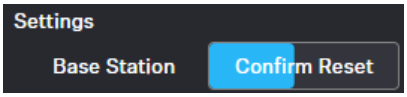
The user password will be reset!

The entitlement will remain.

- Make sure that no connections are being actively used at the time of the reset.

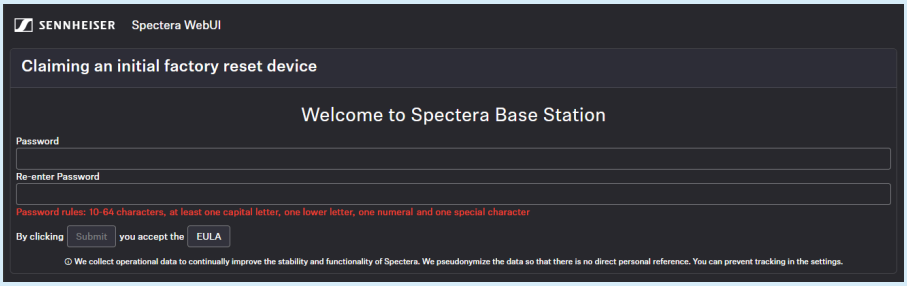
To reset the Base Station remotely:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Click on **Settings** and then on **Factory Reset**.
  - A countdown timer will be displayed (highlighted in blue).



- Press **Confirm Reset** to confirm the factory reset.

✓ The Base Station has been reset. Upon re-login, you will be prompted to set a new password for the device.



Pairing/unpairing mobile devices

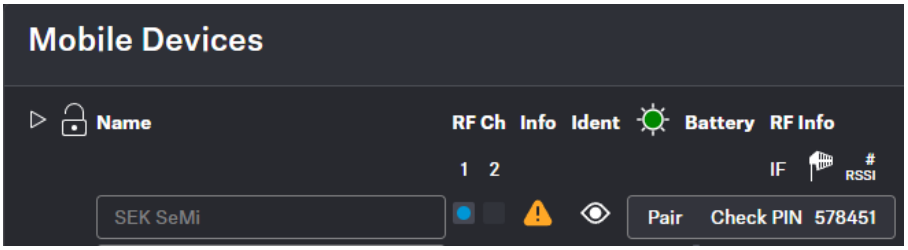
In the WebUI, you can pair up to 128 mobile devices to a Base Station within one RF channel.

Mobile devices can only be paired and operated with one Base Station at a time. If a mobile device is to be used with another Base Station, it must first be paired again.

> **i** Please unmute at least one RF channel before pairing if this was not done automatically.

To pair a mobile device:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Click on **Enable Pairing**.
  - The Base Station starts the pairing process for 300 seconds.
- Switch on your mobile device and activate **Pairing Mode** if it has not been activated automatically (Switching the SEK on and off/Switching the SKM on and off).
  - After a few seconds, the available mobile devices are displayed in the list below under **Mobile Devices**. A verification PIN is displayed on the mobile device and in the WebUI.



- Verify the PIN on the mobile device and click on **Pair**.
  - The mobile device has been paired successfully. The device state color changes to:
    - green (successfully paired)
    - gray (assigned RF channel not on air)
    - yellow (firmware mismatch) or
    - red (unconnected, no RF channel selected, not available)

To unpair a mobile device:

To unpair a paired device, the audio links must first be deactivated.

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Click on the button **Unpair** > **Confirm** in the line of the mobile device to be unpaired.
  The mobile device has been successfully unpaired.

The mobile devices have been successfully paired/unpaired.

Identifying the Base Station

You can remotely identify your Base Station.

To identify the Base Station:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Click on the  **Identify** icon.
  - The icon on the Base Station card flashes. The Base Station display shows "Identify".

✓ The Base Station has been identified.

Saving/loading audio settings

You can save your audio settings and load them at a later time.

> **i** In order to apply the audio settings, a familiar ID of the previously assigned mobile device is expected in connection with the hardware configuration of the Base Station described in this document. Unknown IDs of the mobile device or unknown hardware configurations will result in the settings not being accepted successfully.

The audio settings can be exported in a `.json` file.

To save your audio settings:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Under **Settings** click on **Save**.
  - ✓ Your audio settings have been exported as a `.json` file.

To load your saved audio settings:

- In the top bar, navigate to **Configuration** > **Base Station**.
- Under **Settings** click on **Load**.
  - ✓ A new upload window opens.
- Select your saved file and click on **Open**.
  - ✓ Your audio settings file has been successfully loaded.

✓ The audio settings have been successfully saved/loaded.

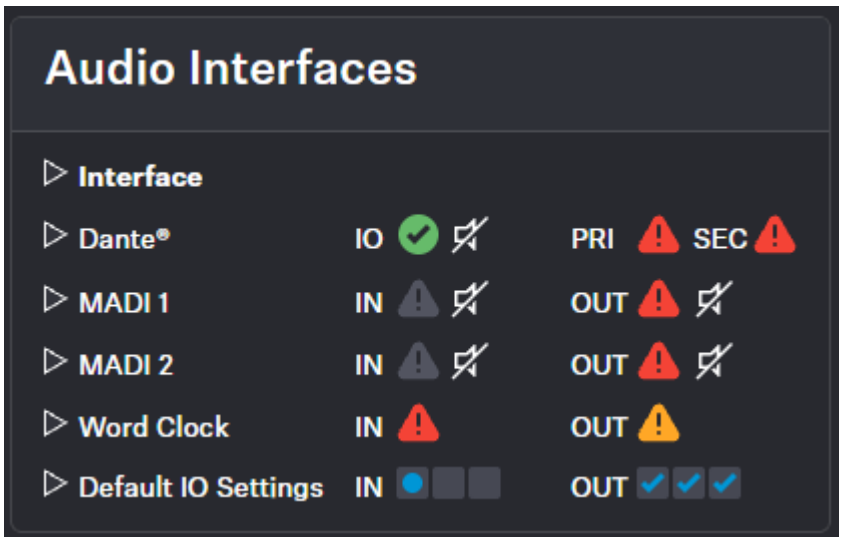
Audio interfaces

Here you can monitor all available interfaces and manage the outputs.

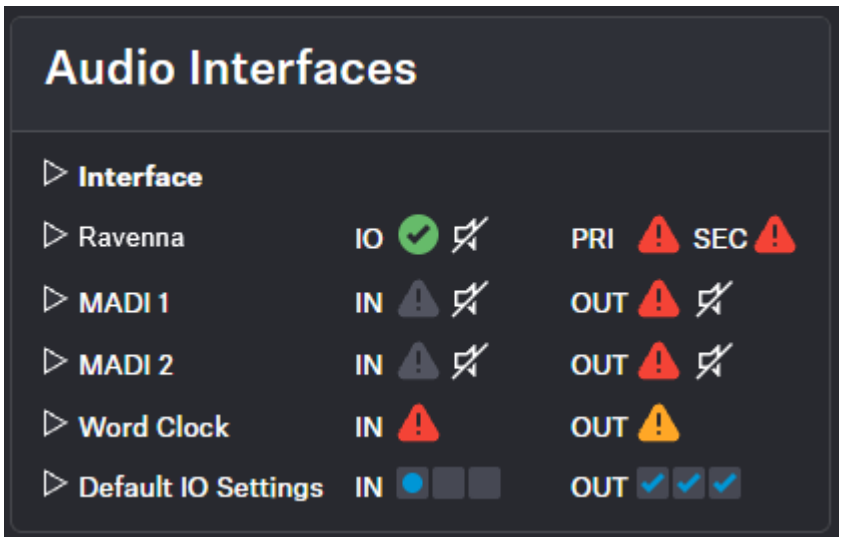
A built-in sample rate converter can be used to convert the outputs to predetermined frequencies and generate a custom sample rate for any audio channel. The following settings are available for MADI 1, MADI 2 and Word Clock interfaces:

- Leader 48 kHz
- Leader 96 kHz
- Follow MADI 1 Input
- Follow MADI 2 Input
- Follow World Clock Input
- Follow Audio Network

Base Station:



Base Station ZMAN:



The interface status is indicated by the following colors:

-  OK
-  Not used
-  Attention, e.g.: "fallback active"
-  Warning, e.g.: "input not toggling"

Audio Network

- Dante® (Base Station) / Ravenna (Base Station ZMAN)
- Primary
- Secondary

MADI 1

- Input
- Output

MADI 2

- Input
- Output

Word Clock BNC

- Input
- Output

Default Input Interface

- Dante® (Base Station) / Ravenna (Base Station ZMAN)
- MADI 1
- MADI 2

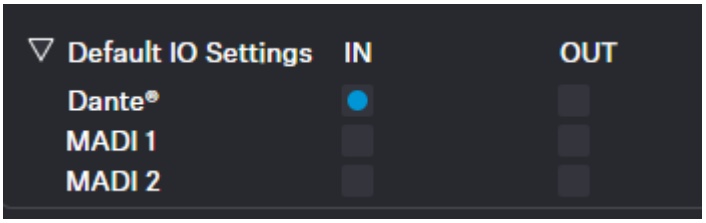
Selecting the default audio input/output source

You can select the default source for the audio input and output of your audio interface.

To select the default input interface:

- In the top bar, navigate to **Configuration RF** > **Audio Interfaces**.
- Select the input interface under **Default IO Settings**.

The default input interface has been selected.



To select the clock source output:

- Select the desired setting for the clock source under:
  - **MADI 1**
  - **MADI 2**
  - **Word Clock BNC**

  The clock source output has been selected.

The audio interfaces have been selected.

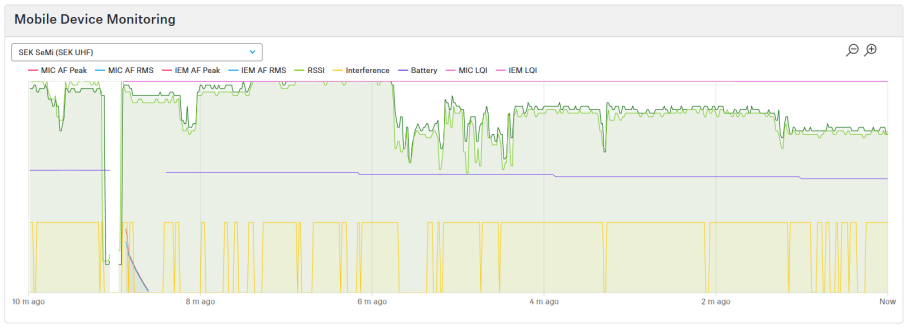
Mobile Device Monitoring

Here you can monitor the live data of the mobile devices as graphs.

> The data is live only, can't be zoomed in to a certain point in time and can't be recorded.

To show the data, click on the grey menu bar **Mobile Device Monitoring**.

The data is the same as you can see in the mobile device section below.



- Switch between the mobile devices.

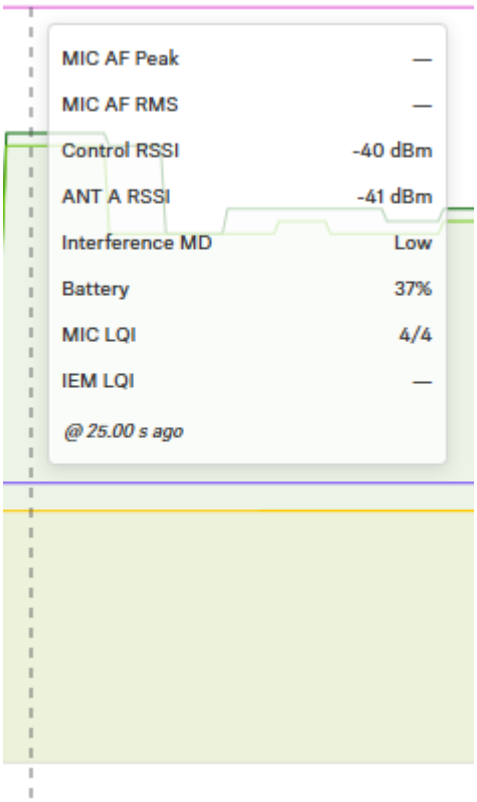


- Select the prefered data by clicking on the values or double-click to isolate/show all.

- Zoom in or out from 10 h ago to now.



- Hover over the graphs for details.



The RSSI graph shows different parameters

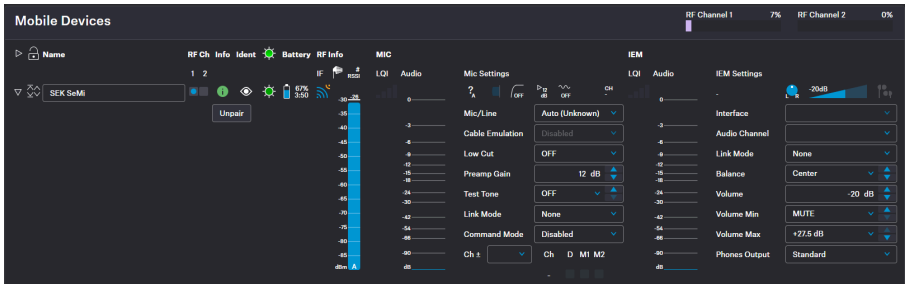
- control channel and
- received signal from up to four antennas.

The Interference will be indicated in four steps.

- None
- Low
- Mid
- High

Mobile Devices

Here you can configure specific settings for mobile devices.



The following interactions can be made for each mobile device:

General

-  Locking the sorting of mobile devices
- Changing the name of the device (see Changing the device name)
- Assigning an RF channel (see Assigning an RF channel)
-  Monitoring the status of the device (connection status, temperature, entitlement, data-transition etc).

   red flashing, Warning: Firmware update not possible
  - Hardware revision too old and not longer supported. **OR**
  - Handware revision too new. Please update the Base Station firmware first. **OR**
  - Battery too low. Please use a battery with higher fill level.
-  Identifying the device (see Identifying your mobile device)
-  Changing the LED color (see Changing the LED color, the top LED changes the color for all mobile devices)
- Pairing/unpairing the device (see Pairing/unpairing mobile devices)
-  Monitoring the battery status

> **i** The time specifications for hh:mm have a tolerance of ± 10 minutes. If the battery shows < 10%, a lower battery level is displayed than is actually still available.
> The displayed time is an estimated remaining runtime based on current power consumption. Different audio link modes, headphone types and IEM volume can change this estimate.

-  Interference level at mobile device

-  Receive Single Strength Indication at the dominant antenna
-  Link Quality Input (LQI)

MIC

-  Link Quality Input (LQI) (see Selecting audio link mode (Mic/Line))
- SEK
  -  Input Mic/Line (see Selecting the Mic/Line input)
  -  Cable Emulation (see Activating/deactivating cable emulation)
- SKM
  - Mic Module
  - Pickup Pattern
- 

Low Cut (see Activating/deactivating Low Cut)
- 

Preamp Gain (see Setting the Preamp Gain)
- 

Test Tone (see Activating/deactivating Test Tone)
-  Link Mode (color depends on the mode) (see Selecting audio link mode (Mic/Line))
- Command Mode (see Setting the command mode)
- 

Assigned channel (see Audio inputs and outputs)

In-Ear Monitoring (IEM)

- Interface (see Selecting the default audio input/output source)
- Audio Channel (see Selecting an audio channel (IEM link))
- Link Mode (see Selecting audio link mode (IEM))
  -  Max Range
  -  Max Link Density
  -  Live Link Density Range
  -  Live Link Density Range
  -  Live Low Latency
  -  Live Ultra Low Latency
- 

Balance / Center (see Adjusting the balance)
- 

Volume (see Setting the volume)

- Headphone
- Phones Output (see Selecting the phones output)

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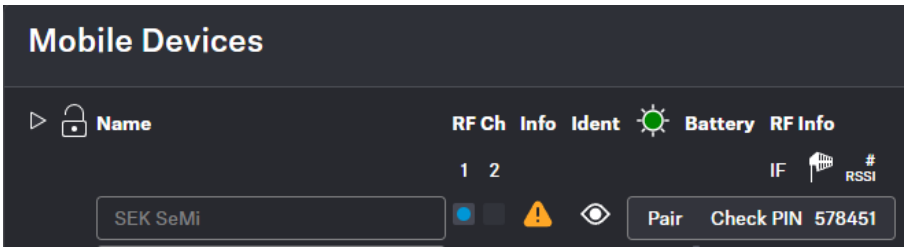
- Click on **Enable Pairing**.
  - The Base Station starts the pairing process for 300 seconds.
- Switch on your mobile device and activate **Pairing Mode** if it has not been activated automatically (Switching the SEK on and off/Switching the SKM on and off).
  - After a few seconds, the available mobile devices are displayed in the list below under **Mobile Devices**. A verification PIN is displayed on the mobile device and in the WebUI.



- Verify the PIN on the mobile device and click on **Pair**.
  - The mobile device has been paired successfully. The device state color changes to:
    - green (successfully paired)
    - gray (assigned RF channel not on air)
    - yellow (firmware mismatch) or
    - red (unconnected, no RF channel selected, not available)

To unpair a mobile device:

To unpair a paired device, the audio links must first be deactivated.

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Click on the button **Unpair** > **Confirm** in the line of the mobile device to be unpaired.
  The mobile device has been successfully unpaired.

The mobile devices have been successfully paired/unpaired.

Identifying your mobile device

You can remotely identify your mobile device.

To identify the mobile device:

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Click on the  **Identify** icon.
  - The LED on the mobile device flashes white alternately for 5 seconds.

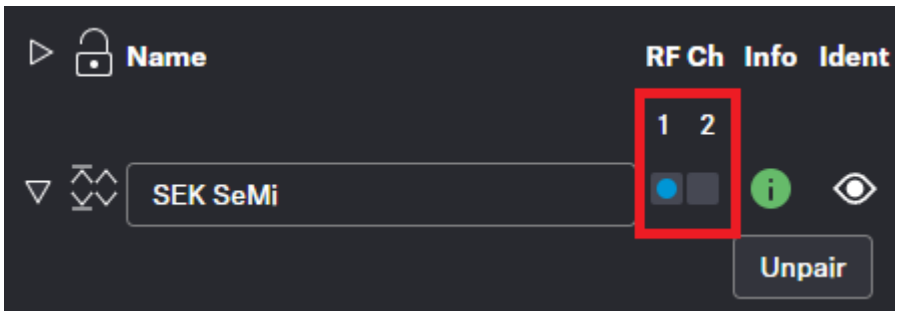
✓ The mobile device has been identified.

Assigning an RF channel

You can assign a configured RF channel to your mobile device.

To assign the RF channel:

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Select your configured channel under **RF Ch**.



> To change the RF channel, you must first deactivate the audio Link Mode and the audio Channels.

- Enable the toggle switch of the configured RF channel.

✓ The RF channel has been assigned to your mobile device.

Selecting audio link mode (IEM)

You can select the audio mode for your IEM link.

> Please note that the bandwidth utilization varies depending on the link mode.

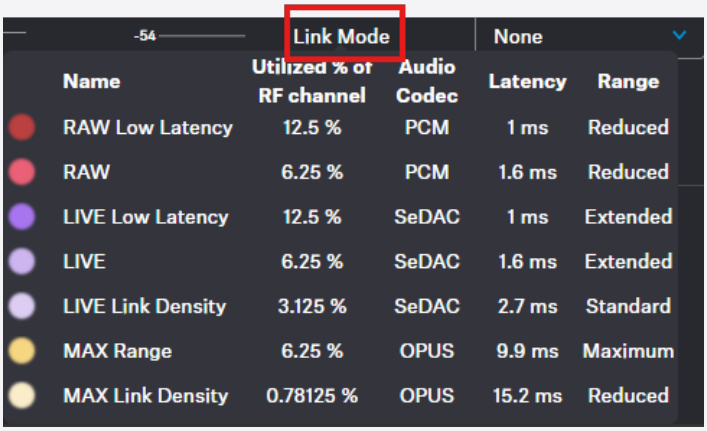
The following modes are available:

- Max Range
- Max Link Density
- Live Link Density Range
- Live Link Density Range
- Live Low Latency
- Live Ultra Low Latency

To select the audio mode:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the audio mode from the drop-down list **Link Mode**.

> Hover your mouse over the word **Link Mode** to display a tabular listing of possible modes.



Name	Utilized % of RF channel	Audio Codec	Latency	Range
RAW Low Latency	12.5 %	PCM	1 ms	Reduced
RAW	6.25 %	PCM	1.6 ms	Reduced
LIVE Low Latency	12.5 %	SeDAC	1 ms	Extended
LIVE	6.25 %	SeDAC	1.6 ms	Extended
LIVE Link Density	3.125 %	SeDAC	2.7 ms	Standard
MAX Range	6.25 %	OPUS	9.9 ms	Maximum
MAX Link Density	0.78125 %	OPUS	15.2 ms	Reduced

✓ The audio mode has been selected.

Selecting audio link mode (Mic/Line)

You can select the audio mode for your Mic/Line link.

> Please note that the bandwidth utilization varies depending on the link mode.

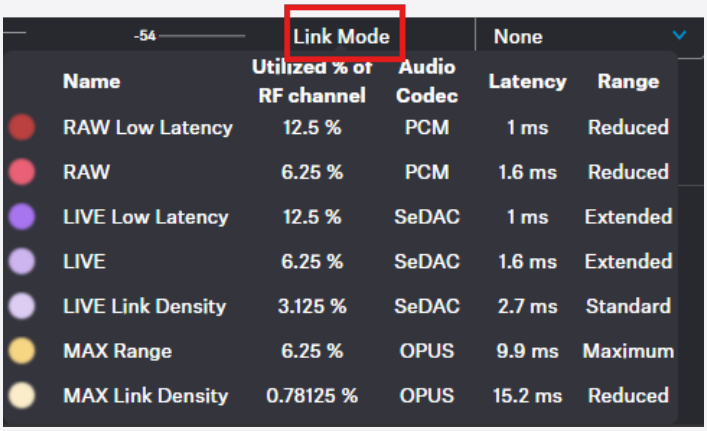
The following modes are available:

- Max Range
- Max Link Density
- Live Link Density
- LIVE
- Live Low Latency
- RAW
- RAW Live Low Latency

To select the audio mode:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the audio mode from the drop-down list **Link Mode**.

> Hover your mouse over the word **Link Mode** to display a tabular listing of possible modes.



Name	Utilized % of RF channel	Audio Codec	Latency	Range
RAW Low Latency	12.5 %	PCM	1 ms	Reduced
RAW	6.25 %	PCM	1.6 ms	Reduced
LIVE Low Latency	12.5 %	SeDAC	1 ms	Extended
LIVE	6.25 %	SeDAC	1.6 ms	Extended
LIVE Link Density	3.125 %	SeDAC	2.7 ms	Standard
MAX Range	6.25 %	OPUS	9.9 ms	Maximum
MAX Link Density	0.78125 %	OPUS	15.2 ms	Reduced

> The audio mode has been selected.

Selecting the Mic/Line input

You can select the audio input as the signal source for your Mic/Line link.

> **i** For a smooth system configuration, we recommend first selecting the link modes and afterwards assigning the channels:
>
> - Selecting audio link mode (Mic/Line)
> - Selecting audio link mode (IEM)
> - Adding/removing an audio channel (Mic/Line)
> - Selecting an audio channel (IEM link)
> - Selecting the IEM audio interface

> **i** You can route audio links to several channels. Routing can be performed easily via the routing matrix (see Audio inputs and outputs).

The following input signals are available:

- Auto (unknown)
- Mic
- Line

> **i** The automatic mic/line detection is based on power consumption and is optimized for use with Sennheiser microphones. Because third-party microphones vary widely, reliable detection cannot always be ensured.

To choose the audio input:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the audio input from the drop-down list **Mic/Line**.

✓ The audio input has been selected.

Adding/removing an audio channel (Mic/Line)

You can assign an audio channel number and the interface output for your Mic/Line link.

> You can route audio links to several channels. Routing can be performed easily via the routing matrix (see Audio inputs and outputs).

To add an audio channel:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the channel number from the drop-down list **Channel** which is indicated with a plus in front of it (e.g. **+1**).

To remove the link channel:

- Select the channel number from the drop-down list **Channel** which is indicated with a minus in front of it (e.g. **-1**).

To select the output interface of the assigned link channel:

- Activate/deactivate the check-boxes under **D** (for DANTE®), **M1** (for MADI 1) and/or **M2** (for MADI 2).

✓ The audio channel and the audio interface output has been added/removed.

Changing the device name

You can change the device name for your mobile device.

> For security reasons, please do not enter any sensitive personal data as the device name.

To change the device name:

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Edit the name under **Name** and confirm with **ENTER**.
  - The name is immediately transmitted to the mobile device and saved.

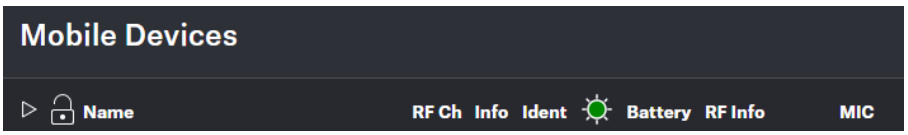
✓ The device name has been changed.

Changing the LED color

You can select the connected state color of your LED on the mobile device.

To change the LED color for all mobile devices:

- Click on the  on the top to change the LED color for all mobile devices.



There are five settings for the LED:

-  OFF
-  Dim
-  Standard
-  Bright
-  Individual

To change the LED color for one mobile device:

- In the top bar, navigate to **Configuration** > **Mobile Devices**.
- Click on the  icon to change the LED color.
- Select a color.



- Click on `Apply` to set the new color or click `Cancel` to discard the change.

The LED color has been changed.

If you reset the Base Station, all LED color settings are reset to their default values.

Selecting the IEM audio interface

You can select the desired audio interface as the signal source for your IEM link.

The following interfaces are available:

- Dante®
- MADI 1
- MADI 2

To choose the audio interface:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the audio interface from the drop-down list **Interface**.

✓ The audio interface has been selected.

Selecting an audio channel (IEM link)

You can assign an audio channel number for your IEM link.

> For a smooth system configuration, we recommend first selecting the link modes and afterwards assigning the channels:
>
> - Selecting audio link mode (Mic/Line)
> - Selecting audio link mode (IEM)
> - Adding/removing an audio channel (Mic/Line)
> - Selecting an audio channel (IEM link)
> - Selecting the IEM audio interface

> It is also possible to select an existing link (marked with *), as long as it is using the same RF channel.

To add an audio channel:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the channel number from the drop-down list **Audio Channel**.

✓ The audio channel has been selected.

Adjusting the balance

You can change the balance for your IEM link.

The following values can be selected directly and adjusted individually in steps of 1%:

- 100% Left
- 75% Left
- 50% Left
- 25% Left
- Center
- 25% Right
- 50% Right
- 75% Right
- 100% Right

To change the balance:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the balance mode from the drop-down list **Balance**.

✓ The balance mode has been changed.

