

# Linea Focus

Beam Steering Systems

DLI-130 / DLI-230 / DLI-330 / DLI-430



Please read this user manual through carefully before putting the system into operation and keep it for future reference.

# Contents

- 1. Introduction and General Instructions ..... 4
  - 1.1 Important Safety Instructions ..... 4
    - 1.1.1 Explanation of Terms..... 4
    - 1.1.2 General Safety Instructions ..... 5
    - 1.1.3 Electrical Safety Information ..... 6
    - 1.1.4 Acoustic Safety Information ..... 6
    - 1.1.5 Connections and Cabling ..... 7
  - 1.2 Operating Conditions ..... 7
    - 1.2.1 Information on Abnormal Operation ..... 8
  - 1.3 Storage and Transportation ..... 8
- 2. The Product ..... 9
  - 2.1 Product Description..... 9
  - 2.2 Delivery and Accessories ..... 10
    - Flying adapter with tilt function, black, for Linea Focus DLI-130/230/330/430 ..... 11
  - 2.3 Unpacking..... 12
- 3. Setting up ..... 13
  - 3.1 Installation..... 13
    - 3.1.1 Tools for installation..... 13
  - 3.2 Cabling..... 14
    - 3.2.1 Connections..... 15
    - 3.2.2 Opening the service flap..... 21
  - 3.3 System Set-up..... 23
    - 3.3.1 Configuration..... 24
    - 3.3.2 System Requirements for the Computer ..... 28
    - 3.3.3 Downloading and Installing Fohhn Audio Soft ..... 28
    - 3.3.4 Fohhn-Net Cabling and ID Allocation ..... 29
    - 3.3.5 Identifying Connected Systems ..... 30
    - 3.3.6 Renaming Devices / Channels ..... 31
    - 3.3.7 Graphically Arranging the Loudspeaker Systems ..... 32
    - 3.3.8 Loading Loudspeaker Presets..... 32
  - 3.4 Further Options ..... 34
    - 3.4.1 Auto Power Save ..... 34

3.4.2 Pilot Tone Detection.....	35
3.4.3 Switching Contacts .....	36
3.4.4 Password Lock .....	37
3.4.5 Tilt Sensor .....	37
4. Control via Fohhn Audio Soft .....	38
4.1 Beam Steering – the functional principle .....	38
4.1.1 Side Lobe Free Technology.....	39
4.1.2 Two Beam Technology (Two Beam-Modus).....	40
4.1.3 Acoustic Centre .....	41
4.2 Setup in the Beam Steering View .....	42
4.3 Adjustment of DSP Functions.....	44
4.4 Saving projects .....	45
5. Technical documentation .....	46
5.1 Technical Specifications.....	46
5.1.1 DLI-130 (all product versions) .....	46
5.1.2 DLI-230 (all product versions) .....	49
5.1.3 DLI-330 (all product versions) .....	52
5.1.4 DLI-430 (all product versions) .....	55
6. Troubleshooting .....	58
7. Service and Repair .....	59
7.1 Maintenance Measures.....	59
8. Glossary .....	60
9. Appendix.....	61
9.1 Environmental Information.....	61
9.2 CE Marking and Declaration of Conformity.....	61
9.3 Trademarks.....	61
9.4 Protection Classes and Protection Types .....	61
9.5 Disclaimer and Copyright .....	62
9.6 Contact Address .....	62

# 1. Introduction and General Instructions

Congratulations on the purchase of your **Fohhn Linea Focus** system. As with all our **FOCUS-SERIES** systems, **Linea Focus** loudspeakers are equipped with the very latest **Fohhn Beam Steering Technology**. This allows users to adjust the system's vertical beam dispersion characteristics in real time, enabling optimum sound coverage – even in the most acoustically challenging venues.

All the functions of a **Linea Focus** system can be controlled using a single piece of software, **Fohhn Audio Soft**.

All **Linea Focus** systems are available in both mobile and fixed installation variants.

**In order to benefit from all the advantages of your Linea Focus system and to guarantee smooth operation, please read the following instructions carefully before using the system and keep this manual for future reference!**

## 1.1 Important Safety Instructions

Please read the following safety instructions in their entirety before using this device. Keep these instructions near the device at all times. Reading the instructions does not replace the need for awareness of and compliance with currently applicable national safety regulations and standards, or the observance of safe on-site working methods.

All information and technical specifications published here are based on data that was available at the time of publication. We expressly reserve the right to make any changes.

### 1.1.1 Explanation of Terms

#### **Danger**

This signal word indicates a hazard with a high risk level, which, if not avoided, could result in death or serious injury.

#### **Warning**

This signal word indicates a hazard with a medium risk level, which, if not avoided, could result in death or serious injury.

#### **Caution**

This signal word indicates a hazard with a low risk level, which, if not avoided, could result in minor to moderate injury.

## 1.1.2 General Safety Instructions

### Danger:

To avoid danger to life or limb, please ensure that all personnel involved in installing or dismantling this system have read and understood the contents of this manual.

The information presented here should, however, be regarded as accompanying advice and it does not affect the ultimate responsibility of the user to ensure safe on-site operation of a **Linea Focus** system.

### Warning:

To prevent injury caused by a fallen system,

- ⚠ this device must be securely mounted in accordance with the assembly instructions and current safety guidelines. Only use the specially designed **Fohhn** mounting accessories or components, which are explicitly specified in the assembly instructions.
- ⚠ this device must be regularly inspected for any signs of wear or loosening of the load-bearing connections.
- ⚠ it is necessary to ensure that the mounting points on a building or structure have sufficient load-bearing capacity and are structurally viable.
- ⚠ all components of a hung (i.e. “flown”) device must be visually inspected before installation. Any part showing signs of deformity, cracks, rust, fractured welds or other signs of wear must not be used under any circumstances.
- ⚠ the load limit of any component that will be used for system suspension (including shackles, chains and hoists) must not be exceeded. In order to comply with local safety regulations, these load limits may, in certain circumstances due to underlying safety factors (operating ratios), need to be recalculated and, if necessary, reduced.

All components required for the mounting or suspension of a **Linea Focus** system have been designed and constructed in accordance and compliance with the following regulations that are applicable in Germany: BGV-C1, BGI 810-3, DIN EN 1993-1-1, DIN EN 1999-1-1 and DIN 18032-2. The safety factor (operating ratio) is therefore equal to or better than 10:1. If the system is to be used in countries that have stricter requirements, the permissible load capacity must be reduced accordingly.

To avoid injury, the device must be stored, installed and operated well away from children.

To avoid injury, this device must be taken out of operation, marked appropriately and protected against accidental use if it

- ⚠ shows visible signs of damage,
- ⚠ appears to contain loose parts,
- ⚠ is not working correctly,
- ⚠ has been subjected to unfavourable conditions (e.g. moisture) for a prolonged period,
- ⚠ has been subjected to poor transportation conditions (e.g. with unsuitable packaging or humidity).

**If necessary, please contact your Fohhn dealer or the transport company immediately.**

### 1.1.3 Electrical Safety Information

**Linea Focus** systems are Protection Class 1 appliances. They are built and certified in accordance with the VDE safety measures for electronic devices and, safety-wise, leave our factory in perfect condition. The devices comply with all currently applicable EMC directives, confirmed by the attached CE marking.

**The relevant guidelines can be found in the appendix to this user manual!**

#### **Warning:**

To minimize the risk of electric shock,

- ⚠ the mains plug grounding pin must never be separated and under no circumstances should the plug be taped up.
- ⚠ the device must **only** be connected to a professionally tested shockproof socket.
- ⚠ the device enclosure must never be opened. The device does not contain any components that can be repaired by the user. In the unlikely case of a defect, please consult qualified service personnel and/or the dealer from whom you purchased the system.

Please also ensure that the local mains supply voltage matches the power supply voltage specified on the device.

To minimize the risk of an electric shock or fire,

- ⚠ the device must not be subjected to moisture.
- ⚠ containers filled with liquid (e.g. beverage containers) must not be placed on the device.
- ⚠ ventilation slots must not be covered with objects (e.g. protective rain covers).
- ⚠ the device must not be subjected to excessive heat, sunshine, fire or similar.
- ⚠ no open sources of flame (e.g. pyrotechnics) must be placed on the device.

#### **Caution**

To avoid damaging the device,

- ⚠ do not leave the power cable plugged in if the device is not going to be used for a while. (Remove the plug from the mains socket in order to completely disconnect the device!)

### 1.1.4 Acoustic Safety Information

**Linea Focus** loudspeaker systems are capable of generating very high sound pressure levels, which can cause irreparable damage to hearing.

#### **Warning:**

To avoid potential hearing impairment,

- ⚠ never stand in close proximity (1 metre or less) to a device while it is in operation.

To prevent both hearing impairment and damage to the device, avoid the following while the device is in operation:

- ⚠ acoustic feedback,

- ⚠ high powered, permanently distorted signals,
- ⚠ impulse noises, which can occur when a device is switched on or off, connected or disconnected from the system.

### 1.1.5 Connections and Cabling

Please note the following when wiring up your system:

- ⚠ Check that your cable is working faultlessly and only use cables with a sufficient cross section.
- ⚠ Only use cabling- and connector materials that meet professional standards.
- ⚠ Only use properly shielded cables and plugs for the audio and data connections.
- ⚠ Only use power cables with a fully intact grounding pin and make sure that the device's mains plug is accessible at all times so that it can be quickly removed from the mains supply in the event of a malfunction.
- ⚠ Lay and secure the cabling so that it cannot be damaged by tools, or through being trapped by the device or by a fixing bracket.
- ⚠ Protect any laid cables from mechanical damage, or unnecessary traction.
- ⚠ Avoid excessive tightening of the screws on connection terminals! (This only applies to fixed installation variants.)

