User Manual  NA2-IO-DLINE
Line I/O to Dante™ Interface
Imprint

Subject to change due to technical advances! This user manual corresponds to the level of technology at the time the product was delivered and not the current stage of development at Neutrik.

If any pages or sections of this user manual are missing, please contact the manufacturer at the address listed below.

Copyright
This user manual is protected by copyright. The user manual must not be duplicated, reproduced, microfilmed or translated, or converted to be saved and processed in IT systems, neither as excerpts nor in full, without the express written authorization of Neutrik.

Copyright by: © Neutrik® AG

Document identification
Document No: BDA 537 V3
Version: 2019/02
Language: English
Original language: German

Each user manual in a different language is a translation of the operating manual in German.

Manufacturer
Neutrik® AG
Im alten Riet 143
9494 Schaan
Liechtenstein

T: +423 2372424
F: +423 2325393
E: neutrik@neutrik.com
www.neutrik.com
# Table of contents

1 About this document ............................................4  
  1.1 Significance of the user manual  4  
  1.2 Designations  4  
  1.3 Explanation of symbols  5  
  1.3.1 Symbols in illustrations  5  
  1.4 Target group  5  

2 Safety ................................................................ 6  
  2.1 Warning information and signal words  6  
  2.2 Warning symbols  6  
  2.3 Important regulatory notes  6  
  2.3.1 Declaration of conformity  7  
  2.4 Important safety instructions  7  
  2.5 Intended use  7  
  2.6 Foreseeable improper use  7  

3 Description of product ........................................ 8  
  3.1 What is the Dante™ adapter?  8  
  3.2 Device  8  
  3.3 Connections and displays  8  

4 Operation ...........................................................10  
  4.1 Preparations  10  
  4.2 Connecting devices with the Dante™ adapter  10  
    4.2.1 Connection diagram using a switch with PoE  
      support  11  
    4.2.2 Connection diagram using a switch without  
      PoE support  11  
  4.3 Applications  12  
    4.3.1 Converting an analog audio signal into a  
        Dante™ signal  12  
    4.3.2 Converting a Dante™ signal into an analog  
        audio signal  12  
    4.3.3 Signal conversion in both directions (mixed  
        mode)  12  
  4.4 Controlling the Dante™ adapter with the Dante™  
    controller  13  
    4.4.1 Enabling a Dante™ link  13  
  4.5 How to update your Neutrik Dante™ device via  
      Firmware Update Manager  13  

5 After operation ......................................................16  
  5.1 Dismounting devices  16  
  5.2 Transporting  16  
  5.3 Storage  16  
  5.4 Cleaning and care  16  
  5.5 Maintenance and repair  16  
  5.6 Disposal  16  

6 Appendix ................................................................18  
  6.1 Technical specifications  18
1 About this document

This user manual provides an overview of the necessary operation steps and settings on the product.

1.1 Significance of the user manual

This user manual is an integral component of the product and part of the product’s safety concept.

- Make sure that all persons who work with the product have fully read and also understood this user manual.
- Observe all instructions exactly, especially the safety instructions.

This user manual contains important information for safely and properly operating the product.

- Keep this user manual in the immediate vicinity of the product so personnel have access to it at all times.

- Pass this user manual on to every user, e.g., by lending it, or to the future owner of the product.
- If this user manual is lost or damaged, a copy of it can be downloaded from the Neutrik’s website (www.neutrik.com).

1.2 Designations

<table>
<thead>
<tr>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DanteTM adapter</td>
<td>DanteTM adapter NA2-IO-DLINE; to create the easy-to-read texts, the device is hereinafter referred to as DanteTM adapter.</td>
</tr>
<tr>
<td>DanteTM audio networking</td>
<td>DanteTM audio networking (hereinafter referred to as DanteTM) DanteTM stands for Digital Audio Network Through Ethernet and is an audio network protocol developed by the Australian company Audinate. DanteTM delivers uncompressed, multichannel, low-latency digital audio over a standard Ethernet network using Layer 3 IP packets.</td>
</tr>
<tr>
<td>PoE</td>
<td>Power over Ethernet; the device is supplied with power via the network connection.</td>
</tr>
<tr>
<td>Peripheral devices</td>
<td>All devices that can be connected to the DanteTM adapter: audio sources (transmitters) and audio sinks (receivers)</td>
</tr>
<tr>
<td>Audio source</td>
<td>All devices that emit an audio signal</td>
</tr>
<tr>
<td>Audio sink</td>
<td>All devices that receive the audio signals, e.g., loudspeakers, audio systems (amplifiers, mixing consoles, etc.)</td>
</tr>
</tbody>
</table>
1.3 Explanation of symbols

In order to make this user manual easier to understand, uniform safety instructions, symbols, terms and abbreviations were used. The following symbols designate instructions which are not relevant to safety, yet make it easier to understand the operating manual.