Setting the volume

The volume can be controlled directly from the device as well as from the WebUI.

If the volume value is changed on the device, this change is displayed in the WebUI in real time.

WARNING



Hearing damage due to high volumes

This product is capable of producing sound pressure levels exceeding 85 dB (A). Volume levels that are too high may damage your hearing.

- Reduce the volume and the microphone amplification, if applicable, before using the product.

To set the volume:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Enter the desired volume level in dB under **Volume**.

✓ The volume has been set.

Setting the min volume

You can set a predefined min volume for your IEM link.

The volume set here is the minimum level that is sent to your dedicated mobile device.

The following values can be selected directly and adjusted individually in steps of 0.5 dB:

- -6 dB
- -12 dB
- -18 dB
- -24 dB
- -30 dB
- -36 dB
- -42 dB
- -48 dB
- -54 dB
- -60 dB
- MUTE

WARNING



Hearing damage due to high volumes

This product is capable of producing sound pressure levels exceeding 85 dB (A). Volume levels that are too high may damage your hearing.

- Reduce the volume and the microphone amplification, if applicable, before using the product.

To set the min volume:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the min volume level in dB under **Volume min**.

✓ The min volume has been set.

Setting the max volume

You can set a predefined max volume for your IEM link.

The volume set here is the maximum level that is transmitted to your connected mobile device.

The following values can be selected directly and adjusted individually in steps of 0.5 dB:

- -27.5 dB
- -24 dB
- -18 dB
- -12 dB
- -6 dB
- 0 dB
- +6 dB
- +12 dB
- +18 dB
- +24 dB
- +27.5 dB

WARNING



Hearing damage due to high volumes

This product is capable of producing sound pressure levels exceeding 85 dB (A). Volume levels that are too high may damage your hearing.

- ▶ Reduce the volume and the microphone amplification, if applicable, before using the product.

To set the max volume:

- ▶ In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- ▶ Select the max volume level in dB under **Volume max**.

✓ The max volume has been set.

Selecting the phones output

Selecting the output for the PHONES socket of the mobile device.

The following outputs are available:

- Standard: Unbalanced mono or stereo phones output.
- Balanced: Enables right channel inversion for mono link modes.

  The 'Balance' setting is disabled in this mode.

  With this setting, for example, a cable with the following pinout can be used to connect the phones output to a balanced line input.



To choose the phone output:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **IEM Settings**.
- Select the phone output from the drop-down list **Phones Output**.

✓ The phones output has been selected.

Activating/deactivating cable emulation

You can emulate the capacitance of the connected instrument cable and influence the sound of your mic/line input.

> **i** Cable emulation is only applicable when line input is selected.

The following presets are available:

-  OFF
-  Short
-  Mid
-  Long

To activate cable emulation:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the value **Line** from the audio input list.
- Select the value from the drop-down list **Cable Emulation**.

To deactivate cable emulation:

- Select the value **OFF**.

> ✓ The cable emulation value has been activated/deactivated.

Activating/deactivating Low Cut

You can reduce or remove low frequencies in the audio signal while allowing high frequencies to pass through.

This allows low-frequency ambient noise to be filtered out of the audio signal, thereby improving the clarity of the audio.

The following presets are available:

- OFF
- 30 Hz
- 60 Hz
- 80 Hz
- 100 Hz
- 120 Hz

To activate Low Cut:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the value from the drop-down list **Low Cut**.

To deactivate Low Cut:

- Select the value **OFF**.

✓ Low Cut has been activated/deactivated.

Setting the Preamp Gain

With the preamp you can increase the audio level for your Mic/Line output.

To set the gain:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Enter the desired preamp gain level in 1 dB increments under **Preamp Gain**.

✓ The Preamp Gain has been set.

Activating/deactivating Test Tone

With a constant test tone, you can simulate and test the performance of your audio devices in different dB levels.

The following values can be selected directly and adjusted individually in steps of 1 dB:

- OFF
- -60 dB
- -54 dB
- -48 dB
- -42 dB
- -36 dB
- -30 dB
- -24 dB
- -18 dB
- -12 dB
- -6 dB
- 0 dB

To activate the Test Tone:

- In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
- Select the value from the drop-down list under **Test Tone**.

To deactivate the Test Tone:

- Select the value **OFF**.

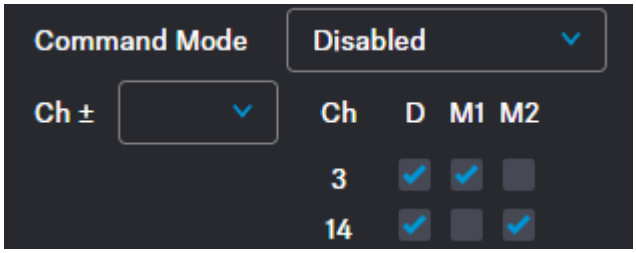
✓ The Test Tone has been activated/deactivated.

Setting the command mode

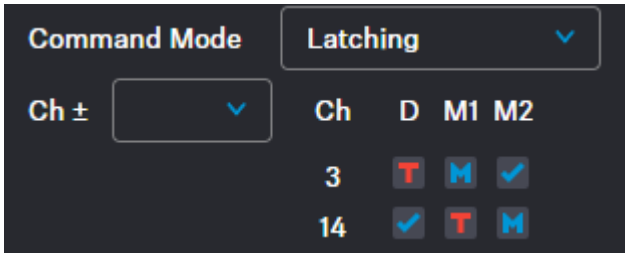
You can set the command mode for the COM buttons of the Command Button for SEK and SKM Command Ring for SKM.

The settings of the selected audio output channels can vary whether the command mode is active or inactive.

- Command mode disabled:



- Command mode enabled:



> This option is only available if **Mic** is selected as the audio input for SEK.

The following options are available separately for each selected audio output channel on the Base Station individually:

- Disabled - audio is either on or off
- Momentary - hold down the COM button
- Latching - press the COM button to change the state

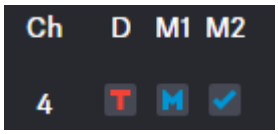
To set a command mode:

1. In the top bar, navigate to **Configuration** > **Mobile Devices** > **Mic Settings**.
2. For SEK only: Select the value **Mic** from the audio input list.
3. Select the audio mode from the drop-down list **Link Mode**.

- Select an audio channel from the drop-down list **Ch ±**.
- Select the mode from the drop-down list **Command Mode**.

If you selected Momentary:

- Set the options for the audio channel by clicking in the boxes.

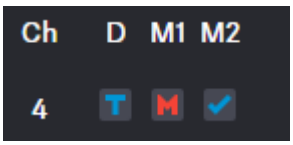


> Meaning of the letters and colors:
> T = talk
> M = mute
> red = audio inactive
> blue = audio active

- Hold down the COM button.

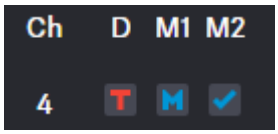
  The icon changes to .

  The audio transmission changes:



If you selected Latching:

- Set the options for the audio channel by clicking in the boxes.

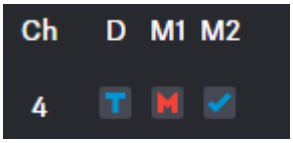


> Meaning of the letters and colors:
> T = talk
> M = mute
> red = audio inactive
> blue = audio active

- Press the COM button.

✓ The icon changes to .

The audio transmission changes:



To change the color of the command modes for SKM COM:

- Click on the icon to change the color of the LED.
- Click on the  icon to change the LED color.
- Select a color.



- Click on `Apply` to set the new color or click `Cancel` to discard the change.

✓ The command mode has been set.

If the mobile device is turned off or the antenna is muted, the color of the settings changes to blue.

Frequency Scan

You can use an RF scan to examine the current frequency situation of your connected antenna.



> **i** Make sure that no antenna is activated!

You can monitor and control the following settings in the Frequency Scan menu:

- Selecting the antenna (A-D) connected to the Base Station
- Setting the RefLevel (reference level for frequency scan)
- Setting the Sweep time for frequency scan between 2s (fast update rate) and 60s (slow update rate)
- Setting the resolution bandwidth
- Resetting the peak trace
- Saving all settings to a `.csv` file

Scanning the RF frequency

You can run a frequency scan to check the current frequency situation in your surrounding area.

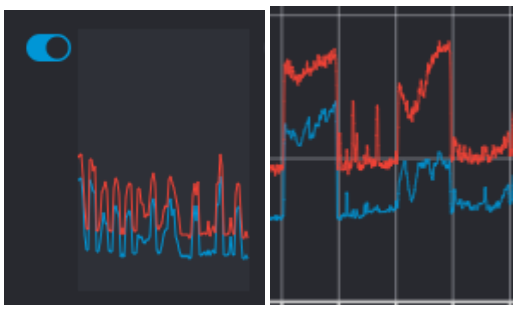
The frequency scan provides an overview of the frequency situation in your location. You can save the antenna configuration as a .csv info file. This file can be used as a backup file to recapitulate your settings or as local frequency information for your specific environment. You can scan the frequencies of all antennas connected to the Base Station.

The scan can be initiated:

- via the RF configuration tab to see a small extract without any details or
- via the Frequency Scan tab for a detailed overview of the frequency situation.

The scan results will be displayed in two different curves:

- **Peak** (red) = Maximum value
- **RMS** (blue) = Average power or strength



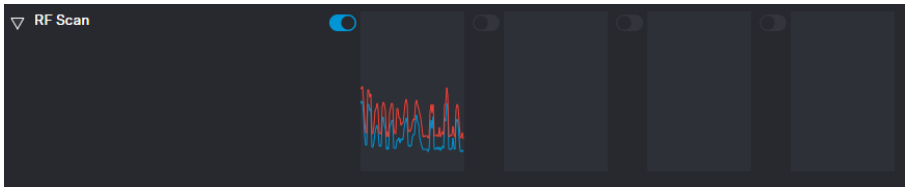
Please note that the antenna must not be assigned to an RF channel before scanning (see Assigning an antenna to an RF channel).

To scan the RF frequency via the RF configuration tab:

- In the top bar, navigate to **Configuration** > **RF Configuration**.
  - Under the **RF Scan** drop-down menu, there are four toggle switches that enable and disable the scan function for each connected antenna.



- Click on the toggle switch of the antenna to be scanned in order to start an immediate scan.
  - The square is highlighted with a blue dot and the scan result is displayed in a small frequency curve after approx. 5 seconds.

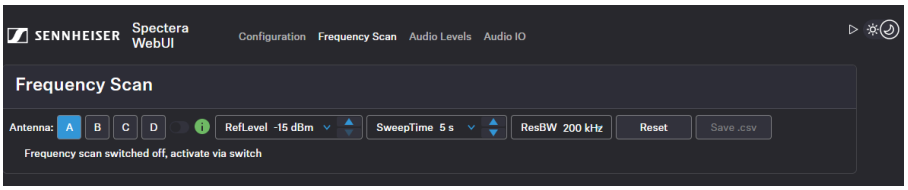


- In order to view the results,

- click on the small frequency icon or
- navigate to **Frequency Scan** in the top bar.

To scan the RF frequency via the Frequency Scan tab:

- In the top bar, navigate to the tab **Frequency Scan**.



- Select your antenna to be scanned and adjust your desired settings.
- Switch on the toggle to start the scan.
  - The frequency scan is started and the result is displayed in a detailed frequency diagram. Supported frequency ranges are shown in green and unsupported ranges in gray.

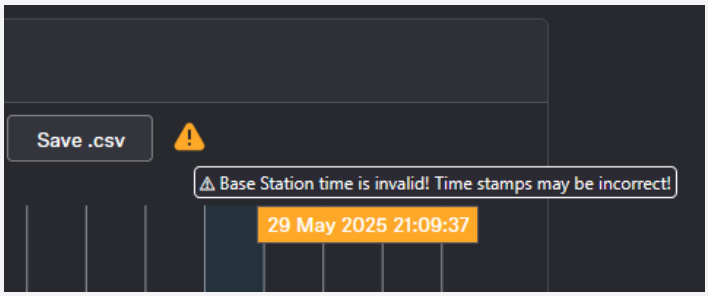


To reset a scan:

- Click on **Reset**.
  - The current scan will be reset.

To save the scan results as `.csv` :

- Click on **Save.csv**.
  - The antenna configuration has been downloaded locally to your computer as a `.csv` file.

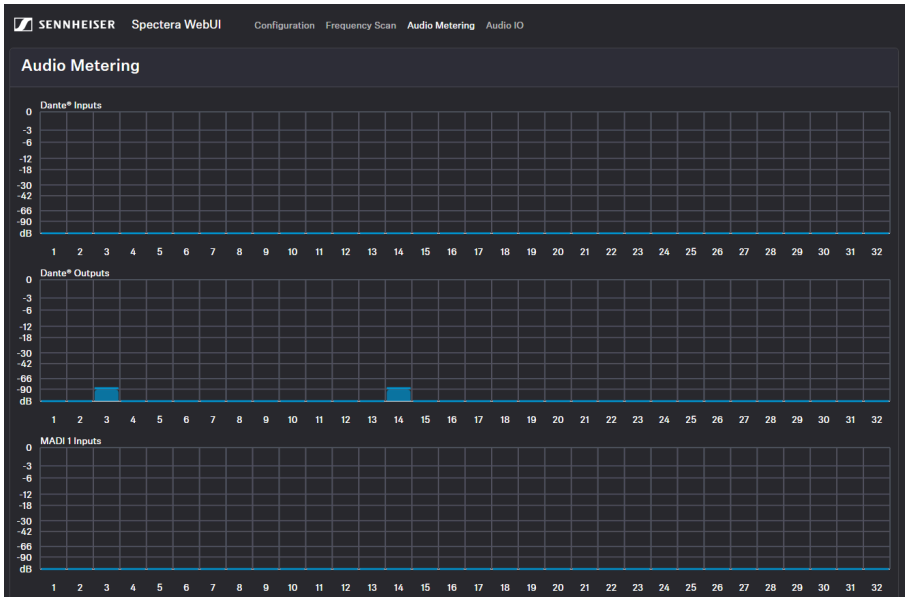
> **i** If a ⚠ appears after **Save.csv**, the time on the Base Station is invalid.
>
> 
>
>
> Connect the Base Station to the Internet to get the correct time.

✓ The frequency of your connected antenna has been scanned.

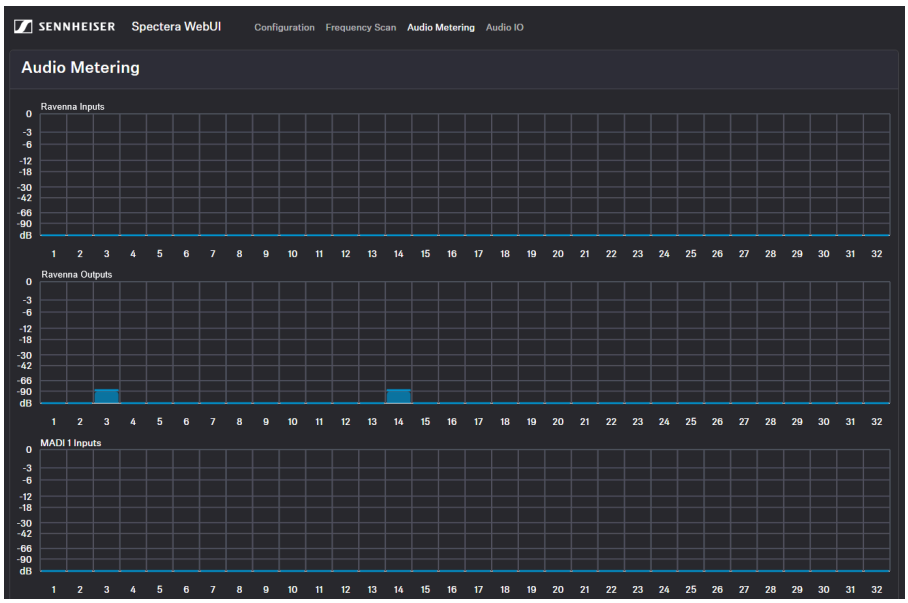
Audio Metering

Under Audio Metering you can monitor all interfaces at a glance.

Base Station:



Base Station ZMAN:



All interfaces are sorted according to their inputs and outputs and displayed visually with a frequency response:

- Dante® Inputs (Base Station) / Ravenna Inputs (Base Station ZMAN)
- Dante® Outputs (Base Station) / Ravenna Outputs (Base Station ZMAN)
- MADI 1 Inputs
- MADI 1 Outputs

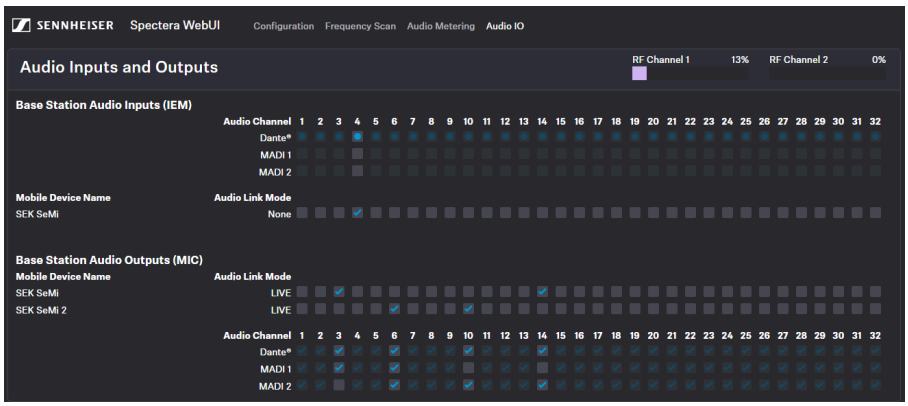
- MADI 2 Inputs
- MADI 2 Outputs

Audio inputs and outputs

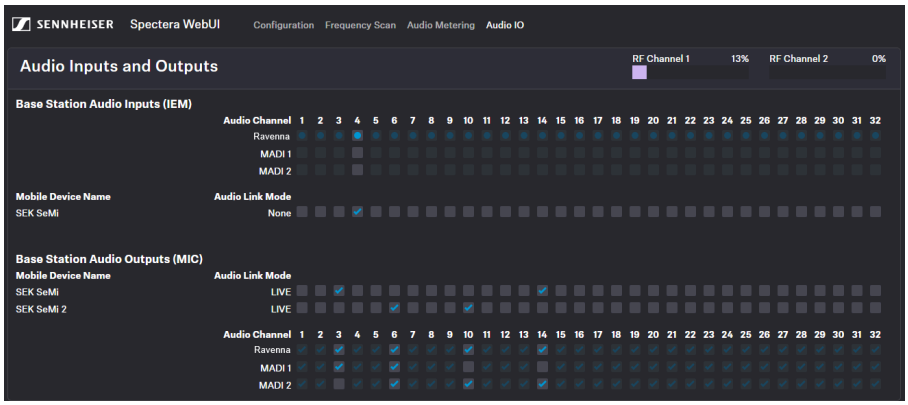
Here you have an overview of all channels at a glance and can assign the audio network input and output for the link channels directly and easily.

The link modes assigned in the mobile devices are displayed here. You can select the desired channels directly and assign them to your audio network input or output.

Base Station:



Base Station ZMAN:



Changing the device password

You have two options to change the device password on your Base Station.

You have two options:

- Change the password before logging in.
- Change or reset the password by resetting the device to factory settings.

> **i** To change or reset the device password, the device must be reset to factory settings.

NOTICE

Data loss during the factory reset

All audio devices will be unpaired and all audio routes will be deleted.

All settings (including the device password) are reset to the default values. The license remains activated.

After the reset, the device is restarted automatically.

- ▶ Do not reset the Base Station during an active live audio transmission.

To reset the password to factory settings, you have two options available:

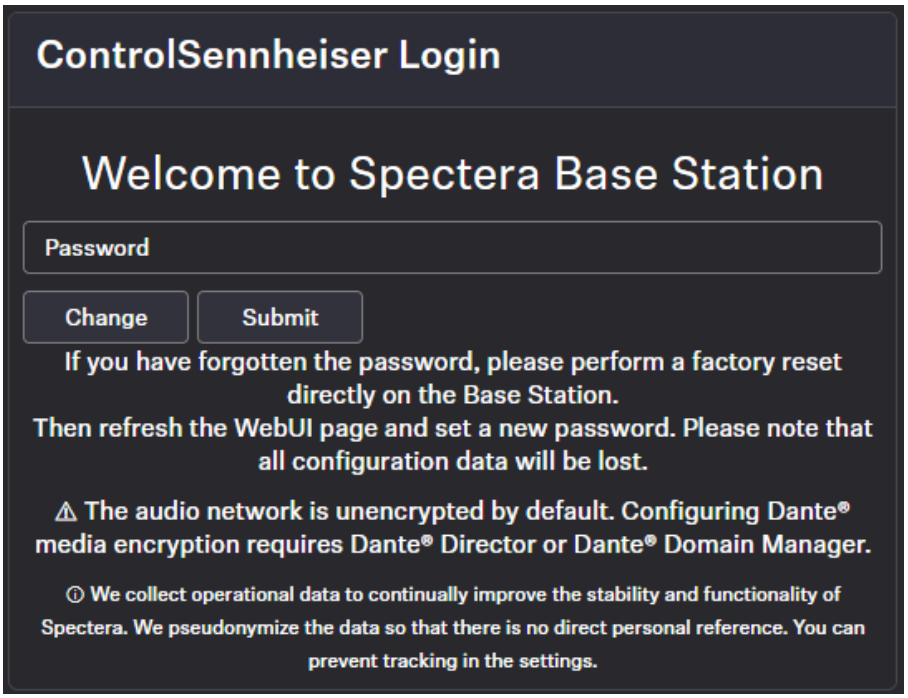
- Reset via the device (see Reset)
- Reset via the WebUI interface (see Resetting the Base Station)

To change the password:

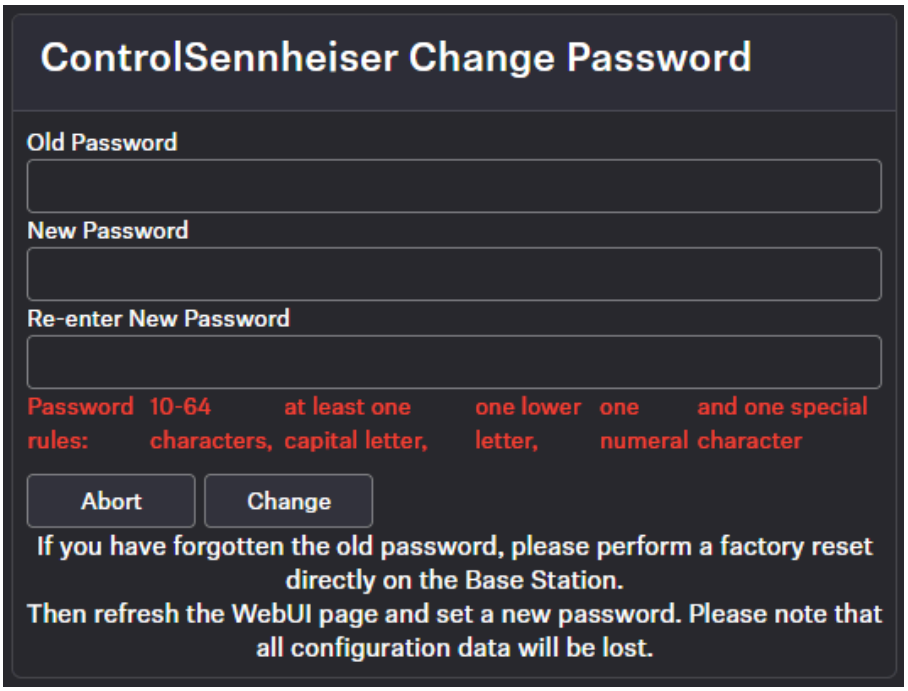
- ▶ Enter the following URL into your browser: `https://deviceIP/specterawebui/index.html`.

  > **i** Since the certificate is unknown to your browser, a security warning is displayed the first time you run the application. The security warning depends on the browser you are using.

- ▶ Click on **Change**.



- Enter the old password.
- Enter the new password two times.

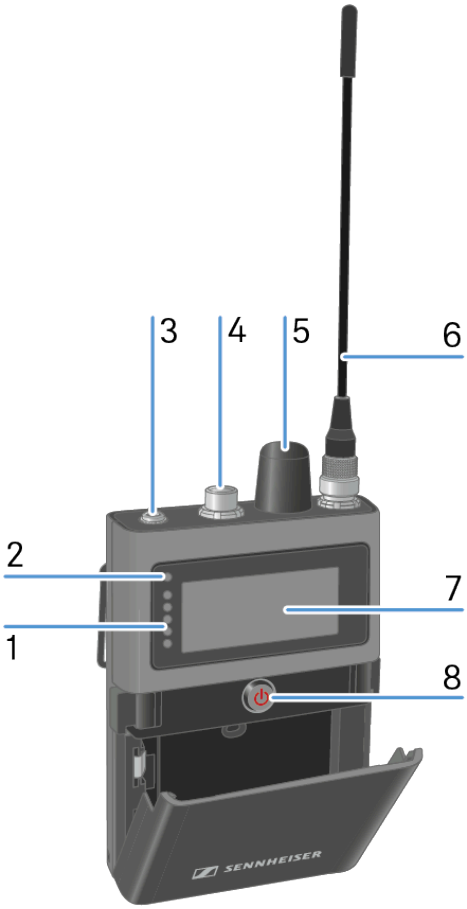


- Click on **Change** to save the new password or click on **Abort** to cancel the change.

✓ The password has been changed or the Base Station has been reset to its factory default settings.

SEK

Product overview



1 LEDs

see Meaning of the LEDs

2 Status LED

see Meaning of the LEDs

3 Phones 3.5 mm jack

see To use the Phones jack

4 Microphone / Instrument input

see Connecting a microphone / instrument

see Connecting the COM Button

5 Rotary encoder

with push function

see Information on the display

6 Antenna

see Mounting the antenna

7 Display

see Information on the display

8 ON/OFF Button

see Switching the SEK on and off

Inserting and removing the rechargeable battery

The SEK operates only with the recharable battery BA 70 (seperate accessory).