**The wiring up of loudspeakers should only be carried out by suitably qualified personnel!**

**Important:** To enable communication between a Windows PC with **Fohhn Audio Soft** installed and **Linea Focus DLI-130/230/330/430 AES** or **DLI-130/230/330/430 ANA** loudspeaker systems, a **Fohhn** network adapter (e.g. **NA-11 Fohhn-Net USB adapter** or **NA-4 Fohhn-Net ethernet adapter**) is required.

**More information can be found in Chapter 3 of this user manual!**

## 1.2 Operating Conditions

Please note the following when operating your **Linea Focus** system:

- ⚠ The permitted ambient temperature of the device during operation ranges from 0 °C to +40 °C. A short period of use outside this temperature range is possible, but not advisable.
- ⚠ The device is intended for use in a dry environment with normal levels of dust and humidity in the air.
- ⚠ If any moisture has formed on the back of the device during transportation or storage, allow the device to acclimatise for approximately 2 hours before use.
- ⚠ Never expose the device to any aggressive chemical fluids or vapours.
- ⚠ Always make sure that heat can be dissipated via the outer surface of the device enclosure.

- ⚠ Always make sure that the device is well ventilated. In order to ensure adequate cooling, the device must not be covered with towels or cloths. Avoid letting the enclosure become hot through exposure to sunlight or strong spotlights.
- ⚠ Never expose the device to strong vibration.

### 1.2.1 Information on Abnormal Operation

If the permissible operating temperature is too high (over 75 °C), the device will shut down. As soon as the temperature returns to within the normal operating range, the device will automatically power up again.

The temperature of the **Linea Focus** loudspeaker system will be displayed in **Fohhn Audio Soft**. Shutdown can also occur if the product is exposed to direct sunlight or very high environmental temperatures. Reliable operation is only guaranteed in compliance with the permissible ambient temperature range.

The device should be immediately inspected by a **Fohhn Audio AG** approved service partner if

- ⚠ the mains cable or power socket is damaged,
- ⚠ a foreign body or liquid has got into the interior of the device,
- ⚠ the device has been exposed to rain,
- ⚠ the device is not working normally, i.e. it is showing marked differences in performance,
- ⚠ the device is damaged (e.g. after a fall).

### 1.3 Storage and Transportation

Please note the following:

- ⚠ The device should only be transported in its original packaging.
- ⚠ Store the device in a dry environment, with a constant ambient temperature, in order to avoid condensation.
- ⚠ The permitted ambient temperature range for storing the device is -10 °C to +70 °C.
- ⚠ Due to fluctuations in temperature during transportation and storage, condensation may start to build up on the surface of the device. Before operating the device, examine its surface for any signs of moisture. If this is the case, allow the unpacked device to acclimatise for two hours in the environmental temperature before using it.

## 2. The Product

### 2.1 Product Description

**Fohhn Linea Focus** loudspeakers are active, high performance line source systems that can be remotely controlled and monitored. Equipped with coated 4" long excursion drivers, the systems have integrated CLASS-D amplifiers and DSP technology specially developed for this area of application.

The main feature of these systems is their **Beam Steering Technology**. This enables intuitive control of the systems' vertical beam dispersion characteristics - in real time – using **Fohhn Audio Soft** (Version 5.0.3 or later): the vertical beam width is adjustable from 0° and 90° and the vertical inclination angle from -40° to +40°, in precise 0.1° increments. This helps to avoid unwanted reflections from floors and ceilings, while enabling precise, even coverage of audience areas. Conventional mechanical tilting, i.e. the physical adjustment of the loudspeaker at the venue, is no longer necessary.

The current version of **Fohhn Audio Soft** can be downloaded free of charge from [www.fohhn.com](http://www.fohhn.com) .

If higher sound pressure levels are required in the low frequency range, **Linea Focus** systems can easily be combined with **Fohhn** active or passive subwoofers.

**Linea Focus** has been developed for both mobile and fixed installation applications. The models described in this manual are fixed installation variants, e.g. for use in churches and cathedrals, congress halls and exhibition centres, airports and railway stations, theatres, TV studios, university lecture theatres and auditoria, conference rooms or museums.

The following applies to all **Linea Focus** models: The longer the line source system, the further its reach – and the better its ability to precisely control low frequencies.

#### ***Loudspeaker system overview (fixed installation)***

The following models are available:

Model	Components	Amplifier channels	Unit length
<b>DLI-130</b>	8 x 4" long excursion driver	8 x 100 W, Class-D	1358 mm
<b>DLI-230</b>	16 x 4" long excursion driver	16 x 100 W, Class-D	2308 mm
<b>DLI-330</b>	24 x 4" long excursion driver	24 x 100 W, Class-D	3377 mm
<b>DLI-430</b>	32 x 4" long excursion driver	32 x 100 W, Class-D	4316 mm

## Input Interfaces

Linea Focus systems are available as standard with different input interface options, as per the following product variants:

- **DLI-130/230/330/430 AES** – with digital AES/EBU and Airea signal inputs
- **DLI-130/230/330/430 ANA** – with analogue signal inputs
- **DLI-130/230/330/430 DAN** – with an interface for the Dante network protocol

AES/EBU **AIREA**<sup>®</sup> 

## 2.2 Delivery and Accessories

Every product is examined according to the highest quality and safety standards prior to despatch. Please check your product carefully for any signs of transport damage and, in the event of any damage having occurred, inform your dealer and the transportation company immediately. Please also check that the packaging contains all the components belonging to the device.

Your **Linea Focus** system is delivered with the following:

- **1 × DLI-130 / DLI-230 / DLI-330 or DLI-430 speaker system**
- **1 × quick start guide**

**If the delivery does not appear to be complete, please contact your Fohhn dealer!**

### Accessories

Setting up a **DLI-130/230/330/430 AES** or **DLI-130/230/330/430 ANA** system requires a Windows PC with **Fohhn Audio Soft** (min. **Version 5.x**) installed and one of the two following **Fohhn** network adapters:

Product ID	Article number	Description
<b>NA-11</b>	6115-00000	Fohhn-Net USB Adapter
<b>NA-4</b>	6122-00000	Fohhn-Net Ethernet Adapter



NA-11 Fohhn-Net USB adapter

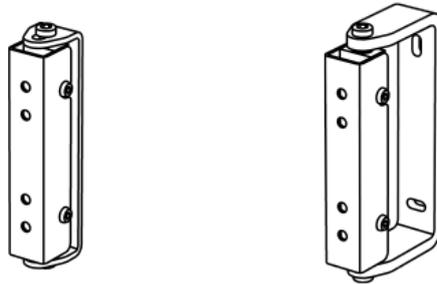


NA-4 Fohhn-Net ethernet adapter

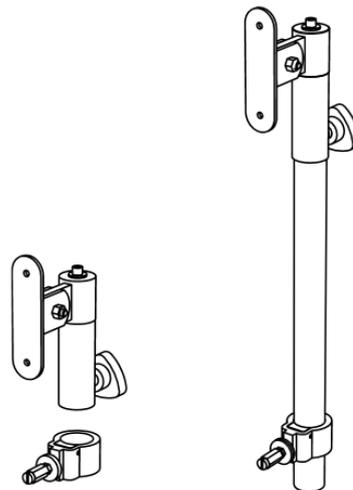
The following accessories are available for **Linea Focus** products:

Product ID	Article number	Description
<b>LC-50</b>	8301-00000	Clamp for safe and easy mounting on traverses, $\varnothing$ 50 mm ( <b>TV spigot no. 8011-00000</b> needed)
<b>SA-9</b>	8220-00000	Tripod/stand adapter 36 mm (2-part) with spacer, black, for <b>Linea Focus DLI-130/230</b>
<b>SA-10</b>	8212-00000	Adapter with perforations for M10 screws (without tripod adapter) for flown applications e.g. with optional <b>LC-50 clamp</b> and <b>TV spigot</b> with M10 internal thread, black, for <b>Linea Focus DLI-130/230/330/430</b>
<b>VL-1</b>	8458-00000	Flying adapter with tilt function, black, for <b>Linea Focus DLI-130/230/330/430</b>
<b>WLF-1</b>	8435-B0000 / 8435-W0000	Wall mounting bracket for <b>Linea Focus DLI-130/230/330/430*</b> , black/white
<b>WLF-2</b>	8438-B0000 / 8438-W0000	Wall mounting bracket for <b>Linea Focus DLI-130/230/330/430*</b> , black/white
<b>CB-LX-150</b>	8118-00000	Padded carrying bag for <b>Linea Focus DLI-130</b> and also <b>LINEA LX-150</b>

\*Note: For more secure mounting of DLI-330/430 systems, 2 × WLF-1/2 are required.



WLF-1 (left) and WLF-2 (right) wall mounting brackets



SA-9 stand adapter (2-part), with spacer (left), with stand (right)



SA-10 stand adapter (left), LC-50 clamp and TV spigot

## 2.3 Unpacking

When unpacking the system, we recommend the following procedure:

1. Open the packaging and take out the product.
2. Examine the product for any visible signs of transport damage.  
If the product has been damaged, inform the transportation company immediately. A claim for transport damage can only be made by the recipient (that is to say, you). Keep the packaging for examination by the transportation company.
3. As a general rule, always retain the packaging. Despatch the product in appropriate outer packaging or in a suitable flightcase.

