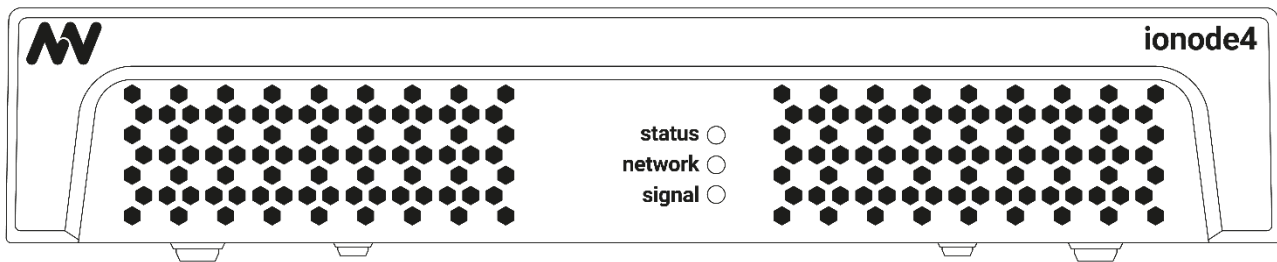**ionode4 – Audio Integration Device**

HARDWARE USER GUIDE

Conventions used in this manual:

- **WARNING**: Information marked 'Warning' alerts the user to potential situations that could cause personal injury or death.
- **CAUTION**: Alerts the user to possible damage to equipment or property. By not following the instructions, the damage caused to the equipment may not be covered under warranty.
- **IMPORTANT**: Indicates instructions or information that are vital to the successful completion of the procedure.
- **NOTE:** Is used to indicate additional useful information.

The intent of the lightning flash with arrowhead symbol in a triangle is to alert the user to the presence of un-insulated "dangerous" voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

The intent of the exclamation point within an equilateral triangle is to alert the user to the presence of important safety, and operating and maintenance instructions in this manual.

⚡ WARNING ⚡

1. To prevent the risk of electric shock, only qualified personnel should remove the cover.
2. Before servicing, disconnect the power supply.
3. Don't expose the device or its equipment to water, rain, or any other liquids or liquid cleaners, as it may cause fire or electric shock.
4. This device may only be operated via earthed main sockets in networks that comply with IEC 364 or similar regulations.
5. The mains connection must be suitable for the rated power of the device.
6. Output terminals are hazardous: wiring connecting to these terminals requires installation by an instructed person and the use of ready-made leads.
7. Fasten the device securely in accordance with installation instruction to avoid any injuries.
8. Do not place flame sources such as lighted candles on the device.
9. DO NOT use the device at altitudes above 2000 m.
10. DO NOT use the device in tropical environment.
11. DO NOT use this device if the electrical power cord is frayed or broken.

⚠ IMPORTANT SAFETY INSTRUCTIONS ⚠

- Operating temperature of the device - range 32°F – 122°F (0°C–50°C), storage temperature - range 14°F to 140°F (-10°C–60°C).
- Power should only be supplied over IEC 10 A Connector, 100-240 VAC @ 50-60Hz.
- Relative humidity range during storage: 10% to 85% humidity (non-condensing).

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- Read these instructions.
- Keep these instructions.
- Follow all instructions.
- Heed all warnings and cautions.
- Do not use this apparatus near water.
- Clean only with a dry cloth.
- Do not block any ventilation opening. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- To reduce the risk of electrical shock, the power cord shall be connected to a mains socket outlet with a protective earthing connection.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The appliance coupler, or the AC mains plug, is the AC mains disconnect device and shall remain readily operable after installation.
- Adhere to all applicable, local codes.
- Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.
- Do not use any aerosol spray, cleaner, disinfectant or fumigant on, near or into the apparatus. Clean only with a dry cloth.
- Do not unplug the unit by pulling the cord, use the plug.
- Do not submerge the apparatus in water or liquids.
- Keep the ventilation opening free of dust and other contaminants.

THE MANUFACTURER CANNOT BE HELD RESPONSIBLE FOR DAMAGES CAUSED TO PERSONS, THINGS OR DATA DUE TO AN IMPROPER OR MISSING GROUND CONNECTION. CONTACT THE AUTHORIZED SERVICE CENTER FOR ORDINARY AND EXTRAORDINARY MAINTENANCE.
IT IS ABSOLUTELY NECESSARY TO VERIFY THESE FUNDAMENTAL REQUIREMENTS OF SAFETY AND, IN CASE OF DOUBT, REQUIRE AN ACCURATE CHECK BY QUALIFIED PERSONNEL.

The device has been tested for compliance:

- ICES-003:2020-10
- EN 55032:2015 / DIN EN 55032:2015/A11:2021 Electromagnetic compatibility of multimedia equipment – Emission Requirements / (CISPR 32:2015/AMD1:2019)
- ENT 55035:2017 / DIN EN 55035:2017/A11:2022 Electromagnetic compatibility of multimedia equipment – Immunity requirements / (CISPR 35:2016)

FCC Statement

NOTE: 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.

RoHS Statement

Directive 2002/95/EC – Restriction of Hazardous Substances (RoHS)

Maintenance and Repair

To prevent device damage or hazards, only nnounce authorized personnel should service or repair the device.

Unpacking

- ionode4 device
- 4 clear anti-scratch rubber feet
- 2 rack mount brackets
- 3x terminal block connectors with 12 positions
- 1x terminal block connectors with 9 positions
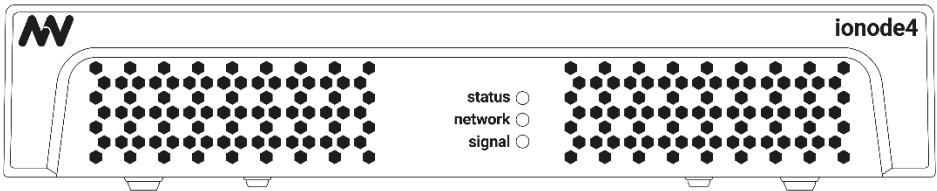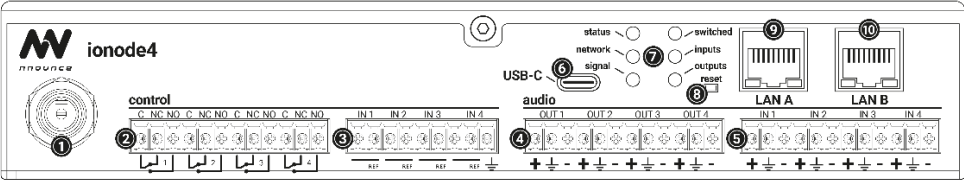
Optional accessories

- Optional: Connection plate with 4 screws for rack mounting in pair

INTRODUCTION

ionode4 is an **audio integration device** with built-in firmware, processing, and I/Os. It provides 4 audio inputs, 4 audio outputs, 4 control inputs and 4 control outputs. The device has convenient pairing capabilities and can be rack-mounted individually, in pairs, or used as a stand-alone unit. Ionode4 is connected to your network via LAN and communicates over the network using all contemporary audio standards such as AES67, RTP or VoIP.

