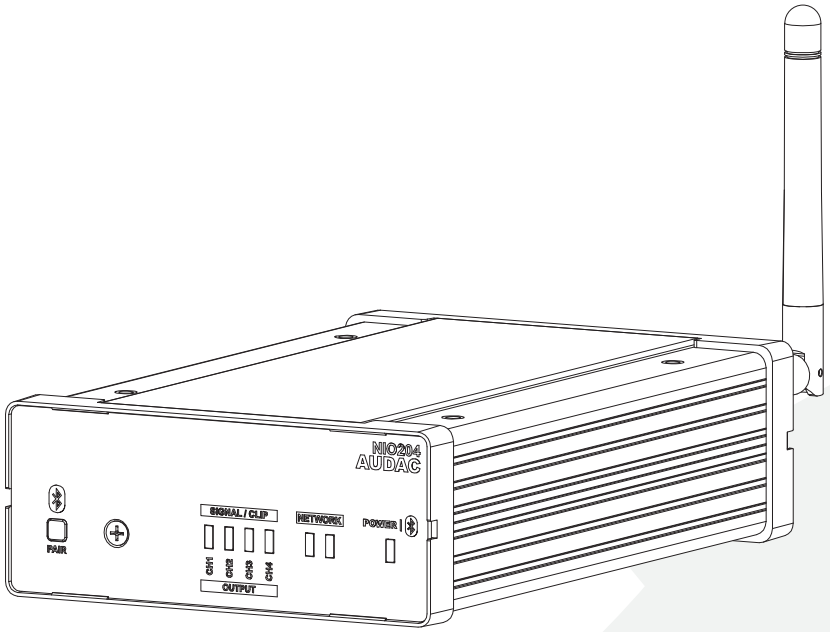
AUDAC

Hardware Manual

NIO2xx



ADDITIONAL INFORMATION

This manual is put together with much care, and is as complete as could be on the publication date. However, updates on the specifications, functionality or software may have occurred since publication. To obtain the latest version of both manual and software, please visit the Audac website @ audac.eu.

REV-1.1

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Introduction

Networked I/O expander Dante™/AES67

NIO series are Dante™/AES67 networked I/O expanders featuring terminal block input and output audio connection and Bluetooth connection. The audio inputs can be switched between line-level and microphone-level audio signals and phantom power (+48 V DC) can be applied to the input connectors for powering condenser microphones. Various further integrated DSP functions such as EQ, automatic gain control, and other device settings can be configured through the AUDAC Touch™.

The IP-based communication makes it future-proof while also being backwards compatible with many existing products. Thanks to the limited PoE power consumption, the NIO series is compatible with any PoE network-based installation.

The networked I/O expanders are compatible with MBS1xx setup box installation accessories which allow them to be mounted under a desk, in a closet, on the wall, on top of a dropped ceiling or a 19” equipment rack.

Precautions

READ FOLLOWING INSTRUCTIONS FOR YOUR OWN SAFETY

ALWAYS KEEP THESE INSTRUCTIONS. NEVER THROW THEM AWAY

ALWAYS HANDLE THIS UNIT WITH CARE

HEED ALL WARNINGS

FOLLOW ALL INSTRUCTIONS

NEVER EXPOSE THIS EQUIPMENT TO RAIN, MOISTURE, ANY DRIPPING OR SPLASHING LIQUID. AND NEVER PLACE AN OBJECT FILLED WITH LIQUID ON TOP OF THIS DEVICE

NO NAKED FLAME SOURCES, SUCH AS LIGHTED CANDLES, SHOULD BE PLACED ON THE APPARATUS

DO NOT PLACE THIS UNIT IN AN ENCLOSED ENVIRONMENT SUCH AS A BOOKSHELF OR CLOSET. ENSURE THERE IS ADEQUATE VENTILATION TO COOL THE UNIT. DO NOT BLOCK THE VENTILATION OPENINGS.