✔ The preconditions for an action are depicted with this symbol. Complete the specified items before carrying out the action steps which follow.

➢ Action steps are designated by this symbol. Carry out the action steps in the order they are presented.

✔ The result of the action or the reaction of the product to the action are depicted with this symbol.

• Lists without a mandatory sequence are presented as a list with this bullet.

1. Numbered listings are displayed in this manner.

(1) Refers to a position in an illustration.

Wherever you see this symbol, you will find useful information for safe, trouble-free operation of the product.

1.3.1 Symbols in illustrations

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image_position.png" alt="Image position" /></td>
<td>Image position</td>
</tr>
<tr>
<td><img src="action_steps.png" alt="Action steps numbered in an illustration." /></td>
<td>Action steps numbered in an illustration. Carry out the action steps in the order they are presented.</td>
</tr>
</tbody>
</table>

1.4 Target group

This user manual is addressed to sound engineers, musicians and personnel who have comprehensive experience in sound and event technology.
2 Safety

2.1 Warning information and signal words

Special warning information regarding potential dangers inherent in a particular action are presented before instructions for an action. The warnings are ranked as follows:

⚠️ CAUTION
Possible threat of danger!
This type of warning points out a situation which could result in minor or moderate injuries.
► If this warning is not heeded, minor injuries may result.

⚠️ NOTICE
Possible threat of property damage!
This type of warning points out a situation which could result in damage to the device and its components.
► If this warning is not heeded, property damage may result.

2.2 Warning symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ ]</td>
<td>General warning</td>
</tr>
<tr>
<td>![ ]</td>
<td>Warning of hearing impairment</td>
</tr>
</tbody>
</table>

2.3 Important regulatory notes

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.
NOTICE
Changes or modifications made to this equipment not expressly approved by Neutrik may void the FCC authorization to operate this equipment.

2.3.1 Declaration of conformity

The device meets all the relevant EU directives and therefore has the CE marking. The Declaration of Conformity may be consulted at www.neutrik.com/en/approvals-and-certificates.

2.4 Important safety instructions

Avoid property damage to the Dante™ adapter due to unsuitable operating and environmental conditions:
- Never immerse in water.
- Protect from strong sunlight.
- Never install the device near heat sources such as radiators, heating units, ovens or stoves.
- Never cover the device, to avoid overheating.
- Protect the device from impact and above all, from falling from poles, stages, tables or furniture.

Repair

NOTICE
Property damage due to improper repair!

The Dante™ adapter does not contain any parts which you can repair yourself. Opening or repairing the devices on your own can lead to severe damage to the device.
- Do not open the housing of the Dante™ adapter under any circumstances.
- Do not exchange any parts yourself.
- Only have the Dante™ adapter repaired by an authorized specialist dealer.

Information for operation
- Ensure that the ambient conditions specified for the Dante™ adapter are observed during operation.
- Do not use the Dante™ adapter if it is not functioning properly, have fallen or been damaged, have become wet or if parts of it have been immersed in water.
- If disruptions occur during operation: Immediately disconnect the Dante™ adapter from audio sources and/or audio sinks.
- Do not operate the Dante™ adapter in environments where flammable or explosive materials, gases or vapors are present or could occur.

2.5 Intended use

The Dante™ adapter is designed for converting the signal of an analog LINE audio signal into a Dante™ signal. Dante™ signals can also be converted into analog LINE signals.

2.6 Foreseeable improper use

The Dante™ adapter is not suitable for use outdoors and in potentially explosive atmospheres.
3 Description of product

3.1 What is the Dante™ adapter?

The Dante™ adapter is an end-of-network device. It is a breakout box which allows two channels of audio to be integrated into a Dante™ network. Simultaneously, Dante™ adapter converts a Dante™ stream into analog audio signals. Hence, it is possible to use this tiny box to feed analog audio signals into the Dante™ network while at the same time receiving a mix from another Dante™ source.