This manual provides an overview of the hardware components and their functions, followed by installation and configuration instructions.

FEATURES

A. Front panel	
The front panel has 3 control LEDs: 1. status 2. network 3. signal	
B. Rear panel 1. Barrel secure jack power connector 2. Control outputs (relay C, NC, NO pins) 3. Supervised control inputs (0-12 V input tolerance, 12 Vref) 4. Balanced audio output channels 5. Balanced audio input channels 6. USB-C (for service purposes, firmware update) 7. Control LEDs 8. Reset button 9. LAN A with PoE 10. LAN B with PoE	 Control LEDs on the left-side from the LAN: • status • network • signal • switched • inputs • outputs

The **product sticker** on the bottom of the device contains the MAC address required for device pairing.

Control LEDs

Front panel and rear panel LEDs are aligned, the description below is valid for both.

Status	Device status: • Red LED light indicates booting of the device.

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	• Yellow LED light indicates that the operating system successfully booted and services are starting. • Green LED light indicates all services are up and running.
Network	Network connection availability check: • LED light is off, no network connection. • Blue LED light when auto mode active and no IP obtained from DHCP. Device available only through IPv6 link local. • Green LED light when at least one active interface is available with correct IP address. NOTE: The indicator is not available until all services are in operation.
Signal	Green LED lights up if DSP and the design are running, else LED lights up red. NOTE: The indicator is not available until all services are in operation.
Outputs	Green LED lights up if at least one output contact is closed. NOTE: The indicator is not available until all services are in operation.
Inputs	Green LED lights up if at least one input contact is closed. NOTE: The indicator is not available until all services are in operation.
Switched	Reserved for future use.

DEVICE CONFIGURATION AND SETUP

First connect your device to the power supply using a suitable, secure jack plug. In a second step, connect the device to your network with a LAN cable and then establish the network connection. Access the nnounce configuration UI to define the LAN setup for your device. If you are incorporating the ionode4 device within a Q-SYS installation, perform further steps in the Q-SYS designer and download the ionode4 plugin.

Connect the Device

Connect your ionode4 device to the power supply with a jack plug and to your network with a data communication cable CAT5 with a RJ45 connector.

NOTE: Use the LAN B port for a secondary connection if required.

1. Connect the device to power – use a *barrel secure jack power connector*.
2. Connect the device to the network, with a DHCP enabled data communication cable CAT5 with a RJ45 connector.
3. Use a computer with an Internet browser and search for your ionode4 device by typing the URL https://ionode4- and the last 6 digits of the MAC address of your device, which you can find on the product sticker of your device.
   • Example: https://ionode4-000000 or https://ionode4-000000.local
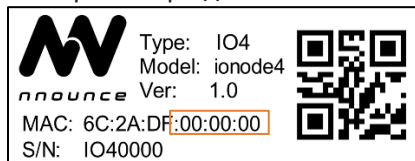
   • **IMPORTANT**: Instead of *000000*, enter the last 6 digits of the MAC address found on your ionode4 device.
   • **NOTE**: The device is using mDNS.
4. Your web-browser shows the login page of your **ionode4 device.**

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5. **Enter credentials into the nnounce configuration user interface:**

IMPORTANT: Default credentials are admin/simpleway. Change default password upon the first login.

Now you are able to access the configuration settings of the device and continue with interface configuration.

Interface Settings

After login into the nnounce configuration UI, establish a connection between your new ionode4 device and your network. Configure the LAN A and LAN B ports in the *Interfaces* section.
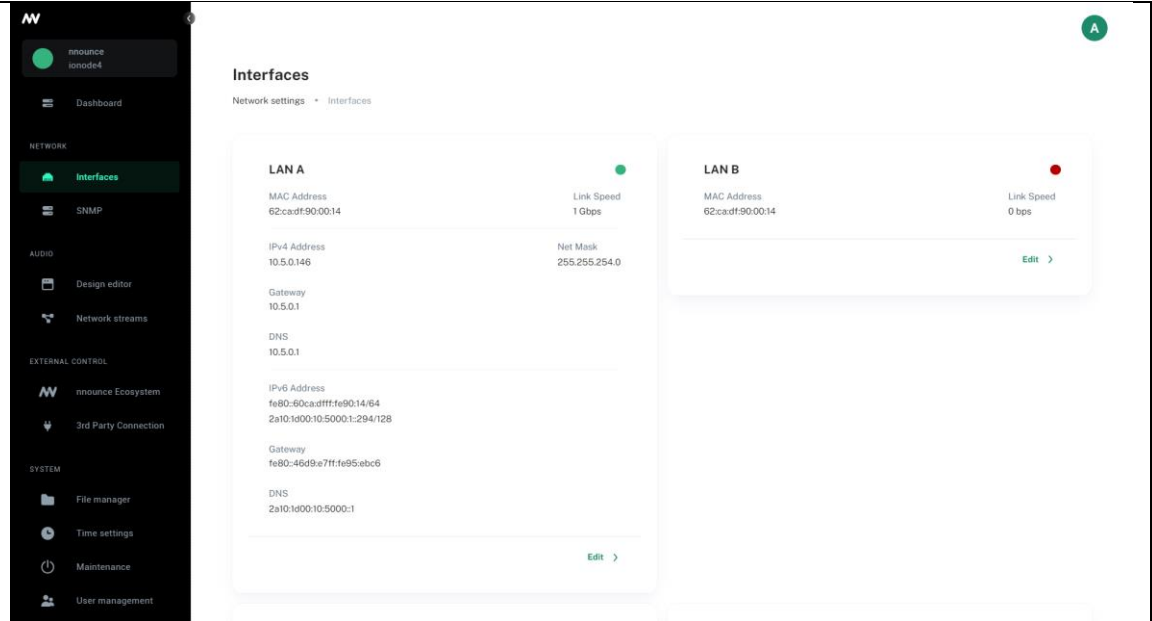
Choose between *manual* and *auto mode* setting:

- *Manual* - user enters IP Address, Net Mask and default Gateway.
- *Auto* - DHCP server needs to be available to obtain network settings automatically.
- *Off* mode turns the port off.

