
# Evolution Wireless Digital

## Security Configuration Guide for EW-DX Devices

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v1.1

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# Contents

# Introduction

In today's digital environments, safeguarding wireless audio systems is critical. Sennheiser EW-DX receivers offer multiple layers of protection to secure communication, data transfer, and device access.

This guide outlines how to enable and manage the security features of EW-DX devices (EM 2, EM 2 Dante, EM 4 Dante), using both device interfaces and software tools such as Sennheiser Control Cockpit, Wireless System Manager (WSM) or SoundBase.

# Enhanced Security Features with EW-DX

Sennheiser applies the following principles to ensure device security:

- Security by design
- Compliance with international standards, e.g.:
  - ETSI EN 303 645
  - EU RED
  - California SB 327
- Encrypted communication:
  - AES-256 for audio
  - HTTPS for control
- Device authentication and claiming
- Secure 3rd party API access

# Key product security features

EW-DX devices (EM 2, EM 2 Dante, and EM 4 Dante) support enhanced security measures, ensuring both a secure connection between devices via radio and secure data transfer over Bluetooth® and on the network.

We offer the following security features, which can be activated or deactivated as needed:

- **AES-256 Link Encryption:**
  The AES-256 Link Encryption protects audio and control communication between devices.
- **Device Claiming & Authentication:**
  The Device Claiming & Authentication feature ensures authorized control access using passwords.
- **SSCv2 API Encryption:**
  The SSCv2 protocol secures 3rd party integration via HTTPS.
- **Dante® Media Encryption:**
  The Dante® Media Encryption is an optional channel encryption for Dante networks.

## Bluetooth® and Security

Bluetooth® is a wireless technology standard that enables data exchange between devices over short distances using radio waves in the 2.4 GHz band.

Bluetooth® data is encrypted using various encryption protocols to protect against eavesdropping and other malicious attacks. This includes pairing encryption, which secures the initial pairing process between devices, and link encryption, which protects data as it is transmitted between devices.

## Bluetooth® Pairing

The Sennheiser EW-DX devices utilize Bluetooth® Low Energy (BLE) for communication between the receiver module (EM) and the Smart Assist App and to synchronize a transmitter and receiver (see chapter "Connecting to the EW-DX EM receivers / synchronizing the EW-DX".

BLE ensures an energy-efficient connection and simplifies device configuration.

### How to enable and use the security features

**Connection to the Smart Assist APP**

The security of the connection is ensured by the **Numeric Compare** procedure, which uses a unique, secret key to authenticate and encrypt the connection between the devices.

**Synchronization between transmitter and receiver**

There are two scenarios for the connection, depending on whether link encryption is activated or not:

1. **Link Encryption enabled**

   When Link Encryption is enabled, the “Just Works” pairing procedure is used. This procedure is particularly user-friendly as it does not require a numeric compare. Instead, automatic encryption is established between the EM and other devices (SK, SKM, TS) to ensure a secure connection.

2. **Link Encryption disabled**

   If Link Encryption is disabled, a standard connection is established without encryption. This can be useful in situations where security is not a primary concern, and a faster or simpler connection is preferred.

   Overall, the BLE functionality of the Sennheiser EW-DX devices provides a flexible and secure way to connect and control the devices via the Smart Assist app.

> **i** Bluetooth® encryption (Link Encryption) is deactivated by default. For more details on how to activate the encryption, see chapter „Enabling Link Encryption (AES-256)“.

## Link encryption

You can secure the radio link between the transmitter and receiver by enabling AES-256 encryption. Once activated, all communication between the devices will be protected with AES-256, a top-tier encryption standard designed to safeguard sensitive data (see „Enabling Link Encryption (AES-256)“).

Enabling Link Encryption includes the following interfaces:

- The connection between the transmitter and receiver for audio transmission.
- The connection between the transmitter and receiver for device setting synchronization.
- The connection between the device and the Smart Assist App for smart setup and remote control via iOS and Android devices.