The Dante™ adapter is designed for harsh stage conditions. It therefore features lockable chassis connectors for both the audio and network connections. For fixed installations, the rubber protection can be removed. With optional mounting brackets or a rack panel, the box can be mounted below tables, in floor boxes, or in equipment racks.

3.2 Device

![Image of the Dante™ adapter]

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sheet metal housing</td>
</tr>
<tr>
<td>2</td>
<td>Rubber protection (removable)</td>
</tr>
<tr>
<td>3</td>
<td>Connections and displays</td>
</tr>
</tbody>
</table>

3.3 Connections and displays

![Image of the Dante™ adapter connections]

1. IN 1
2. IN 2
3. OUT 1
4. OUT 2
5. Dante™ PoE
6. Power
7. Sync
8. SYS
9. Line
10. Ground
11. Power
12. Dante™ PoE
13. Power
14. Sync
15. SYS
16. Line
17. Ground
18. Power
19. Dante™ PoE
20. Power
21. Sync
22. SYS
23. Line
24. Ground
25. Power
26. Dante™ PoE
27. Power
28. Sync
29. SYS
30. Line
31. Ground
32. Power
33. Dante™ PoE
34. Power
35. Sync
36. SYS
37. Line
38. Ground
39. Power
40. Dante™ PoE
41. Power
42. Sync
43. SYS
44. Line
45. Ground
46. Power
47. Dante™ PoE
48. Power
49. Sync
50. SYS
51. Line
52. Ground
53. Power
54. Dante™ PoE
55. Power
56. Sync
57. SYS
58. Line
59. Ground
60. Power
61. Dante™ PoE
62. Power
63. Sync
64. SYS
65. Line
66. Ground
67. Power
68. Dante™ PoE
69. Power
70. Sync
71. SYS
72. Line
73. Ground
74. Power
75. Dante™ PoE
76. Power
77. Sync
78. SYS
79. Line
80. Ground
81. Power
82. Dante™ PoE
83. Power
84. Sync
85. SYS
86. Line
87. Ground
88. Power
89. Dante™ PoE
90. Power
91. Sync
92. SYS
93. Line
94. Ground
95. Power
96. Dante™ PoE
97. Power
98. Sync
99. SYS
100. Line
101. Ground
102. Power
103. Dante™ PoE
104. Power
105. Sync
106. SYS
107. Line
108. Ground
109. Power
110. Dante™ PoE
111. Power
112. Sync
113. SYS
114. Line
115. Ground
116. Power
117. Dante™ PoE
118. Power
119. Sync
120. SYS
121. Line
122. Ground
123. Power
124. Dante™ PoE
125. Power
126. Sync
127. SYS
128. Line
129. Ground
130. Power
131. Dante™ PoE
132. Power
133. Sync
134. SYS
135. Line
136. Ground
137. Power
138. Dante™ PoE
139. Power
140. Sync
139. SYS
140. Line
141. Ground
142. Power
## Description of product

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1    | **Balanced XLR inputs**  
• Inputs for analog line signals (IN 1 and IN 2) |
| 2    | **Network connection (RJ45, PoE)**  
• Input/output for Dante™ network  
• Dante™ adapter power supply |
| 3    | **Balanced XLR outputs**  
• Outputs for analog line signals (OUT 1 and OUT 2) |
| 4    | **Network status LED**  
Indicates the device’s system status.  
• LED lights up red: system is starting.  
• LED lights up green: system is ready. |
| 5    | **SYS LED**  
Indicates the device’s system status.  
• LED lights up red: system is starting.  
• LED lights up green: system is ready. |
| 6    | **SYNC LED**  
Indicates the Dante transfer status.  
• LED lights up yellow: the system searches for SYNC.  
• LED lights up red: SYNC error  
• LED lights up green: the device is in Slave mode. The mode is managed via the Dante™ Controller.  
• LED flashes green: the device is in Master mode. The mode is managed via the Dante™ controller.  
• SYS + SYNC LED flashes green: the device has been identified via the identification function of the Dante™ Controller. |
4 Operation

4.1 Preparations

- Unpacking the Dante™ adapter.
- Save packaging for later transport and storage.
- Check the packaging and Dante™ adapter for visible damage.
- When visible damage to the packaging and/or delivered parts is detected:
  Contact the salesperson or Neutrik sales partner.
- Do not use damaged devices under any circumstances.