IMPORTANT: You will need the device's IP address, MAC address from your device which you find on the rear panel.

NOTE: Navigate backwards or cancel your steps with the Back function in your browser.

A. Navigate in the left-hand Menu to the **Interfaces** section. You can preconfigure two LANs A and B, see rear panel ports.	
B. Configure the interface in the *Manual mode or Auto mode (DHCP).*	

Manual mode

|	
C. Fill in the fields: • IP Address • Net Mask • Other fields are optional. • **Static routes** for remote networks that need to be reached via the LAN adapter. • **DNS server** and **Search domains** are assigned by the DHCP server.	
D. Advanced slider allows you to insert an advanced configuration. • CIDR notation. Click on the *Save Changes* button to confirm the configuration.	

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Auto mode

|	
D. Automatically obtain from DHCP server: • IP address • Net Mask • Gateway • **Static routes** for remote networks that need to be reached via the LAN adapter (for advanced use). • **DNS server** and **Search domains** are assigned by the DHCP server. Click on the *Save Changes* button to confirm the configuration.	
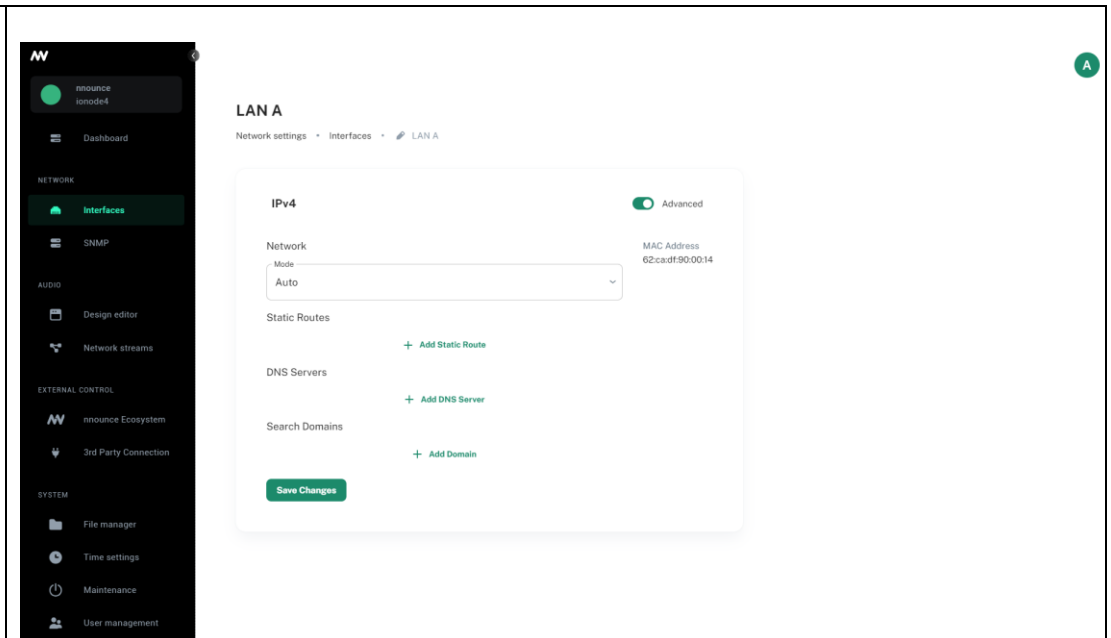
IMPORTANT: The *OFF* option disables the port.

Q-SYS ECOSYSTEM INTEGRATION

In the previous chapter you connected your ionode4 audio integration device to the network via a standard ethernet cable. This network consists of:

- Q-SYS Core and further Q-SYS peripherals,
- Windows-based computer for Q-SYS designer network setup, not required for runtime operation,
- Gigabit Ethernet Switch.

Network overview:

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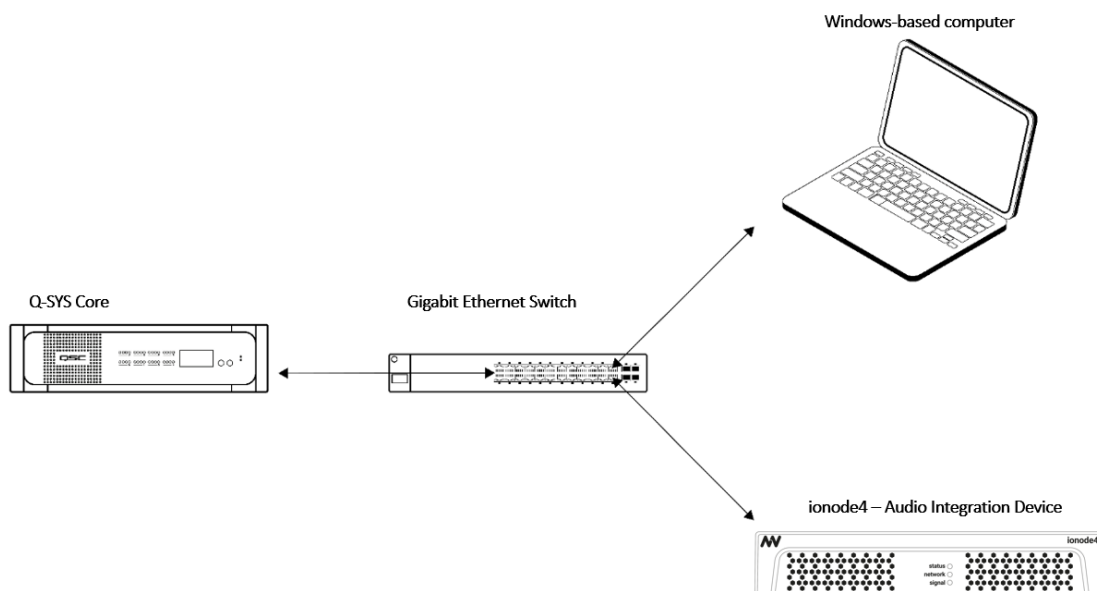
NOTE: Q-SYS Designer version 9.9.0 pictures used in this manual are for illustration purposes only.