> The BA 70 can be charged in the L 70 USB, the L 6000 with LM 6070 or with the SEK in the CHG 70N-C.
>
> - L 70 USB: Charging the rechargeable battery
> - L 6000: Charging the rechargeable batteries in the L 6000 charger
> - CHG 70N-C: Charging the rechargeable battery

To insert the recharable battery into the SEK:

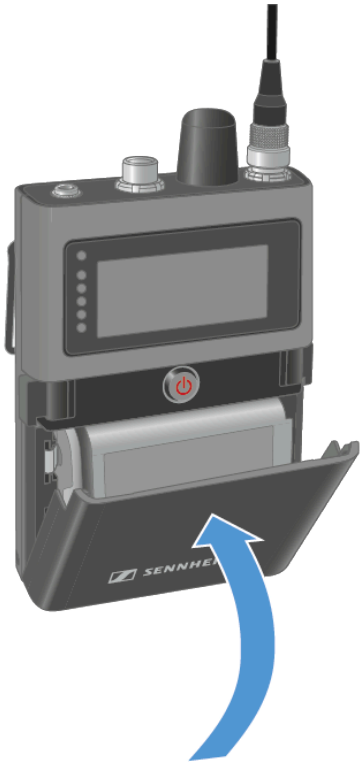
- Press the two catches and open the battery compartment cover.



- Insert the BA 70 rechargeable battery in the battery compartment.



▶ Close the battery compartment.



✓ The cover locks into place with an audible click.

✓ The battery has been inserted.

Mounting the antenna

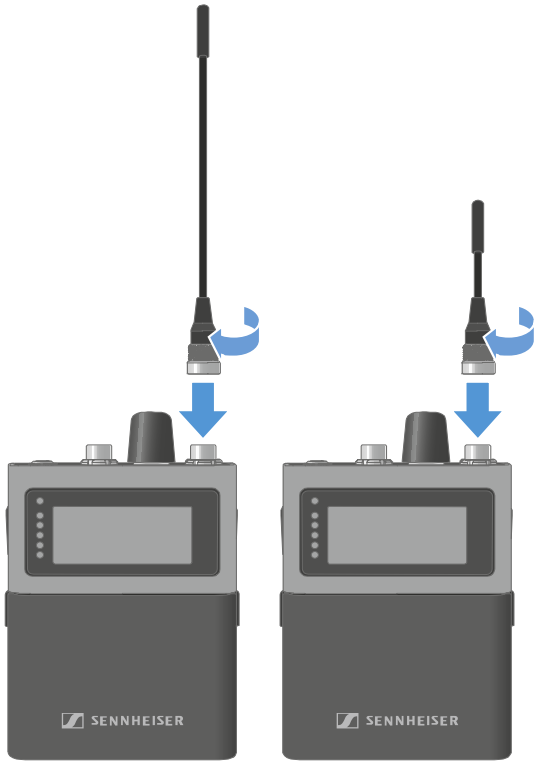
Two antennas are available, one for each frequency range.

For more information see Spectera SEK Antenna.

The antenna is screwed on when it is delivered.

To mount the antenna to the SEK:

- Connect the antenna to the SEK antenna socket.
- Tightly screw the antenna coupling ring onto the SEK antenna socket.



SEK UHF SEK 1G4

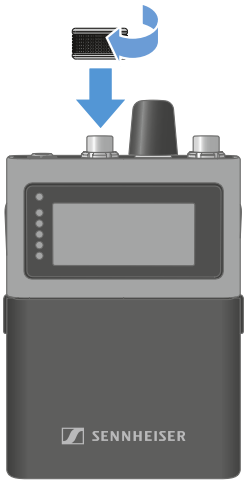
✓ The antenna has been mounted.

Using the protection cap

The cap protects the microphone / instrument input, when not in use.

To screw the cap on the SEK:

- Screw the cap on the microphone / instrument input socket.



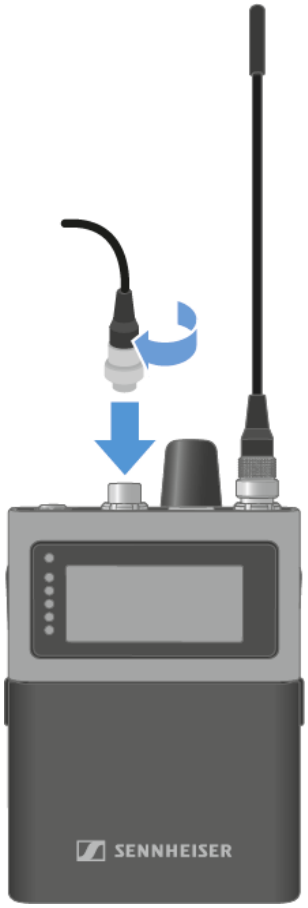
✓ The cap has been attached.

Connecting a microphone / instrument

You can connect a microphone or instrument to the SEK.

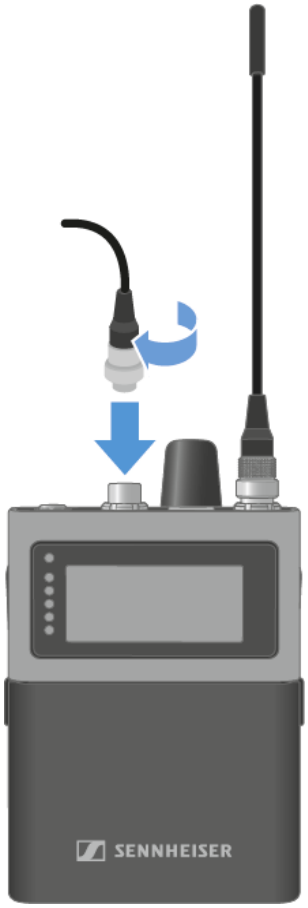
To connect a microphone to the SEK:

- Use a 3-pin audio connector to connect the microphone cable to the SEK microphone / instrument input socket.
- Screw the plug's coupling ring onto the microphone / instrument input thread of the SEK.



To connect a instrument to the SEK:

- Use a 3-pin audio connector to connect the instrument cable to the SEK microphone / instrument input socket.
- Screw the plug's coupling ring onto the microphone / instrument input thread of the SEK.



✓ A microphone or instrument has been connected.

i The automatic mic/line detection is based on power consumption and is optimized for use with Sennheiser microphones. Because third-party microphones vary widely, reliable detection cannot always be ensured. To select the auto input manually, see **Selecting the Mic/Line input**.

The following microphones are compatible:

- **Headmic 1 (3-Pin)** | Headset microphone with omni-directional pattern
- **Headmic 4 (3-Pin)** | Headset microphone with cardioid pattern
- **HM 200 (3-Pin)** | Headset microphone with omni-directional pattern
- **HSP 2 (3-Pin)** | Headset microphone with omni-directional pattern

- **HSP 4 (3-Pin)** | Headset microphone with cardioid pattern
- **ME 102 (3-Pin)** | Mini-microphone with omni-directional pattern
- **MKE 1 (3-Pin)** | Lavalier microphone with omni-directional pattern
- **MKE 2 (3-Pin) blue label** | Lavalier microphone with omni-directional pattern
- **MKE 40 (3-Pin)** | Lavalier microphone with cardioid pattern
- **MKE Essential (3-Pin)** | Lavalier microphone with omni-directional pattern

To use the Phones jack

> **i** You have to set up an audio link in Spectera WebUI.

CAUTION



Danger due to high volume levels

Volume levels that are too high may damage your hearing.

- Turn down the volume of the headphone output before you put on the headphone.

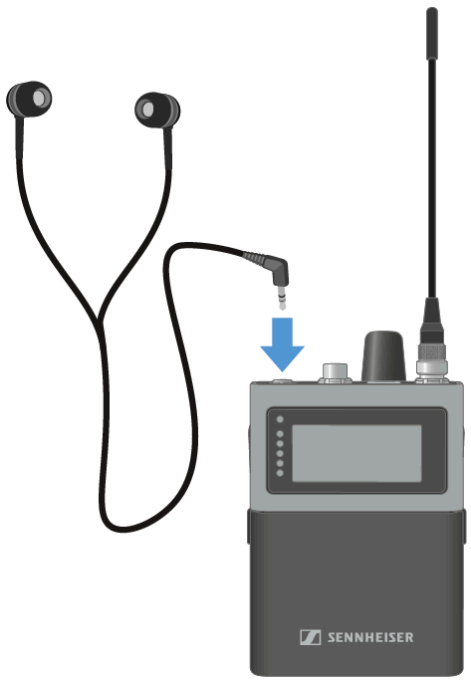
The SEK checks the headphone's impedance when a headphone is plugged in at switching on, or each time a headphone is newly plugged in.

To connect earphones to the SEK:

- Turn down the volume.

> **i** The volume can be altered between -100 dB to +27.5 dB in steps of 0.5 dB.

- Insert the cable's 3.5 mm jack plug into the phones socket on the SEK.



To connect an adapter cable:

- Insert the 3.5 mm jack plug of the cable into the **Phones** jack on the SEK.
- Connect the other plug to the desired device.
- In the WebUI, set the **Phones Output** to **Balanced**, see Selecting the phones output. The **Balanced** setting can only be used with mono Link Modes.

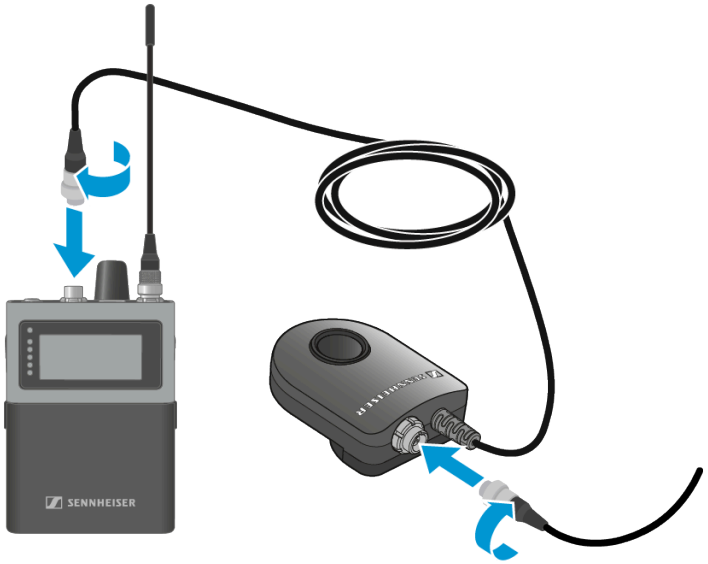
✓ The **Phones** jack is used.

Connecting the COM Button

The COM Button can be programmed with different functions, like mute or push to talk.

To connect the COM button to the SEK:

- Connect the 3-pin audio connector of the COM Button to the microphone / instrument input socket of the SEK.
- Connect the 3-pin audio connector of the Sennheiser microphone or the Sennheiser line/instrument cable to the 3-pin audio socket of the COM Button.



✓ The COM Button has been connected.

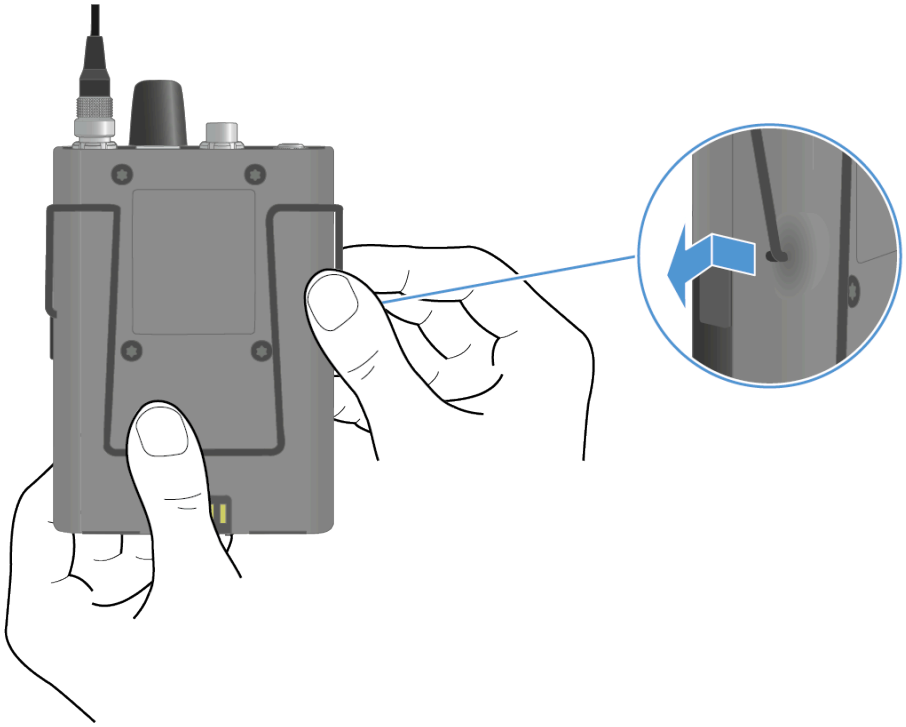
ℹ The KA 9000 COM is not compatible with the Spectera system.

Changing the belt clip

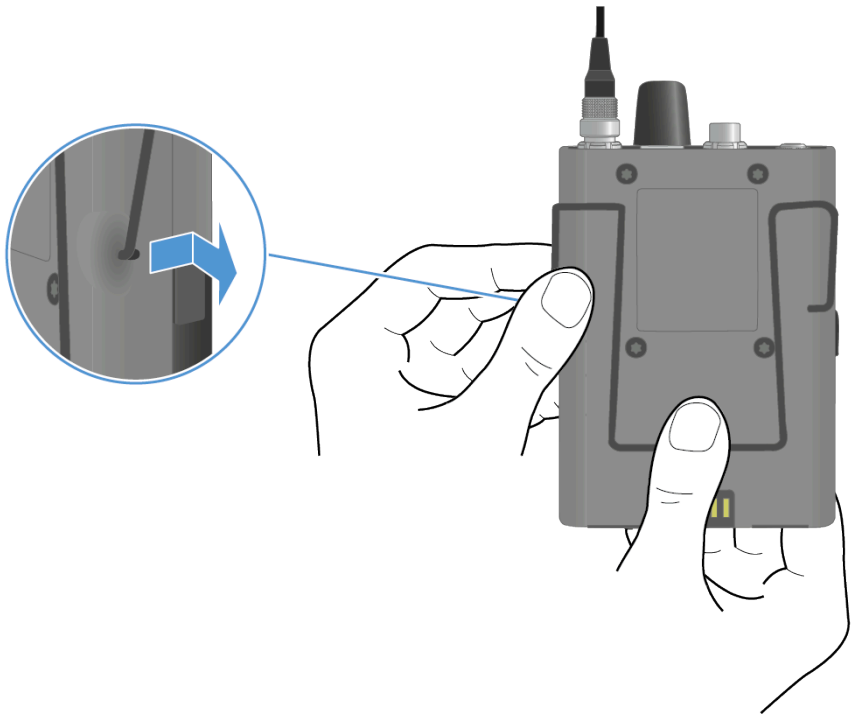
You can change the belt clip on the SEK or flip it over depending on how you want to wear it.

To remove the belt clip:

- Hold down the belt clip with the thump to the housing.
- Use the other hand to carefully pull back and then out one side of the belt clip.



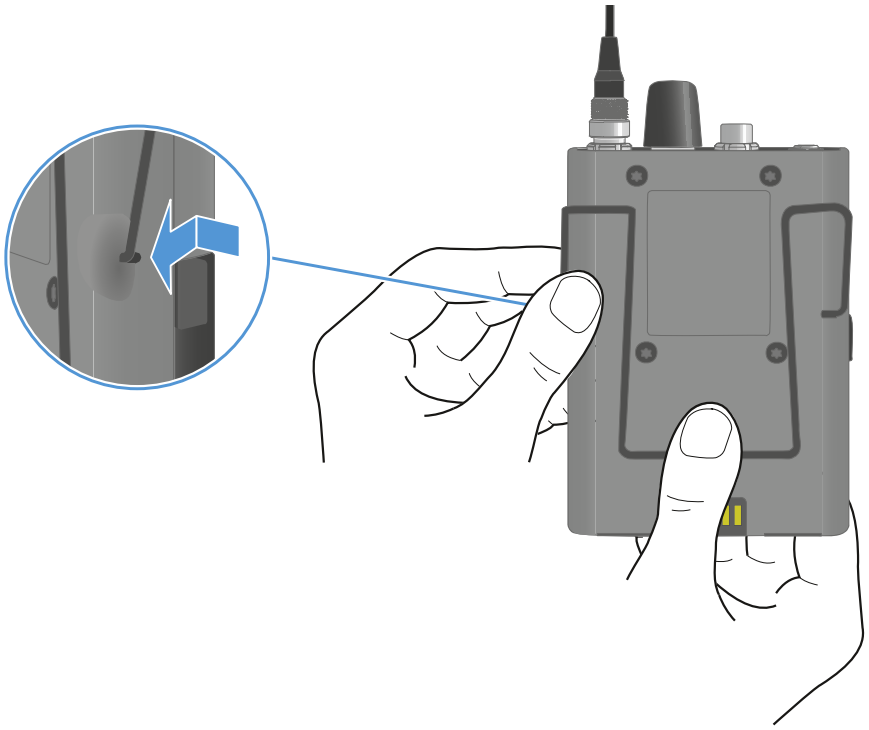
- While still holding the belt clip down, carefully pull back and then out the other side of the belt clip.



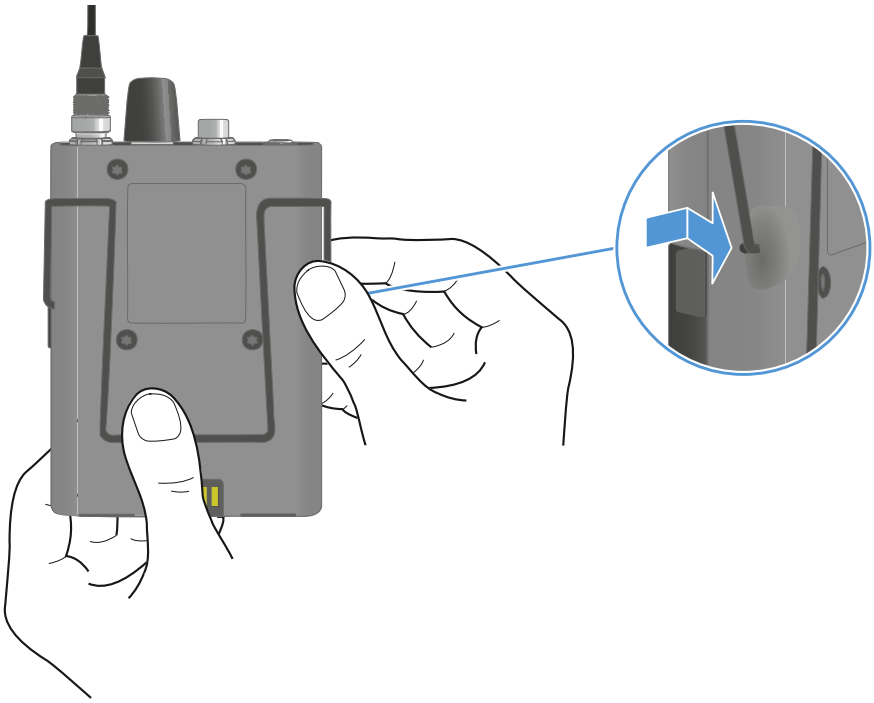
To insert the belt clip:

> **i** Always insert one side before the other, not at the same time, as otherwise the belt clip could bend.

- Hold down the belt clip with the thump to the housing.
- Insert one side of the belt clip first.



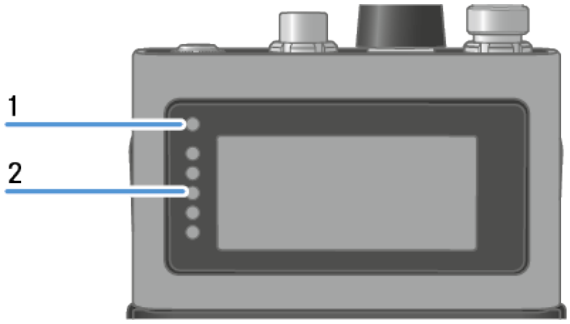
▶ Then insert the second side of the belt clip.



✓ The belt clip has been removed and inserted.

Meaning of the LEDs

The **Status LED** and **LEDs** can indicate the following information.

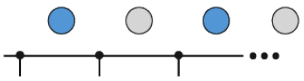
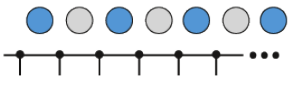


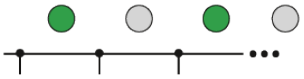
1 Status LED

2 LEDs

Status LED

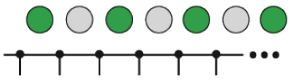
The **Status LED** provides information about the status between the SEK and Base Station, as well as status information for the SEK.

	The LED is off: • SEK is switched off
	The LED is orange: • SEK is starting
	The LED is flashing blue: • Searching for a new Base Station to pair
	The LED is flashing blue quickly: • Pairing to new Base Station is in progress • SEK turns off after five minutes, when no Base Station was found
	The LED is blue: • Connected to new Base Station, waiting for confirmation



The LED is flashing green:

- SEK is searching for previously paired Base Station



The LED is flashing green quickly:

- SEK is connecting to previous paired Base Station



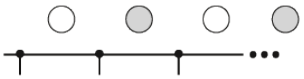
The LED is green:

- SEK is on
- SEK is connected to the Base Station



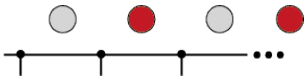
The LED is pulsing green:

- SEK is in sleep mode



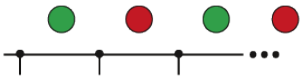
The LED is flashing white:

- Identify of SEK is in progress



The LED is flashing red:

- Battery state is below 10 %



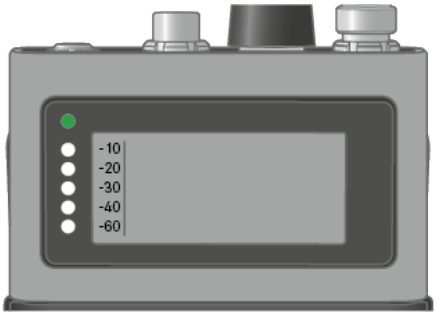
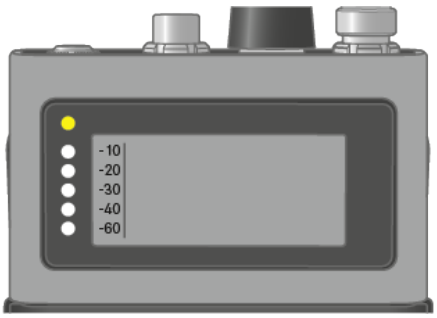
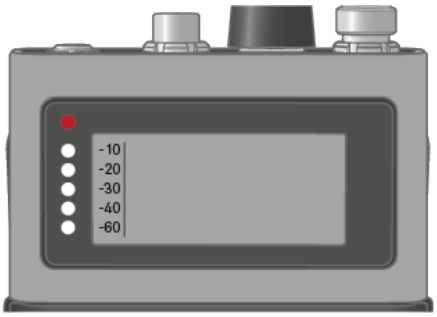
The LED is flashing green and red:

- Firmware update is in progress

LEDs

The **LEDs** provide information about the mic line input level, if a microphone or instrument is connected to the SEK.

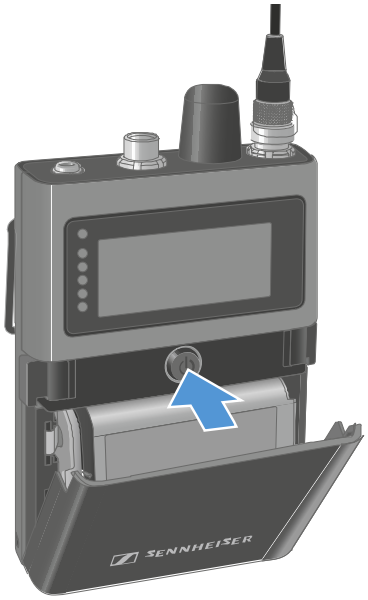
> **i** You have to set up an audio link in Spectera WebUI.

	
	above -5 dBFS RMS
	above -1 dBFS PEAK

Switching the SEK on and off

To switch the SEK on:

- Short-press the ON/OFF button.



  - ✓ The SEK is starting. The status LED is orange.

To put the SEK in pairing mode:

- When the SEK is off, long press the ON/OFF button.
  - ✓ The SEK is searching for a new Base Station to pair. The status LED is flashing blue.

To switch the SEK off:

- Press the ON/OFF button.
  - ✓ The status LED goes off.

> **i** The display will stay on when the device is switched off or the battery has been removed.

✓ The SEK has been switched on/off.

When the SEK is unpaired via the software Spectera WebUI, the SEK will automatically switch into pairing mode. The status LED is flashing blue.

Sleep mode

The SEK switches to sleep mode after 5 minutes if it cannot establish a connection to the Base Station. The LED then pulses green.

Once per 20 seconds, the SEK wakes up automatically and checks whether a connection to the Base Station can be established.

Operating the jog dial wakes the SEK up immediately and it attempts to establish a connection.

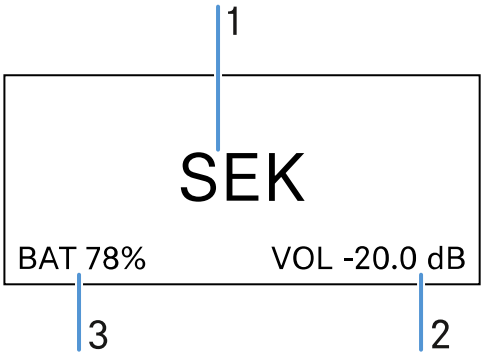
In doing so, the SEK searches for a connection for 10 seconds.

If a connection is established, the SEK remains active; otherwise, it switches back to sleep mode.

Information on the display

You can view the following information on the SEKs display.

> **i** The display will stay on when the device is switched off or the battery has been removed.



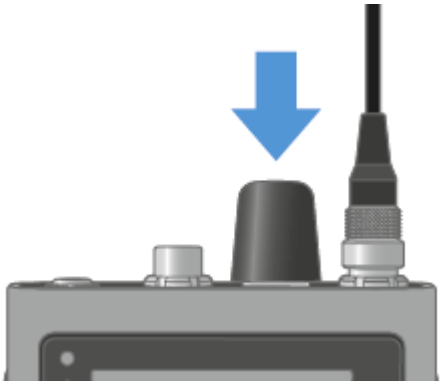
1 Name of mobile device

2 In-Ear volume level (only applicable when an audio link mode for IEM is set)

3 Battery status

The order of the displayed information changes depending on the setting.

- Press the rotary encoder to navigate through the menu.



To turn on the backlight:

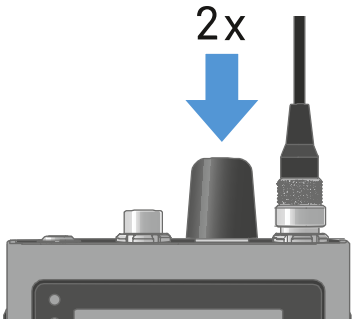
> **i** No microphone or headphone is connected.

- Press the rotary encoder.
  - ✓ The backlight is on for five seconds.