4.2 Connecting devices with the Dante™ adapter

The Dante™ adapter can be connected to a Dante™ network via a standard 100 Mb/s twisted-pair Ethernet cable (CAT5e). This individual connection is responsible for the data transfer as well as for the power supply. Depending on the cable length and shield, we do not recommend installing cables parallel to power supply lines.

The Dante™ adapter requires a switch that supports PoE (48 V). If a switch without PoE support is available, a PoE injector (compatible with 802.3af or 802.3at) must be connected in series.

**NOTICE**

Device damage due to a non-compliant PoE injector!

Non-compliant PoE injectors can damage the Dante™ adapter. The warranty is invalidated in this case.

- Only use a PoE injector that complies with IEEE 802.3af or 802.3at; class1

**CAUTION**

Danger of damage to hearing!

Signal peaks may occur when an audio source or sink is connected.

- Before making connections, mute the signal path of the peripheral devices.

- Connect the device depending on the desired application.
  e.g. audio source for LINE IN, audio sink for LINE OUT.
- Connect the Dante™ adapter to the PoE switch using a network cable.
- If the switch does not support PoE:
  Use a PoE injector.
- LEDs light up once the Dante™ adapter is supplied with power via the switch or the PoE injector.
- The Dante™ adapter is ready for operation.
- Set up the desired audio connection with the “Dante™ controller” software.
4.2.1 Connection diagram using a switch with PoE support

The Dante™ adapter forwards information to the PoE switch indicating that it is a “Class 1” device to ensure the correct power supply.

4.2.2 Connection diagram using a switch without PoE support

⚠️ NOTICE
Device damage due to a non-compliant PoE injector!
Non-compliant PoE injectors can damage the Dante™ adapter. The warranty is invalidated in this case.

▶️ Only use a PoE injector that complies with IEEE 802.3af or 802.3at.
4.3 Applications

4.3.1 Converting an analog audio signal into a Dante™ signal

Here, the Dante™ adapter is used to integrate up to 2 analog LINE signals into a Dante™ system.

4.3.2 Converting a Dante™ signal into an analog audio signal

Loudspeakers and amplifiers that do not support Dante™ can be connected to a Dante™ network using the Dante™ adapter.

4.3.3 Signal conversion in both directions (mixed mode)

Using the Dante™ adapter, the two applications described above can also be operated simultaneously (= mixed mode).
4.4 Controlling the Dante™ adapter with the Dante™ controller

The Dante™ controller is a free software application that enables routing of audio signals and configuring devices in a Dante™ network. Setting up a Dante™ network is very easy. The Dante™ controller offers automatic device detection, one-click signal routing and user-editable device and channel labelings.

The software is available on the Audinate website (www.audinate.com).

4.4.1 Enabling a Dante™ link

► Download and install the “Dante™ Controller” software. (https://www.audinate.com).
► Connect the computer to the switch using a standard network cable.
► Run the “Dante™ Controller” software.
► In the routing menu, click the + symbols of the devices.
► Establish the desired link.

The Dante™ adapter is displayed in the “Dante™ Controller” as a NA2DLINE by default, followed by a suffix with the last 6 digits of the MAC address. This name can be customized for each device in the Dante™ controller.

The “Dante™ Controller” software is solely used to set up the audio connection (routing) between devices and to configure the involved devices. During operation, the computer and the “Dante™ Controller” software can be disconnected from the network, since all relevant information remains saved on the involved devices.

4.5 How to update your Neutrik Dante™ device via Firmware Update Manager

Updates are important part of every device. They contain fixes, improvements and/or new functions. To ensure your system is stable, make sure your device is always up-to-date. This document will take you through all the necessary steps to update your device via Dante Firmware Update Manager.

You can download the firmware file here: www.neutrik.com/en/support/downloads

2. Connect your device via PoE injector to your PC and open Firmware Update Manager.
3. Choose the Network Adapter on which your device is connected to your PC. Click Next.

4. Click Update Dante Firmware

5. Browse to the firmware file (.dnt) and click Open

6. Click Next
7. Wait until your device(s) appear and select

8. Press Start and confirm

9. After successful update, the message appears informing you about the status. Now after rebooting the device(s), they are up-to-date.
5 After operation

5.1 Dismounting devices

Disconnect devices from audio sources/sinks.

5.2 Transporting

Always transport devices and accessories in the original packaging.

5.3 Storage

If devices are not used for a longer period:
- Disconnect the device from the connected devices.
- Always store devices in a clean, dry location.
- Always protect devices from dirt, dust, heat, humidity and moisture.