To make your device operable within the Q-SYS ecosystem, follow the steps which are described in more detail in the chapters below:

1. **Download Q-SYS plugin** for ionode4,
2. **Configure the plugin** in Q-SYS designer,
3. Set up **streams**.

Q-SYS Plugin – Download & Configuration

To configure the ionode4 device, you will need to install the respective plugin for Q-SYS designer so that you can then set up the device's properties.

IMPORTANT: Configuration from the Q-SYS designer is auto populated to the nnounce configuration UI and thus your ionode4 device.

1. The nnounce **ionode4 plugin for Q-SYS Designer** can be obtained from:
   a. Q-SYS designer Asset Manager,
   b. nnounce webpage in the Download center - https://www.nnounce.com/download-center.
2. The downloaded file with the plugin should be opened upon double-click or place it on your computer in the folder: C:\Users*username*\Documents\QSC\Q-Sys Designer\Plugins
3. Open your **Q-SYS designer**.
4. Find the **ionode4 plugin** in the right panel below and drag and drop it into your design.
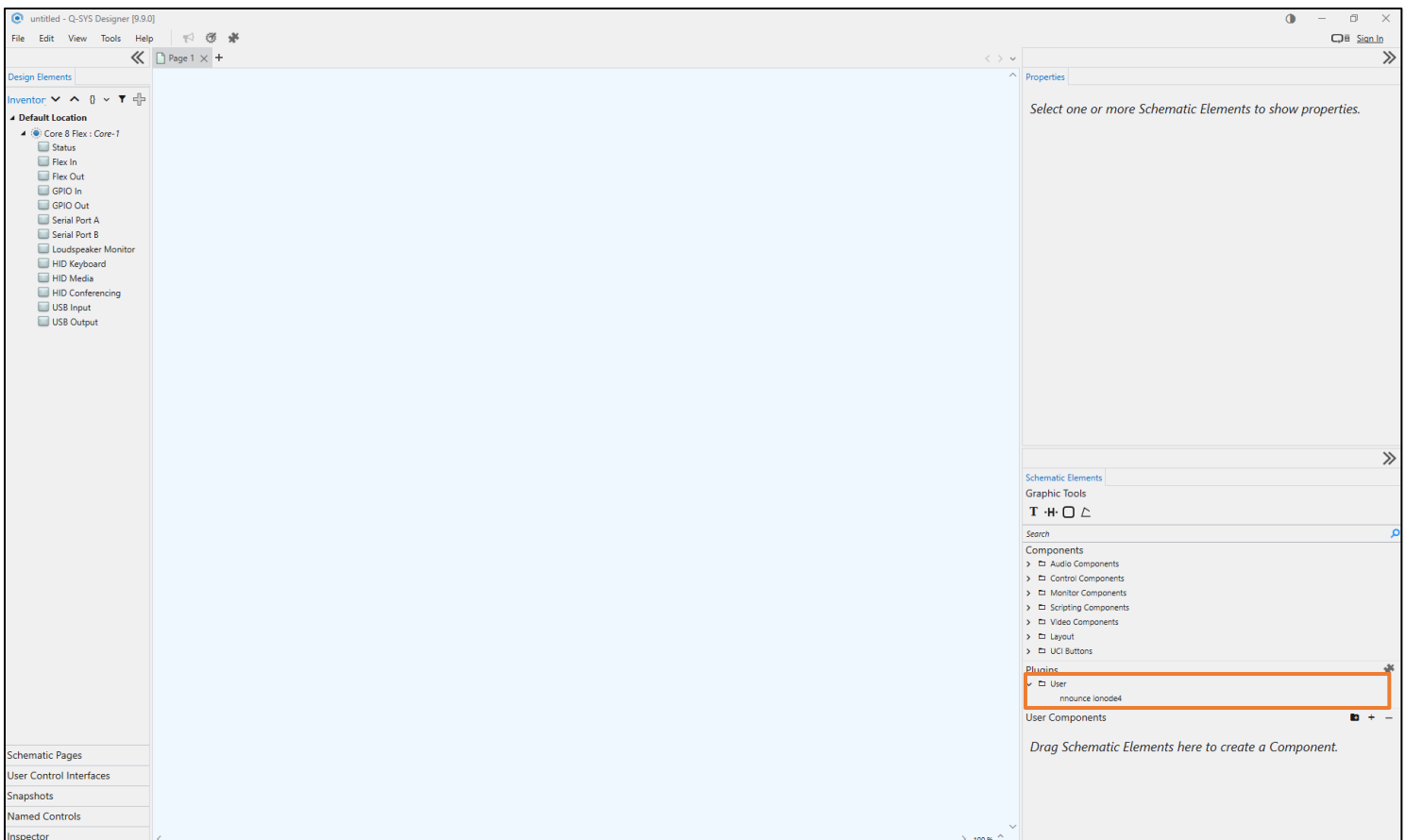
Example design with Components:

- Receiver - ionode4 AES67 RX (RTP streams available, see stream configuration for more details).
- Transmitter – ionode4 AES67 TX (RTP streams available, see stream configuration for more details).
  NOTE*: Receiver and Transmitter must be created separately.
 See the relevant chapter below.
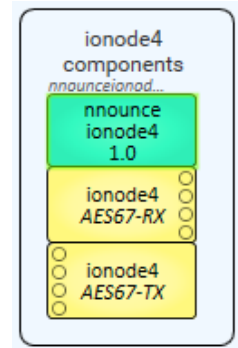
5. Set up the **properties of your ionode4 audio integration device:**
   NOTE: Properties are opened by simple click on the ionode4 item in the right-hand panel.
   - **Connection Mode** - will be selected based on Q-SYS version. In older versions TCP socket needs to be manually selected. Web-Socket with encryption is supported since Q-SYS version 9.8.
   - **Configuration Mode** – select stream configuration mode:
     o **Basic** – default ionode4 design is applied and stream configuration is predefined for you.
       NOTE: An existing default configuration is not overwritten.
     o **Advanced** – manual design and steam configuration. Streams Net Tx and Net Rx channel numbering needs to be correct according to conventions applied. Default design is applied when no other design is created.
   - **Unit Id** – number your device, it is important to assign a unique number, we recommend ascending numbering of your nnounce devices.
     IMPORTANT: The number is further used for stream configuration.
   - **Show Debug** – set level of debug mode.