DO NOT INSTALL THIS UNIT NEAR ANY HEAT SOURCES SUCH AS RADIATORS OR OTHER APPARATUS THAT PRODUCE HEAT

DO NOT PLACE THIS UNIT IN ENVIRONMENTS WHICH CONTAIN HIGH LEVELS OF DUST, HEAT, MOISTURE OR VIBRATION

THIS UNIT IS DEVELOPED FOR INDOOR USE ONLY. DO NOT USE IT OUTDOORS

PLACE THE UNIT ON A STABLE BASE OR MOUNT IT IN A STABLE RACK

ONLY USE ATTACHMENTS & ACCESSORIES SPECIFIED BY THE MANUFACTURER

UNPLUG THIS APPARATUS DURING LIGHTNING STORMS OR WHEN UNUSED FOR LONG PERIODS OF TIME

ONLY CONNECT THIS UNIT TO A MAINS SOCKET OUTLET WITH PROTECTIVE EARTHING CONNECTION

USE THE APPARATUS ONLY IN MODERATE CLIMATES

CAUTION - SERVICING

This product contains no user serviceable parts. Refer all servicing to qualified service personnel. Do not perform any servicing (unless you are qualified to)

EC DECLARATION OF CONFORMITY

This product conforms to all the essential requirements and further relevant specifications described in following directives: 2014/30/EU (EMC), 2014/35/EU (LVD) & 2014/53/EU (RED).

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

The WEEE marking indicates that this product should not be disposed with regular household waste at the end of its life cycle. This regulation is created to prevent any possible harm to the environment or human health.

This product is developed and manufactured with high quality materials and components which can be recycled and/or reused. Please dispose this product at your local collection point or recycling centre for electrical and electronic waste. This will make sure that it will be recycled in an environmentally friendly manner, and will help to protect the environment in which we all live.

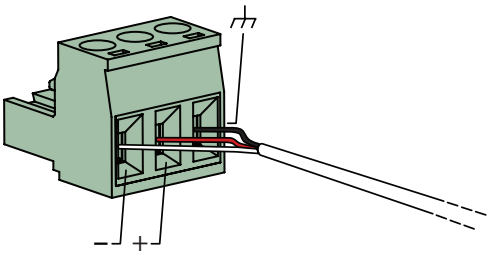
Connections

CONNECTION STANDARDS

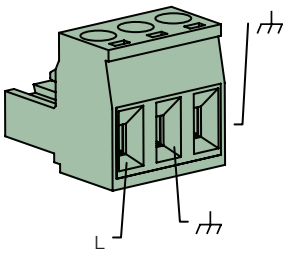
The in- and output connections for AUDAC audio equipment are performed according to international wiring standards for professional audio equipment

3-Pin Terminal block:

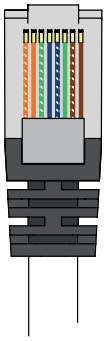
For balanced line output connections.



For unbalanced line input connections.



RJ45 (Network, PoE)
connections



Pin 1	White-Orange
Pin 2	Orange
Pin 3	White-Green
Pin 4	Blue
Pin 5	White-Blue
Pin 6	Green
Pin 7	White-Brown
Pin 8	Brown

Ethernet (PoE):
Used for connecting the NIO series in your Ethernet network with PoE (Power over Ethernet). The NIO series complies with the IEEE 802.3 af/at standard, which allows IP-based terminals to receive power, in parallel to data, over the existing CAT-5 Ethernet infrastructure without the need to make any modifications in it.

PoE integrates data and power on the same wires, it keeps the structured cabling safe and does not interfere with concurrent network operation. PoE delivers 48v of DC power over unshielded twisted-pair wiring for terminals consuming less than 13 watts of power.

The maximum output power is depending on the power delivered by the network infrastructure. In case the network infrastructure is not capable of delivering sufficient power, use a PoE injector to the NIO series.

While CAT5E network cable infrastructure is sufficient for handling the required bandwidth, it is recommended to upgrade the network cabling to CAT6A or better cabling to achieve the best possible thermal and power efficiency throughout the system when drawing higher powers over PoE.