5.4 Cleaning and care

**NOTICE**

Danger of property damage due to improper cleaning!
- Disconnect device from all connections before cleaning.
- Never immerse device or accessory in water under any circumstances.
- Never spray device or accessory with liquids under any circumstances.

- Wipe the surfaces of the device and accessory with a soft cloth slightly moistened with a mild soap solution.
- Never use aggressive, solvent-based or abrasive cleaning agents under any circumstances.
- Never use rough materials (e.g., cleaning cloths or sponges with a rough coating).

5.5 Maintenance and repair

The Dante™ adapter does not contain any parts which can be maintained or repaired by the user.
- Only have the Dante™ adapter repaired by a specialist dealer authorized by Neutrik.

- Check the Dante™ adapter regularly for visible damage to the housings, controls, connections, cables and plugs.
- If damage is detected, do not use device under any circumstances.
- Immediately decommission the damaged device.
- Replace defective cables or accessories immediately.
### 5.6 Disposal

- Dispose of the Dante™ adapter and accessories in accordance with the applicable local regulations.
- Never dispose of electrical devices or electrical accessories such as cables, plug, batteries or components with household wastes under any circumstances.

- Dispose of packaging and packaging elements in accordance with the applicable local regulations.
- Take device components made of plastic, metal or other recyclables for reclamation in accordance with the applicable local regulations.
# Appendix

## 6.1 Technical specifications

### Dante™ specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channels</td>
<td>2 INPUTS (line level), 2 OUTPUTS (line level)</td>
</tr>
<tr>
<td>Supported sampling rates</td>
<td>44.1 / 48 / 88.2 / 96 kHz</td>
</tr>
<tr>
<td>Bit depth</td>
<td>16, 24 and 32 Bit</td>
</tr>
<tr>
<td>Latency</td>
<td>Depending on the network configuration, 1 ms (standard)</td>
</tr>
<tr>
<td>Ethernet connection</td>
<td>100BASE-TX (PoE support)</td>
</tr>
</tbody>
</table>

### Electrical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>&lt; 2 watts</td>
</tr>
<tr>
<td>Power supply</td>
<td>PoE switch (Power over Ethernet) or PoE injector (according to IEEE 802.3af/at, class 1)</td>
</tr>
</tbody>
</table>

### Analog audio input

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input impedance</td>
<td>6.6 kOhm</td>
</tr>
<tr>
<td>Input level (balanced)</td>
<td>Max. 22 dBu</td>
</tr>
<tr>
<td>Frequency response</td>
<td>20 Hz to 20 kHz (±/0.5 dB)</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 100 dB</td>
</tr>
<tr>
<td>Signal-to-noise ratio</td>
<td>&gt; 100 dB</td>
</tr>
<tr>
<td>THD + noise:</td>
<td>&lt; 0.01 % @ + 4 dBu, A-weighting</td>
</tr>
<tr>
<td>Crosstalk</td>
<td>&lt; -80 dB @ 20 kHz</td>
</tr>
</tbody>
</table>

### Analog audio output

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output impedance</td>
<td>&lt; 800 Ohm</td>
</tr>
<tr>
<td>Output level (balanced)</td>
<td>Max. 16 dBu</td>
</tr>
<tr>
<td>Frequency response</td>
<td>20 Hz to 20 kHz (±/0.5 dB)</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 100 dB</td>
</tr>
<tr>
<td>Signal-to-noise ratio</td>
<td>&gt; 100 dB</td>
</tr>
<tr>
<td>THD + noise:</td>
<td>&lt; 0.01 % @ + 4 dBu, A-weighting</td>
</tr>
<tr>
<td>Crosstalk</td>
<td>&lt; -80 dB @ 20 kHz</td>
</tr>
</tbody>
</table>

### Mechanical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.44 kg (1 pound)</td>
</tr>
</tbody>
</table>
| Dimensions (with rubber protection) | L = 164 mm (6.3 inches)  
B = 82 mm (3.2 inches)  
H = 51 mm (2.0 inches) |
| Dimensions (without rubber protection) | L = 151 mm (5.9 inches)  
B = 66 mm (2.6 inches)  
H = 41 mm (1.6 inches) |
| Operating environment      | Indoor                                                                  |
| Operating temperature      | –5°C to +70°C                                                           |
| Storage temperature        | –40°C to +150°C                                                         |