6. Create your design in Q-SYS or add the ionode4 to your existing audio configuration. Make sure your design is disconnected.
7. Save to core & Run, after that open the ionode4 plugin detail and set **Host/IP** of the ionode4 device.
   NOTE: For secured Web-Socket connection it is required to use domain name of the device.
   IMPORTANT: Use the host as defined in the Connect the Device chapter above – ionode4 dash and the last six numbers of the station's MAC address. *Example*: ionode4-90002D
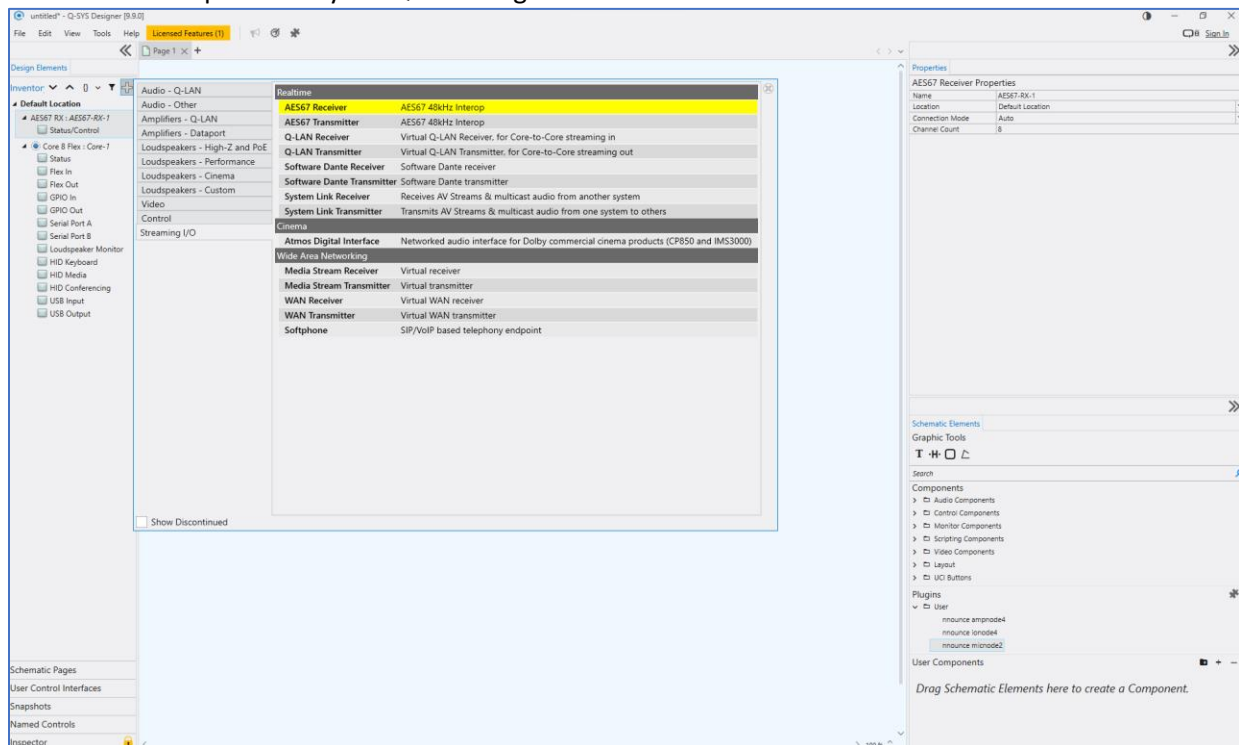
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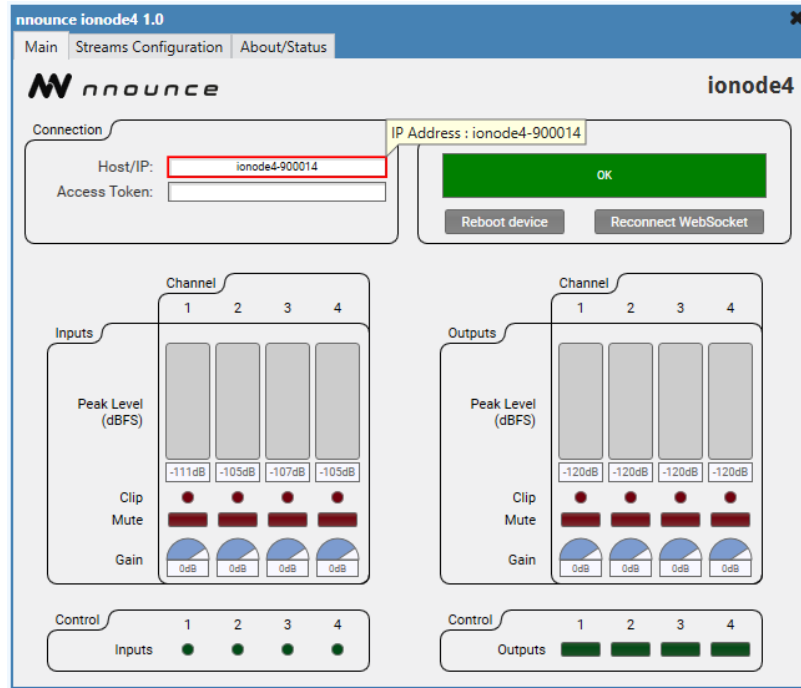
8. Upon successful connection status field will show OK.

Stream Configuration

Create an AES67 stream in the Q-SYS designer. Select first the component and then configure it in the ionode4 plugin.

1. Add the stream component to your Q-SYS design:

2. Set up **stream properties**:

Properties	
AES67 Receiver Properties	
Name	AES67-RX-1
Location	Default Location ▼
Connection Mode	Manual ▼
Channel Count	1
Graphic Properties	
Label	AES Receiver main
Position	33,593
Fill	✎
Script Access	
Code Name	AES Receiver main
Script Access	All ▼

IMPORTANT: Streams need to have *Script access* set to the value *Script*. In older Q-SYS designer versions Script access is not visible in Stream properties. Rename the stream in a disconnected design. Only after that the stream is visible in the ionode4 plugin.

3. Once the Stream component is set up, switch to the **ionode4 plugin** and configure the ***Streams Configuration* section**. Based on the chosen Configuration *Mode* **Basic or Advanced** in the device's *Properties*, the values are either prefilled in or you can set up the values manually.
    Basic mode has a default design and preset ports, in the *Advanced* mode you create your own design and set manually your stream configuration.