## 3. Setting up

### 3.1 Installation

Installation instructions for commercial loudspeaker stands and mounting brackets:  
To guarantee stability, the device must be installed and secured at the installation site using appropriate tools and accessories. Please therefore use the specified system accessories (see Chapter 2.2 “Delivery and Accessories”).

#### 3.1.1 Tools for installation

The following tools are required for installing and wiring up a **Linea Focus** loudspeaker system:

- (1) a 4 mm Allen key (for wall brackets)
- (2) a small screwdriver (for Phoenix connectors)
- (3) a screwdriver (for opening the front grille)
- (4) a 5.5 socket spanner (for the 4 strain relief nuts)
- (5) a Philips screwdriver (for opening the service flap; for the grounding screws [on DLI-130 and DLI-230])
- (6) a knife (for widening the rubber profile slot if necessary)



## 3.2 Cabling

All connectors are internally mounted and can be accessed from behind one of the service flaps on the front of the loudspeaker. This means that all connection cables must be fed into the speaker enclosure from behind, via a cable duct. It also means that no unsightly cabling will be visible. The internal strain relief guarantees safe operation.

### *Widening the rubber profile slot*

Depending on the dimensions of the cable harness, the slot in the cable duct's rubber profile can easily be widened using a small knife.

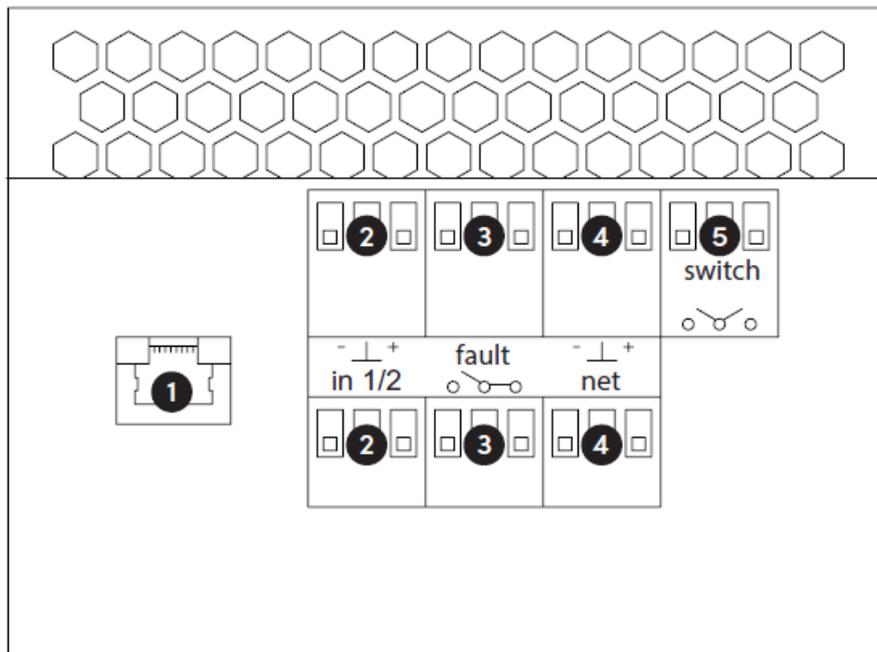


Cable duct on a Linea Focus system

### 3.2.1 Connections

All loudspeaker systems are available in different product variants with the relevant input options, i.e. input interfaces:

#### ***DLI-130/230/330/430 AES – AES/EBU and Airea connection variant***



#### **(1) Airea-NET Input**

The **DLI-130/230/330/430 AES** is connected to the **Airea-NET** via its RJ-45 input. **Airea-NET** is a network that enables transmission of digital remote control signals (**Fohhn-Net**) and digital audio signals (AES/EBU).

**Airea-NET signals cannot be further routed (no signal link)!**

**Using the Airea-NET input, Airea BREAK OUT/IN EXTENSIONS (ABX) can also be supplied with power!**

#### **(2) AES/EBU Input**

Digital audio signals (AES/EBU) can be fed in via these two 3-pin Phoenix connectors.

**When connecting digital audio signals, please use either the Airea-NET Input (1) or one of the two 3-pin Phoenix connectors (2). Both connectors are designed for Channels 1 and 2 respectively.**

**AES/EBU signals cannot be further routed (no signal link)!**

### (3) Fault message contact (2x)

An error status can be reported via these open/closed contacts. The fault contact relay (2 x UM) should be operated with a maximum of 50 V and 500 mA.

**One of the two 3-pin Phoenix connectors can be used as a link!**

### (4) Fohhn-Net Input (2x)

The **DLI-130/230/330/430 AES** can be connected to the **Fohhn-Net** remote control network via these 3-pin Phoenix connectors

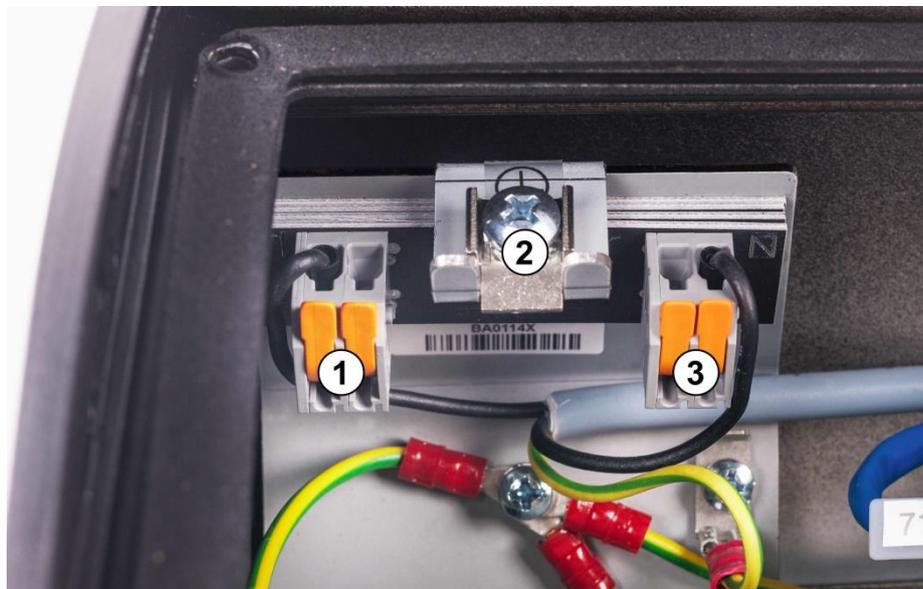
**One of the two 3-pin Phoenix connectors can be used as a link!**

### (5) Switching contact

This 3-pin Phoenix connector serves as a switching contact for changing presets. This can be configured in **Fohhn Audio Soft** (see Chapter 3.4.3 “Switching contacts”).

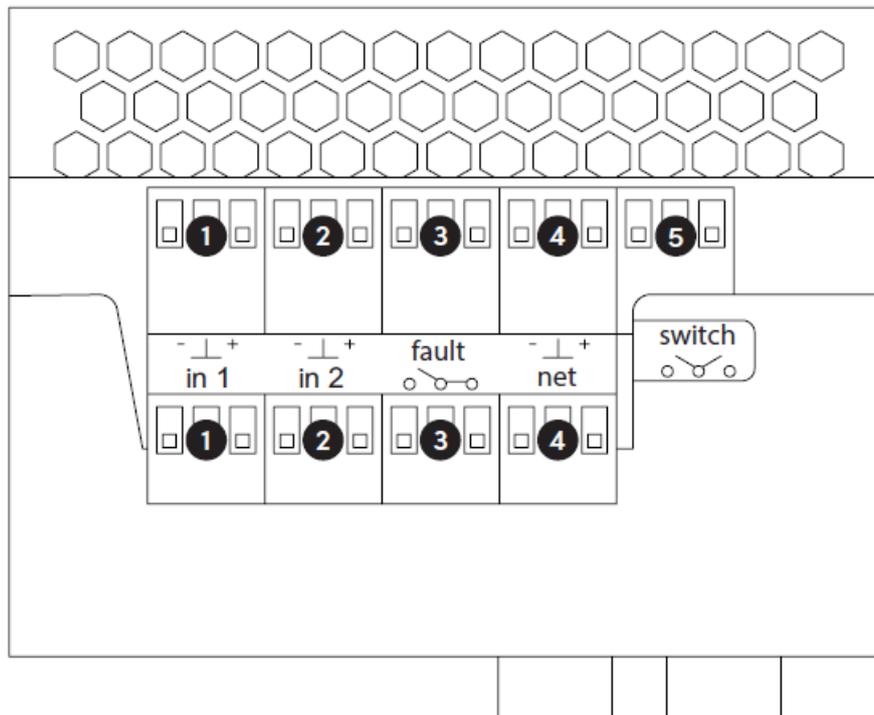
### (6) Mains connection

Mains connection is via a 2-pin WAGO (grounding screwed). The switching power supply (with Power Factor Correction) allows a supply voltage of 100 V – 240 V AC / 4 A / 50/60 Hz.



WAGO terminal for mains connection with two pins (1) and (3) and grounding screw (2)

## ***DLI-130/230/330/430 ANA – analogue connection variant***



### **(1) Analogue Input 1**

Analogue audio signals can be fed in via these 3-pin Phoenix connectors.

**One of the two 3-pin Phoenix connectors can be used as a link!**

### **(2) Analogue Input 2**

Analogue audio signals can be fed in via these 3-pin Phoenix connectors.