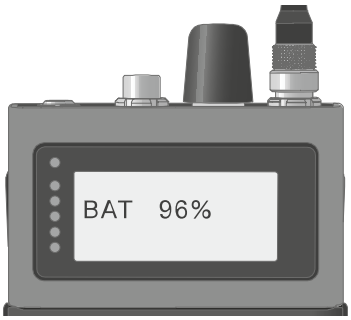
To check the battery status:

> No audio link is set.

- Press the rotary encoder for two times.



  - The battery status displays for five seconds.



To display the headphone volume:

> Only available if in-ear audio link mode is activated.

- Press the rotary encoder.
  - The backlight is on for five seconds.
- Press the rotary encoder again within 5 seconds after the first press.
  - The headphone volume displays for five seconds.



> The volume can be altered between -100 dB to +27.5 dB in steps of 0.5 dB.

- Turn the rotary encoder slowly to change the volume.
  - The volume changes by 0.5 dB per click.
- Turn the rotary encoder quick to change the volume.
  - The volume changes dynamically in larger increments.

To display the mic/line level:

> Only available if mic audio link is activated.

- Press the rotary encoder.
  - The backlight is on for five seconds.
- Press the rotary encoder again within 5 seconds after the first press.
  - The mic/line level is displayed. The five LEDs show the input level.

To display the E-label:

> The SEK is paired to the Base Station and the activated license uses E-labels.

- Press the rotary encoder.
  - The backlight is on for five seconds.
- Press the rotary encoder till the end of the menu.
- Press the rotary encoder long for E-label screen.
  - The first page of the E-label displays.

- Press the rotary encoder again to display subsequent E-labels.
- Press the rotary encoder long to return to the information screen.
- Press the rotary encoder for two seconds to leave the E-label menu.

Pairing the SEK to the Base Station

> **i** Mobile devices can only be paired and operated with one Base Station at a time.

You can pair up to 128 mobile devices to a Base Station within one RF channel.

Please make sure that on the Base Station

- a RF channel is configured and
- this RF channel is activated (RF on).

To pair the SEK to a Base Station:

- Put the Base Station into **Pairing Mode** using Spectera WebUI.
  - ✓ The LED flashes blue.

    > **i** Pairing Mode is activated for five minutes. The audio signal is not interrupted.

- While the SEK is off, long-press the ON/OFF button until the Status LED is blue.
  - ✓ The status LED is flashing blue while searching for a new Base Station.

    When the SEK found the Base Station, the status LED is flashing blue quickly and then is blue.

    The SEK appears in the software.

- Confirm the pairing in the software, see Spectera WebUI: **Pairing/unpairing mobile devices**.
  - ✓ The status LED of the SEK is flashing green quickly while connecting. When connecting is completed, the status LED is green.

To unpair the SEK from a Base Station:

- The SEK can only be unpaired in Spectera WebUI.
  - Spectera WebUI: **Pairing/unpairing mobile devices**
  - ✓ The SEK will automatically switch to pairing mode. The status LED is flashing blue.

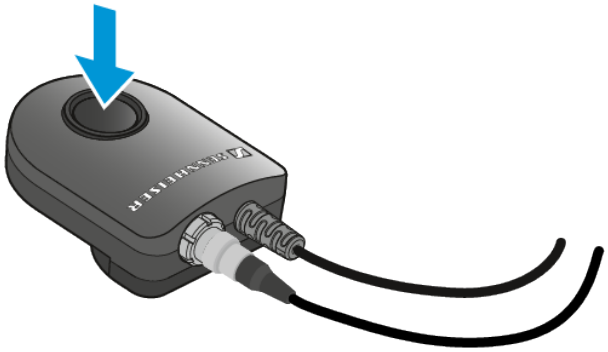
✓ The SEK has been paired to a Base Station.

Operating the SEK with the COM Button

The COM Button can be programmed with different functions, like mute or push to talk.

You can set the function of the COM button in the WebUI (see Setting the command mode) for each selected audio output channel on the Base Station.

- Momentary
- Latching



Updating the SEK

You can update the firmware of the SEK via Spectera WebUI.

All Spectera devices must use the same firmware version. The Base Station determines the firmware version.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

The remaining battery state must be higher than 10 % to start the update.

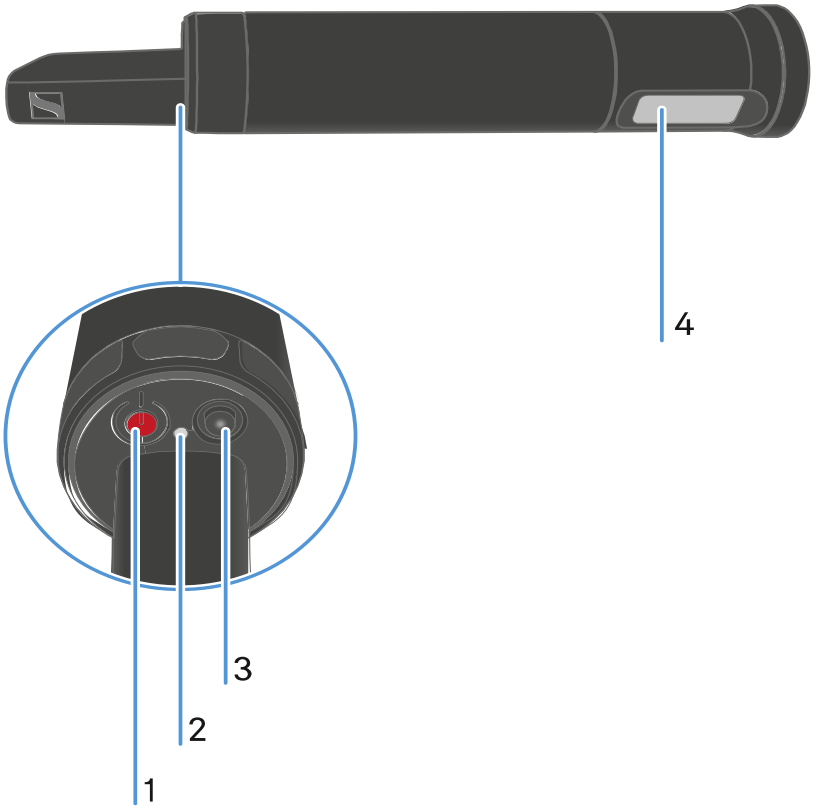
To update the firmware:

- If you want to update the SEK via Spectera WebUI: Updating the firmware (mobile devices).
  - The Status LED is flashing green and red during the update.

✓ The firmware has been updated.

SKM

Product overview



1 ON/OFF Button

see Switching the SKM on and off

2 LED

see Meaning of the LED

3 Control button

see Information on the display

4 Display

see Information on the display

Inserting and removing the rechargeable battery

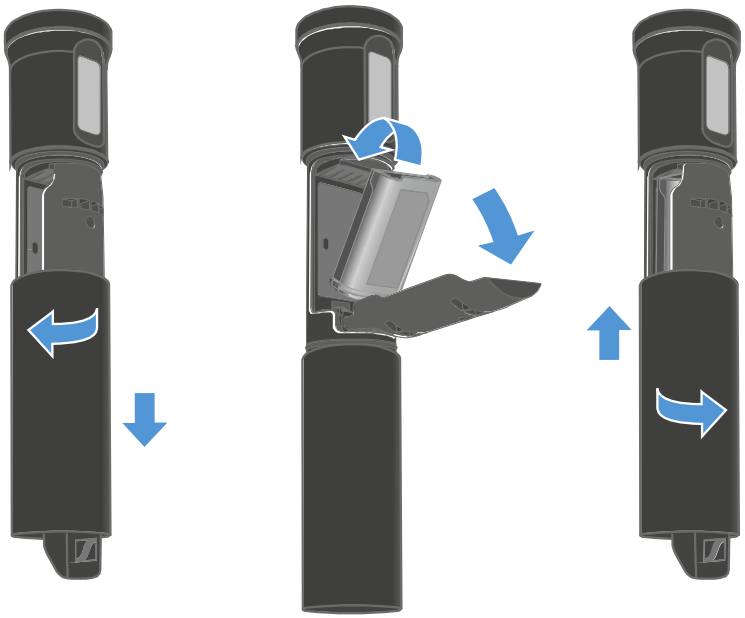
The handheld transmitter is powered exclusively by the BA 70 battery (separate accessory).

i The BA 70 can be charged in the L 70 USB, the L 6000 with LM 6070 or with the SEK in the CHG 70N-C.

- L 70 USB: Charging the rechargeable battery
- L 6000: Charging the rechargeable batteries in the L 6000 charger
- CHG 70N-C: Charging the rechargeable battery

To insert the battery into the handheld transmitter:

- Unscrew the handheld transmitter housing as shown in the illustration and pull it down as far as it will go.
- Insert the BA 70 battery as indicated in the battery compartment. Make sure the polarity is correct when inserting.
- Screw the handheld transmitter housing back on.



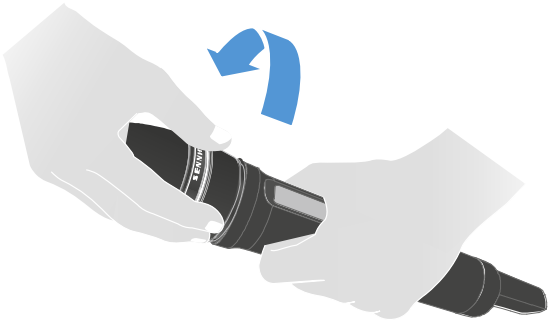
✓ The battery has been inserted.

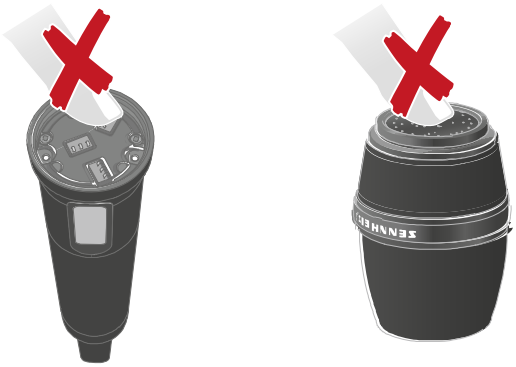
Replace microphone module

Different microphone modules are available for the handheld transmitter.

To replace the microphone module:

- Unscrew the microphone module.
- Screw on the desired microphone module.
- Do not touch the contacts of the microphone or the microphone module, as you may contaminate or bend them.





✓ The microphone module has been replaced.

The following microphone modules are compatible with the SKM:

- **MD 9235** | Dynamic microphone module with cardioid pickup pattern
- **ME 9002** | Permanently polarized condenser microphone module with omnidirectional pickup pattern
- **ME 9004** | Permanently polarized condenser microphone module with cardioid pickup pattern
- **ME 9005** | Permanently polarized condenser microphone module with supercardioid pickup pattern

- **MM 435** | Dynamic microphone module with cardioid pickup pattern
- **MM 445** | Dynamic microphone module with supercardioid pickup pattern
- **MMD 42-1** | Dynamic microphone module with omnidirectional pickup pattern
- **MMD 835-1** | Dynamic microphone module with cardioid pickup pattern
- **MMD 845-1** | Dynamic microphone module with supercardioid pickup pattern
- **MME 865-1** | Permanently polarized condenser microphone module with supercardioid pickup pattern
- **MMD 935-1** | Dynamic microphone module with cardioid pickup pattern
- **MMD 945-1** | Dynamic microphone module with supercardioid pickup pattern
- **MMK 965-1** | Condenser microphone module with switchable cardioid and supercardioid pickup patterns
- **Neumann KK 104 A** | Condenser microphone module with cardioid pickup pattern
- **Neumann KK 105 A** | Condenser microphone module with supercardioid pickup pattern
- **Neumann KK 204** | Condenser microphone module with cardioid pickup pattern
- **Neumann KK 205** | Condenser microphone module with supercardioid pickup pattern

Attaching the SKM COM

The SKM COM with the push button adds additional functions to the SKM.

To attach the SKM COM:

- Switch off the SKM.

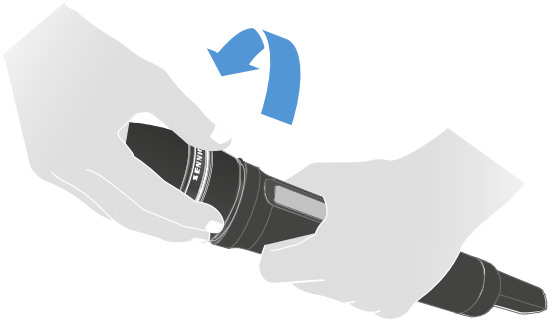
  > The SKM must be switched off before the SKM COM is attached or removed.

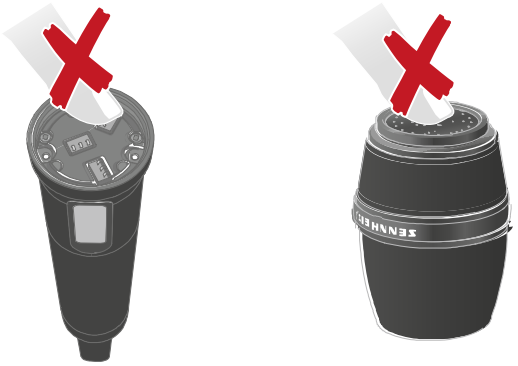
- Place the SKM COM on the SKM so that the push button is positioned above the display.
- Tighten the 3 screws evenly by hand using the supplied angle screwdriver.



- Screw on a compatible microphone module.

- Do not touch the contacts of the microphone or the microphone module. You might contaminate or bend them.

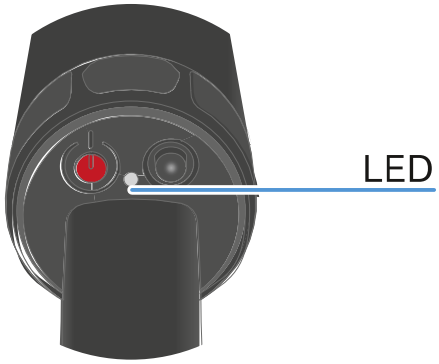




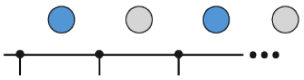
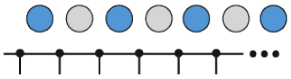
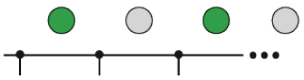
✓ The SKM COM is attached to the SKM.

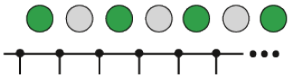
Meaning of the LED

The LED on the bottom of the SKM can display the following information.



The **LED** indicates the status between the SKM and the Base Station.

	The LED is off: • SKM is switched off
	The LED is orange: • SKM is starting
	The LED is flashing blue: • Searching for a new Base Station to pair
	The LED is flashing blue quickly: • Pairing to new Base Station is in progress • SKM turns off after five minutes, when no Base Station was found
	The LED is blue: • Connected to new Base Station, waiting for confirmation
	The LED is flashing green: • SKM is searching for previously paired Base Station



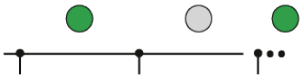
The LED is flashing green quickly:

- SKM is connecting to previous paired Base Station



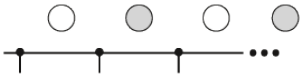
The LED is green:

- SKM is on
- SKM is connected to the Base Station



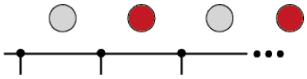
The LED is pulsing green:

- SKM is in sleep mode



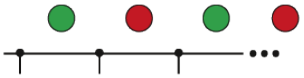
The LED is flashing white:

- Identify of SKM is in progress



The LED is flashing red:

- Battery state is below 10 %



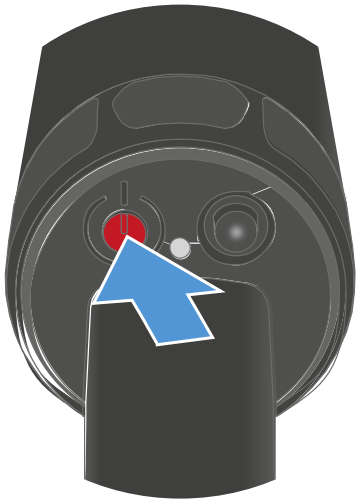
The LED is flashing green and red:

- Firmware update is in progress

Switching the SKM on and off

To switch the SKM on:

- Short press the ON/OFF button.



  - The SKM is starting. The status LED is orange.

To put the SKM in pairing mode:

- When the SKM is switched off, press the ON/OFF button for about seven seconds.
  - The SKM is searching for a new Base Station to pair. The status LED is flashing blue.

To switch the SKM off:

- Press the ON/OFF button.
  - The status LED goes off.

✓ The SKM has been switched on/off.

When the SKM is unpaired via the software Spectera WebUI, the SKM will automatically switch into pairing mode. The status LED is flashing blue.

Sleep mode

The SKM switches to sleep mode after 5 minutes if it cannot establish a connection to the Base Station. The LED then pulses green.

Once per 20 seconds, the SKM wakes up automatically and checks whether a connection to the Base Station can be established.

Operating the jog dial wakes the SKM up immediately and it attempts to establish a connection.

In doing so, the SKM searches for a connection for 10 seconds.

If a connection is established, the SKM remains active; otherwise, it switches back to sleep mode.

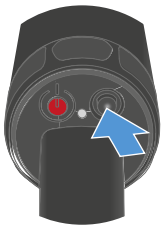
Information on the display

You can view the following information on the SKMs display.



The order of the displayed information changes depending on the setting.

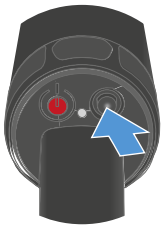
- Press the **Control** button to navigate through the menu.



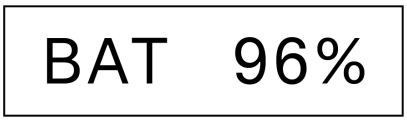
To check the battery status:

> No audio link is configured.

- Press the **Control** button.



The battery status is displayed for five seconds.



To display the E-Label:

> The SKM is paired with the Base Station and the enabled license uses E-Labels.

- Press the **Control** button until you reach the end of the menu.
- Press and hold the **Control** button to display the E-Label window.
  - The first page of the E-Label is displayed.
- Press the **Control** button again to display subsequent E-Labels.
- Press and hold the **Control** button to return to the information window.
- Press and hold the **Control** button for two seconds to exit the E-Label menu.

Pairing the SKM to the Base Station

> **i** Mobile devices can only be paired and operated with one Base Station at a time.

You can pair up to 128 mobile devices to a Base Station within one RF channel.

Please make sure that on the Base Station

- a RF channel is configured and
- this RF channel is activated (RF on).

To pair the SKM to a Base Station:

- Put the Base Station into **Pairing Mode** using Spectera WebUI.
  - ✓ The LED flashes blue.

    > **i** Pairing Mode is activated for five minutes. The audio signal is not interrupted.

- While the SKM is off, long-press the ON/OFF button until the Status LED is blue.
  - ✓ The status LED is flashing blue while searching for a new Base Station.

    When the SKM found the Base Station, the status LED is flashing blue quickly and then is blue.

    The SKM appears in the software.

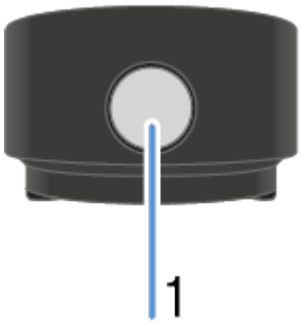
- Confirm the pairing in the software, see Spectera WebUI: **Pairing/unpairing mobile devices**.
  - ✓ The status LED of the SKM is flashing green quickly while connecting. When connecting is completed, the status LED is green.

To unpair the SKM from a Base Station:

- The SKM can only be unpaired in Spectera WebUI.
  - Spectera WebUI: **Pairing/unpairing mobile devices**
  - ✓ The SKM will automatically switch to pairing mode. The status LED is flashing blue.

✓ The SKM has been paired to a Base Station.

Using the SKM COM



1 Push button with LED

You can set the function of the COM button in the WebUI (see Setting the command mode) for each selected audio output channel on the Base Station.

- Momentary
- Latching

The colors of the LED can be set in the WebUI.

Updating the SKM

You can update the firmware of the SKM via Spectera WebUI.

All Spectera devices must use the same firmware version. The Base Station determines the firmware version.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

The remaining battery state must be higher than 10 % to start the update.

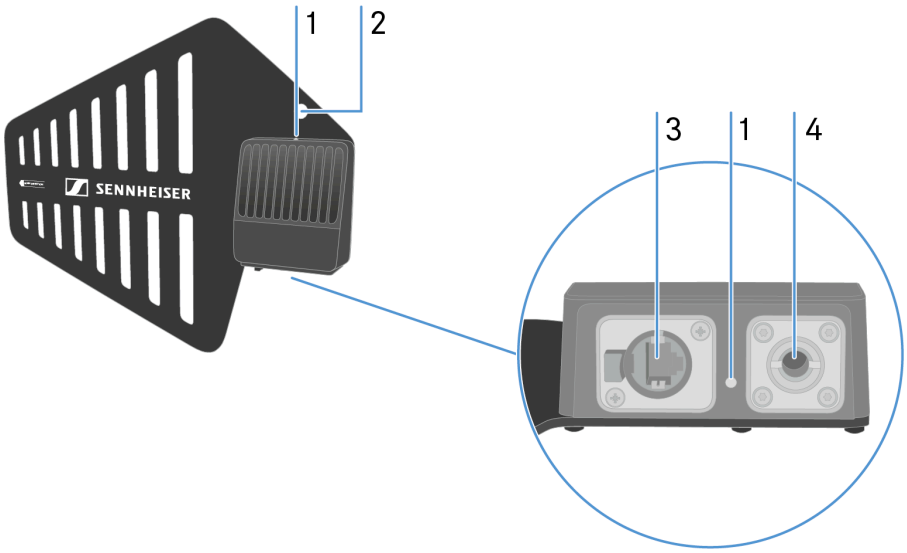
To update the firmware:

- If you want to update the SKM via Spectera WebUI: Updating the firmware (mobile devices).
  - The Status LED is flashing green and red during the update.

✓ The firmware has been updated.

DAD

Product overview



1 LED to indicate the status

see Meaning of the LED

2 Hole for rigging safety cable

3 Ruggedized RJ45

see Connecting/disconnecting the antenna

4 Microphone stand

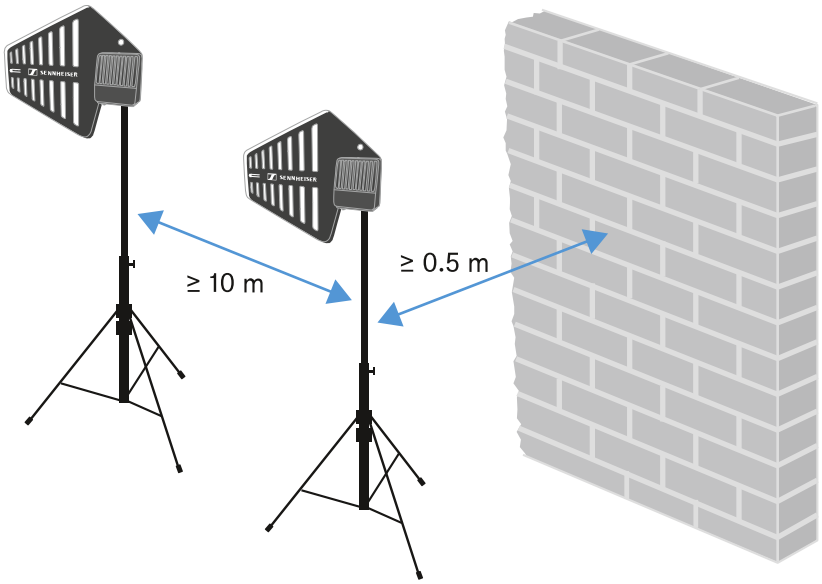
see Information on antenna setup

Information on antenna setup

Handle with care: The antenna contains electrical components.

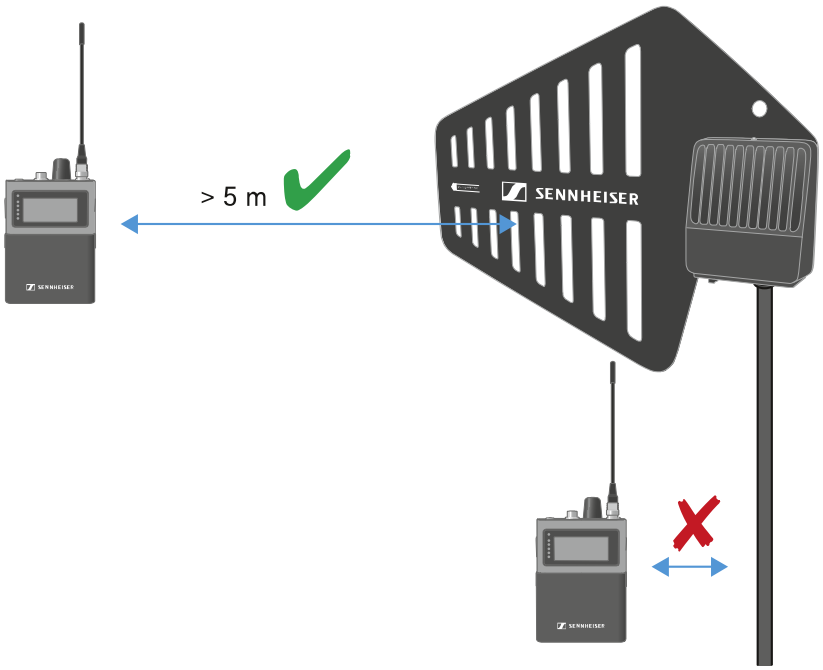
Setup with other antennas

- Keep a distance more than 10 m (393.7") between the antenna and another antenna.
- Keep a distance more than 0.5 m (19.69") between the antenna and a wall.



Setup with a mobile device

- Keep a distance more than 5 m (169.85") between the antenna and the mobile device.


> 5 m
SENNHEISER

Meaning of the LED

The LED on top and below indicates the same information.



The LED is off:

- The antenna is not connected to the Base Station.



The LED is flashing green:

- The antenna is connecting to the Base Station.



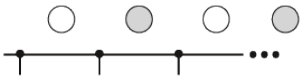
The LED is green:

- The antenna is connected to the Base Station and one or both RF channels are active.



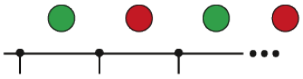
The LED is yellow:

- The antenna is connected to the Base Station and one or both RF channels are muted.



The LED is flashing white:

- The connected antenna is identified.



The LED is flashing green and red:

- Firmware update is in progress.

Placing on a stand

The thread is suitable for mounting on a standard microphone stand with 3/8" or 5/8" thread.

i Handle with care: The antenna contains electrical components.