## Device control encryption and authentication

As of firmware version 4.0.0, all control communication over the network for EW-DX receiver devices (EM 2, EM 2 Dante, and EM 4 Dante) is encrypted and authenticated. The devices are password protected and must be claimed in the control software before use (see „Claiming single device (Control Cockpit)“, „Claiming single device (Wireless System Manager)“ or „Claiming device (SoundBase)“).

In order not to compromise the security of the device and to follow best security practices, the firmware version can no longer be downgraded.

### Benefits of device claiming

Device claiming is a feature of the Sennheiser Control Cockpit Software, Wireless System Manager and SoundBase that allows the user to claim ownership of their Sennheiser devices, providing an extra layer of security and control. It allows to assign a device to one or more remote installations on which prevents any unauthenticated device control within the network.

As part of the initial configuration, users claim a device by configuring a mandatory device password.

Within an installation, multiple Software applications can be used simultaneously with this device password for optimal usability. Once a device is claimed, its settings can only be viewed and modified via an encrypted connection which requires entry of the configuration password.

With Control Cockpit 9.0 and later versions, Wireless System Manager 4.9.0 and later versions and SoundBase 2.0.23 and later versions it is possible to select multiple devices and claim them in a single step.

## Secure 3rd party access

Sennheiser offers two different protocols that can be used to connect 3rd party systems to Sennheiser devices and control them (see „Secure 3rd party access“). Depending on the functional scope of the implemented device firmware and the supplied software, the following protocols can be used:

**Secure API: Sennheiser Sound Control Protocol v2 (SSCv2):**

- New protocol with a high security standard for Sennheiser devices that are delivered with a password.

**Legacy API: SSCv1:**

- Unsecure legacy protocol based on UDP/TCP.

> **i** Note: after updating to the latest EW-DX firmware, all 3rd party APIs will be switched off by default.

### Sennheiser Sound Control Protocol v2 (SSCv2)

The latest Sennheiser 3rd party API protocol enables configuration and monitoring of devices via encrypted REST API calls, allowing the user to control the device via HTTPS commands and integrate the products into any IT environment. It offers end-to-end security, utilizing HTTPS (TLS 1.3).

In addition to encryption, SSCv2 also provides an authentication scheme. By using HTTP basic authentication, a compatible and well-established mechanism of username and password is employed to ensure that no unauthorized changes are made to the device's settings and that no data is read from it.

### Sennheiser Sound Control Protocol v1 (SSCv1)

The legacy protocol (Sennheiser Sound Control protocol v1) can still be utilized by the user, and is provided for interoperability reasons.

> **i** We strongly recommend that you switch to the new and secure protocol, which is supported in the latest 3rd party modules provided by Sennheiser. Nevertheless, to ensure that your room is fully functional at all times, you can use the unencrypted protocol.

# How to enable the security features

The following section explains how you can activate the various security features both via the device itself and via supported software applications.

## Enabling Link Encryption (AES-256)

You can secure the radio link between the transmitter and receiver using AES 256 encryption.

### Enabling Link Encryption on EW-DX device

**To enable audio encryption on the device:**

▷ In the System menu, navigate to the menu item **Link Encryption.**

▷ Press the jog dial to open the menu.
The following view is displayed:


▷ Turn the jog dial to choose between the **On** and **Off** options.


▷ Press the jog dial to save your setting.
Audio encryption has been activated.

> **i** After enabling AES 256 encryption, the connected transmitter must be resynchronized with the receiver to enable encryption on the transmitter as well.

### Enabling Link Encryption in Control Cockpit

**To enable audio encryption in the Control Cockpit software:**

▷ Navigate to **Devices** > **your device** > **RF Settings** > **Audio Encryption**.

▷ Switch the button on **On**.

Audio encryption has been activated.

> After enabling AES 256 encryption, the connected transmitter must be resynchronized with the receiver to enable encryption on the transmitter as well.

## Device control encryption and authentication

As of firmware version 4.0.0, all control communication over the network for EW-DX receiver devices (EM 2, EM 2 Dante, and EM 4 Dante) is encrypted and authenticated. The devices are password protected and must be claimed in the control software before use.