Option: Basic Mode

1. The multicast address is filled in automatically. In the Basic mode the *Pattern* is the IPv4 first and second byte and the last number is your device's *Unit ID*.
    NOTE: This field is editable but prefilled, changes are visible in the stream IP address fields.
    IMPORTANT: Unit ID is a number you have assigned to your device in the Properties section. It is important to assign a unique number, we recommend ascending numbering of your devices.
2. Select your streams from the dropdown.
    IMPORTANT: The stream name needs to include TX for transmitter streams and RX for receiver streams.
3. Confirm your configuration with the *Submit* button.
    NOTE: The field below the Submit button will show the progress.
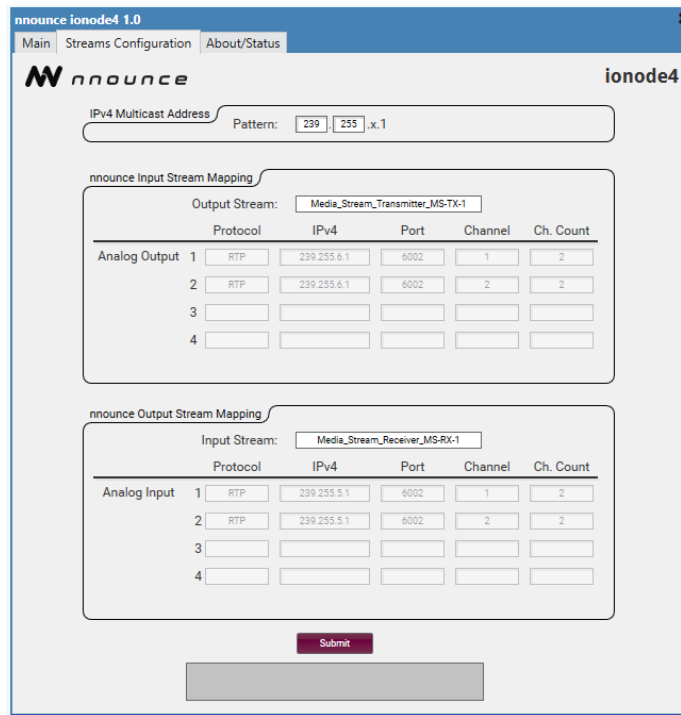
The nnounce configuration UI takes over the information from Q-SYS. In the Basic mode the default design is used in the DSP designer. Manual changes by the user are overwritten with the default design after reconnecting to the WebSocket. The *Network Streams* section shows the streams as configured in the Q-SYS designer.

IMPORTANT: Do not make any changes in the nnounce configuration UI - DSP designer and Network stream - to avoid malfunction.

Default DSP design:

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Option: Advanced Mode

The Advanced mode lets you set up manually your ionode4 device's protocols, IP addresses, ports etc. for your streams.

IMPORTANT: When using RTP streams, Q-SYS is limited to 2-channel transmitters. The advanced mode allows you to configure multiple TX components to use all 4 analog inputs/outputs of ionode4.

1. Open the *Streams Configuration* section of your ionode4 plugin.

   IMPORTANT: No values are auto filled in.

2. Map your stream/s:
   a. *Protocol* – stream protocol (AES67, RTP),
   b. *IP address* – fill in the address depending on multicast or unicast stream,
   c. *Port* – stream port number,
   d. *Channel* – define the particular channel of the stream,
   e. *Ch. Count* – sets the total number of channels of the stream.

   IMPORTANT: ionode4 stream configuration needs to correspond to receiver and/or transmitter configuration in your Q-SYS designer.

3. Confirm your configuration with the *Submit* button.

   NOTE: The field below the Submit button will show the progress and validation messages in case of any connection errors.

The **DSP designer** in the **nnounce configuration UI** takes over the design from Q-SYS only unless no custom design is created by the user. The *Network Streams* section shows the streams as configured in the Q-SYS designer.

NOTE: Please do all network stream changes in the Q-SYS designer to avoid any misalignments.

- *TX stream* – transmits audio to other devices, output.
- *RX stream* – receives audio from other devices, input.

Example of network stream configuration in nnounce configuration UI:

INSTALLATION

The ionode4 devices are designed to be rack-mounted individually, in pairs, or used as a stand-alone unit.

CAUTION: Make sure that nothing blocks the front and rear ventilation openings, and that each side has a minimum of 2 cm clearance.

IMPORTANT: Please use the supplied connectors for audio and logic connections.

Option: Stand-alone

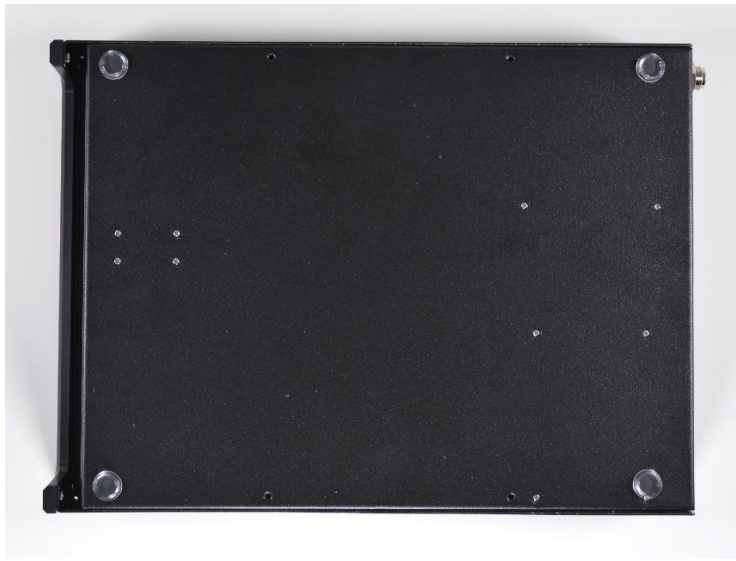Stick the 4 anti-scratch rubber feet to your device.

A. Turn your device upside down.	
B. Take the rubber feet and stick them to the corners of the device.	

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C. Your stand-alone inonode4 device is prepared.	

Option: Rack mounting

The ionode4 can be mounted into a rack as

1. a single unit or
2. as a pair of units attached to each other.

1. Single

Two brackets are used to mount a single ionode4 unit:

A. Remove the two front screws from the side of the device.	
B. Place the bracket as on the picture (use the smaller holes). Use the same screws and attach the bracket to the device.	
C. Repeat the steps above also for the other device side.	