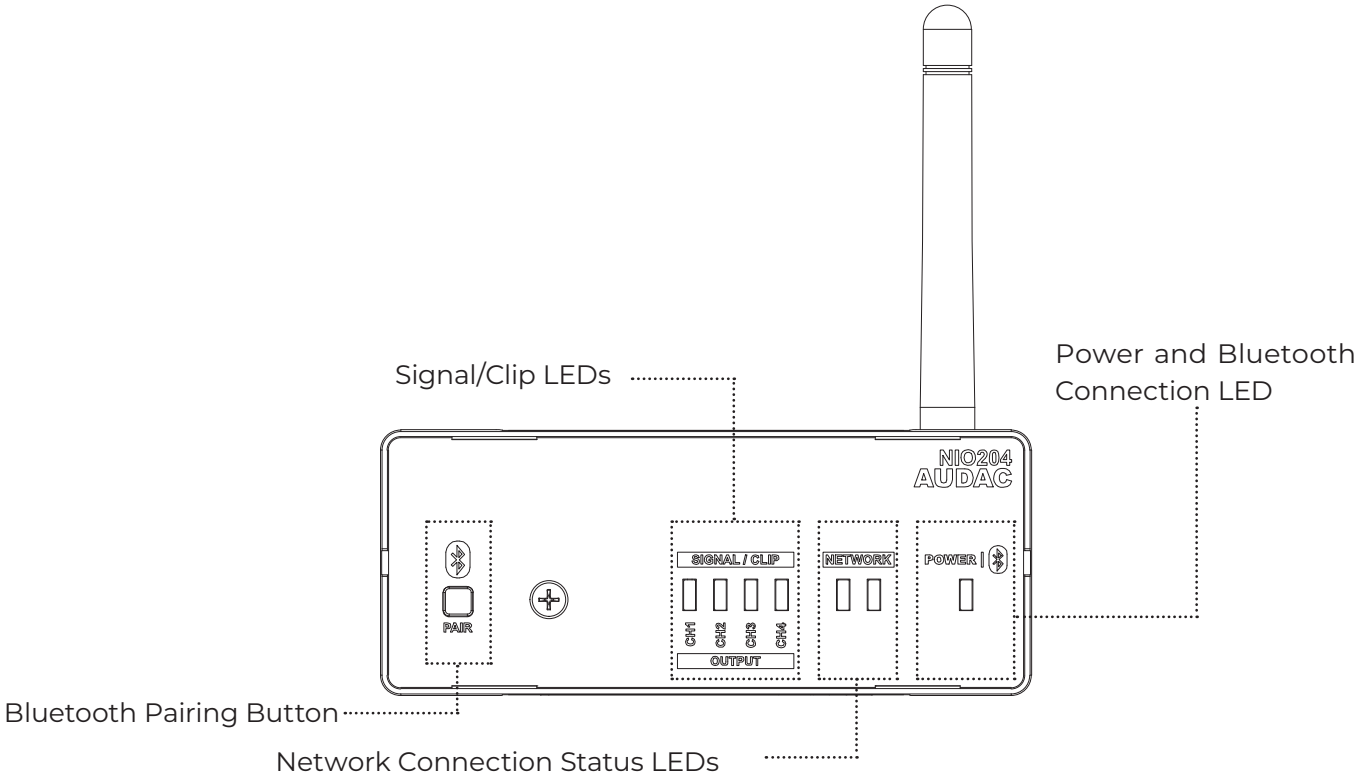
Network settings

STANDARD NETWORK SETTINGS
DHCP: **ON** IP Address: Depending on DHCP Subnet Mask: 255.255.255.0 (Depending on DHCP) Gateway: 192.168.0.253 (Depending on DHCP) DNS 1: 8.8.4.4 (Depending on DHCP) DNS 2: 8.8.8.8 (Depending on DHCP)

Chapter 2

Overview front panel

The NIO2xx series comes in a compact convection cooled enclosure. The front panel of each NIO2xx series product has a power and Bluetooth connection LED, network connection status LEDs, Bluetooth pairing button and signal/clip indicator LEDs. Signal/clip LEDs can be for input, output or both based on the model.



Front panel description

Power and Bluetooth Connection LED
The LED turns green when the device is powered, flashes in blue when the device is in Bluetooth discovery mode and turns blue when Bluetooth is paired. If no pairing occurs while the LED is flashing, the LED turns back to green after 60 seconds.