### Claiming single device (Control Cockpit)

When you connect your device to a Sennheiser Control Cockpit instance for the first time, the new device is automatically detected and displayed as an unclaimed device (“Claim device”):

- If the device is in a factory default state and the original password is still assigned, it will be automatically detected and applied.
- If the device was previously claimed by another Control Cockpit instance, the previously set password must be entered. If you cannot remember the previously set password, please perform a hardware reset of the device (see „Resetting the configuration parameters of the Dante Controller“). After the reset, the default password for EW-DX (“sennheiser”) will be automatically applied by the software.

You can claim either a single device or several devices simultaneously for your Control Cockpit instance.

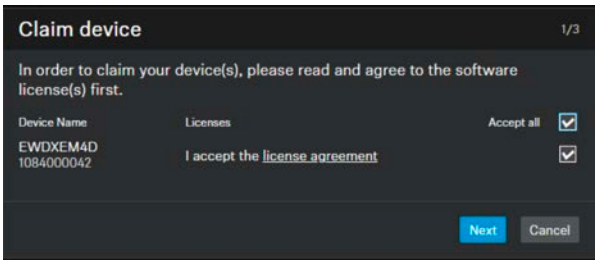
**To claim a single device for your Control Cockpit instance:**

▷ Connect the device’s control network port to the network.

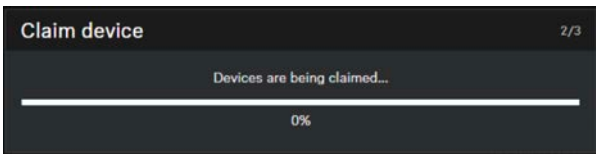
▷ Open Control Cockpit and click on the **Device list** view.

The new device is automatically detected and displayed as “Not claimed.” If the device does not appear in the device list, add the device manually by entering an IP address.

▷ Click on **Claim device**.



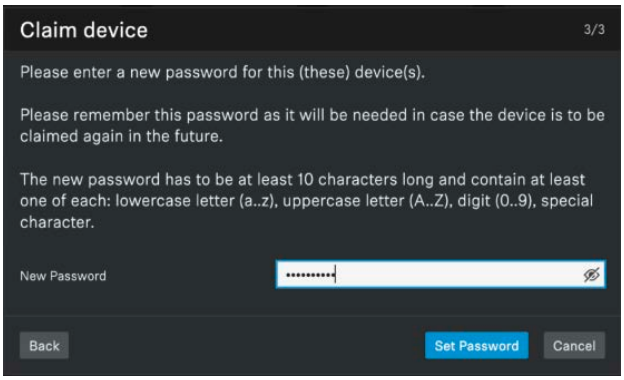

▷ Read and agree to the software licenses and click on **Next**.




▷ Enter the password of the device if it was previously set.

If the device was previously claimed by another Control Cockpit instance, enter the previously set password. If you do not remember the previously set password, please perform a hardware reset of the device (see „Resetting the device password (EW-DX device)“) and try again. The default password for EW-DX will be automatically applied by the software.

▷ Next to ensure secure access to the device, you will be asked to enter a new password.




Please note that the new password must meet the following requirements:

- At least ten characters
- At least one lowercase letter
- At least one uppercase letter
- At least one number
- At least one special character: !#$%&()*+,-./:;<=>?@[]^_{|}~
- Maximum length: 64 characters

▷ Enter the new password for your device and click **Set password**.

The device has now been claimed by your Control Cockpit instance. You can now use all available functions.

You can view and change the device password on the **Access** tab on the device page. In case you wish to configure the device with a second Control Cockpit instance, simply claim the device by entering the set device password.

## Claiming multiple devices (Control Cockpit)

**To claim multiple devices for your Control Cockpit instance at once:**

▷ Connect the devices’ control network ports to the network.

▷ Open Control Cockpit and click on the **Device List** view.

The new device is automatically detected and displayed as “Not claimed.” If the device does not appear in the device list, add the device manually by entering an IP address.

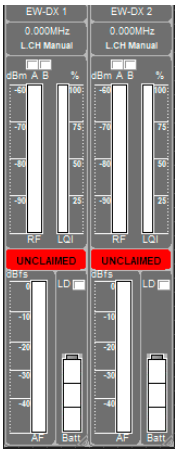
▷ Select the desired devices from the list and then click on **Claim devices** at the top right of the Device List.