CAUTION



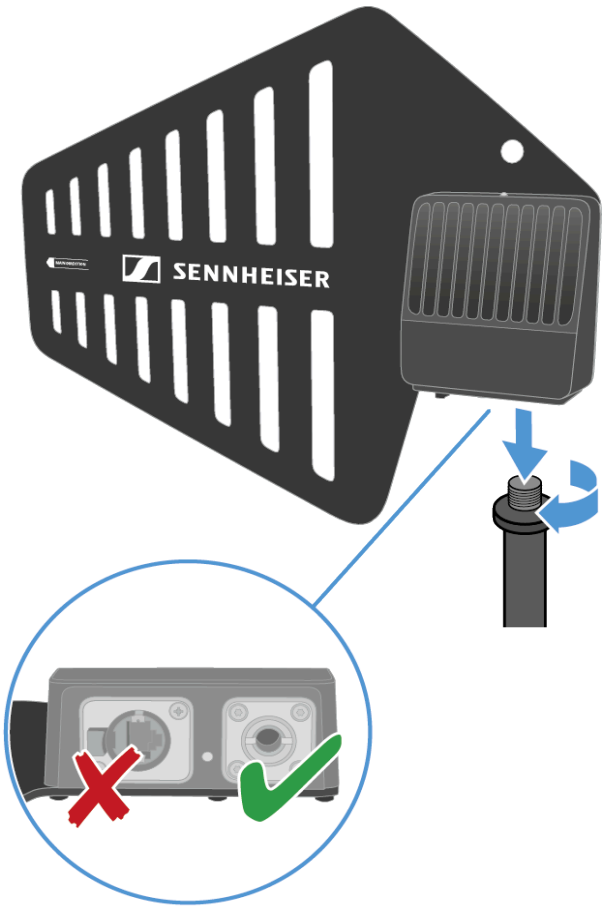
Personal injury and damage to property if the antennae should tip or fall over

If you do not secure the antennae against tipping or falling over, they may cause personal injury and damage to property.

- Secure antennae so that they cannot tip and fall over. Use safety wires for this purpose. The safety wires, rope terminations and coupling links must comply in their dimensioning and condition with the regulations and standards of the country in which they are used!

To place the DAD on a stand:

- Screw the DAD to the stand.
- Make sure to use the correct hole!



✓ The DAD has been placed on a stand.

Connecting/disconnecting the antenna

The cable supplies power and exchanges data.

> **i** Handle with care: The antenna contains electrical components.

The cable must

- be a CAT5e or higher,
- have ruggedized plugs and
- not extend 100 m (3937").

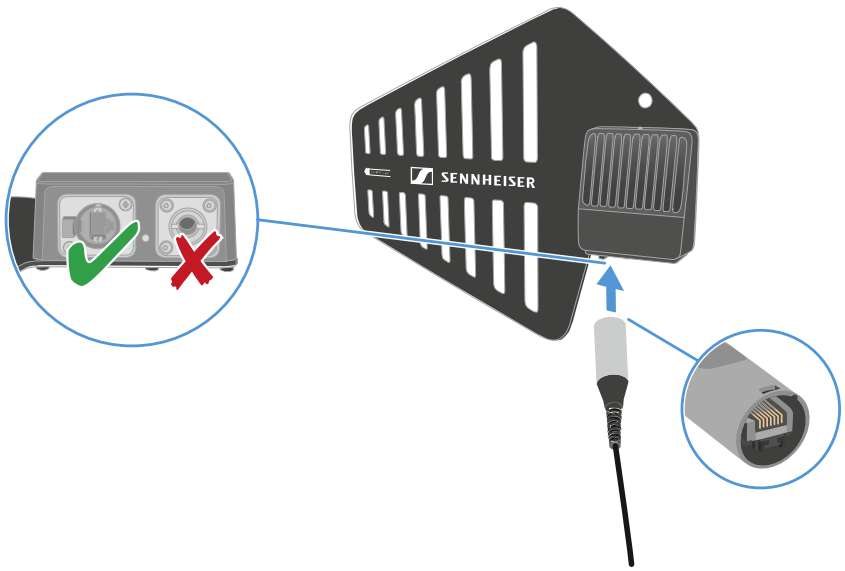
> **i** We recommend using a antenna cable cat 5e (see Accessories for the DAD).

To connect the antenna to the Base Station:

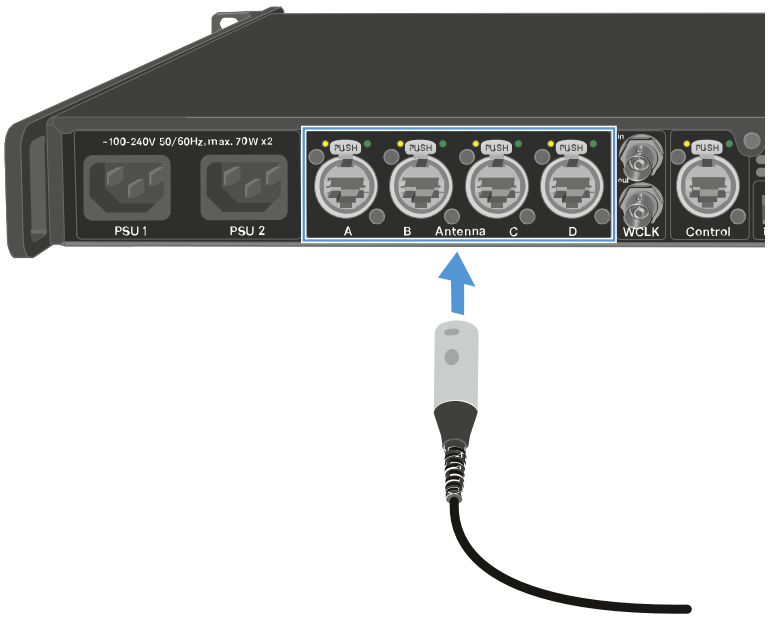
- Observe the information: Information on antenna setup.

  > **i** The antenna must be connected directly to the Base Station, with no switch in between.

- Plug on side of the cable into the antenna.
- Make sure to use the correct hole!



- Plug the other side of the cable into one antenna port (A, B, C or D) at the rear site of the Base Station.



The LED flashes green to connect to the Base Station.

The LED is green, when the antenna is connected to the Base Station and and one or both RF channels are active.

Or the LED is yellow, when the antenna is connected to the Base Station and the radio signal is muted.

Or the LED is flashing green and red, when the firmware is updating automatically.

> **i** If the Base Station is in standby, the DAD is off.

- You can connect up to four antennas to one Base Station.

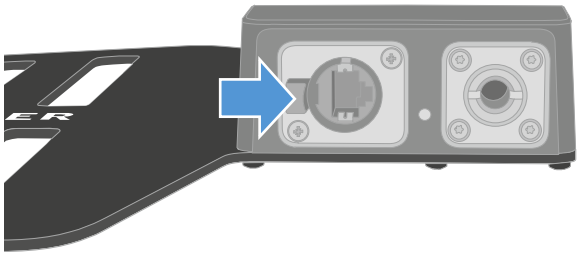
  The Base Station has two independend RF channels. Both variants of the antenna (UHF and 1G4) can be connected to the Base Station at the same time.

To disconnect the antenna from the Base Station:

- Hold the push button down.
- Unplug the cable from the Base Station.

To disconnect the cable from the antenna:

- Hold the snap-in nose down.



- Unplug the cable from the antenna.

✓ The antenna has been connected/disconnected.

Antenna cable extension

Longer cable distances are possible with the use of fiber optic cables and media converters.

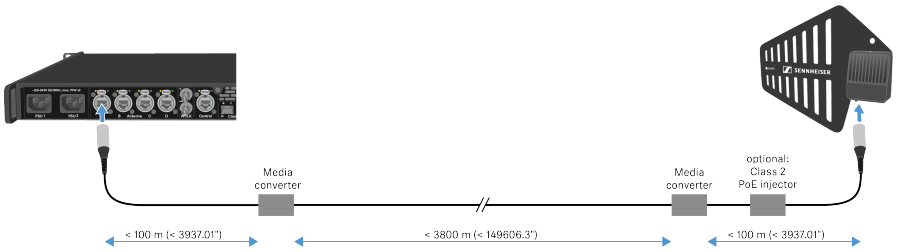
Sennheiser tested the recommend converters for a complete distance of 4 km (157480.31").

We only recommend the following converters for fully tested functionality:

- Base Station | Base Station ZMAN:

  > Do not use converters with PoE to connect to the Base Station | Base Station ZMAN.

  - Lantronix M/GE-T-SFP-01
- DAD:
  - Lantronix M/GE-PSW-PSE-01 (with PoE only for DAD)
  - Lantronix M/GE-T-SFP-01 (needs a Class 2 PoE injector capable of supplying powering to the DAD (power consumption < 6.5 W))
  - Barnfind Technologies BarnColor 4xEth (with PoE only for DAD)
  - StarTech.com Industrial PoE Media Converter (Product ID: IMC1GSFP30W) (with PoE only for DAD)



> The media converter must not have a switch function.

Updating the DAD

The firmware of the antenna will update automatically, when connected to the Base Station.

NOTICE

Data loss during firmware update

The audio transmission is interrupted during the firmware update of the Base Station, the antenna or the mobile device.

After the firmware update, the device is restarted automatically.

- Do not update the firmware during an active live audio transmission.

To update the firmware:

- Connect the antenna to a Base Station. See Connecting/disconnecting the antenna.
  To update the Base Station, see Updating the Base Station.
  - The LED is flashing green and red during the update.

✓ The firmware has been updated.

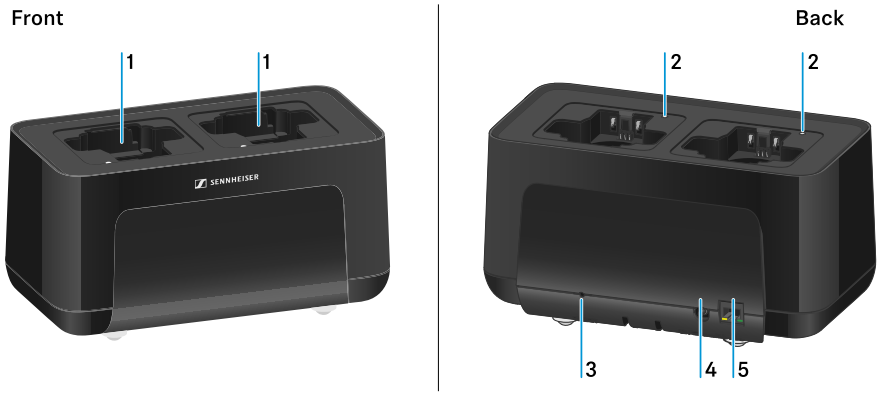
CHG 70N-C charger

The CHG 70N-C is a network enabled charger featuring two individual charging bays.

Compatible products:

- EW-DX SKM/EW-DX SKM-S handheld transmitter
- EW-DX SK/EW-DX SK 3-PIN bodypack transmitter
- SPECTERA SEK bidirectional transmitter
- BA 70 rechargeable battery

Product overview



1 Charging slots

- See Charging the rechargeable battery

2 Status LED of the charging slots

- See Charging the rechargeable battery

3 **Reset** button

- Press and hold for 10 seconds to reset the device's network settings, see Connecting a charger in a network
- Press and hold for 4 seconds to enable power saving mode, see Power saving mode

4 **DC in** connection socket for the **NT 12-35 CS** power supply unit

- See Connecting/disconnecting the charger to/from the power supply system

5 **PoE/Ethernet** RJ45 socket for controlling the device over the network and for Power over Ethernet power supply

- See Connecting a charger in a network
- See Connecting/disconnecting the charger to/from the power supply system

> **i** You can cascade up to 5 devices with only one power supply and one network connection. See Cascading chargers.

Connecting/disconnecting the charger to/from the power supply system

You can operate the charger either with the Sennheiser NT 12-35 CS power supply unit or with Power over Ethernet (PoE IEEE 802.3af Class 0). Please refer to the following information.

Power from the NT 12-35 CS power supply unit

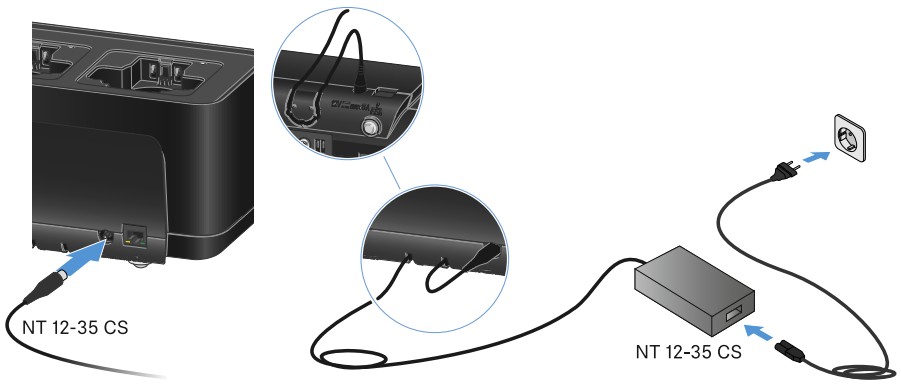
- Use only the **NT 12-35 CS** power supply unit from Sennheiser. It is designed for your charger and ensures safe operation.

  > **i** The power supply unit is available either separately (Sennheiser article number 508995) or together with the charger as a kit (see CHG 70N-C network-enabled charger).

Power from the NT 12-35 CS power supply unit

> **i** Use only the **NT 12-35 CS** power supply unit from Sennheiser. It is designed for your charger and ensures safe operation. The power supply unit is available either separately (Sennheiser article number 508995) or together with the charger as a kit (see CHG 70N-C network-enabled charger).

- Connect the hollow jack plug of the power supply unit to the **DC in** socket on the charger.
- Pass the cable through the strain relief.
- Plug the power supply unit into the wall outlet using the correct power cable for your country.



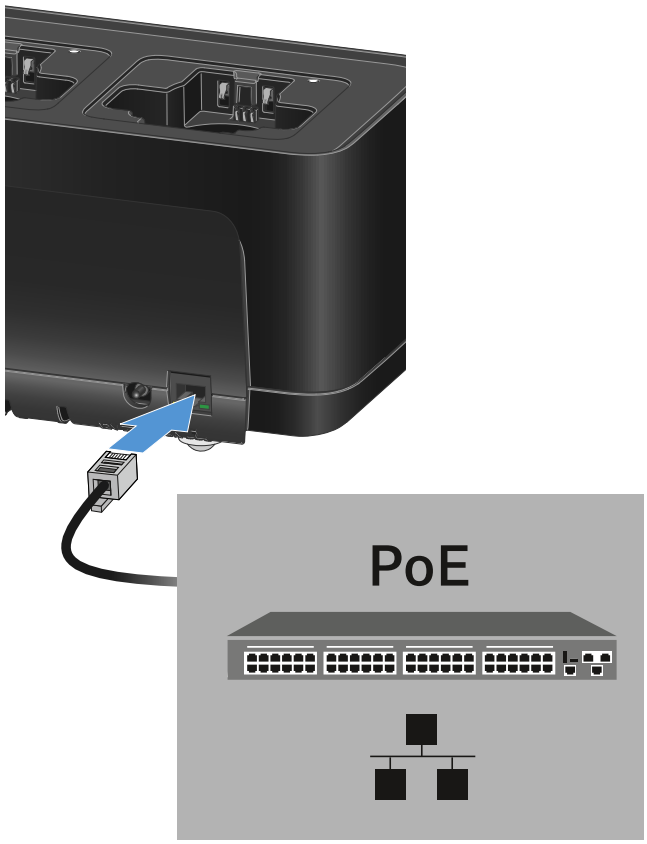
Disconnecting the charger completely from the power supply system

- Unplug the mains cable from the wall socket.
- Unplug the hollow jack plug of the power supply unit from the **DC in** socket on the charger.

Power over Ethernet (PoE)

> The charger can be powered via **Power over Ethernet** (PoE IEEE 802.3af Class 0).

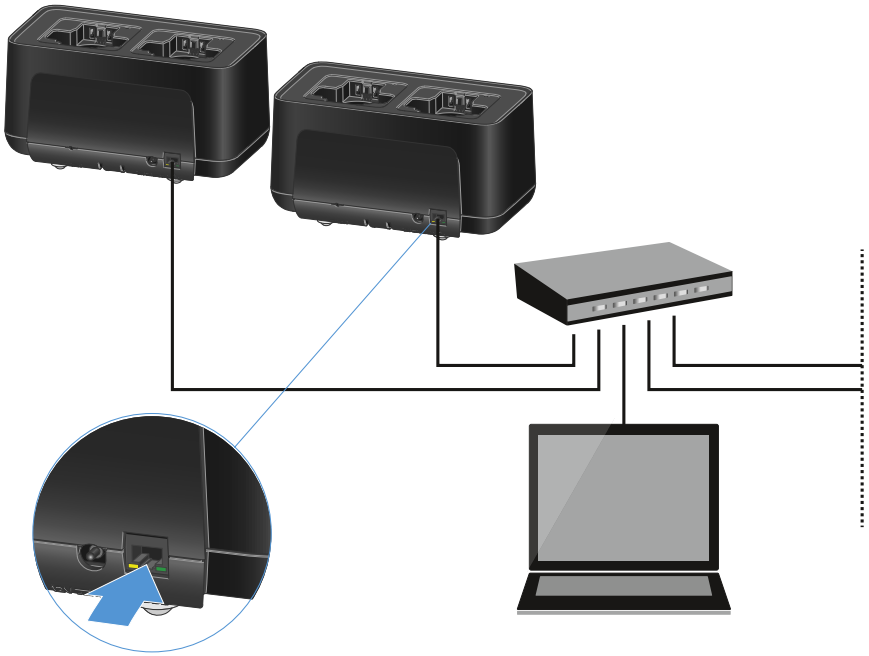
- Connect the charger to a **PoE**-enabled network switch.



Connecting a charger in a network

You can monitor and control one or more chargers via a network connection using the **Sennheiser Control Cockpit (SCC)** software.

> **i** The network does not have to be a homogeneous network including only chargers. You can integrate the charger into your existing network infrastructure with any other types of devices.



You can integrate the devices into the network individually or cascade up to 5 chargers (see Cascading chargers).

To reset the network settings to their factory defaults:

- Hold the **Reset** button for 4 seconds.

> **i** For more information about controlling devices via the Sennheiser Wireless Systems Manager or Sennheiser Control Cockpit software, refer to the instruction manual for the software. You can download the software here: sennheiser.com/control-cockpit

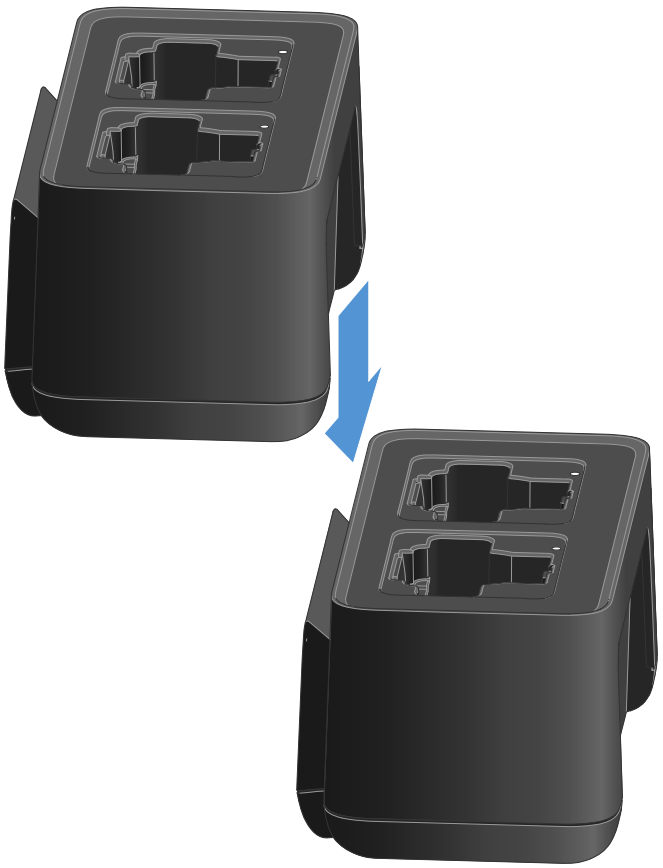
Cascading chargers

You can cascade up to five CHG 70N-C chargers and operate them with a single power supply and a single network connection. This minimizes the cabling required for larger systems.

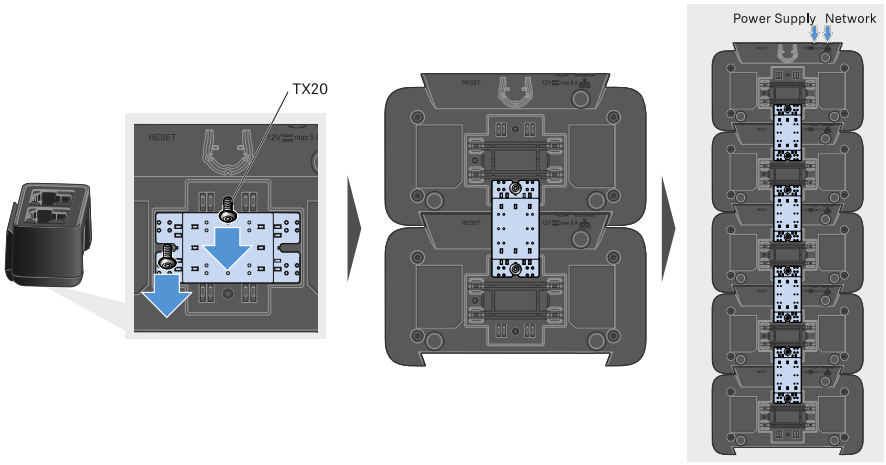
> **i** The power must be supplied via the NT 12-35 CS power supply unit. Power over Ethernet (PoE) is not possible when cascading.

To cascade the chargers:

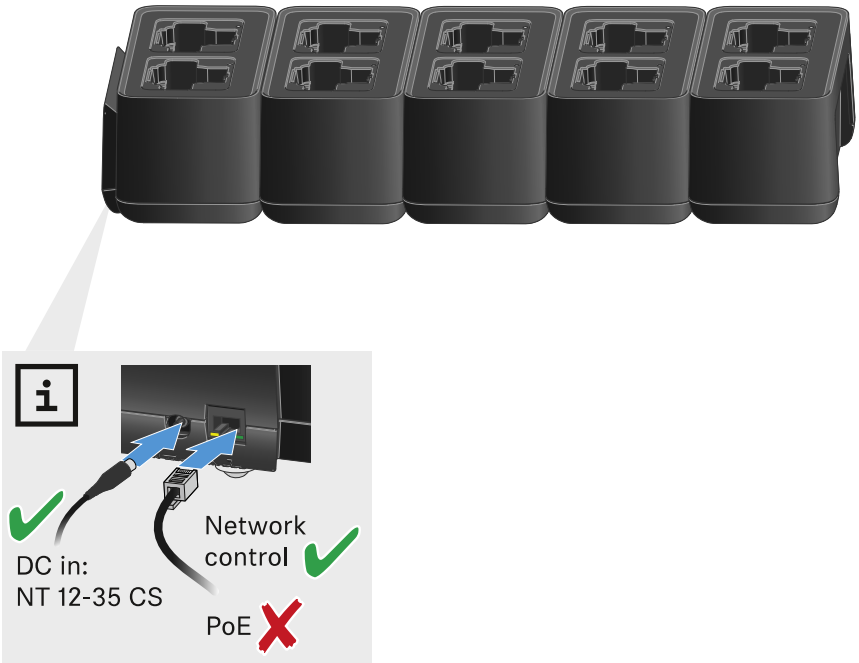
- Make sure that no chargers are connected to the power before you start.
- Plug the chargers into each other as shown in the figure.



- Detach the connecting rail on the bottom of the charger.
- Fasten the connecting rail beneath two chargers as shown in the figure.
  - ✓ The power and the network connection are passed on to all devices via the connecting rails.



- Connect the first charger in the cascade to the network (see Connecting a charger in a network).
- Finally, connect the NT 12-35 CS power supply unit to the first charger in the cascade (see Connecting/disconnecting the charger to/from the power supply system).

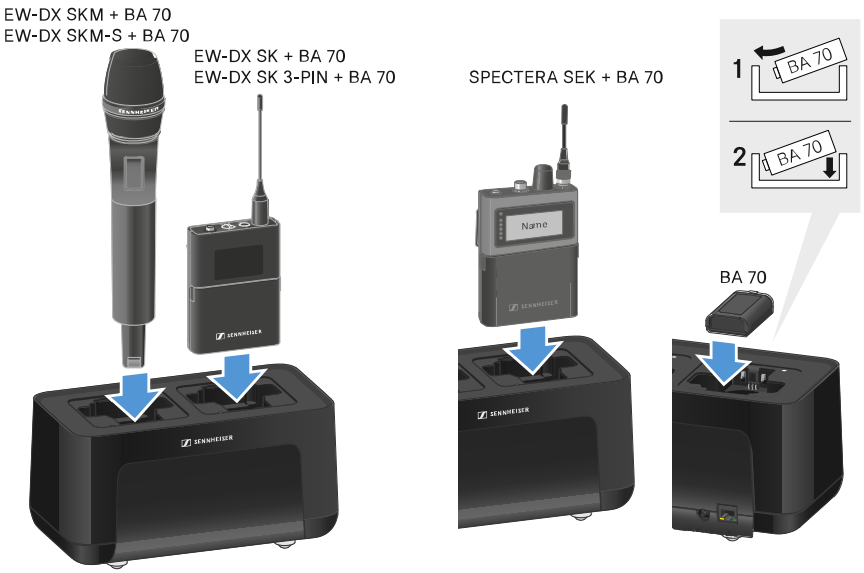


Charging the rechargeable battery

You can use the CHG 70N-C charger to charge individual BA 70 rechargeable batteries, or to charge EW-DX SKM, EW-DX SKM-S, EW-DX SK, EW-DX SK 3-PIN or Spectera SEK with the BA 70 rechargeable battery already inserted.

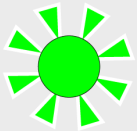
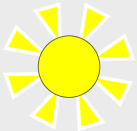
To charge the battery:

- Insert the individual rechargeable battery or the transmitter with battery already inserted into the charging slot as shown in the figure.



✓ The rechargeable battery will begin charging.

The LED on the charging slot shows the battery's charge level.

LEDs	
	100 %
	> 60 %
	> 20 %
	> 0 %
	Error

Power saving mode

In power saving mode, the transmitters are charged only once. The charger also does not provide any trickle charge.

To activate power saving mode:

> In power saving mode, the CHG 70N-C cannot be controlled over the network.