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D. Your device is ready to be mounted in your rack.	

2. Pair

For two devices next to each other in the rack, place them in pairs. You will need two brackets and a connection plate with 4 screws.

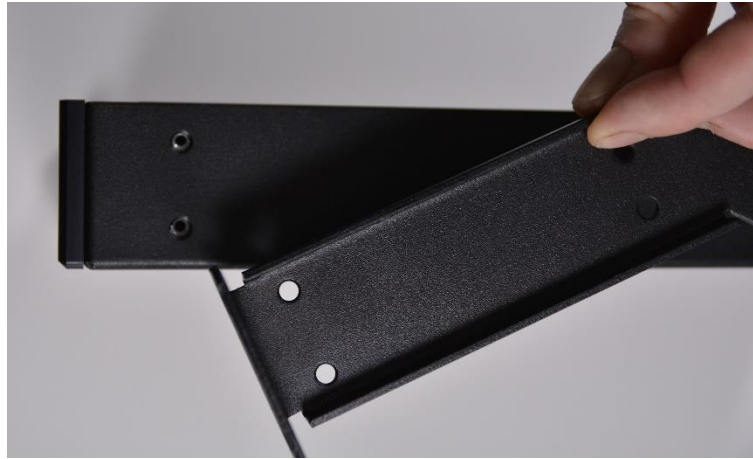|	
A. Remove two front screws and the middle screw on the device side.	
B. Repeat step A also for the second ionode4 device just on the other device side.	

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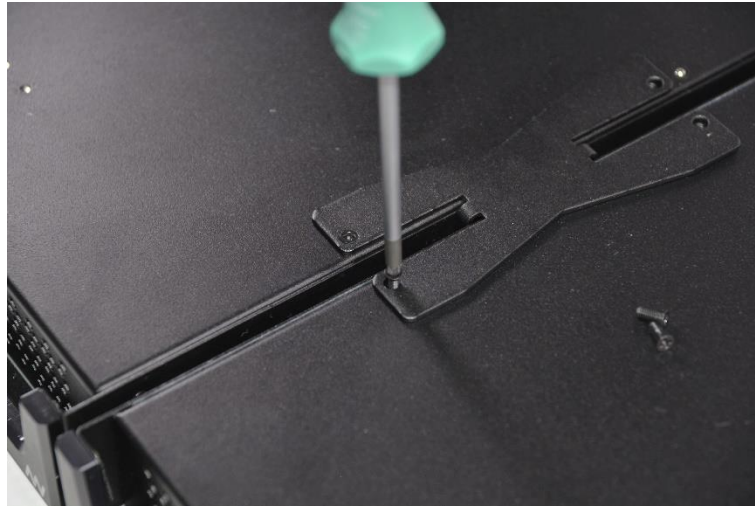|	
C. Place the bracket on the device side as on the picture. Use the same screws and attach the bracket to the device. Repeat this step also for the second device.	
D. Turn the devices upside up and place them next to each other as in the picture.	

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E. Attach the two devices together with the connection plate using 4 screws.	
F. Your devices are ready to be mounted in your rack.	
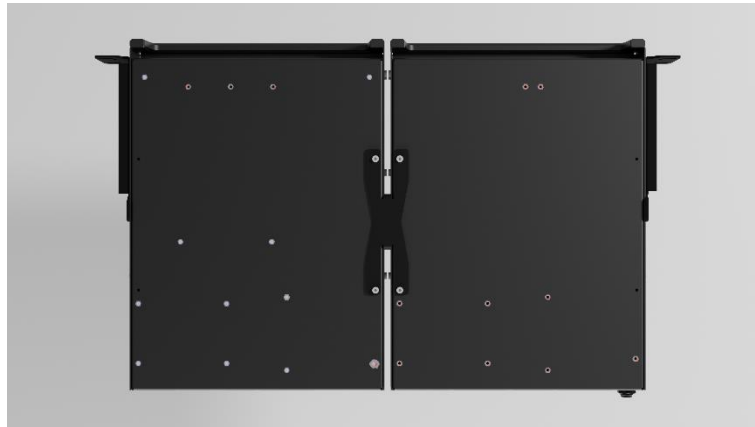
OPERATION

Recovery from USB

ionode4 device recovery from USB is provided by nnounce support team.

1. Insert the USB drive into the USB-C port on the rear panel.
2. Power off and then power on the device by disconnecting and reconnecting the power connector on the rear panel.
3. Control LEDs on rear panel show flashing progress once the device is again on power supply. The control LEDs are continuously starting to turn on in blue color.
4. The upgrade is complete when all control LEDs on the rear panel turn green.
5. REMOVE the USB drive.
6. Complete the process by turning the power off and on again (as in step 2).
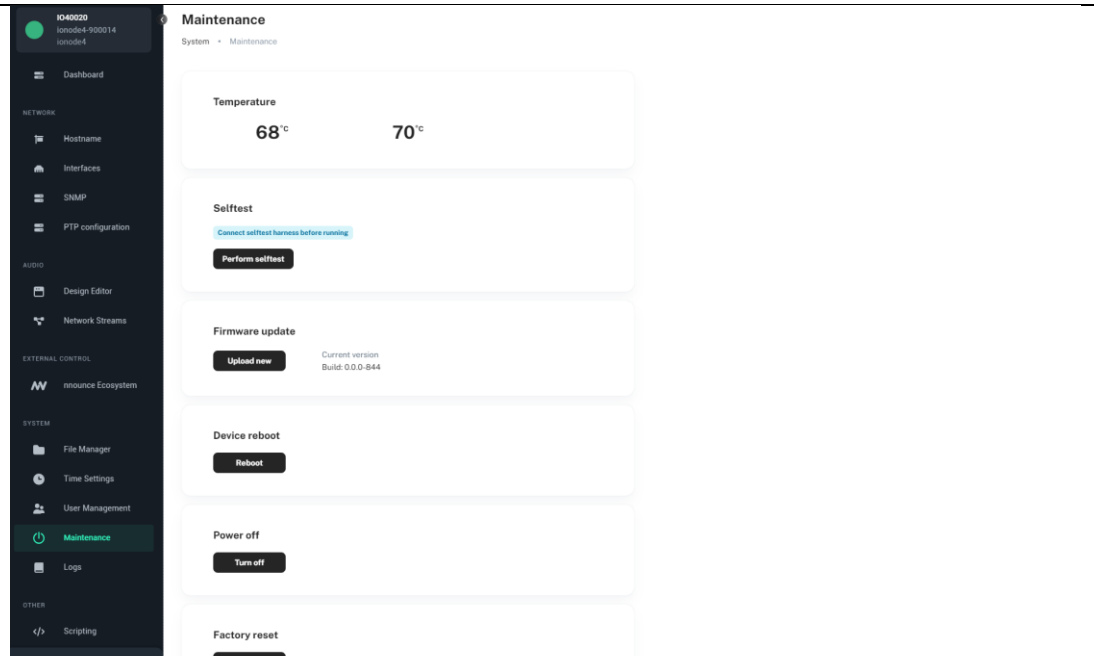
Firmware Update