You will then be guided through the claim process in the multiple selection.

The devices have now been claimed by your Control Cockpit instance. You can now use all available functions.

## Claiming single device (Wireless System Manager)

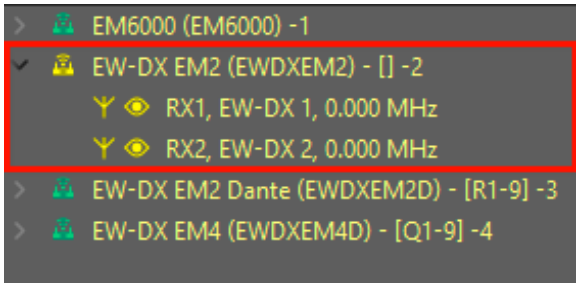
The channels of unclaimed devices are marked as “unclaimed” in the channel view. Unclaimed devices are also shown in the device list in yellow.




**To claim a single device for your WSM instance:**

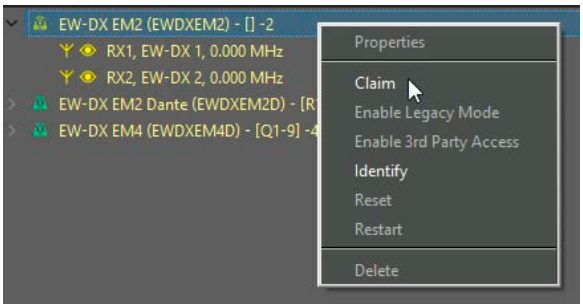
▷ Connect the device’s control network port to the network.

▷ Open Wireless System Manager.




> **i** In order to use the device with another client you need to know the password. With a right mouse click you can authenticate on an already claimed device (see „Authentication during operation (Wireless System Manager)“).

▷ Right-click on the displayed device and select **Claim**.

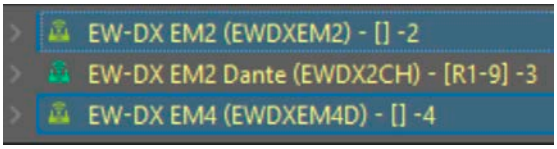



A modal appears where you can set a password for the device.


▷ Set a new password.
The device has been claimed to WSM.

## Claiming multiple devices (Wireless System Manager)

It is also possible to claim several devices at the same time.

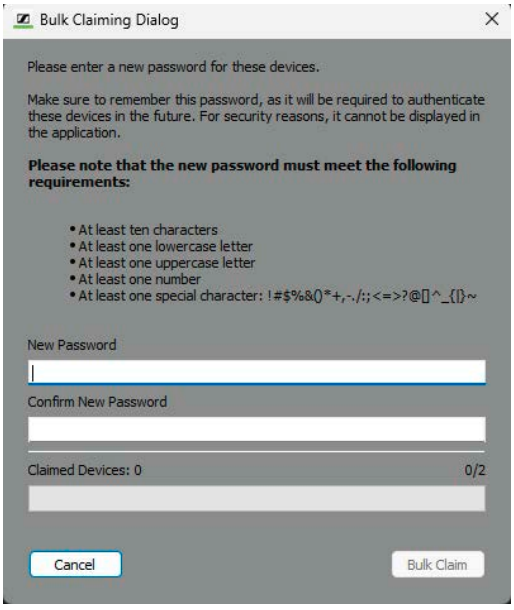


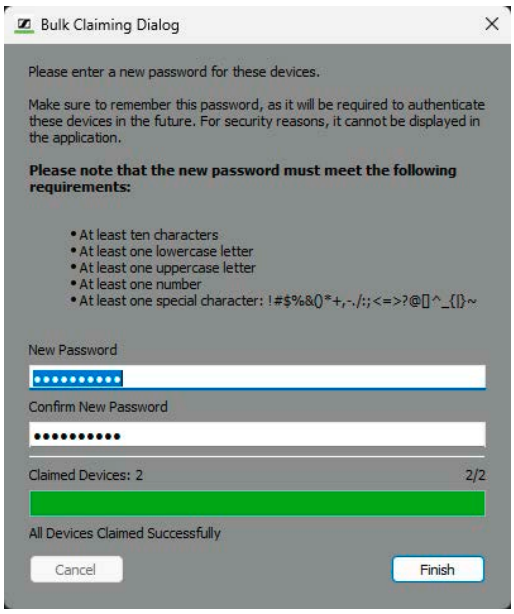

**To claim multiple devices at once:**

In your WSM, select the devices you want to claim.