- Remove all transmitters and/or rechargeable batteries from the charging slots.
- Hold the **Reset** button for 4 seconds.
  - The charging slot LEDs light up purple.
- Insert the rechargeable battery/transmitter for charging.
  - The rechargeable battery will begin charging. The charging slot LED turns green once it reaches full charge.

To deactivate power saving mode:

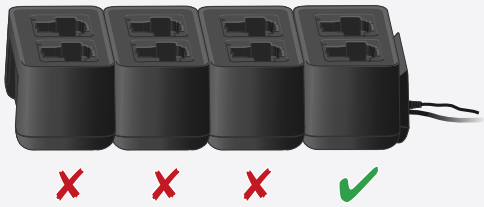
- Disconnect the charger from the power supply system.
- Then reconnect it to the power supply system.
  - The charger will start up in the configuration that was set before you activated power saving mode.

Updating the firmware of the charger

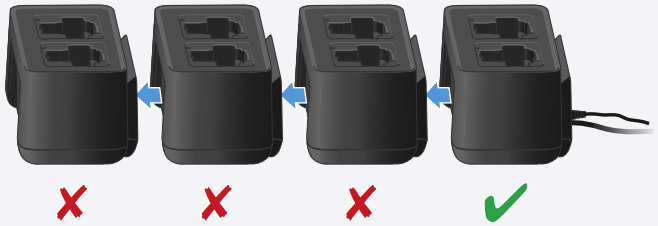
You can update the charger firmware using the **Sennheiser Control Cockpit** software.

Note on firmware version 4.0.0

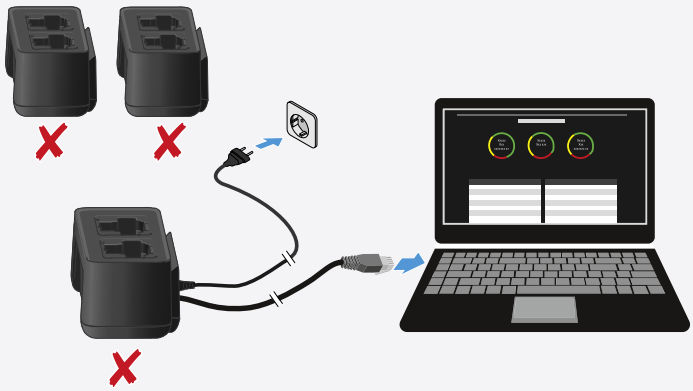
Devices with outdated firmware can no longer be reached in a cascade if the first charger has the new firmware.



- Disconnect the chargers from the cascade.



- Update the firmware of each charger individually.



- Connect the chargers.



Updating with the Sennheiser Control Cockpit:

- Connect the charger to a network (see Connecting a charger in a network) and establish the connection with the software.

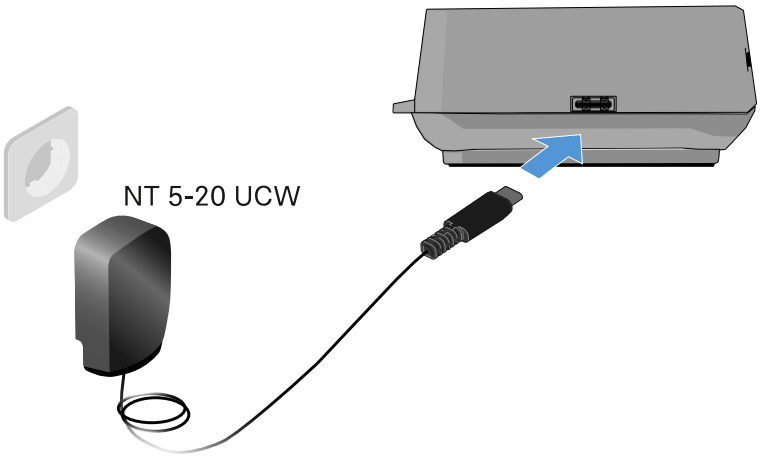
> For more information about controlling devices with the **Sennheiser Control Cockpit** software, refer to the software help.
> You can download the software here:
>
> sennheiser.com/control-cockpit

L 70 USB charger

Connecting/disconnecting the charger to/from the power supply system

To connect the charger to the power supply system:

- Use only the **NT 5-20 UCW** power supply unit from Sennheiser.
- Connect the USB-C plug on the charging cable to the USB-C port on the side of the charger.
- Plug the power supply unit with the correct country adapter into a suitable power outlet.



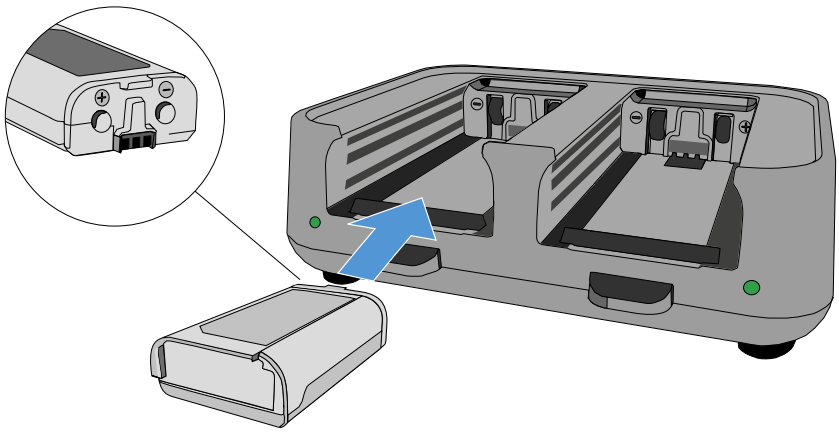
To disconnect the charger from the power supply system:

- Unplug the power supply unit from the wall socket.
- Remove the USB-C plug on the charging cable from the USB-C port on the side of the charger.

Charging the rechargeable battery

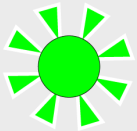
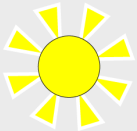
To charge the BA 70 rechargeable battery in the L 70 USB charger:

- Slide the rechargeable battery completely into the charging slot as shown in the figure.



✓ The rechargeable battery will begin charging.

The LED on the charging slot shows the battery's charge level:

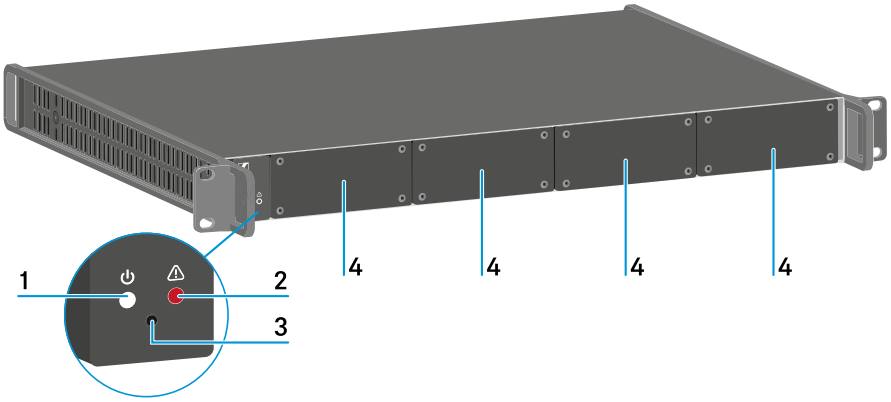
LEDs	
	100 %
	> 60 %
	> 20 %
	> 0 %
	Error

Modular L 6000 charger

These sections contain information about installing, starting up and operating the modular L 6000 charger and the corresponding charging modules.

Product overview

Front



1 Power status LED

See Meaning of the LEDs

2 Warning status LED

See Meaning of the LEDs

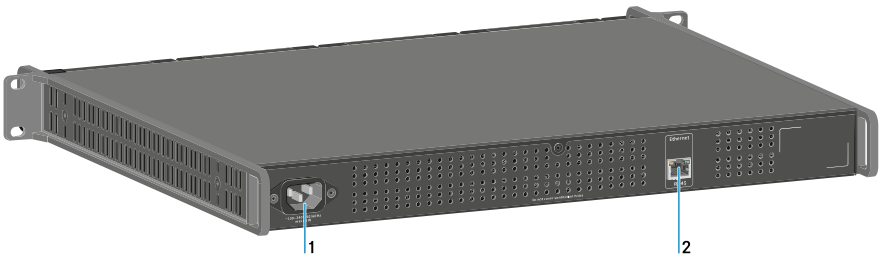
3 Reset

See Resetting settings (factory reset)

4 Dummy caps

See Installing a charging module in the L 6000 charger

Back



1 Power socket

See Connecting/disconnecting the L 6000 to/from the power supply system

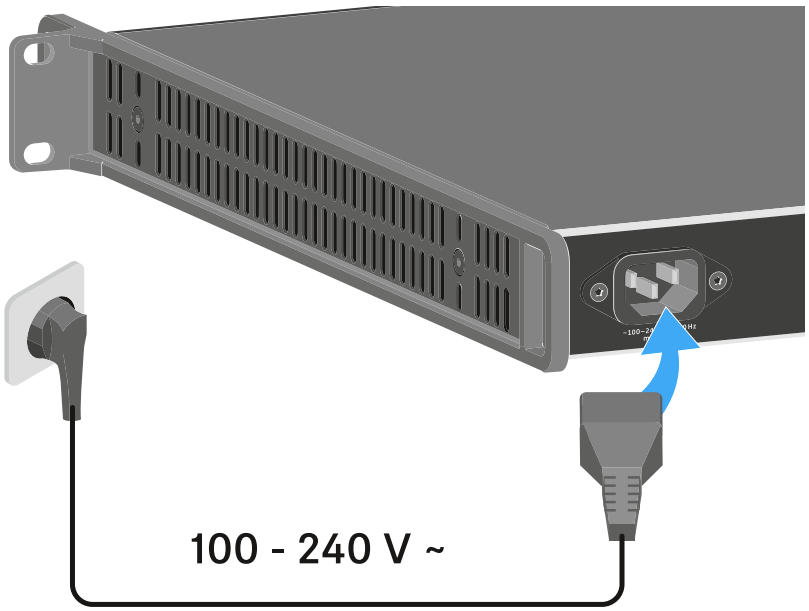
2 **Ethernet** socket

See Connecting the L 6000 to a network

Connecting/disconnecting the L 6000 to/from the power supply system

To connect the L 6000 to the power supply system:

- Connect the mains cable IEC connector to the power socket on the rear side of the L 6000.
- Connect the mains cable plug into a suitable wall socket.



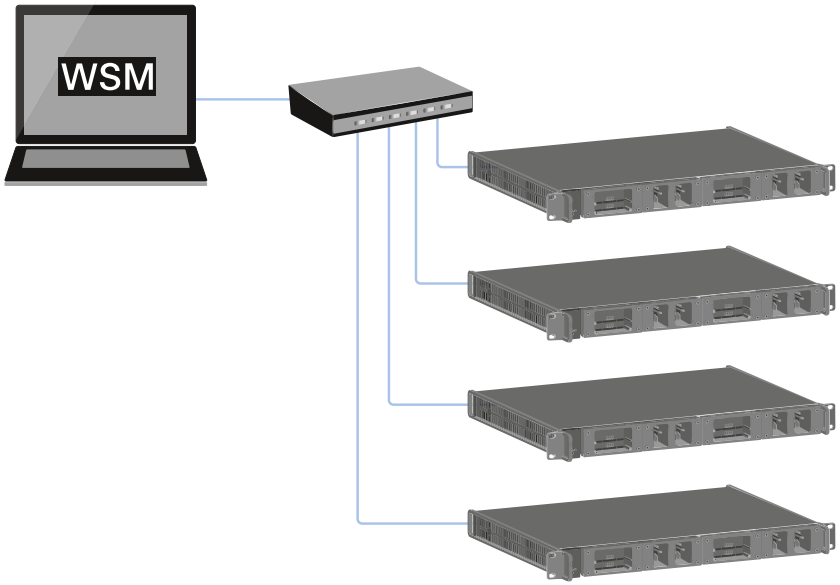
To completely disconnect the L 6000 from the power supply system:

- Unplug the mains cable plug from the wall socket.
- Unplug the mains cable IEC connector from the power socket on the rear side of the L 6000.

Connecting the L 6000 to a network

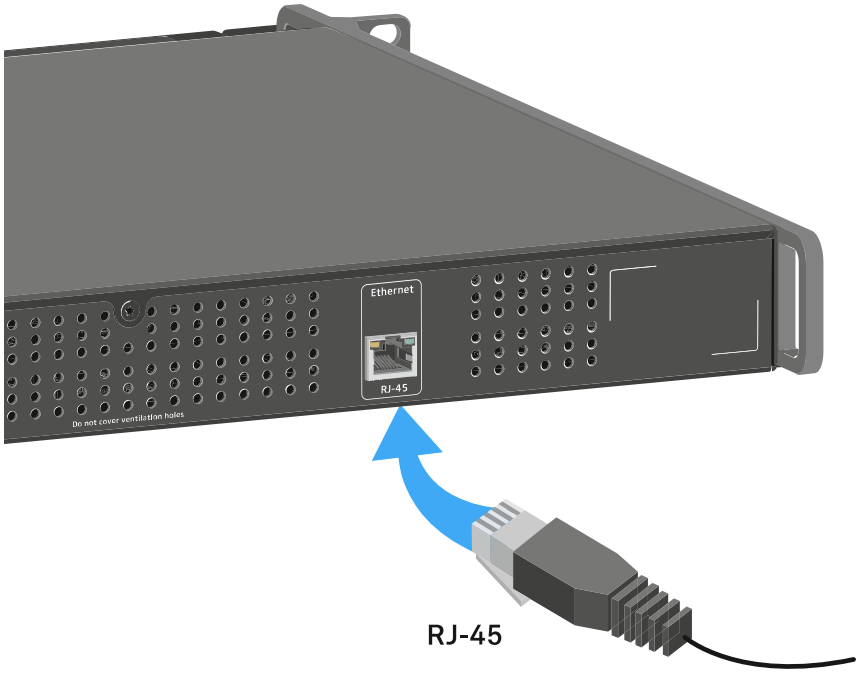
You can monitor and control one or more L 6000s via a network connection using the **Sennheiser Wireless Systems Manager** (WSM) software.

The network does not have to be a homogeneous network including only chargers. You can integrate the L 6000 into your existing network infrastructure with any other types of devices.



To connect the L 6000 to a network:

- Connect a network cable with an RJ-45 connector (Cat5 at minimum) to the **Ethernet** socket on the rear side of the L 6000.

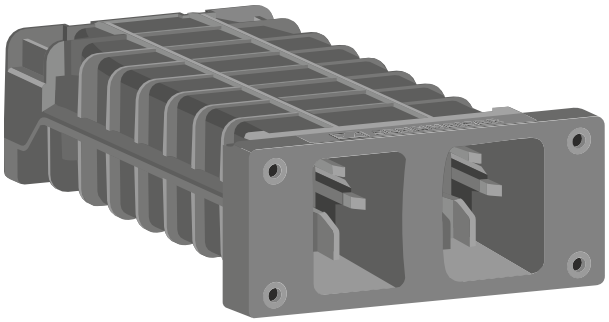


i For more information about controlling devices via the **Sennheiser Wireless Systems Manager** (WSM) software, refer to the instruction manual for the software. You can download the software here:
sennheiser.com/wsm

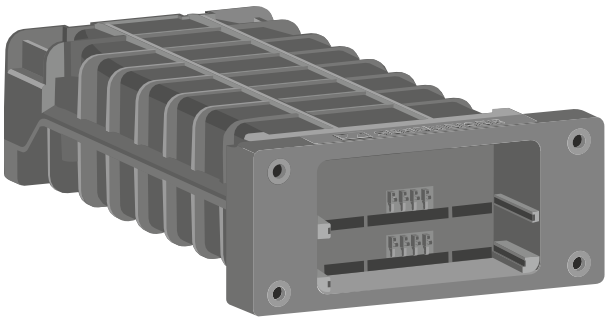
Installing a charging module in the L 6000 charger

The following charging modules are available for the L 6000 charger.

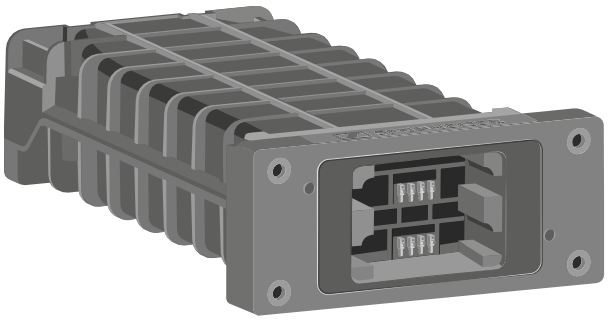
- **LM 6060** -> for charging the **BA 60** rechargeable battery



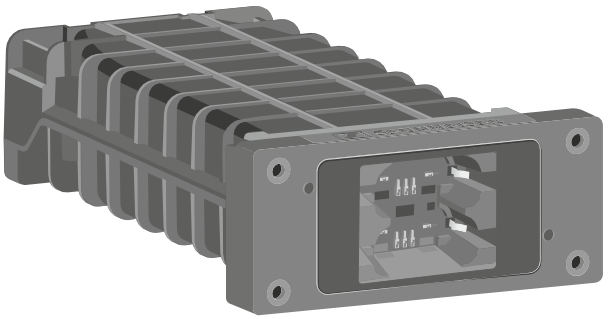
- **LM 6061** -> for charging the **BA 61** rechargeable battery



- **LM 6062** -> for charging the **BA 62** rechargeable battery



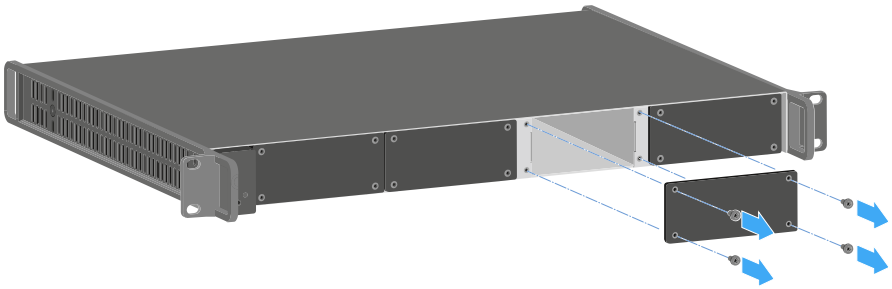
- **LM 6070** -> for charging the **BA 70** rechargeable battery



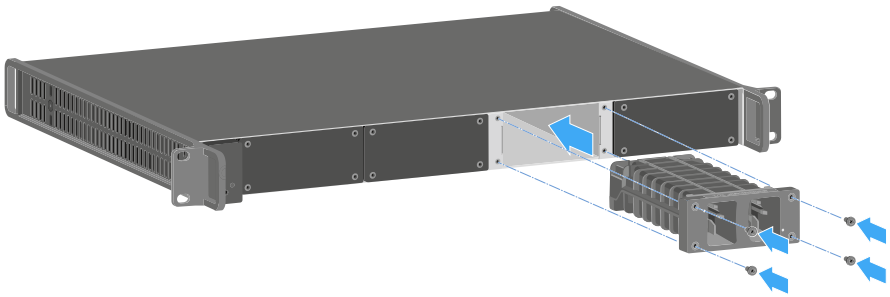
You can combine the LM 6060, LM 6061, LM 6062 and LM 6070 in any way in the L 6000 charger.

To install a charging module in the L 6000 charger:

- Completely disconnect the L 6000 charger from the power supply system. See Connecting/disconnecting the L 6000 to/from the power supply system.
- Unscrew one of the dummy caps on the L 6000.
  To do so, you require a Torx 10 screwdriver.



- Fully slide the charging module into the open charging slot as shown in the figure.
  - The charging module can be inserted into the L 6000 housing only in one direction. The Sennheiser lettering on the charging module must face upward.



- Tightly screw on the charging module.

Always use the latest firmware for the L 6000 charger (version 2.0 or later) to ensure you have access to the full range of functions. You can download the latest firmware from the following address:

sennheiser.com/l-6000

> For more detailed information about charging the BA 60, BA 61 and BA 62 and BA 70 rechargeable batteries, see Charging the rechargeable batteries in the L 6000 charger.

Installing the L 6000 in a rack

You can install the L 6000 charger in any conventional 19" rack.

The rack mounting angles are already attached to the device.

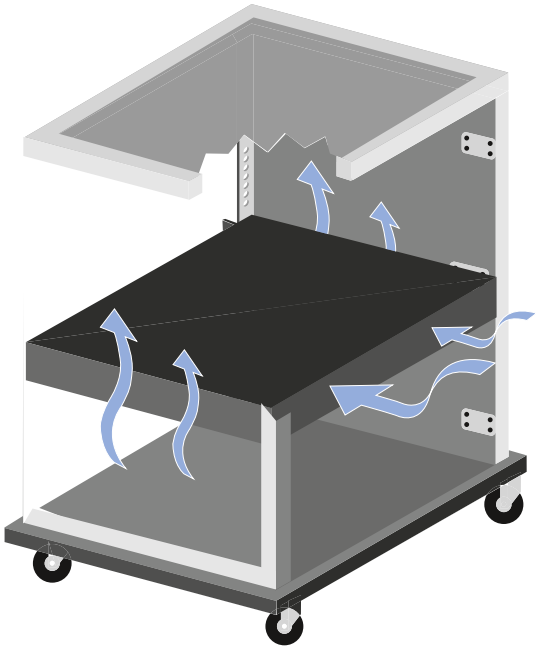
Always observe the following information during rack mounting.

NOTICE

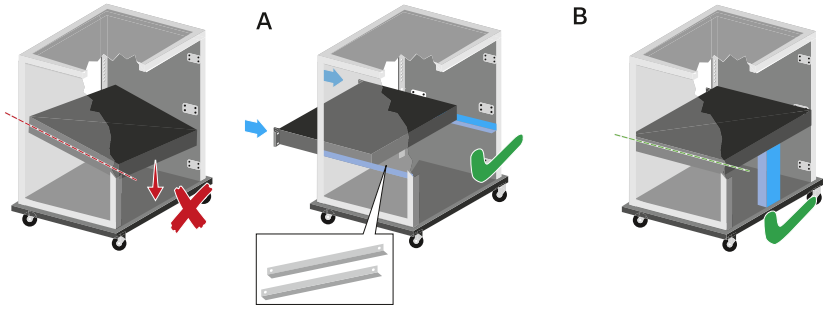
Material damages caused by devices overheating

When there is insufficient ventilation, the devices mounted in the rack may overheat.

- Ensure that there is sufficient ventilation in the rack, particularly if several devices are installed.
- If necessary, install a fan in the rack.



- Support the EM 6000 after installation in the rack. Due to the weight and depth of the device, there is a risk that it may break off in the rack and become damaged as a result.



Version A:

- Use special rack mounting rails.
- The design of the rack used must be suitable for the installation of these mounting rails.

Version B:

- Use a suitable object to support the device on the rear side.
- Ensure that this object cannot become loose.

Switching the L 6000 on and off

The L 6000 does not have a separate on/off switch.

Once the power supply is established, the device is switched on.

▶ See Connecting/disconnecting the L 6000 to/from the power supply system.

Charging the rechargeable batteries in the L 6000 charger

To charge the BA 60, BA 61, BA 62 and BA 70 rechargeable batteries with the L 6000 charger, you need the LM 6060, LM 6061, LM 6062 or LM 6070 charging modules.

Before charging, you have to install the charging modules in the L 6000 charger. For installation information, see Installing a charging module in the L 6000 charger.

Note on the charger firmware
Always use the latest firmware for the L 6000 charger (version 2.0 or later) to ensure you have access to the full range of functions. You can download the latest firmware from the following address:

sennheiser.com/l-6000

Note on the BA 62 rechargeable battery for the SK 6212 bodypack transmitter
It is possible that new rechargeable batteries cannot be fully charged to 100 % in the first few charging cycles.

The remaining operating time may still be unclear after the first few charging cycles. This will improve over time after more charging cycles because the rechargeable battery calibrates itself.

NOTICE

Damage to the charging contacts in the charging slot

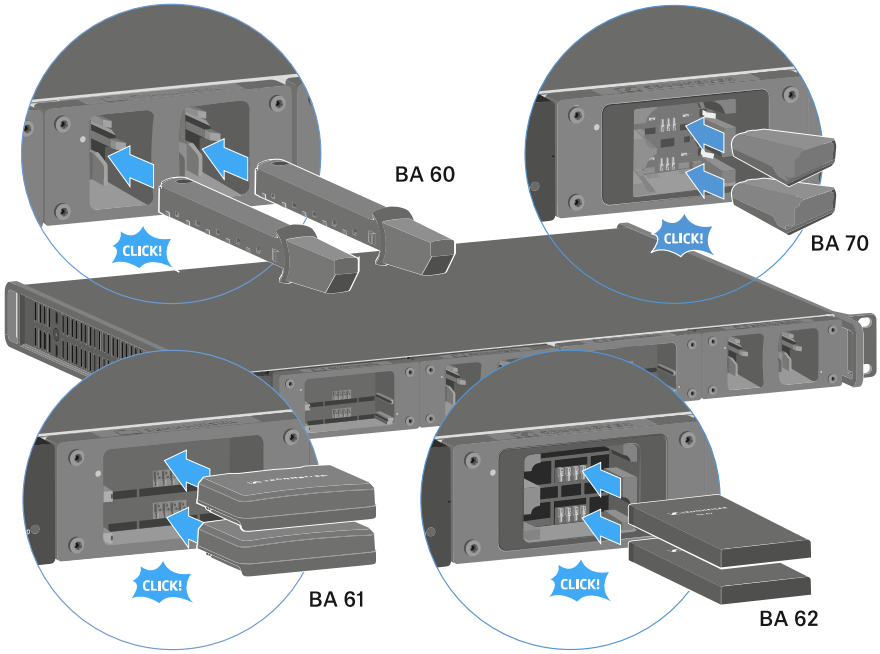
If you touch the contacts in the charging slot, they may become dirty or bent.

- When replacing and removing the rechargeable batteries, ensure that you do not touch the charging contacts in the charging slots.

To charge the rechargeable batteries:

- Insert the rechargeable battery into the charging module as shown in the figure until it audibly clicks into place.

  The rechargeable batteries can be inserted into the charging modules only in one direction. You can see the charge level of the rechargeable batteries from the LEDs on the charging modules (see Meaning of the LEDs).