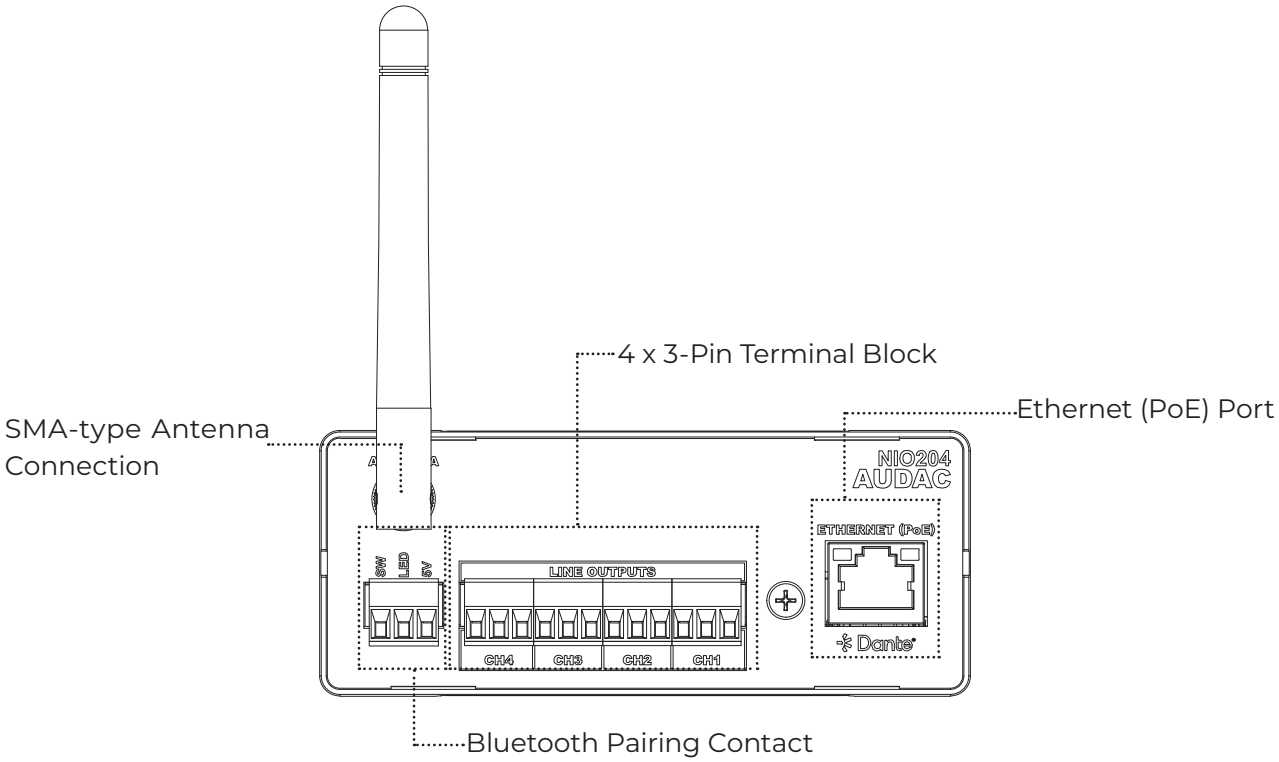
Network Connection Status LEDs
The network LEDs are the status indicator for network activity and speed, the same as the ethernet port on the rear panel of the device. Activity link LED (Act.) should be green for a successful link whereas the speed LED (Link) should be orange for indication of a 1Gbps connection.

Signal/Clip LEDs
Signal/clip LEDs are indicators for signal presence and clipping warning on the input or output of the device. NIO204 has signal/clip LEDs for its output four channels. NIO240 has signal/clip LEDs for its input four channels. NIO222 has signal/clip LEDs for its two input and two output channels.

Bluetooth Pairing Button
The NIO2xx series has Bluetooth, and pairing can be enabled in various ways. One of them is the pairing button on the front panel. Pressing the Pair button for 5 seconds activates Bluetooth pairing, and the power LED blinks in blue. After the connection is established, the power LED will turn solid blue.