▷ Right-click on the devices to be claimed.
The **Bulk Claiming** option appears.

▷ Enter the new passwords and click on **Bulk Claim**.
The progress will be displayed in the progress bar.



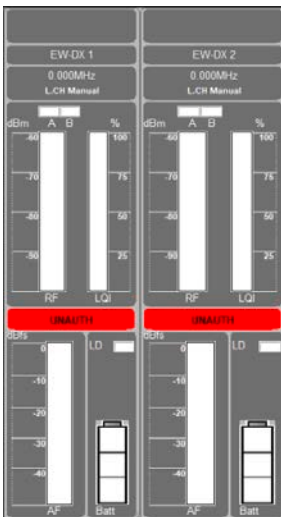




▷ Click on **Finish** to complete the process.
The devices have been claimed to WSM.

## Authentication during operation (Wireless System Manager)

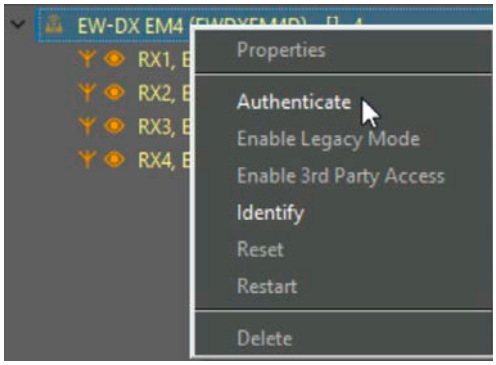
Authentication is required to use the device with another client or re-assign it to a different device. This typically occurs if the device was previously used by another client.

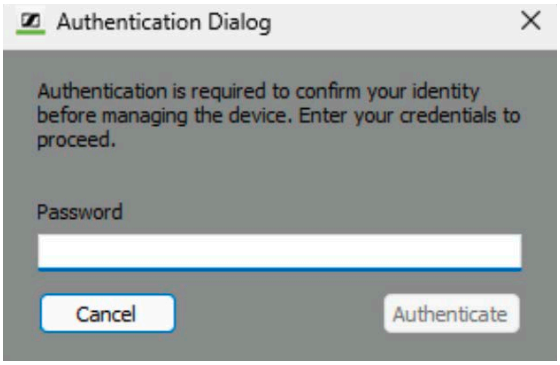
In such cases, the device's channels will be marked as unauthenticated, and the device will appear in orange in the device list.

**To authenticate the device during operation:**

▷ Right-click on the unauthenticated device and select **Authenticate**.
A new password window appears.




▷ Enter the set password of the device.

▷ Click on **Authenticate**.
The device is ready for use.

## Claiming device (SoundBase)

Devices can be discovered using either the SSCv1 or the newer SSCv2 protocols. Both methods are fully supported, allowing for compatibility with older firmware versions in mixed environments, such as situations where an update cannot be deployed on-site.

**To claim a single device for your SoundBase instance:**

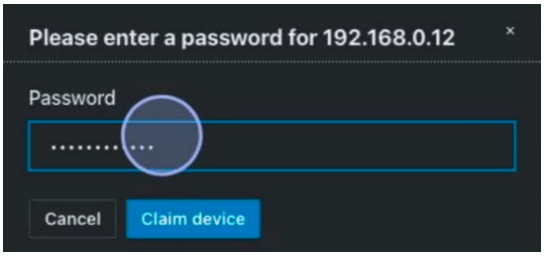
▷ Connect the device's control network port to the network.

▷ Open SoundBase.