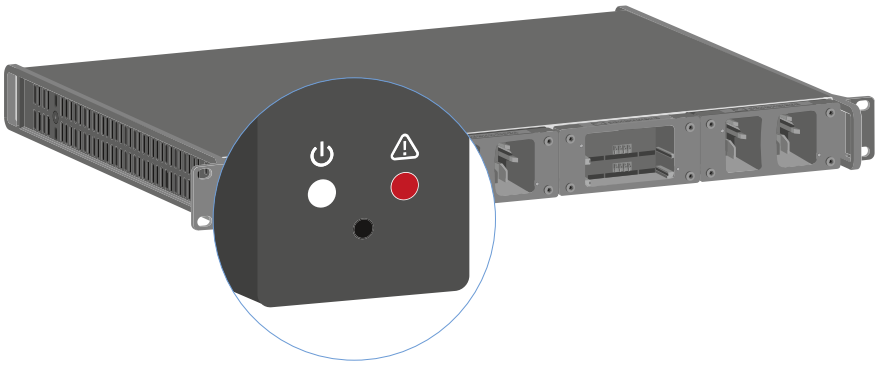
i At ambient temperatures of 45° C (113° F) and above, the rechargeable batteries can no longer be fully charged. They can only be charged to a maximum of 70 %.

Meaning of the LEDs

You can read the following information from the LEDs on the L 6000 charger and the LM 6060, LM 6061, LM 6062 and LM 6070 charging modules:

L 6000 status LEDs

The L 6000 charger has two status LEDs on the front of the device to the left.





White LED **flashing** >> device is starting or firmware is being updated



White LED **illuminated** >> device is ready for operation



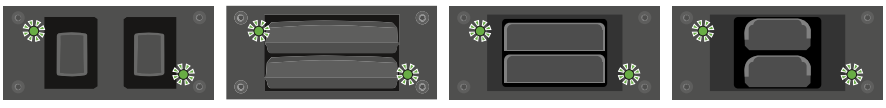
Red LED **flashing** >> fan is damaged



Red LED **illuminated** >> device is too hot or too cold and the charging process was stopped

LM 6060 | LM 6061 | LM 6062 | LM 6070 status LEDs

The LM 6060, LM 6061, LM 6062 and LM 6070 modules each have two charging slots. Next to each charging slot, there is a status LED that displays the following status information:





Flashing red >> the charging slot or rechargeable battery is too hot or too cold and the charging process was stopped.



Lights up red >> the rechargeable battery is defective.



Flashing yellow >> the rechargeable battery is being regenerated.



Lights up yellow >> the rechargeable battery is being charged. Charge level **0% to 80%**



Flashing green >> the rechargeable battery is being charged. Charge level **81% to 96%**



Lights up green >> the rechargeable battery is fully charged. Charge level **100%**

LM 6060, LM 6061, LM 6062 and LM 6070 status LEDs in storage mode

If you are operating the L 6000 charger in **storage mode** via **WSM**, the meaning of the status indicators changes. You can find more information under Preparing rechargeable batteries for storage (storage mode).

Preparing rechargeable batteries for storage (storage mode)

If you are not using the rechargeable batteries for a longer period of time and therefore want to store them, the rechargeable batteries should have a charge of approx. 70%.

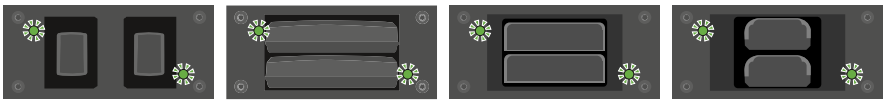
You can set this level using the **storage mode** from the Sennheiser Wireless Systems Manager (WSM) software.

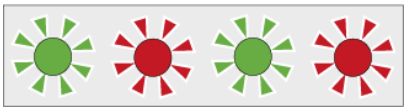
- To do so, connect the L 6000 charger to a network (see Connecting the L 6000 to a network) and establish the connection with the WSM software.

> **i** For more information about controlling devices via the **Sennheiser Wireless Systems Manager** (WSM) software, refer to the instruction manual for the software. You can download the software here: sennheiser.com/wsm

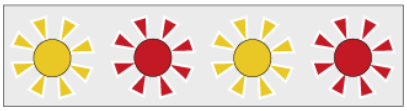
Meaning of the status LEDs in storage mode

In **storage mode**, the status LEDs next to the individual charging slots show the following status information:

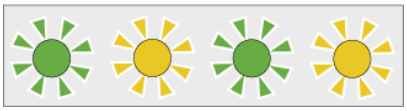




Flashing green/red >> rechargeable battery not inserted.



Flashing yellow/red >> the rechargeable battery is being charged or discharged to 70%.

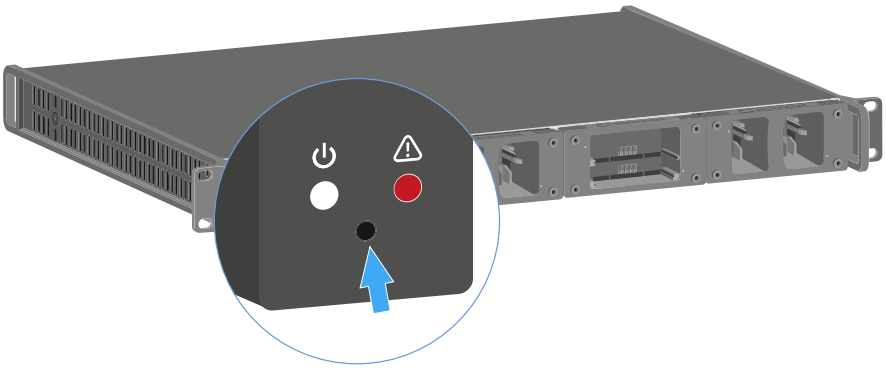


Flashing green/yellow >> the rechargeable battery has reached the storage charge level of 70%.

Resetting settings (factory reset)

To reset the L 6000 charger settings to the factory settings:

- Use a pointed object to press the Reset button on the front of the L 6000 charger.
  - The settings are reset to the factory settings.



Updating the firmware

You can update the firmware for the L 6000 charger using the Sennheiser **Wireless Systems Manager** (WSM) software.

- To do so, connect the L 6000 charger to a network (see Connecting the L 6000 to a network) and establish the connection with the WSM software.

> **i** For more information about controlling devices via the **Sennheiser Wireless Systems Manager** (WSM) software, refer to the instruction manual for the software. You can download the software here: sennheiser.com/wsm

> **i** You can find the **latest firmware** on the Digital 6000 product page or in the Sennheiser website's download area:
> sennheiser.com/digital-6000
>
> sennheiser.com/download

Operating the L 6000 via a network

You can use the Sennheiser **Wireless Systems Manager** software to operate the charger via a network connection.

▶ To do so, connect the L 6000 charger to a network (see Connecting the L 6000 to a network) and establish the connection with the WSM software.

> **i** For more information about controlling devices via the **Sennheiser Wireless Systems Manager** (WSM) software, refer to the instruction manual for the software. You can download the software here: sennheiser.com/wsm

You can perform the following actions using WSM:

- Update the L 6000 charger firmware
- Prepare rechargeable batteries for storage (see Preparing rechargeable batteries for storage (storage mode)).

Cleaning and maintenance

Note the following information when cleaning and maintaining products of the Spectera series.

NOTICE



Liquids can damage the electronics of the product

Liquids entering the product housing can cause a short-circuit and damage the electronics.

- Keep all liquids away from the products.
- Do not use any solvents or cleansing agents.
- Disconnect the mains-operated products from the power supply system and remove rechargeable batteries and batteries (if present) before you begin cleaning.
- Clean all products only with a soft, dry cloth.

- Note the special cleaning instructions below for the following products.

Replacing the Base Stations fan filter

- Check the filter from time to time and replace it if necessary. See Changing the fan filter.

Cleaning the L 70 USB and CHG 70N-C chargers

- Remove all rechargeable batteries from the charging slots.
- Disconnect the charger from the power supply system before cleaning.
- Clean the product with a dry cloth.
- In addition, use a brush to remove dust from the charging slots.
- Clean the charging contacts from time to time with a cotton swab, for instance.

4. Knowledge base

Central hub for information, resources, and guides with further content on the product and/or service.

This page provides an overview of all additional information such as guides, know-how, best practices, and further links related to the product.

Helpful links

- sennheiser.com/spectera

PDF downloads

For all PDF downloads, please refer to the page Knowledge base.

Troubleshooting

This chapter provides a systematic approach for identifying and resolving issues that may occur during the startup or operation of Spectera.

Depending on the specific problem, click on the relevant chapter to identify possible causes and apply potential solutions.

License activation fails

Condition

An error occurs during license activation.

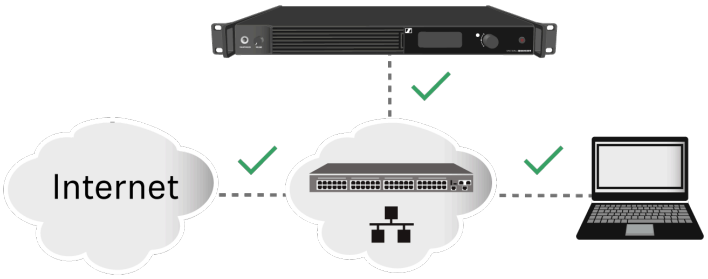
Causes

The three most common causes of activation errors are as follows:

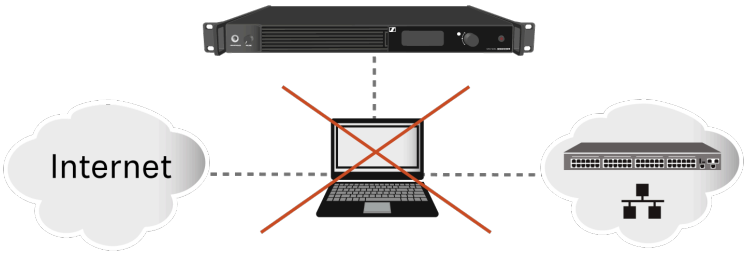
1. The Base Station was not connected properly and has no Internet connection (see Solution 1: Establish a proper connection of the Base Station to the Internet).
2. The license server and/or NTP time server are/is unreachable due to missing port permissions, preventing license key authorization and system clock synchronization (see Solution 2: Open required ports for license activation and system clock synchronization).
3. The license key was entered incorrectly or has already been activated and is in use with another Base Station (see Solution 3: Check the activation code and contact support if necessary).

Solution 1: Establish a proper connection of the Base Station to the Internet

- Please connect the Base Station directly to a network with Internet access via a switch or router.



- Direct connections via laptop etc. are only supported in certain network configuration (see **Sharing Internet connection in small network setups**). To eliminate this issue, please avoid a direct connection with your device for license activation.



Solution 2: Open required ports for license activation and system clock synchronization

- Please contact your IT administrator to provide Internet access to the License Server and any NTP server by opening the required network ports and to provide DNS settings via DHCP to the device.

Address	Port	Protocol	Type	Service	Usage
my.nalpeiron.com	80	HTTPS (TCP)	Unicast	Sennheiser License Server	Activation of devices
ANY (see list of **NTP servers**)	123	NTP	Unicast	NTP Time Server	Synchronize system time

> **i** You can find the complete overview of all ports at **Ports, protocols and services.**

Solution 3: Check the activation code and contact support if necessary

- Please verify that you have correctly entered the Activation Code, or check if someone else has already used the code to activate another Base Station.
- If the code has already been used for activation, please reach out to Sennheiser Customer Support.

No device access via the WebUI

Condition

The device cannot be accessed via the self-hosted WebUI.

Cause

The wrong device IP or URL schema is being used in the browser.

Solution

- Find out the correct IP of the Base Station (see Network).
- To start the Spectera WebUI, enter the following URL into your browser: `https://deviceIP/`.
  - In some cases the internet browser might have trouble showing the page.

The Base Station cannot be found

Condition

The Base Station cannot be found via WebUI / Dante Manager.

Cause

The required ports for communication with the Base Station have not been made accessible.

Solution

- Depending on the use case, please make the necessary ports available for the Base Station, so that data traffic can flow unrestricted:
  - Spectera Base Station
  - Dante®

Interference noise with old RF devices

Condition

Other devices are disturbed or produce audible interference noise.

Cause

Old devices do not have good RF shielding.

Solution

- Increase the distance between the devices.

Noise in the audio signal

Condition

Noise may occur in the audio signal of the SEK at the MIC/Line input.

Cause

Insufficient shielding of microphones or instrument cables.

Solution

- Use microphones or instrument cables with sufficient shielding.

5. Specifications

All technical data, system requirements and frequencies at a glance.

Spectera System

Transmission scheme

- Multicarrier, TDMA, TDD

RF channel

- Bandwidth: 6 or 8 MHz countrywise limited
- Mobiles devices: up to 128 per RF channel
- Audio links: up to 128 per RF channel

Radio frequency range

- UHF: 470 - 608 MHz, 630 - 698 MHz
- 1G4: 1350 - 1400 MHz, 1435 - 1525 MHz
- countrywise limited

Audio frequency response

- 20 Hz to 20,000 Hz (±1 dB) (Audio link modes with SeDAC and PCM audio codecs only)

Encryption

- AES 256 CTR Mode exp. >10k years

Audio link modes

MIC/LINE	Mono	Max links per RF carrier	Utilized % of RF carrier	Audio codec	La-tency	Range
Raw Low Latency	Mono	8	12.5 %	PCM	1.0 ms	Redu ced
Raw	Mono	16	6.25 %	PCM	1.6 ms	Redu ced
Live Low Latency	Mono	8	12.5 %	SeDAC	1.0 ms	Exten ded
Live	Mono	16	6.25 %	SeDAC	1.6 ms	Exten ded
Live Link Density	Mono	32	3.13 %	SeDAC	2.7 ms	Stand ard

MIC/LINE	Mono	Max links per RF carrier	Utilized % of RF carrier	Audio codec	La-tency	Range
Max Range	Mono	16	6.25 %	OPUS	9.9 ms	Maxi mum
Max Link Density	Mono	128*	0.78 %	OPUS	15.2 ms	Redu ced

IEM/IFB	Mono/ Stereo	Max links per RF carrier	Utilized % of RF carrier	Audio codec	La-ten-cy	Range
Live	Mono	16	6.25 %	SeDAC	1.6 ms	Exten ded
Live Link Density	Mono	32	3.13 %	SeDAC	2.7 ms	Stand ard
Max Range	Mono	16	6.25 %	OPUS	9.9 ms	Maxi mum
Max Link density	Mono	128*	0.78 %	OPUS	15.2 ms	Redu ced
Live Ultra Low Latency	Stereo	4 (8 ch)	25 %	SeDAC	0.7 ms	Exten ded
Live Low Latency	Stereo	8 (16 ch)	12.5 %	SeDAC	1.1 ms	Exten ded
Live	Stereo	16 (32 ch)	6.25 %	SeDAC	1.6 ms	Stand ard
Live Link Density	Stereo	32 (64 ch)**	3.13 %	SeDAC	2.7 ms	Redu ced

* Base Stations have 32 audio outputs, for 128 links in a single RF channel, 4 Base Stations and firmware update with cascade port function are required (future release)

** Base Stations have 32 audio inputs, for 32 stereo links (64 ch) in a single RF channel, 2 Base Stations and firmware update with cascade port function are required (future release)

Base Station

General

RF channels

- 2

Audio inputs and outputs

- Input: up to 32 channels
- Output: up to 32 channels
- Individually selectable from digital audio interfaces

Digital audio inputs and outputs

- Dante®
    - Ethernet, 1 Gbit/s
    - 2× ruggedized RJ45 (Primary and Secondary)
    - 32 In, 32 Out, 48 kHz or 96 kHz, 16/24/32 bit
- MADI (AES10)
    - 2× Expansion Slots for MADI Card OM (optical fiber multimode) or MADI Card BNC (separate accessories)
    - 32 In, 32 Out, 48 kHz or 96 kHz, 16/24 bit
- Individual sample rate for each interface

Headphone output

- 6.3 mm jack
- 2× 50 mW at 32 Ω -40 dB THD (1%) at 1 kHz

Antenna connections

- 4× ruggedized RJ45, PoE supply for up to 4 DAD UHF/1G4

Antenna cable

- Category 5e or higher, S/UTP (maximum 100 m)

Word clock input

- Input: BNC, 75 Ω
- Output: BNC, 75 Ω
- Sampling rates: 48 kHz, 96 kHz

Control

- Ethernet, 1 Gbit/s, ruggedized RJ45

Cascade in / out*

- 2× SFP+ cages (to be equipped with 10 Gbit/s modules)

Power supply

- 2× internal redundant
- 100 to 240 V AC, 50/60 Hz

Power consumption

- 70 W

Power plug

- 3-pin, protection class I as per IEC/EN 60320-1

Dimensions (H x W x D with mounting elements)

- 44 x 483 x 373 mm (1.73" x 19.02" x 14.69")

Weight

- Approx. 6.3 kg (13.89 lbs) (without accessories)

Temperature

- Operation: –10 °C to +50 °C (14 °F to 122 °F)
- Storage: –25 °C to +70 °C –13 °F to 158 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

Dripping and splashing liquids

- The product must not be exposed to dripping and splashing liquids (IP2X)

*Software update with cascade port function required (future release)

Ports - Base Station Control Network Interface

Address	Port	Protocol	Type	Service	Usage
Requests from device to ...					
Sennheiser License Server address[1]	80	HTTPS (TCP)	Unicast	Sennheiser License Server	Activation of devices

Address	Port	Protocol	Type	Service	Usage
ANY address of time server (see list of NTP time server pools)	123	NTP	Unicast	NTP Time Server	Synchronize system time
224.0.0.251	5353	mDNS (UDP)	Multicast	mDNS, DNS-SD	(optional - if desired) Device/Service Discovery
Requests to device from ...					
ANY IP of SSCv2 client	443	HTTPS (TCP)	Unicast	SSCv2 - Spectera Base Station API	Monitor+Control communication from clients

[1] my.nalpeiron.com

NTP time server pools

- pool.ntp.org
- time.nist.gov
- time.aws.com
- time.cloudflare.com

Ports - Base Station Dante® Network Interfaces

Spectera Base Station requires several ports to be opened for both Dante® Network Interfaces to operate properly. For the list of ports and more detailed information, please refer directly to the Dante® website: Audinate FAQ - Networks and Switches.

Base Station ZMAN

General

RF channels

- 2

Audio inputs and outputs

- Input: up to 32 channels
- Output: up to 32 channels
- Individually selectable from digital audio interfaces

Digital audio inputs and outputs

- Ethernet, 1 Gbit/s
    - 2× ruggedized RJ45 (Primary and Secondary)
    - 32 In, 32 Out, 48 kHz or 96 kHz, 16/24/32 bit
- MADI (AES10)
    - 2× Expansion Slots for MADI Card OM (optical fiber multimode) or MADI Card BNC (separate accessories)
    - 32 In, 32 Out, 48 kHz or 96 kHz, 16/24 bit
- Individual sample rate for each interface

Digital audio format

- Ravenna / AES67 with ST 2110, ST 2022-7 and NMOS (IS-04, IS-05)

Headphone output

- 6.3 mm jack
- 2× 50 mW at 32 Ω -40 dB THD (1%) at 1 kHz

Antenna connections

- 4× ruggedized RJ45, PoE supply for up to 4 DAD UHF/1G4

Antenna cable

- Category 5e or higher, S/UTP (maximum 100 m)

Word clock input

- Input: BNC, 75 Ω
- Output: BNC, 75 Ω
- Sampling rates: 48 kHz, 96 kHz

Control

- Ethernet, 1 Gbit/s, ruggedized RJ45

Cascade in / out*

- 2× SFP+ cages (to be equipped with 10 Gbit/s modules)

Power supply

- 2× internal redundant
- 100 to 240 V AC, 50/60 Hz

Power consumption

- 70 W

Power plug

- 3-pin, protection class I as per IEC/EN 60320-1

Dimensions (H x W x D with mounting elements)

- 44 x 483 x 373 mm (1.73" x 19.02" x 14.69")

Weight

- Approx. 6.3 kg (13.89 lbs) (without accessories)

Temperature

- Operation: –10 °C to +50 °C (14 °F to 122 °F)
- Storage: –25 °C to +70 °C –13 °F to 158 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

Dripping and splashing liquids

- The product must not be exposed to dripping and splashing liquids (IP2X)

*Software update with cascade port function required (future release)

Ports - Base Station Control Network Interface

Address	Port	Protocol	Type	Service	Usage
Requests from device to ...					

Address	Port	Protocol	Type	Service	Usage
Sennheiser License Server address[1]	80	HTTPS (TCP)	Unicast	Sennheiser License Server	Activation of devices
ANY address of time server (see list of NTP time server pools)	123	NTP	Unicast	NTP Time Server	Synchronize system time
224.0.0.251	5353	mDNS (UDP)	Multicast	mDNS, DNS-SD	(optional - if desired) Device/Service Discovery
Requests to device from ...					
ANY IP of SSCv2 client	443	HTTPS (TCP)	Unicast	SSCv2 - Spectera Base Station API	Monitor+Control communication from clients

[1] my.nalpeiron.com

NTP time server pools

- pool.ntp.org
- time.nist.gov
- time.aws.com
- time.cloudflare.com

Ports - Base Station Dante® Network Interfaces

Spectera Base Station requires several ports to be opened for both Dante® Network Interfaces to operate properly. For the list of ports and more detailed information, please refer directly to the Dante® website: Audinate FAQ - Networks and Switches.

WebUI

System requirements and ports requirements for inbound and outbound traffic.

System requirements

- Intel i5 Dual Core processor/M1 Mac/or similar
- 16 GB RAM
- Gigabit LAN interface
- Windows® 10 or higher
- macOS 27 - Golden Gate
- macOS 26 - Tahoe
- macOS 15 - Sequoia
- IPv4 network

Supported web browsers for Spectera WebUI

- Google Chrome: 125 or later
- Microsoft Edge: 125 or later
- Mozilla Firefox: 128 or later
- Apple Safari: 18 or later
- JavaScript must be activated

Port requirements

Address	Port	Protocol	Type	Service	Usage
Requests from host to ...					
ANY IP of a Base Station	443	HTTPS (TCP)	Unicast	SSCv2 - Spectera Base Station API	Monitor+Control communication to devices
Sennheiser User Insights addresses [1]	443	HTTPS (TCP)	Unicast	Sennheiser User Insights	Analytics of usage and operational data

[1] sennheiseruserinsights.matomo.cloud

cdn.matomo.cloud

SEK

RF transmission power

- up to 50 mW; countrywise limited

RF channels

- 1

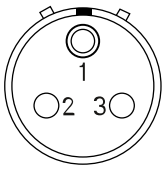
Headphone output

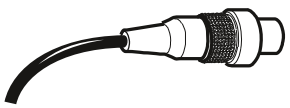
- 3.5 mm TRS jack
- 2× 300 mW RMS (32 Ω, -40 dB THD, 1 kHz)

Microphone / Instrument / Command input

- 3-pin audio socket

Solder side





Assignment	Function
Pin 1	Ground & housing
Pin 2	Line In / command*
Pin 3	Mic In & bias voltage
Housing	Ground

*for auto line detection short pin 1 and 3

Power supply

- BA 70 rechargeable battery pack

Battery operating time

- up to 7 h (unidirectional microphone use)
- up to 6 h (unidirectional IEM use)
- up to 5 h (bidirectional use)

Dimensions

- approx. 83 x 62 x 21 mm (3.39" x 2.44" x 0.83") (without antenna)

Weight

- approx. 178 g (0.39 lbs) (with BA 70)
- approx. 144 g (0.32 lbs) (without BA 70)

Temperature

- Operation: –10 °C to +50 °C (14 °F to 122 °F)
- Storage: –25 °C to +70 °C –13 °F to 158 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

SKM

RF transmission power

- up to 50 mW; countrywise limited

RF channels

- 1

Power supply

- BA 70 rechargeable battery pack

Battery operating time

- > 6 h in live mode

Dimensions

- length: 196 mm (7.72")
- diameter: 40 mm (1.57") (capsule interface), 33,3 mm (1.31") (shaft)

Weight

- approx. 196 g (0.43 lbs) (without BA 70, without module)

Temperature

- Operation: –10 °C to +50 °C (14 °F to 122 °F)
- Storage: –25 °C to +70 °C –13 °F to 158 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

SKM COM

Dimensions

- approx. Ø40 x 23 mm (1.57" x 0.91")

Weight

- approx. 49 g (0.11 lbs)

Temperature

- Operation: –10 °C to +50 °C (14 °F to 122 °F)
- Storage: –25 °C to +70 °C –13 °F to 158 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

DAD

RF transmission power

- up to 100 mW; countrywise limited

RF channels

- 1

Base Station connection

- Ruggedized RJ45 including PoE, max. 100 m cable, CAT5e or better, 1 Gbit/s

Power consumption

- PoE class 2 (< 6.5 W)

Apex angle vertical

- vertical
    - UHF: 65 °
    - 1G4: 62 °
- horizontal
    - UHF: 109 °
    - 1G4: 93 °

Front to back ratio

- UHF: 15 dB
- 1G4: 17 dB

Gain

- UHF: 5 dB
- 1G4: 6.5 dB

Threads for tripod mounting

- Yes / Adapter 3/8" to 5/8"

Dimensions

- UHF: 349 x 292 x 39 mm (13.74" x 11.5" x 1.54")
- 1G4: 231 x 205 x 39 mm (9.09" x 8.07" x 1.54")

Weight

- UHF: 676 g (1.49 lbs)
- 1G4: 534 g (1.18 lbs)

Temperature

- Operation: –10 °C to +60 °C (14 °F to 140 °F)
- Storage: –25 °C to +80 °C –13 °F to 176 °F)

Relative air humidity

- 25 % to 95 % (non-condensing)

IP class

- IP54

CHG 70N-C charger

Power supply

- 12 V DC (single unit or cascade of up to 5 units)
- PoE IEEE 802.3af Class 0 (CAT5e or higher), single unit only

Current consumption

max. 3.5 A for a cascade of up to 5 units

Ethernet

- RJ-45 socket, IEEE802.3
- 100Base-TX (half+full duplex)
- 10Base-T (half+full duplex)

Dimensions

Approx. 200 x 104 x 116 mm

Weight

Approx. 640 g, without power supply unit

Charging slots

2

Charging capacity per slot

- BA 70 rechargeable battery **or**
- EW-DX SK with BA 70 **or**
- EW-DX SKM with BA 70 **or**
- SPECTERA SEK UHF/1G4

Charging voltage

4.35 V

Charging current

min. 344 mA

max. 860 mA

Full charging time

Max. 3.5 h

Temperature range

- Charging: -10 °C to +50 °C
- Storage: -20 °C to +70 °C

Relative humidity

Max. 95% (non-condensing)

BA 70 rechargeable battery

Rated capacity

1720 mAh

Nominal voltage

3.8 V

Charging voltage

max. 4.35 V

Charging time

Typically 3 h @ room temperature

Dimensions

Approx. 54 x 30 x 15

Weight

Approx. 33 g

Temperature range

- Charging: 0 °C – +55 °C (32 °F – 131 °F)
- Discharging: -10 °C to +55 °C
- Storage: -10 °C to +45 °C

Relative humidity

- Charging/discharging: 25% to 95%, non-condensing
- Storage: 30% to 70%, non-condensing

L 70 USB charger

Charging capacity

2 Sennheiser BA 70 rechargeable battery packs

2x Sennheiser battery BA 62 with 2x L 70 adapter BA 62

Input voltage

Typically 5 V

Input current

max. 2 A

Charging voltage

nominally 4.35 V

Charging current

max. 860 mA per battery pack

Charging time

max. 3.5 h with NT 5-20 UCW power supply unit

Temperature range

- Charging: 0 °C to +55 °C
- Storage: -20 °C to +70 °C

Relative humidity

Max. 95% (non-condensing)

Dimensions

100 × 35 × 70 mm (1 3/4" x 3 7/8" x 7 3/16")

Weight

Approx. 86 g

Modular L 6000 charger

Charging capacity

- Up to 8 rechargeable batteries (BA 60, BA 61, BA 62 and BA 70) across 4 exchangeable charging modules (LM 6060, LM 6061, LM 6062 and LM 6070)

Charging times at 20° C

- BA 60
  - 80%: approx. 1:15 h (approx. 4:45 h operating time)
  - Full: approx. 2:30 h
- BA 61
  - 80%: approx. 1:45 h (approx. 5:00 h operating time)
  - Full: approx. 3:15 h
- BA 62
  - 80%: approx. 1:15 h (approx. 9:30 h operating time)
  - Full: approx. 2:45 h
- BA 70
  - 80%: approx. 1:45 h
  - Full: approx. 3:30 h

Charging temperature range

- 0 to 50 °C (32 °F to 122 °F)

Charging status display

- Multi-colored

Network

- IEEE 802.3-2002 (10/100 Mbit/s), shielded RJ-45 connection

Power supply

- AC 100 – 240 V, 50/60 Hz

Maximum power consumption

- 85 W

Minimum power consumption

- 1 W

Power plug

- 3-pin, protection class I as per IEC/EN 60320-1

Dimensions (H x W x D with mounting elements)

- 44 x 483 x 373 mm (1.73" x 19.02" x 14.69")

Weight

- 5.1 kg (11.24 lbs)

LM 6060 | LM 6061 | LM 6062 | LM 6070 charging modules

Dimensions (H x W x L)

- 44 x 99 x 182 mm (1.73" x 3.9" x 7.17")

Weight

- 144 g (0.32 lbs)

Rechargeable battery type

- LM 6060: 2x BA 60
- LM 6061: 2x BA 61
- LM 6062: 2x BA 62
- LM 6070: 2x BA 70

6. Regulatory information

Information on manufacturer declarations, environmental and disposal notices, and terms of use.