Overview rear panel

The rear of the NIO2xx series contains audio input and output 3-pin terminal block connections, an ethernet connection port which is used to connect the expanders to the RJ45 connector, 3-pin terminal block bluetooth pair contact and bluetooth anttena . As the NIO2xx series are Dante™/AES67 networked audio in & output exapnders with PoE, all data flow and powering are done through this single port.



Rear panel description

Ethernet (PoE) Port
The Ethernet connection is the essential connection for the NIO2xx series. Both audio transmission (Dante/AES67), as well as control signals and power (PoE), are distributed over the Ethernet network. This input shall be connected to your network infrastructure. The LEDs accompanied by this input are indicating the network activity.

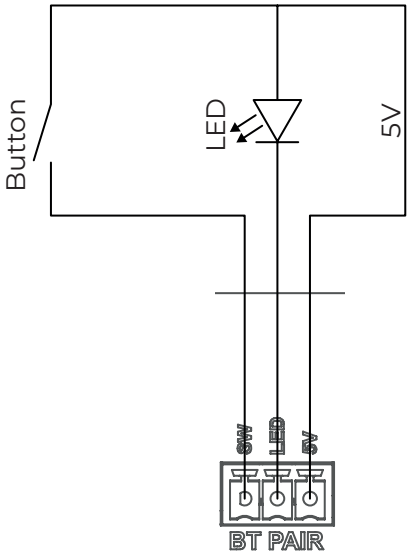
3-Pin Terminal Block
The NIO2xx series has 4 set of 3-pin terminal block on the rear panel. NIO204 has 4 channel balanced line output terminals. NIO240 has 4 channel line/mic input terminals. NIO222 has 2 channel mic/line terminals and 2 channel balanced line output terminals.

SMA-type Antenna Connection
The antenna (input) connection is implemented using an SMA-type (male) connector whereto the supplied antenna should get connected. Depending of the installation conditions (e.g. when installed in a closed / shielded cabinet), it can be extended using optional available accessories for optimal reception conditions.

Bluetooth Pairing Contact

When the NIO2xxx is installed in something like a locked rack, it may be difficult to enable Bluetooth pairing for new devices using the front button. For this purpose, an external pairing connector can be connected that contains the combination LED and button. When the button is pressed, Bluetooth pairing is enabled. This is confirmed by the flashing of the LED. If a device was connected, the connection is broken.

The LED will flicker for 60 seconds and the NIO2xx is visible to make a (new) connection. If a device connects, the LED will remain lit. After 60 seconds without connection, the NIO2xx is no longer visible to new devices but old devices can still connect. After 60 seconds the LED will be off. The connection can be made according to this wiring diagram:



Chapter 3

Quick start guide

This chapter guides you through the setup process for a NIO2xx series networked I/O expanders where the expander is a Dante™/AES67 source connected to the network. The control of the system is done through Audac Touch™.

The NIO2xx are compatible with MBS1xx setup box installation accessories which allow them to be mounted under a desk, in a closet, on the wall, on top of a dropped ceiling or in a 19” equipment rack.

Connecting the NIO2xx series

1) Connecting the NIO2xx series networked I/O expanders to your network
In oder to power your NIO2xx series networked I/O expander, connect your the expander to a PoE-powered ethernet network with a Cat5E (or better) networking cable. In case the available ethernet network is not PoE compatible, an additional PoE injector shall be applied in between. The maximum distance between the PoE switch and the expander should be 100 meters. The operation of the expander can be monitored through the indicator LEDs on the front panel of the unit, which indicate the input signal, clipping, network status or power status.

2) Connecting the 3-pin terminal block connector
The 3-pin terminal block connector shall be connected to the 3-pin pluggable terminal block on the back panel, Depending on the NIO2xx model, NIO204 has 4 channel balanced line output terminals. NIO240 has 4 channel line/mic input terminals. NIO222 has 2 channel mic/line terminals and 2 channel balanced line output terminals.

3) Connecting the Bluetooth
The NIO2xx series has Bluetooth, and pairing can be enabled in various ways. Using the PAIR button or establising a contact on BT PAIR terminal or using Audac Touch™ enables Bluetooth pairing when LED blink in blue color.