**One of the two 3-pin Phoenix connectors can be used as a link!**

### **(3) Fault message contact (2x)**

An error status can be reported via these open/closed contacts. The fault contact relay (2 x UM) should be operated with a maximum of 50 V and 500 mA.

**One of the two 3-pin Phoenix connectors can be used as a link!**

### **(4) Fohhn-Net Input (2x)**

The DLI-130/230/330/430 AES can be connected to the **Fohhn-Net** remote control network via these 3-pin Phoenix connectors

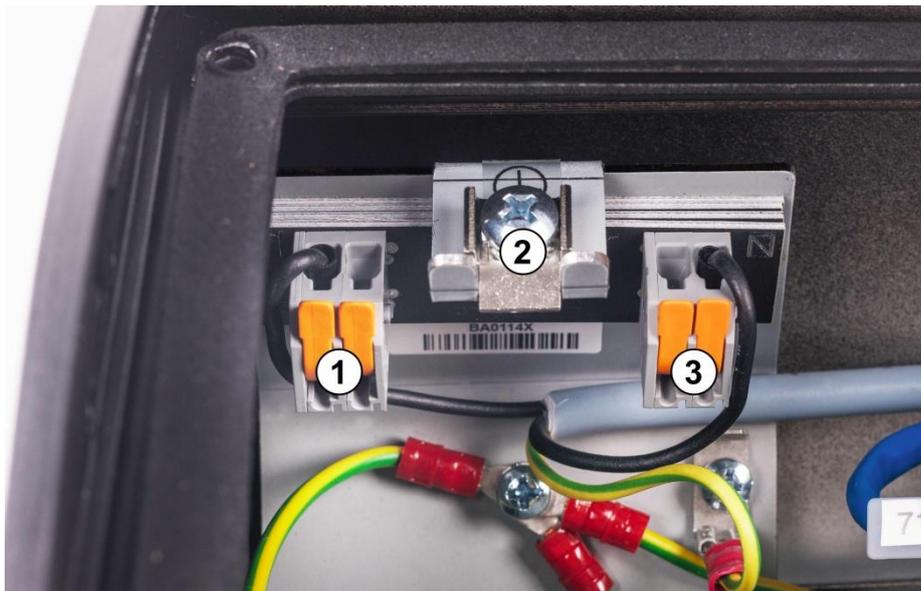
**One of the two 3-pin Phoenix connectors can be used as a link!**

### (5) Switching contact

This 3-pin Phoenix connector serves as a switching contact for changing presets. This can be configured in **Fohhn Audio Soft** (see Chapter 3.4.3 “Switching contacts”).

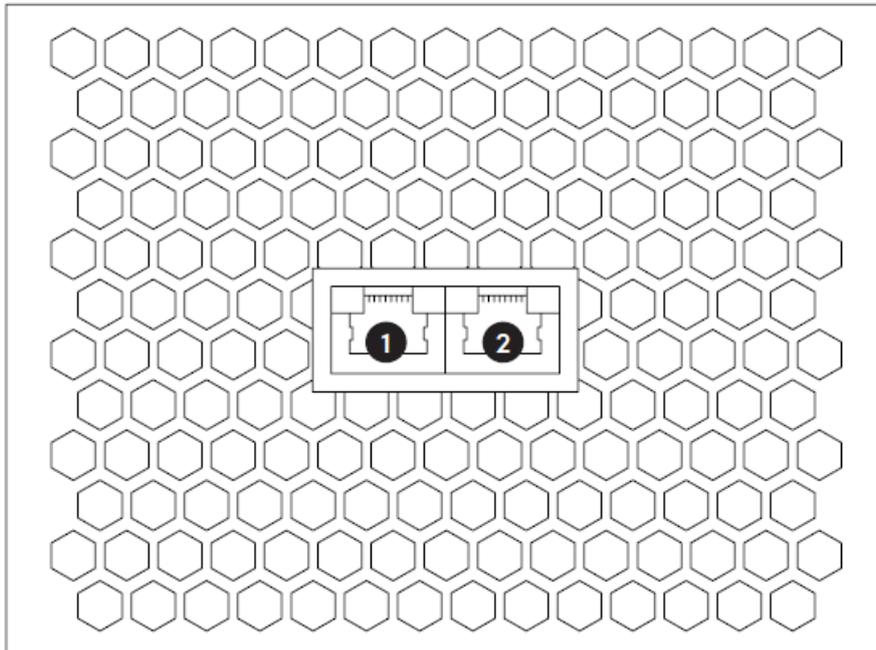
### (6) Mains connection

Mains connection is via a 2-pin WAGO (grounding screwed). The switching power supply (with Power Factor Correction) allows a supply voltage of 100 V – 240 V AC / 4 A / 50/60 Hz.



WAGO for mains connection with two pins (1) und (3) and grounding screw (2)

## **DLI-130/230/330/430 DAN – Dante connection variant**



### **(1) Dante Primary und Fohhn-Net**

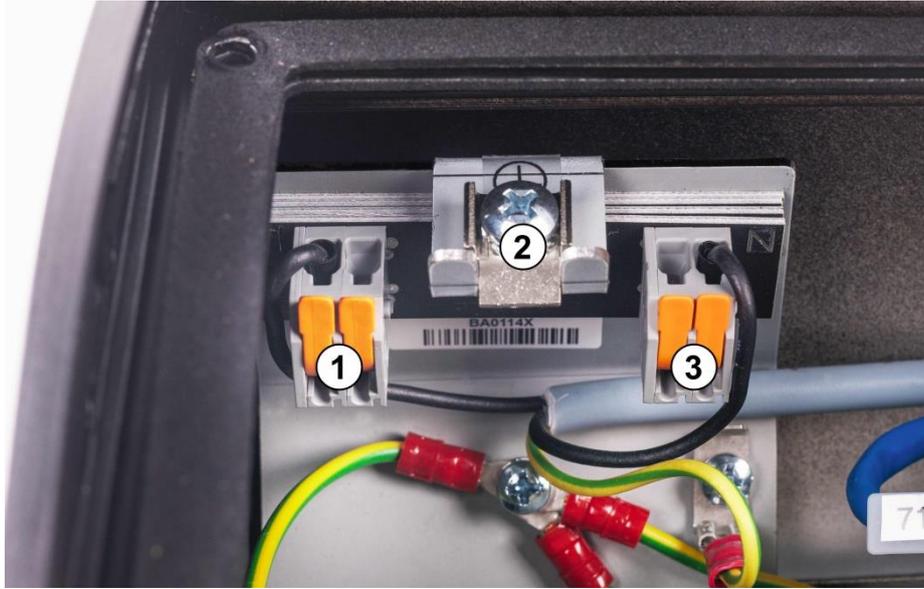
Digital audio signals (Dante) and remote control signals (**Fohhn-Net**) are fed in via this RJ-45 input (1000 Base-T Ethernet).

### **(2) Dante Secondary und Fohhn-Net**

This RJ-45 input (1000 Base-T Ethernet) is exclusively used for redundant cabling (**see Chapter 3.3.1 "Configuration"**).

### **(3) Mains connection**

Mains connection is via a 2-pin WAGO (grounding screwed). The switching power supply (with Power Factor Correction) allows a supply voltage of 100 V – 240 V AC / 4 A / 50/60 Hz.

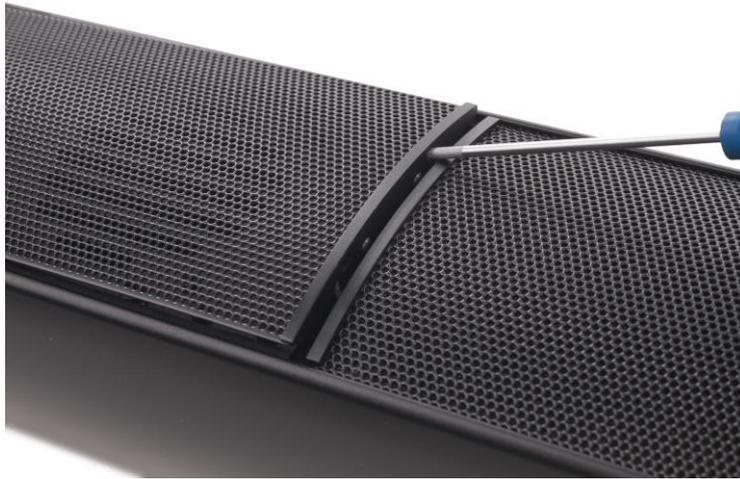


**WAGO for mains connection with two pins (1) and (3) and grounding screw (2)**

### 3.2.2 Opening the service flap

#### 1. Removing the front grille

Using a screwdriver, the lower front grille of the **Linea Focus** can be carefully prized open from its snap lock closure. Two notches provide appropriate leverage points for the screwdriver. Do this carefully to avoid damaging the paintwork!



Notch at the upper end of the front grille

Carefully detach the grille from its groove at the base of the loudspeaker.



Front grille of a DLI-330

## **2. Opening the service flap**

On all models, the service flap is secured with four crosshead screws.



**Service flap on a DLI-130**

Carefully remove the four (or two) large crosshead screws.