Model: Base Station, Base Station ZMAN, SEK UHF, SEK 1G4, SKM UHF, SKM 1G4, DAD UHF and DAD 1G4.

Conditions and restrictions for using frequencies

There may be special conditions and restrictions for using frequencies in your country.

Before putting the product into operation, find the information for your country at the following address: sennheiser.com/sifa.

Warranty

Sennheiser electronic SE & Co. KG gives a warranty of 24 months on these products.

For the current warranty conditions, please visit our website at sennheiser.com or contact your Sennheiser partner.

In the US please contact:

Sennheiser Electronic Corporation

1 Enterprise Drive, Old Lyme, CT 06371

www.sennheiser.com

Warranty for Australia and New Zealand only

Sennheiser Australia Pty Ltd provides a warranty of 24 months on these products. For the current warranty conditions, visit Sennheiser website: Australia: sennheiser.com, New Zealand: sennheiser.com

Sennheiser goods come with guarantees that cannot be excluded under Australian and New Zealand Consumer law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

This warranty is in addition to other rights or remedies under law. Nothing in this warranty excludes, limits or modifies any remedy available to be consumer which is granted by law.

To make a claim under this contract, raise a case via Sennheiser website. Australia: sennheiser.com/support, New Zealand: sennheiser.com/support

All expenses of claiming the warranty will be borne by the person making the claim.

Sennheiser international warranty is provided by: Sennheiser Australia Pty Ltd (ABN 68 165 388 312) Level 14, Tower A Zenith Building, 821 Pacific Highway, Chatswood NSW 2067, Australia

Notes on disposal

The symbol of the crossed-out dumpster on the product, the (rechargeable) battery (if applicable) and/or the packaging indicates that these products must not be disposed of with normal household waste, but must be disposed of separately at the end of their service life. For the packaging, follow the regulations in your country for separating waste. Improper disposal of packaging materials can be harmful to your health and the environment.

The separate collection of waste electrical and electronic equipment, (rechargeable) batteries (if applicable) and packaging is intended to promote reuse and recycling and to prevent negative impacts on public health and the environment, for example due to hazardous substances contained in these products. At the end of their service life, recycle electrical and electronic equipment and (rechargeable) batteries so that their materials can be reused and to prevent environmental pollution.

If (rechargeable) batteries can be removed without destroying them, you are obliged to dispose of them separately (see the product's operating instructions for information on how to remove the batteries safely). Be especially careful when handling (rechargeable) batteries containing lithium, as these pose special hazards, such as the risk of fire and/or health risks if button cells are swallowed. Reduce battery waste as much as possible by using longer-life batteries or rechargeable batteries.

Further information on the recycling of these products can be obtained from your municipal administration, from the municipal collection points, or from your Sennheiser partner. You may also be able to return electrical or electronic equipment to your distributor, if they are legally required to do so. By disposing of your batteries properly, you are helping to protect public health and the environment.

Notice on the processing of personal data

This Spectera device is designed to capture and transmit speech and other acoustic signals. Please note that a person's voice may be considered personal data under the General Data Protection Regulation (GDPR), especially when it is recorded or used for identification purposes.

As the manufacturer, we do not process any voice data ourselves. However, when used in combination with recording devices, applications, or online services, the use of this product may involve the processing of personal data. In such cases, you as the user are responsible for complying with applicable data protection laws, such as obtaining consent from individuals before recording their voices.

We recommend that you familiarize yourself with the privacy policies of any applications or services you use in conjunction with this product.

Base Station

Europe

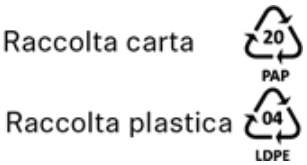
CE

In compliance with the following requirements

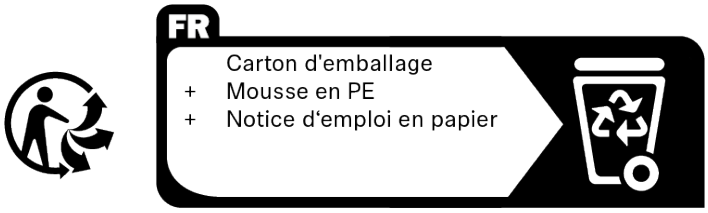
- Regulation (EU) 2023/988 on general product safety
- WEEE Directive (2012/19/EU)



Italy:



France:



EU Declaration of conformity

- RoHS Directive (2011/65/EU)
- EMC Directive (2014/30/EU)
- Low Voltage Directive (2014/35/EU)

The full text of the EU declaration of conformity is available at the following internet address: sennheiser.com/download.

United Kingdom

UKCA

WEEE Regulations (2013)

UK Declaration of conformity

- RoHS Regulations (2012)
- EMC Regulations (2016)
- Electrical Equipment (Safety) Regulations (2016)

Importer: Sennheiser UK Ltd.

Pacific House, Third Avenue, Globe Park, Marlow

Buckinghamshire SL7 1EY, United Kingdom

USA

Statements regarding FCC and ISED

This device complies with part 15 of the FCC rules and RSS-210 of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Changes or modifications not expressly approved by Sennheiser electronic Corp. could void the user's authority to operate the equipment.

Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

CAN ICES-003 (B)/NMB-003(B):

This Class B digital device complies with the Canadian ICES-003.

RSS-210 Issue 10 Annex G.6

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

Notice for Operation in the 1435–1525 MHz Frequency Band (United States)

About the AFTRCC

The Aerospace & Flight Test Radio Coordinating Council (AFTRCC) is the recognized non government coordination authority in the United States responsible for managing access to specific radio frequency bands used for aeronautical mobile telemetry (AMT).

The frequency range 1435–1525 MHz is primarily allocated in the U.S. for flight test telemetry of manned and unmanned aircraft, missiles, and space vehicles. To protect these critical operations, the AFTRCC coordinates all non governmental use of this spectrum and ensures that new users do not cause harmful interference to flight test activities.

User Responsibilities When Operating in the United States

If you intend to operate this microphone system within the 1435–1525 MHz band in the United States, you must comply with the following requirements:

1. Mandatory License Application with AFTRCC Before operating the equipment in this frequency range, you are required to obtain a frequency coordination approval (license) from the AFTRCC. This approval is legally required because the band is reserved for flight test telemetry and may only be used after formal authorization.

The AFTRCC will review your request and determine whether operation at your location and time is permissible without causing interference.

2. Operation Without AFTRCC Authorization Is Prohibited Use of this equipment in the 1435–1525 MHz band without a valid AFTRCC authorization is not permitted and may result in regulatory penalties as well as interference with safety critical systems.

Enabling the Frequency Range on SPECTERA System

Once your AFTRCC authorization has been approved:

1. Go to eas.sennheiser.com to start the coordination process with AFTRCC.
2. If AFTRCC approves the coordination, the EAS will issue an electronic key automatically to download.
3. Use the electronic key in WebUI to unlock the authorized portion.

Without this activation key, the frequency range remains locked and cannot be used.

Canada

Statements regarding FCC and ISED

This device complies with part 15 of the FCC rules and RSS-210 of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

CAN ICES-003 (B)/NMB-003(B):

This Class B digital device complies with the Canadian ICES-003.

RSS-210 Issue 10 Annex G.6

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

Australia / New Zealand

Mexico

Vietnam

Kể từ ngày 1 tháng 12 năm 2012, các sản phẩm được sản xuất bởi Sennheiser tuân thủ Thông tư 30/2011/TT-BCT quy định về giới hạn cho phép đối với một số chất độc hại trong các sản phẩm điện và điện tử.

China

China RoHS

部件名称 (Parts)	有害物质										
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二(2-乙基己)酯 (DEHP)	邻苯二甲酸丁苄酯 (BBP)	邻苯二甲酸二丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)	产品环保年限 EFUP
金属部件 (Metal parts)	x	o	o	o	o	o	o	o	o	o	15
电路模块 (Circuit Modules)	x	o	o	o	o	o	o	o	o	o	15
电缆及电缆组件 (Cables & Cable Assemblies)	x	o	o	o	o	o	o	o	o	o	15

本表格依据 SJ/T 11364 的规定编制。

o：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。

x：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

Japan

日本の電波法に準拠

本機器は、日本の電波法に準拠しています。

本機器を改変しないでください（守らない場合、付与された指定番号が無効になります）。

Japanese Radio Law Compliance

This device is granted pursuant to the Japanese Radio Law (電波法).

This device should not be modified (otherwise the granted designation number will become invalid).

Additional national certification

Further information about approvals and certification for other countries can be found at the following address: sennheiser.com/download.

Base Station ZMAN

Europe

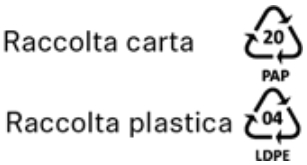
CE

In compliance with the following requirements

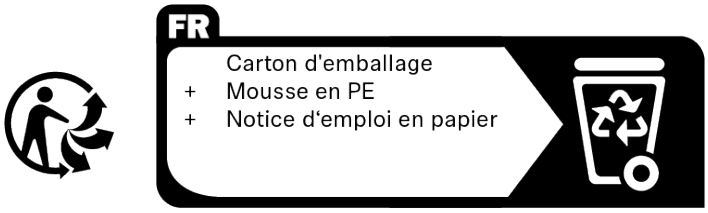
- Regulation (EU) 2023/988 on general product safety
- WEEE Directive (2012/19/EU)



Italy:



France:



EU Declaration of conformity

- RoHS Directive (2011/65/EU)
- EMC Directive (2014/30/EU)
- Low Voltage Directive (2014/35/EU)

The full text of the EU declaration of conformity is available at the following internet address: sennheiser.com/download.

United Kingdom

UK CA

WEEE Regulations (2013)

UK Declaration of conformity

- RoHS Regulations (2012)
- EMC Regulations (2016)
- Electrical Equipment (Safety) Regulations (2016)

Importer: Sennheiser UK Ltd.

Pacific House, Third Avenue, Globe Park, Marlow

Buckinghamshire SL7 1EY, United Kingdom

USA

Statements regarding FCC and ISED

This device complies with part 15 of the FCC rules and RSS-210 of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

CAN ICES-003 (B)/NMB-003(B):

This Class B digital device complies with the Canadian ICES-003.

RSS-210 Issue 10 Annex G.6

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

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The AFTRCC will review your request and determine whether operation at your location and time is permissible without causing interference.

2. Operation Without AFTRCC Authorization Is Prohibited Use of this equipment in the 1435–1525 MHz band without a valid AFTRCC authorization is not permitted and may result in regulatory penalties as well as interference with safety critical systems.

Enabling the Frequency Range on SPECTERA System

Once your AFTRCC authorization has been approved:

1. Go to eas.sennheiser.com to start the coordination process with AFTRCC.
2. If AFTRCC approves the coordination, the EAS will issue an electronic key automatically to download.
3. Use the electronic key in WebUI to unlock the authorized portion.

Without this activation key, the frequency range remains locked and cannot be used.

Canada



Statements regarding FCC and ISED

This device complies with part 15 of the FCC rules and RSS-210 of Innovation, Science and Economic Development Canada (ISED). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

CAN ICES-003 (B)/NMB-003(B):

This Class B digital device complies with the Canadian ICES-003.

RSS-210 Issue 10 Annex G.6

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

Australia / New Zealand

Mexico

Vietnam

Kể từ ngày 1 tháng 12 năm 2012, các sản phẩm được sản xuất bởi Sennheiser tuân thủ Thông tư 30/2011/TT-BCT quy định về giới hạn cho phép đối với một số chất độc hại trong các sản phẩm điện và điện tử.

China

China RoHS

部件名称 (Parts)	有害物质										
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二(2-乙基己)酯 (DEHP)	邻苯二甲酸丁苄酯 (BBP)	邻苯二甲酸二丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)	产品环保年限 EFUP
金属部件 (Metal parts)	x	o	o	o	o	o	o	o	o	o	15
电路模块 (Circuit Modules)	x	o	o	o	o	o	o	o	o	o	15
电缆及电缆组件 (Cables & Cable Assemblies)	x	o	o	o	o	o	o	o	o	o	15

本表格依据 SJ/T 11364 的规定编制。

o：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。

x：表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

Japan

日本の電波法に準拠

本機器は、日本の電波法に準拠しています。

本機器を改変しないでください（守らない場合、付与された指定番号が無効になります）。

Japanese Radio Law Compliance

This device is granted pursuant to the Japanese Radio Law (電波法).

This device should not be modified (otherwise the granted designation number will become invalid).

Additional national certification

Further information about approvals and certification for other countries can be found at the following address: sennheiser.com/download.

SEK

Europe

CE

In compliance with the following requirements

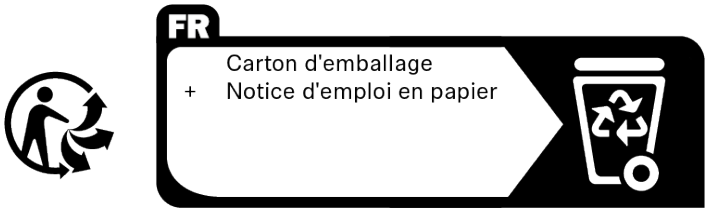
- Regulation (EU) 2023/988 on general product safety
- WEEE Directive (2012/19/EU)
- Regulation (EU) 2023/1542 concerning batteries and waste batteries



Italy:

Raccolta carta 

France:



EU Declaration of conformity

- RoHS Directive (2011/65/EU)

Hereby, Sennheiser electronic SE & Co. KG declares that the radio equipment type SEK UHF, SEK 1G4 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: sennheiser.com/download.

United Kingdom

UKCA

WEEE Regulations (2013)

Battery Regulations (2015)

UK Declaration of conformity

- RoHS Regulations (2012)
- Radio Equipment Regulations (2017)

Importer: Sennheiser UK Ltd.

Pacific House, Third Avenue, Globe Park, Marlow

Buckinghamshire SL7 1EY, United Kingdom

USA

FCC-ID: DMOSEKUHF

Statements regarding FCC and ISED

This device complies with Part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This Class B digital device complies with the Canadian ICES-003.

Changes or modifications not expressly approved by Sennheiser electronic Corp. could void the user's authority to operate the equipment.

Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

Radiofrequency radiation exposure Information

The radiated output power of the device is far below the FCC and ISED radio frequency exposure limits. Nevertheless, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

RSS-210 Issue 10 Annex G.7

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

Canada

IC: 2099A-SEKUHF

Statements regarding FCC and ISED

This device complies with Part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Indonesia

105758/SDPPI/2024
1971

Mexico

NOM-NYCE

ift SESESP25-14727

Vietnam

Kể từ ngày 1 tháng 12 năm 2012, các sản phẩm được sản xuất bởi Sennheiser tuân thủ Thông tư 30/2011/TT-BCT quy định về giới hạn cho phép đối với một số chất độc hại trong các sản phẩm điện và điện tử.

Mainland China

China RoHS

部件名称 (Parts)	有害物质										
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二(2-乙基己)酯 (DEHP)	邻苯二甲酸丁苄酯 (BBP)	邻苯二甲酸二丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)	产品环保年限 EFUP
金属部件 (Metal parts)	x	o	o	o	o	o	o	o	o	o	15
电路模块 (Circuit Modules)	x	o	o	o	o	o	o	o	o	o	15
电缆及电缆组件 (Cables & Cable Assemblies)	x	o	o	o	o	o	o	o	o	o	15
电池 - 如果包含 (battery - if available)	x	o	o	o	o	o	o	o	o	o	5

本表格依据 SJ/T 11364 的规定编制。
o: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。
x: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

Taiwan China

CCAB25LP1100T9

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Brazil

ANATEL
Agência Nacional de Telecomunicações

00809-26-07356

India

SEK UHF:

IS 616/IEC 60065
R-41196606
www.bis.gov.in

SKM

Europe

CE

In compliance with the following requirements

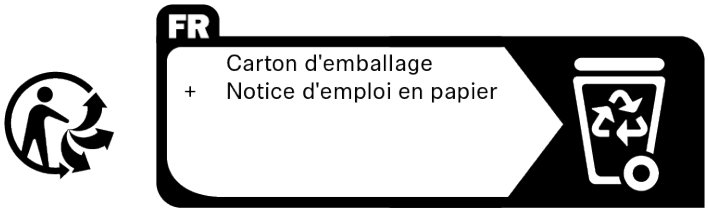
- Regulation (EU) 2023/988 on general product safety
- WEEE Directive (2012/19/EU)
- Regulation (EU) 2023/1542 concerning batteries and waste batteries



Italy:

Raccolta carta 

France:



EU Declaration of conformity

- RoHS Directive (2011/65/EU)

Hereby, Sennheiser electronic SE & Co. KG declares that the radio equipment type SKM UHF, SKM 1G4 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: sennheiser.com/download.

United Kingdom

UKCA

WEEE Regulations (2013)

Battery Regulations (2015)

UK Declaration of conformity

- RoHS Regulations (2012)
- Radio Equipment Regulations (2017)

Importer: Sennheiser UK Ltd.

Pacific House, Third Avenue, Globe Park, Marlow

Buckinghamshire SL7 1EY, United Kingdom

USA

FCC-ID: DMOSKMUHF

SKM 1G4: FCC ID: DMOSKM1G4

Statements regarding FCC and ISED

This device complies with Part 15 of the FCC Rules and with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This Class B digital device complies with the Canadian ICES-003.

Changes or modifications not expressly approved by Sennheiser electronic Corp. could void the user's authority to operate the equipment.

Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

Radiofrequency radiation exposure Information

The radiated output power of the device is far below the FCC and ISED radio frequency exposure limits. Nevertheless, the device shall be used in such a manner that the potential for human contact during normal operation is minimized.

RSS-210 Issue 10 Annex G.7

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

SKM 1G4: Notice for Operation in the 1435–1525 MHz

Frequency Band (United States)

About the AFTRCC

The Aerospace & Flight Test Radio Coordinating Council

(AFTRCC) is the recognized non government coordination authority in the United States responsible for managing access to specific radio frequency bands used for aeronautical mobile telemetry (AMT).

The frequency range 1435–1525 MHz is primarily allocated in the U.S. for flight test telemetry of manned and unmanned aircraft, missiles, and space vehicles. To protect these critical operations, the AFTRCC coordinates all non governmental use of this spectrum and ensures that new users do not cause harmful interference to flight test activities.

User Responsibilities When Operating in the United States

If you intend to operate this microphone system within the 1435–1525 MHz band in the United States, you must comply with the following requirements:

1. Mandatory License Application with AFTRCC Before operating the equipment in this frequency range, you are required to obtain a frequency coordination approval (license) from the AFTRCC. This approval is legally required because the band is reserved for flight test telemetry and may only be used after formal authorization.

   The AFTRCC will review your request and determine whether operation at your location and time is permissible without causing interference.

2. Operation Without AFTRCC Authorization Is Prohibited Use of this equipment in the 1435–1525 MHz band without a valid AFTRCC authorization is not permitted and may result in regulatory penalties as well as interference with safety critical systems.

   Enabling the Frequency Range on SPECTERA System Once your AFTRCC authorization has been approved:
   a. Contact our technical support team and provide a copy of your valid AFTRCC coordination approval.
   b. After verification, we will issue an electronic activation key.

c. This key will unlock the authorized portion of the 1435– 1525 MHz band on your microphone system in accordance with your AFTRCC license parameters. Without this activation key, the frequency range remains locked and cannot be used.

Canada

SKM UHF: IC: 2099A-SKMUHF

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This Class B digital device complies with the Canadian ICES-003.

Changes or modifications not expressly approved by Sennheiser electronic Corp. could void the user's authority to operate the equipment.

Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

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RSS-210 Issue 10 Annex G.7

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s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

Indonesia

SKM UHF:

125935/DJID/2026
1971

Brazil

SKM UHF:

ANATEL
Agência Nacional de Telecomunicações

07592-26-07356

Vietnam

Kể từ ngày 1 tháng 12 năm 2012, các sản phẩm được sản xuất bởi Sennheiser tuân thủ Thông tư 30/2011/TT-BCT quy định về giới hạn cho phép đối với một số chất độc hại trong các sản phẩm điện và điện tử.

Mainland China

China RoHS

部件名称 (Parts)	有害物质										
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸二(2-乙基己)酯 (DEHP)	邻苯二甲酸丁苄酯 (BBP)	邻苯二甲酸二丁酯 (DBP)	邻苯二甲酸二异丁酯 (DIBP)	产品环保年限 EFUP
金属部件 (Metal parts)	x	o	o	o	o	o	o	o	o	o	15
电路模块 (Circuit Modules)	x	o	o	o	o	o	o	o	o	o	15

本表格依据 SJ/T 11364 的规定编制。
o: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。
x: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

South Africa

SEK UHF:

ICASA TA 2026-2727

SEK 1G4:


ICASA
TA 2026-2726

DAD

Europe

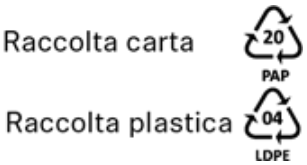
CE

In compliance with the following requirements

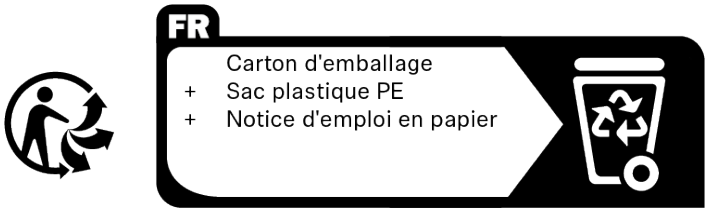
- Regulation (EU) 2023/988 on general product safety
- WEEE Directive (2012/19/EU)



Italy:



France:



EU Declaration of conformity

- RoHS Directive (2011/65/EU)

Hereby, Sennheiser electronic SE & Co. KG declares that the radio equipment type Digital Antenna Directional is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: sennheiser.com/download.

United Kingdom

WEEE Regulations (2013)

UK Declaration of conformity

- RoHS Regulations (2012)
- Radio Equipment Regulations (2017)

Importer: Sennheiser UK Ltd.

Pacific House, Third Avenue, Globe Park, Marlow

Buckinghamshire SL7 1EY, United Kingdom

DAD UHF:

USA

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Changes or modifications not expressly approved by Sennheiser electronic Corp. could void the user's authority to operate the equipment.

Contact information: Sennheiser Electronic Corporation, 1 Enterprise Drive, Old Lyme, CT 06371; sennheiser.com

Radiofrequency radiation exposure Information

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This device must not be co-located or operated in conjunction with any other antenna or transmitter.

RSS-210 Issue 10 Annex G.7

This device operates on a no-interference, no-protection basis. Should the user seek to obtain protection from other radio services operating in the same TV bands, a radio licence is required. For further details, consult Innovation, Science and Economic Development Canada' s Client Procedures Circular CPC-2-1-28, Voluntary Licensing of Licence-Exempt Wireless Microphones in the TV Bands.

E-Label

E-label for SPECTERA DAD UHF and SPECTERA DAD 1G4 can be shown on the SPECTERA Base Station display.

DAD UHF: FCC ID: DMODADUHF

Canada

DAD UHF: IC: 2099A-DADUHF

Statements regarding FCC and ISED

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Indonesia

DAD UHF:

105758/SDPPI/2024
1971

Mexico

DAD UHF:

IFT SESESP25-14151

Vietnam

Kể từ ngày 1 tháng 12 năm 2012, các sản phẩm được sản xuất bởi Sennheiser tuân thủ Thông tư 30/2011/TT-BCT quy định về giới hạn cho phép đối với một số chất độc hại trong các sản phẩm điện và điện tử.

Mainland China

China RoHS

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金属部件 (Metal parts)	x	o	o	o	o	o	o	o	o	o	15
电路模块 (Circuit Modules)	x	o	o	o	o	o	o	o	o	o	15

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o：表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。

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Taiwan China

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

CCAB25LP1110T2

Brazil

ANATEL
Agência Nacional de Telecomunicações

00811-26-07356



Sennheiser electronic SE & Co. KG | Am Labor 1 | 30900 Wedemark | Germany