▷ In the **Coordination Area**, click on **Devices** and then on **Discover.**


▷ Click on the + to add discovered devices.
You will be prompted to set a new password. This is a one-time entry – the password is stored in the project file.

▷ Enter the new password for your device and click **Claim device**.




The device has now been claimed.

> **i** You can also select and add multiple devices at once, making it easy to integrate multichannel systems.

## Resetting the device password (EW-DX device)

The device's configuration password can only be reset through a factory reset (either performed directly on the device or remotely via the Control Cockpit software and Wireless Systems Manager) or through a network reset (directly on the device):

- **Factory reset:**
  - Resets the receiver to factory settings.
  - All settings and all active connections will be lost.
  - This option is accessible at the device and remotely.
- **Network reset:**
  - Resets the network settings to their factory settings.
  - Resets also the claiming password.

**To reset the receiver to its factory settings on the device:**

▷ Press the **SET** to enter the menu.

▷ Rotate the jog dial and navigate to **This Device**.

▷ Press **SET**.

▷ Rotate the jog dial and navigate to **Reset**.

▷ Press the **SET**.

▷ Rotate the jog dial and select **Factory**.
The receiver is reset to its factory settings.

**To reset the network settings to their factory settings on the device:**

▷ Press the **SET** to enter the menu.

▷ Rotate the jog dial and navigate to **This Device**.

▷ Press **SET**.

▷ Rotate the jog dial and navigate to **Reset**.

▷ Press the **SET**.

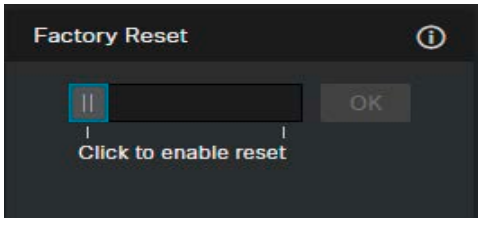
▷ Rotate the jog dial and select **Network**.
The receiver is reset to its factory settings.

## Resetting the device password (Control Cockpit)

**To reset the receiver via Control Cockpit Software:**

▷ Navigate to **Devices** > **your EW-DX device** > **Device**.

▷ Under **Factory Reset**, toggle the slider to enable it and click **OK** to reset the device.
The device will begin the reset process, and all settings will be restored to their default values.




## Resetting the device password (Wireless Systems Manager)

**To reset the receiver via Wireless Systems Manager:**

▷ In your WSM, right-click on your EW-DX device.

▷ Select **Reset**.
The device will begin the reset process, and all settings will be restored to their default values.

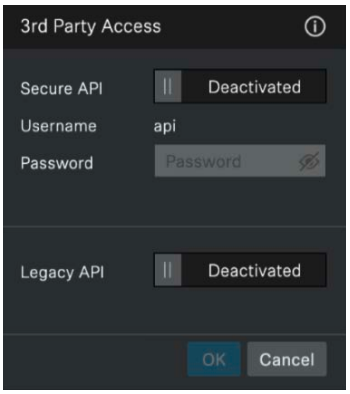
# Secure 3rd party Access

With firmware version 4.0.0 and higher the 3rd party access is deactivated by default. You can enable it via Control Cockpit or Wireless Systems Manager.

You have the option to enable or disable each of the two API protocols separately. They can also be used in parallel:

- **Secure API**: encrypted protocol „Sennheiser Sound Control Protocol v2 (SSCv2)“ using a username and password (recommended).
- **Legacy API:** unsecured control protocol „Sennheiser Sound Control Protocol v1 (SSCv1)“ without password protection and use at your own risk (not recommended).

## Enabling 3rd party access in Control Cockpit




**To enable the 3rd party access:**

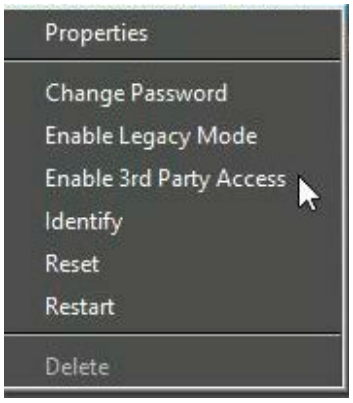
▷ Update your device firmware (≥4.0.0).