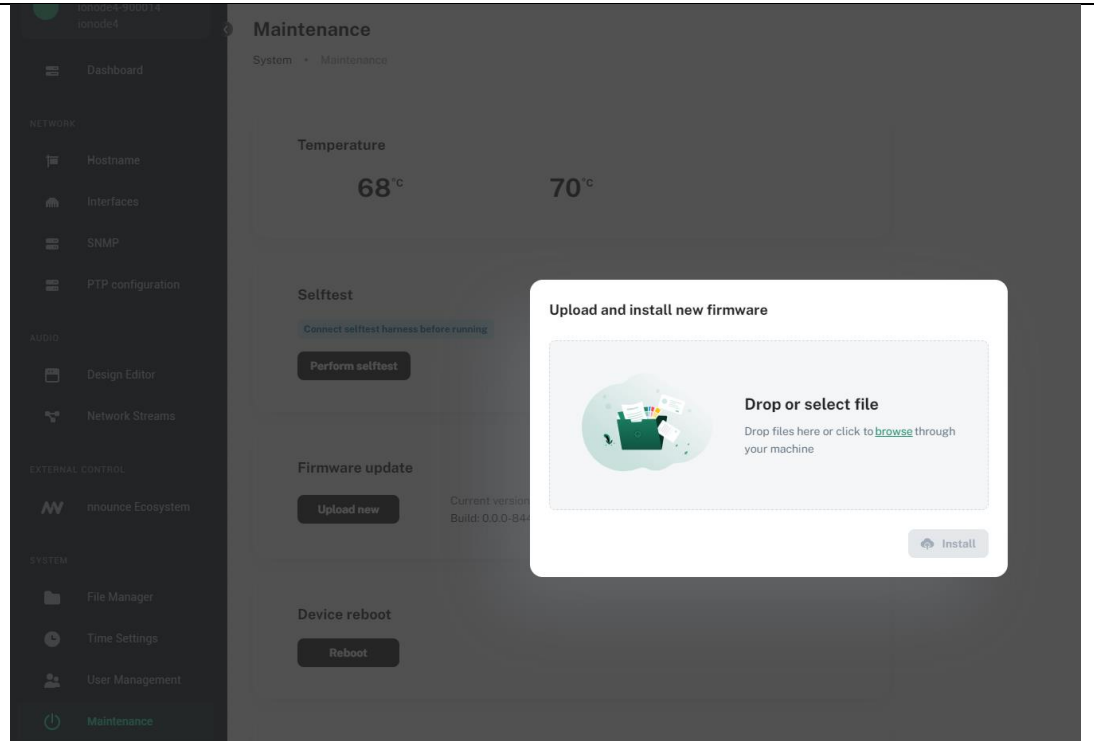Firmware update of your ionode4 device is available in the *Maintenance* section.

The installation file is provided by the nnounce support team.

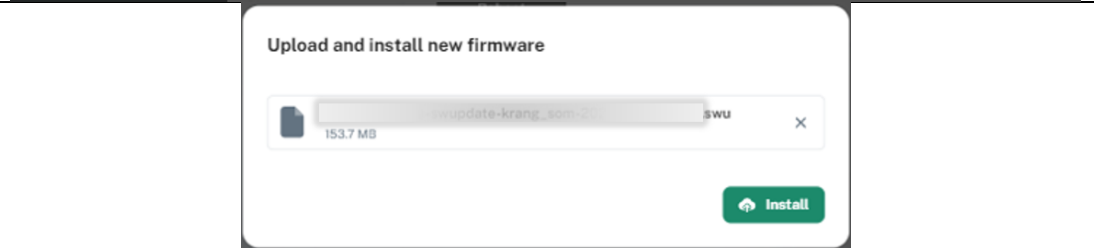|	
A. Navigate in the left-hand menu to the **Maintenance** section. Click on the *Update new* button in the *Firmware update* part.	

B. Drag and drop or select the file provided by the nnounce support team.	
C. Start to install the firmware update.	
D. Wait for the installation process to complete.	
E. After successful completion **login screen** is displayed.	

TECHNICAL SPECIFICATIONS

Audio	AD Converter: 24 Bit @ 48 kHz 125 dB-A Dynamic Range- 0.00x % THD+N Max input level 18 dBU / 6.16 Vrms Crosstalk (1 kHz)- 60 dB Input impedance 20 kΩ balanced CMRR 60 dB DA Converter: 24 Bit @ 48 kHz 115 dB-A Dynamic Range- 0.00x % THD+N Max output level 7.6 Vrms 2.5 ms end to end latency AES67 network audio (with optional encryption)
Connectivity:	4 x Balanced input channels 4 x Balanced output channels Audio input and Output connectors can be wired in redundant wiring with standby unit 4 x Supervised control inputs (0-12 V input tolerance, 12 Vref) 4 x Control outputs (Relay NC, NO, COM pins) 1x USB-C 2 x LAN RJ45 1000 Mbs with PoE
DSP	Built-in web-based graphical DSP pipeline designer 60+ Component library Extended precision fixed point processing API library
User Interface	Front panel diagnostic LEDs Rear panel diagnostic LEDs Web-based interface Cloud-connected
Security	Secure boot Encrypted firmware Tamper sensing Secure enclave chip AES256-GCM encryption for AES67
Storage	Onboard microSD card slot
Environmental	Operating temperature range 32 °F – 122 °F (0 °C – 50 °C) Storage temperature range 14 °F to 140 °F (-10 °C – 60 °C)
Power	12 V DC secure jack IEEE 802.3af power over Ethernet (PoE)
Dimensions	210 mm (W) x 275 mm (D) x 40 mm (H) 1 510 kg without mounting kit
Accessories	Mounting kit

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