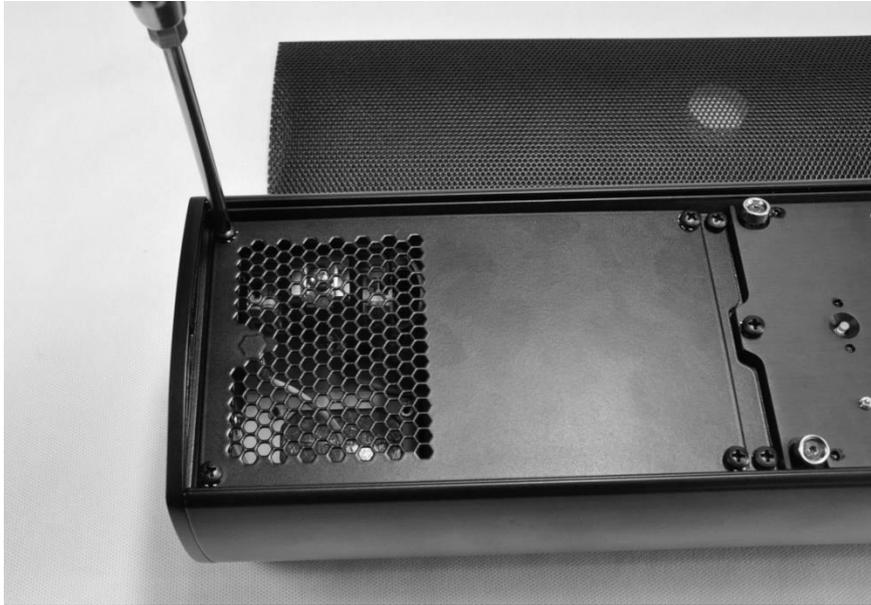


**Service flap with four crosshead screws and tooth lock washers**

The service flap can then be removed and all relevant connectors easily accessed from the front.

### **3. Closing the service flap and replacing the front grille**

Close the service flap using the four (or two) large crosshead screws and their associated tooth lock washers, which are vital for screw retention.



Closing the service flap on a DLI-130

Carefully place the grille in the groove at the base of the loudspeaker then lay it along the enclosure. Using both hands and equal pressure, press the grille carefully into its snap lock closure.

### **3.3 System Set-up**

**Linea Focus** loudspeaker systems have no on/off switches, however, connection to the mains supply via the power cable makes them ready for immediate operation. To avoid any circuit overload when switching on, the systems are equipped with a switch-on delay (or Soft Start function).

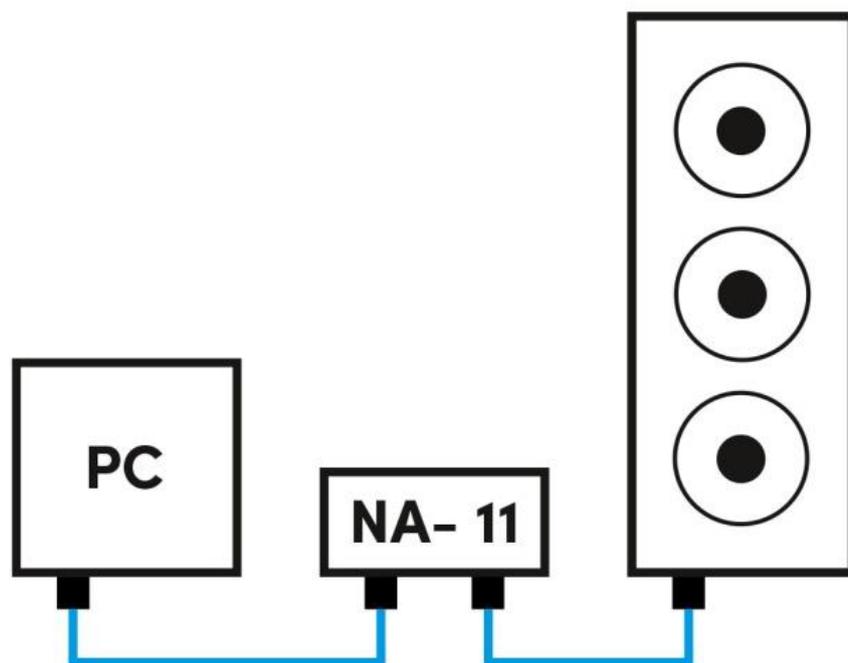
- ⚠ **Only connect the Linea Focus systems to the main power supply AFTER all other system components (mixing desk, playback devices, etc.) have been switched on.**
- ⚠ **Switch off in reverse order, disconnecting the systems from the mains power BEFORE switching off all the other components! Otherwise this could result in hearing damage due to loud signals! Nobody should stand directly in front of the loudspeaker systems for any length of time!**

### 3.3.1 Configuration

Using the **Fohhn-Net** network, you can remotely control and monitor the functionality of your **Linea Focus** systems' integrated digital signal processors (DSP). For this you will need a Windows PC with **Fohhn Audio Soft** (Version 5.0.3 or later) installed.

Further information on **Fohhn-Net** and the use of media control systems can be found in the **Fohhn-Net Technical Manual** at [www.fohhn.com](http://www.fohhn.com) under *Downloads > Manuals > Fohhn-Net*.

When connecting **DLI-130/230/330/430 AES** or **DLI-130/230/330/430 ANA** systems, you will need an appropriate **Fohhn-Net** Adapter: the **NA-11 Fohhn-Net USB adapter**, or **NA-4 Fohhn-Net ethernet adapter**.

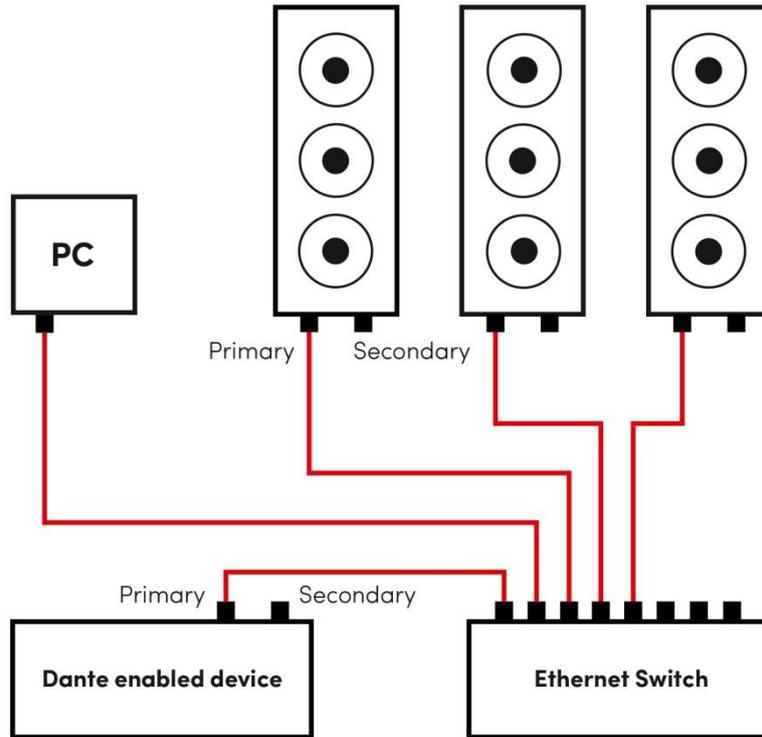


Example: Controlling a DLI-130 ANA system via computer and NA-11 Fohhn-Net USB adapter

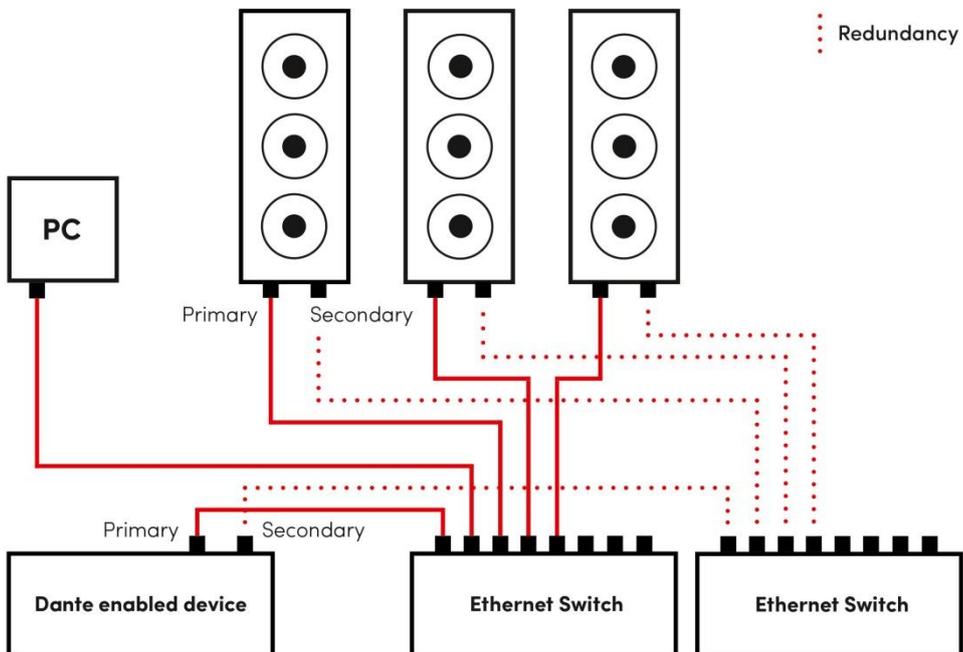
Connecting **DLI-130/230/330/430 DAN** product variants to the **Fohhn-Net** is done via an Ethernet Switch, to which an appropriate Dante device must also be connected. For control via PC, Audinate's **Dante Controller** software is required in addition to **Fohhn Audio Soft** (see Chapter 3.3.4 "Fohhn-Net Cabling and ID Allocation").