▷ In the control software, navigate to **Devices** > **your device** > **Access** > **3rd Party Access**.

▷ Click on **Edit** and activate **Secure** (recommended) for an encrypted device connection via „Sennheiser Sound Control Protocol v2 (SSCv2)“.

▷ Alternatively, you can choose **Legacy** for unsecured communication at your own risk (not recommended). In this case the „Sennheiser Sound Control Protocol v1 (SSCv1)“ will be applied.

## Enabling 3rd party access in WSM

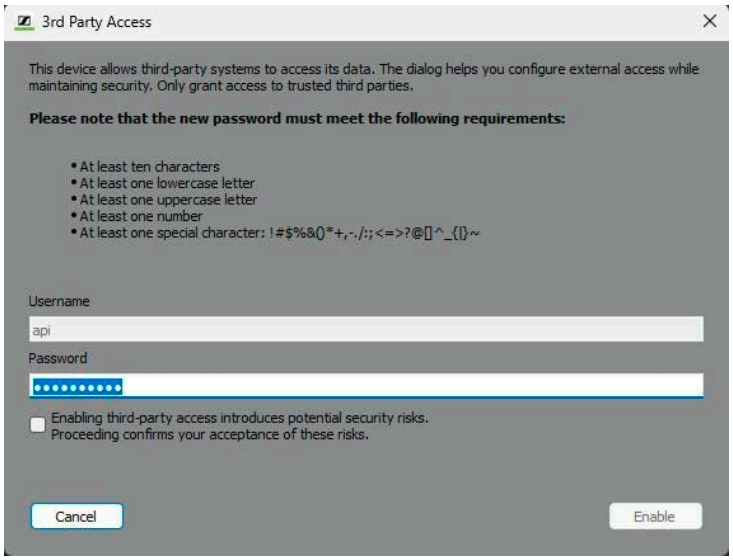



**To enable the 3rd party access:**

▷ Update your device firmware (≥4.0.0).

▷ Right-click on the displayed device and select:

- **Enable 3rd Party Access** (recommended) to enable an encrypted device connection via „Sennheiser Sound Control Protocol v2 (SSCv2)“ or
- **Enable Legacy Mode** to enable an unsecured communication at your own risk (not recommended). In this case the „Sennheiser Sound Control Protocol v1 (SSCv1)“ will be applied.



## Dante® encryption

Dante media encryption extends the security benefits of using Dante on your network by concealing the media content during transmission between devices. Dante utilises the Advanced Encryption Standard (AES) with a 256-bit key to provide industry-leading media protection. Concealing the contents of media packets prevents malicious or unauthorised users eavesdropping or interfering with Dante media traffic.

> **i** Please refer to the Audinate documentation for detailed information and current updates on Dante® encryption at Audinate/Media-Encryption.

## Resetting the configuration parameters of the Dante Controller

All parameters configured in the Dante Controller can be reset to default settings. This includes the parameters:

- User-defined device (Dante) name
- User-defined channel names
- Clock configuration (clock leader / external clock leader setting)
- Sample rate setting (including pull-up/down)
- Latency setting
- Any existing audio routes

> **i** After resetting, the network configurations (e.g. IP settings, mode, etc.) are retained and the device is not restarted.