Factory Reset

In order to perform a factory reset on the NIO2xx series, power the device in normal way. Later, hold the PAIR button for 30 seconds and re-power the device within 30 seconds after releasing the button. The device will perform a factory reset at start-up.

Configuring the NIO2xx series

1) Dante controller

Once all connections are made, and the NIO2xx series wall panel is operational, the routing for the Dante audio transfer can be made.

For the configuration of the routing, the Audinate Dante Controller software shall be used. The use of this tool is extensively described in the Dante controller user guide which can be downloaded from both Audac (audac.eu) and Audinate (audinate.com) websites.

In this document, we quickly describe the most basic functions to get you started.

Once the Dante controller software is installed and running, it will automatically discover all the Dante-compatible devices in your network. All devices will be shown on a matrix grid with on the horizontal axis all the devices with their receiving channels shown and on the vertical axis all the devices with their transmitting channels. The shown channels can be minimized and maximized by clicking the '+' and '-' icons.

Linking between the transmitting and receiving channels can be done by simply clicking the cross points on the horizontal and vertical axis. Once clicked, it only takes a few seconds before the link is made, and the cross point will be indicated with a green checkbox when successful.

To give custom names to the devices or the channels, double-click the device name and the device view window will pop up. The device name can be assigned in the 'Device config' tab, while the transmitting and receiving channel labels can be assigned under the 'Receive' and 'Transmit' tabs.

Once any changes are made to linking, naming, or any other, it is automatically stored inside the device itself without requiring any save command. All settings and linkings will be automatically recalled after power off or re-connection of the devices.

Besides the standard and essential functions described in this document, the Dante Controller software also includes many additional configuration possibilities that might be required depending on your application requirements. Consult the complete Dante controller user guide for more information.

2) NIO2xx series settings

Once the Dante routing settings are made through the Dante Controller, other settings of the NIO2xx series expanders can be configured using the Audac Touch™ platform, which can be freely downloaded and operated from various platforms. This is very intuitive to be operated and automatically discovers all available compatible products in your network. Available settings include input gain range, output mixer, as well as advanced configurations such as WaveTune™ and much more.

Technical specifications

Inputs	Type	Mic/Line (NIO240/NIO222)
	Connector	Back: 2 x 3-pin terminal block (NIO222) 4 x 3-pin terminal block (NIO240)
	Impedance	10 kOhm Unbalanced
		20 kOhm Balanced
	Sensitivity*	0 dBV (Line) / -35 dBV (Mic)
	THD+N	< 0.02% - 0.013% (Line)
		< 0.1% - 0.028% (Mic)
	Signal / Noise	> 93 dBA (Line) / > 86 dBA(Mic)
	Type	Bluetooth receiver (Version 4.2)
	Type	Dante™ / AES67 (4 Channels)
		RJ45 with indicator LEDs
Configurable Settings		Gain, AGC, Noise Gate, WaveTune™, Maximum Volume
Output	Type	Balanced Line (NIO204/NIO222)
	Connector	Back: 2 x 3-pin terminal block (NIO222) 4 x 3-pin terminal block (NIO204)
	Impedance	52 Ohm
	Type	Dante™ / AES67 (4 Channels)
	Connector	RJ45 with indicator LEDs
	Output level	Switch between 0dBV and 12 dBV
Configurable Settings		8 Channels Mixer, Maximum Volume, Gain
Power supply		IEEE 802.3 af/at
Power consumption	(BT paired)	3.75W (NIO222) 3.54W (NIO240) 3.59W (NIO204)
Phantom power		48V DC
Noisefloor		-76.5 dBV
Dimensions	(W x H x D)	108 x 44 x 165 mm
Weight		0.48 kg
Accessoiries	Included	Bluetooth antenna
	Optional	MBS1xx setup box installation accessories
Compatible devices		All Dante compatible devices

*Input and output sensitivity levels defined are referred to a -13 dB FS (Full Scale) level, which is consequent through digital Audac devices and can be digitally gained when interfacing with 3rd party equipment.

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