You can download the Dante Controller software free of charge from here:

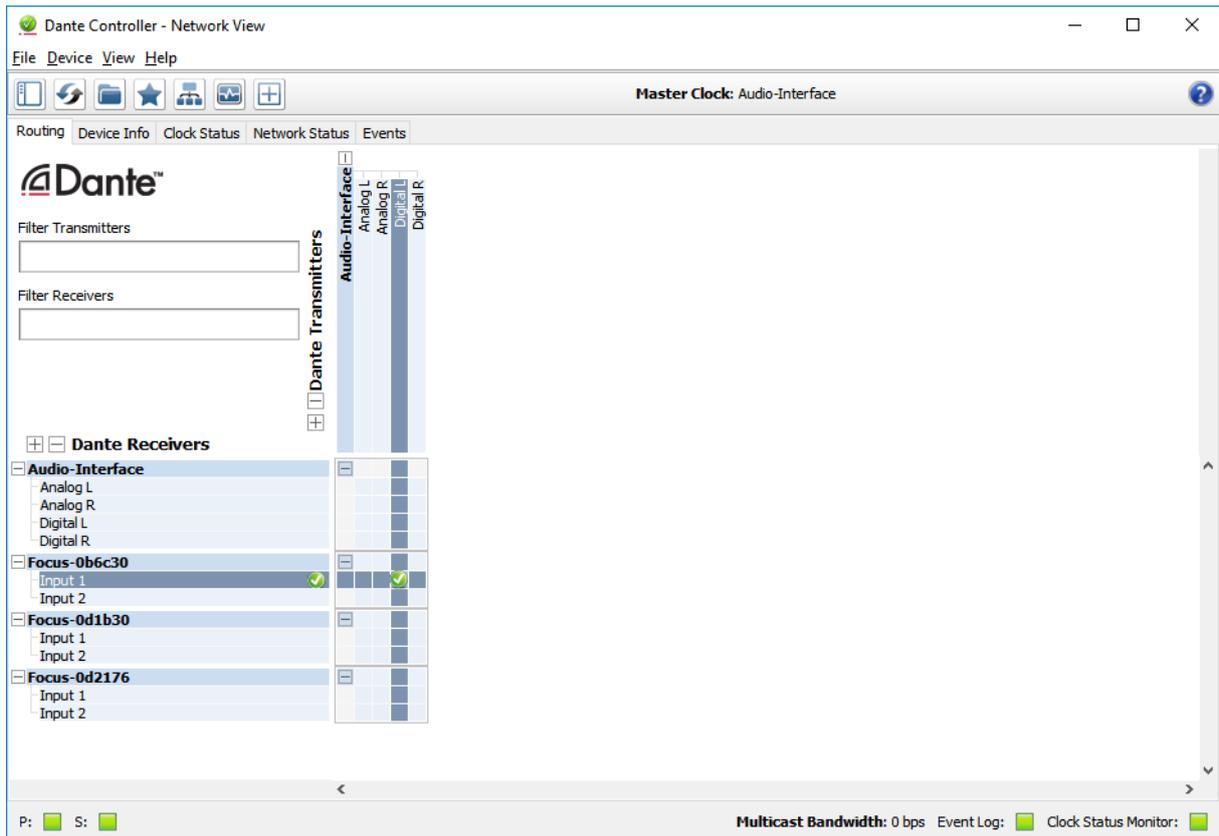
<https://www.audinate.com/products/software/dante-controller>



Example: Control of three DLI-130 DAN systems via computer and Ethernet Switch for simpler cabling



Example: Control of three DLI-130 DAN systems via computer and Ethernet Switch using redundant cabling.  
(Here, all devices must already be in "Redundant Mode".)



With a DLI-130/230/330/430 DAN system, all Dante Input Interface parameters (e.g. the audio routing inside a Dante network) must be configured using the Dante Controller software.

### ***DLI-130/230/330/430 DAN Firmware Update***

Updating the Dante Firmware in a **DLI-130/230/330/430 DAN** requires the **Dante Firmware Update Manager** software. You can download this free of charge from the following URL:

<https://www.audinate.com/products/firmware-update-manager>

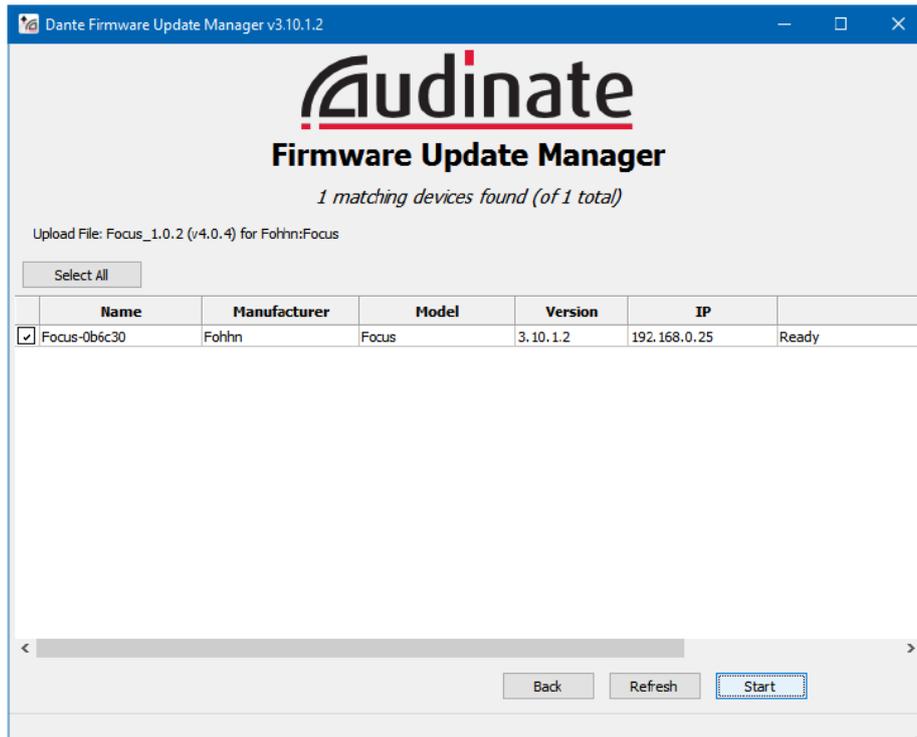
Dante Firmware files have the extension **.dnt** and can be downloaded from here:

<https://www.fohn.net/download/dante/>

Example: **Focus\_1.0.2.dnt** for Dante devices in the **FOCUS-SERIES**.

Perform the update as follows:

1. Start the **Dante Firmware Update Manager**.
2. Select the appropriate network interface and confirm the selection with *Next*.
3. Select *Update Dante Firmware*.
4. Select the appropriate **.dnt** file and confirm the selection with *Next*.
5. Select the listed Dante devices that are to be updated and click on *Start*.



6. Following a full update, the Dante devices should be restarted by switching off and on.

**The Dante Firmware update only updates the firmware of the integrated Dante module. The Fohhn device firmware is unaffected and must, if necessary, be separately updated!**

Here you can find all of Audinate's technical documentation relating to Dante:

<https://www.audinate.com/resources/technical-documentation>

Here you can find some helpful guidance on identifying a Dante device when the IP address is not known:

<https://www.audinate.com/faq/how-can-i-locate-dante-device-static-ip-address-unknown-subnet>

### 3.3.2 System Requirements for the Computer

To use **Fohhn Audio Soft** you will need a commercially available computer with the following:

- **Computer and Processor:** x86- or x64 multi-core system
- **RAM:** 4 Gigabyte (GB) RAM
- **Hard disk:** 40 Megabyte (MB) of free disk space
- **Display:** Minimum resolution 1366 x 768
- **Operating system:** Microsoft Windows 7 SP1 or Windows 10
- **.NET-Version:** Microsoft .NET Framework 4.6.1
- **Additional requirements:** current status of the operating system

Further information can be found in the separate **Fohhn Audio Soft** manual. You can download this free of charge from the Fohhn website: [www.fohhn.com](http://www.fohhn.com)

### 3.3.3 Downloading and Installing Fohhn Audio Soft

**Fohhn Audio Soft** is directly compatible with all **Fohhn** active DSP systems; therefore, no special **Linea Focus** version of this software is required. Regardless of the loudspeaker systems, you can always work with the same software and within the same user interface.

The current version of **Fohhn Audio Soft** can be downloaded free of charge from [www.fohhn.com](http://www.fohhn.com)

If a new version becomes available, proceed as follows to install **Fohhn Audio Soft** on your computer:

1. Download the latest version of **Fohhn Audio Soft** to your computer.
2. Locate the *Fohhn\_Audio\_Soft\_X.X.X\_Setup.exe* file on your computer (X.X.X represents the respective version number).
3. Start the installation program by double-clicking on the file: Follow the on-screen instructions.
4. Click on *Install* to install the program on your computer. Also confirm in the *User Account Control* dialog if this appears.
5. Click on *Finish* to complete the installation.

The software is immediately ready for use following installation and can either be opened via the program symbol on the desktop, or via the *Start > All Programs > Fohhn Audio AG > Fohhn Audio Soft* path.

### 3.3.4 Fohhn-Net Cabling and ID Allocation

For the control of multiple **Linea Focus** loudspeaker systems, each system in the **Fohhn-Net** must be allocated its own specific ID. Using this ID, each individual **Linea Focus** system can be clearly identified and controlled from within **Fohhn Audio Soft**.