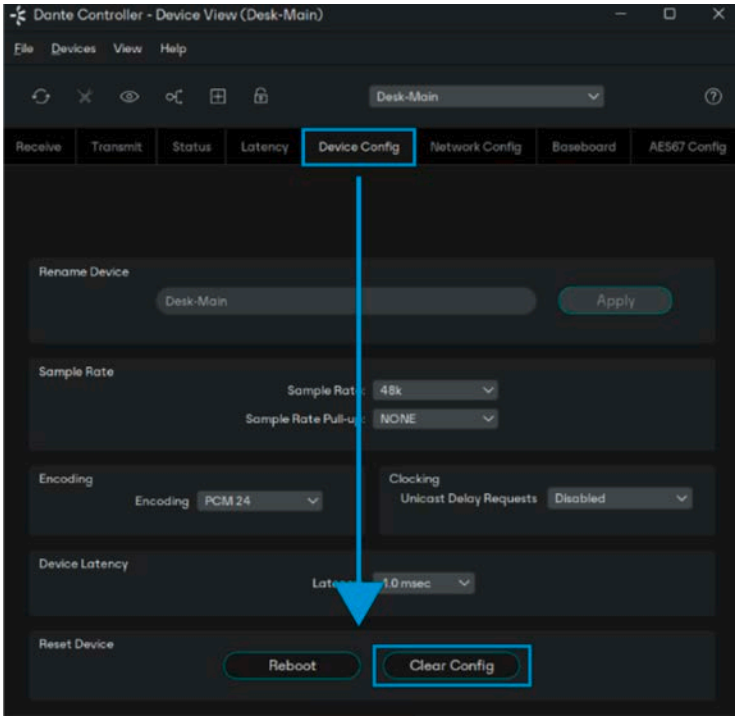
**To reset the configuration parameters of the Dante Controller:**

▷ In Dante Controller, navigate to the Tab **Device Config**.

▷ At the bottom, click on **Clear Config**.

▷ The parameters have been reset to default settings.

Further support information can be found on the website Dante Controller.



## Summary

Implementing the above security features helps ensure that your Sennheiser EW-DX devices remain protected in any professional environment. Regular firmware updates, strong password management, and proper configuration of encryption features and network access are vital to maintaining a secure audio network.

For further assistance or firmware downloads, please visit the website Product Security.

# Ports, protocols and services

In order to communicate between software and EW-DX devices, certain ports must be enabled (especially for the organization/enterprise firewall). If necessary, please contact the local administrator to configure the required ports.

**Port requirements**

## Dante® network

| Port | Protocol | Service | Description |
|---|---|---|---|
| 319, 320 | PTP | | |
| 4440, 4444, 4455 | UDP | Audio Control | |
| 4321 | | ATP Multicast Audio | |
| 5004 | | AES67 Multicast Audio (RTP / AVP port) | |
| 5353 | | mDNS (Multicast 224.0.0.251) | Discovery mDNS |
| 8002 | UDP | Dante Lock Server | |
| 8700-8708 | | Multicast Control and Monitoring | |
| 8800 | UDP | Control & Monitoring | |
| 9875 | | SAP (AES67 discovery) | |
| 14336-14591 | UDP | Unicast Audio | |
| 8753 | TCP | mDNS clients | |
| 8001 | UDP | Dante Millau Device Proxy | |
| 8900 | | | |

## Sennheiser Control Cockpit

| Port | Protocol | Service | Description |
|---|---|---|---|
| 6969 | | Auto setup | |
| 22 | SCP/SSH | SCP Firmware update | (firmware version <4.0.0.) |
| 45 \| 6970 | UDP\|TCP | SSC Sound Control Protocol v1 | SSCv1 (firmware version <4.0.0.) |
| 443 | TCP | SSC Sound Control Protocol v2 | SSCv2 and update (firmware version ≥4.0.0.) |
| 5353 | UDP | mDNS (Multicast 224.0.0.251) | Discovery mDNS (inbound & outbound) |

## Wireless Systems Manager

| Port | Protocol | Service | Description |
|---|---|---|---|
| 2012 | TCP | Microsoft WCF for WSM | WSM.server.exe |
| 6970 | TCP | Internal EM6000/L6000 protocol | WSM.server.exe |
| 8008 | TCP | Metering data | WSM.server.exe (Formerly 8005) |
| 8006 | TCP | Device properties | WSM.server.exe |
| 8007 | TCP | Device warnings | WSM.server.exe |
| 5353 | UDP | mDNS (Multicast 224.0.0.251) | Discovery mDNS (inbound & outbound) |

## SoundBase

| Port | Protocol | Service | |
|---|---|---|---|
| 443 | HTTPS | Web UI / Update service | |
| 8427 | UDP | Data Management | |
| 2202 | UDP | Data Management | |
| 5353 | UDP | mDNS (Multicast 224.0.0.251) | Discovery mDNS (inbound & outbound) |