- ⚠ **All loudspeakers systems have a factory setting of ID 1.**
- ⚠ **Duplicated IDs lead to ID conflict. In such a situation, it will no longer be possible to control the systems concerned.**

#### ***ID allocation for individual systems:***

In order for an ID to be allocated, each **Linea Focus** loudspeaker system must first be connected to **Fohhn Audio Soft**.

Proceed as follows:

1. Connect the **Linea Focus** system to the mains power.
2. Depending on the product variant, connect an appropriate adapter or converter to the computer.  
With the **DLI-130/230/330/430 AES** and **DLI-130/230/330/430 ANA**, you can use an **NA-4** or **NA-11 Fohhn-Net** adapter. The **DLI-130/230/330/430 DAN** requires an Ethernet Switch.
3. Link the adapter or Ethernet Switch to the loudspeaker system using the appropriate CAT- i.e. fibre-optic cable.
4. Start **Fohhn Audio Soft**. The selected **Fohhn-Net** adapter will automatically be recognised. With the **DLI-130/230/330/430 DAN**, the Dante Input Interface will be directly recognised. As a **Fohhn-Net** Node, the IP Address of the Dante Input Interfaces will be displayed. This will automatically be found, but it can also be manually configured.
5. When **Fohhn Audio Soft** opens, an automatic search starts that results in the listing of all correctly connected **Linea Focus** systems.

If a system is not shown, check all the connections and re-run the search. When doing so, please also note the ID search range.

Proceed as follows:

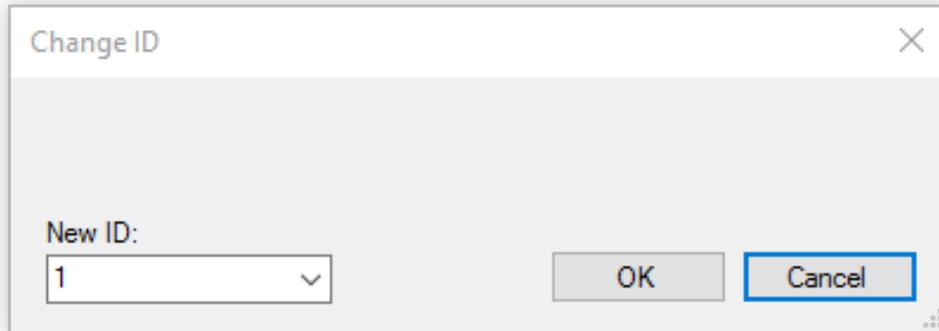
1. In the *Devices* menu, click on the *Search Device/ Network Scan* dialog.
2. If the system is not shown, check the mains power supply and/or the network cabling in your system. Then repeat step 1.

If a **Linea Focus** system is recognised, this appears with ID 1 (factory setting).

To change the ID directly in the *Find Devices* dialog, proceed as follows:

1. Click with the right mouse button on a loudspeaker system in the dialog's list view.
2. In the context menu select *Change Fohhn-Net ID*.
3. In the dialog with the same name, enter a new ID for the **Linea Focus** system. Make sure that this ID is not already in use.

Confirm this entry by clicking *Ok*: The loudspeaker will now have a newly assigned ID.



You can also change the ID of a **Linea Focus** system at any time while it is in use. To do this, the systems must be in the **Fohhn-Net**. Proceed as follows:

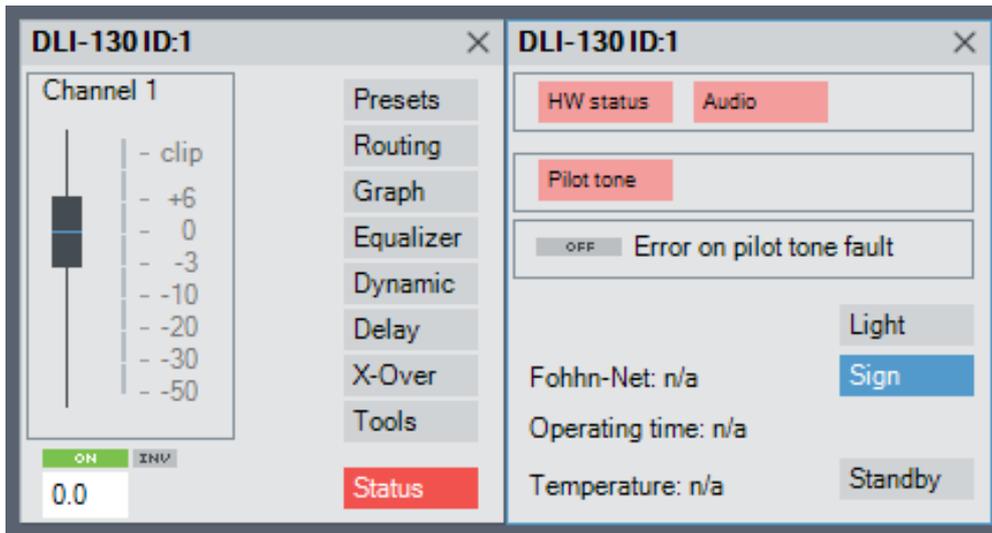
1. Open the *Device List* view, either via the *View* menu or via the corresponding button on the Toolbar.
2. Click with the right mouse button on a loudspeaker system in the list display.
3. In the context menu select *Change Fohhn-Net ID*.
4. In the same dialog, give the **Linea Focus** system a new ID.
5. Confirm this by clicking *Ok*: The loudspeaker will now have a newly assigned ID.

**Further information on setting up a Fohhn-Net and on Fohhn-Net ID allocation can be found in Chapter 4.1 “Fohhn-Net Setup” of the Fohhn Audio Soft user manual.**

### 3.3.5 Identifying Connected Systems

**Linea Focus** products have a function display with a blue LED located behind the front grille. You can let this LED flash in order to visually identify the system.

1. In **Fohhn Audio Soft**, click on the *Status* button in the *Devices* view to reveal a window with information on the **Fohhn-Net** status, the operating time and the temperature of the connected devices.
2. Here, click on the *Sign* button: The LED on the front of the selected system will begin to flash.
3. Deactivate the button once the system has been identified.



**Status window in the *Devices* view in Fohhn Audio Soft**

Using the *Light* button, you can switch off the blue LED on the front of the system as required.

Alternatively, you can carry out this identification process via the *Speakers* view:

1. Open the *Speakers* view and click with the right mouse button on the desired loudspeaker.
2. Click on *Sign* in the opened context menu: The selected system's blue LED will begin to flash.
3. When you reset the selection for the system, the LED will revert to its normal mode.

### 3.3.6 Renaming Devices / Channels

For better identification within **Fohhn Audio Soft** it is recommended that, in an installation involving several **Linea Focus** products, the individual loudspeakers are given separate names. Proceed as follows:

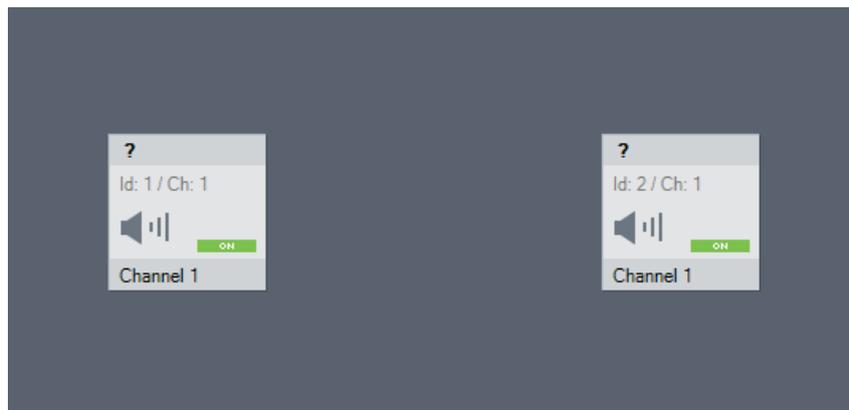
1. Open the *Device List* or *Devices* view, either via the corresponding entry in the Menu view or via the respective button on the Toolbar.
2. Click with the right mouse button on the required system in the list (*Device List*), or in the work space (*Devices*).
3. In the context menu, select the *Rename Device* option.
4. Enter a new name for the device in the *Edit name* dialog then close this by clicking *OK*.

The new name will now appear in the *Device List*, *Devices* and *Channels* views.

### 3.3.7 Graphically Arranging the Loudspeaker Systems

To make the **Fohhn Audio Soft** display easier to manage, all the loudspeakers and devices in use can be graphically arranged on the software interface as desired. With complex applications and/or in the case of fixed installations, it is recommended that the arrangement of devices on the user interface corresponds with their physical positions in the room.

The name shown in the loudspeaker pictogram refers to the currently loaded loudspeaker preset. If a question mark is shown here, the loading process is not yet completed and the loudspeaker preset is not active!



**Example: Linea Focus system pictograms in Fohhn Audio Soft  
(before completion of the loading process)**

Proceed as follows to arrange your **Linea Focus** systems:

1. Open the *Devices* or *Speakers* view, either via the corresponding entry in the Menu view or via the respective button on the Toolbar.
2. Arrange the individual loudspeaker pictograms and/or devices according to the physical positions of the actual loudspeaker systems and/or devices.

The arrangement will be saved in **Fohhn Audio Soft** and will remain until you change the configuration or arrangement.

### 3.3.8 Loading Loudspeaker Presets

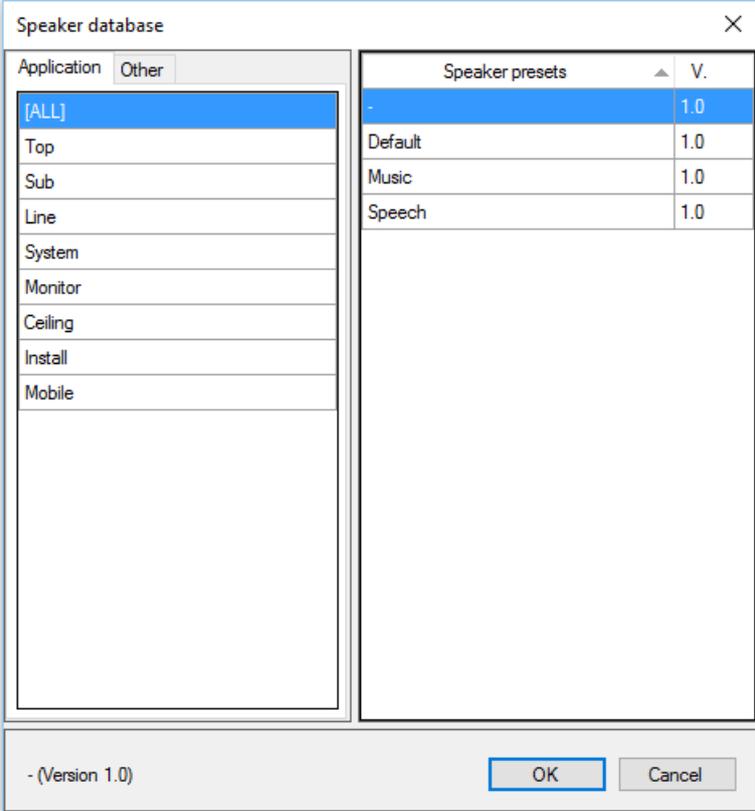
**Fohhn Audio Soft** enables factory-made presets to be loaded into a **Linea Focus** System.

To load loudspeaker presets, proceed as follows:

1. Select the appropriate **Linea Focus** system in the *Output Channels* view.
2. Click with the right mouse button on the selected system to open the context menu.
3. In here, choose either *Select speaker preset from list* or *Select speaker preset from database*.
4. Select a preset from one of these lists.
5. Confirm your choice by clicking *Ok*.

Your loudspeaker preset is now loaded. Repeat the process for all **Linea Focus** systems.

For all systems, three different loudspeaker presets can be selected from the database: *Default*, *Music* (for better music reproduction) and *Speech* (for improved speech reproduction).



**Loudspeaker presets from the database**

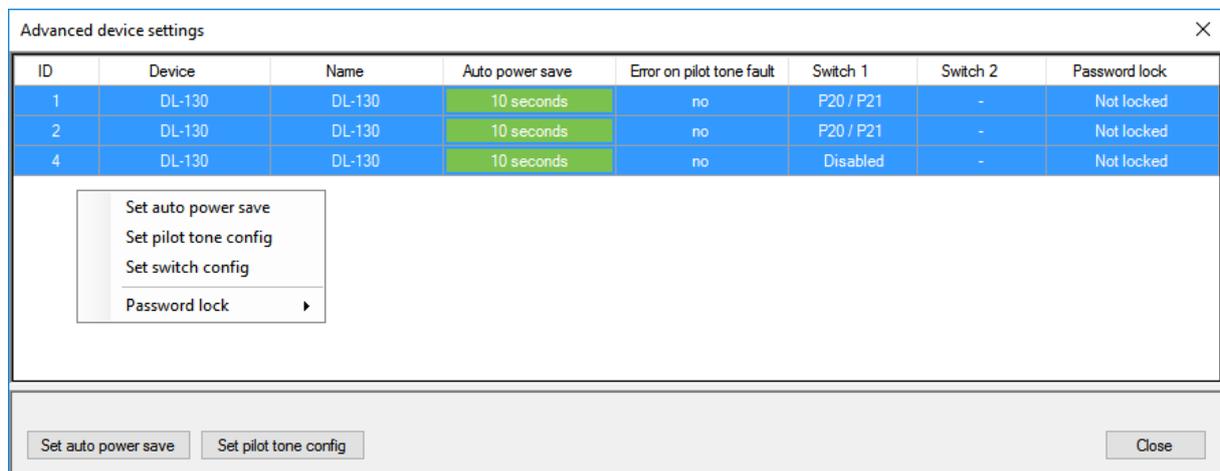
## 3.4 Further Options

### 3.4.1 Auto Power Save

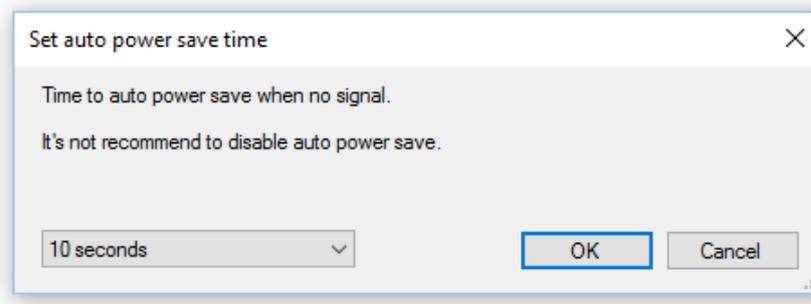
**Linea Focus** systems have a configurable Auto Power Save mode, which enables energy to be saved and the longevity of the device to be extended. If no audio signal is received, the integrated CLASS-D amplifiers switch to power saving mode. As soon as an audio signal is detected, the amplifiers are immediately ready for operation. The amount of time before the device switches to Auto Power Save can be set as desired – between 1 second and 12 hours. The mode can also be completely deactivated.

Proceed as follows to set up *Auto Power Save* in **Fohhn Audio Soft**:

1. Select one or more **Linea Focus** system(s) in the *Device List*, then with a right mouse click open the context menu.
2. In here, select the *Options* entry. This will open the *Advanced device settings configuration* dialog.



3. In here, select one or more **Linea Focus** system(s), then with a right mouse click open the context menu.
4. In here, select the *Set auto power save* entry. This will open the *Set auto power save time* window. (You can also open this window via the corresponding button at the bottom left of the *Advanced device settings* dialog.)



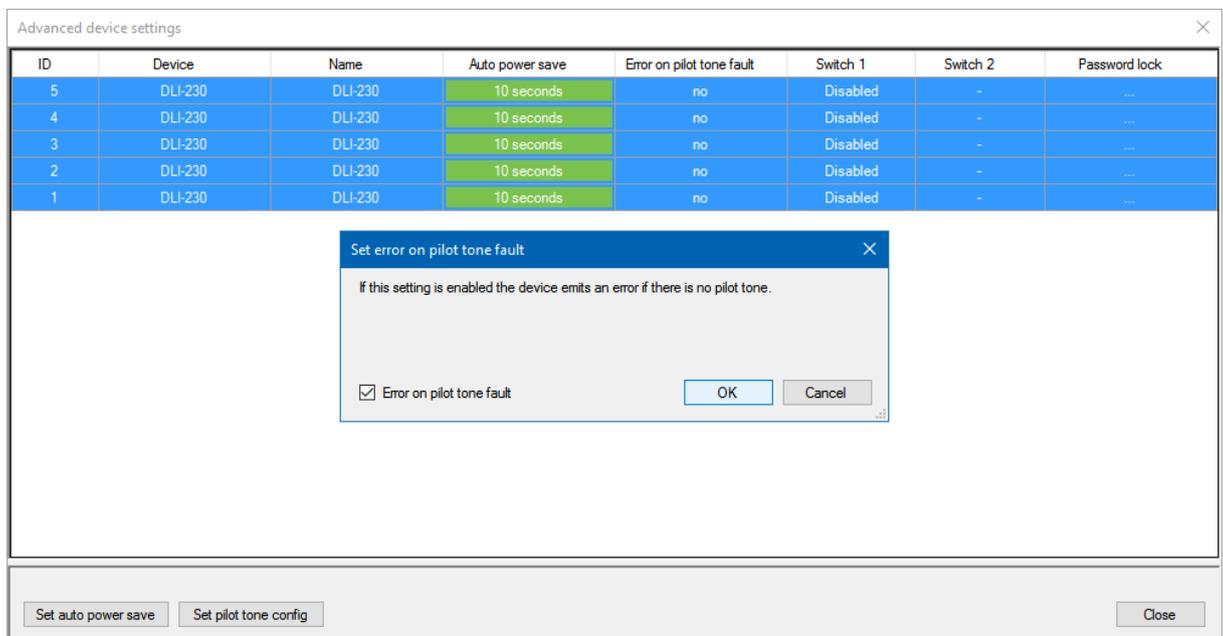
5. From the drop-down list (bottom left), select the desired switching time and confirm your selection by clicking *OK*.

### 3.4.2 Pilot Tone Detection

**Linea Focus** loudspeaker systems are equipped with pilot tone detection. This can be activated / deactivated in **Fohhn Audio Soft**. The setting determines whether the system will report a fault in the case of a missing pilot tone.

Proceed as follows to set up pilot tone detection in **Fohhn Audio Soft**:

1. Select one or more **Linea Focus** system(s) in the *Device List*, then with a right mouse click open the context menu.
2. In here, select the *Options* entry. This will open the *Advanced device settings configuration* dialog.
3. In here, select one or more **Linea Focus** system(s), then with a right mouse click open a further context menu.
4. Select the entry *Set pilot tone config*. This will open the *Set error on pilot tone fault* window. (You can also open this window via the corresponding button at the bottom left of the *Advanced device settings* dialog.)



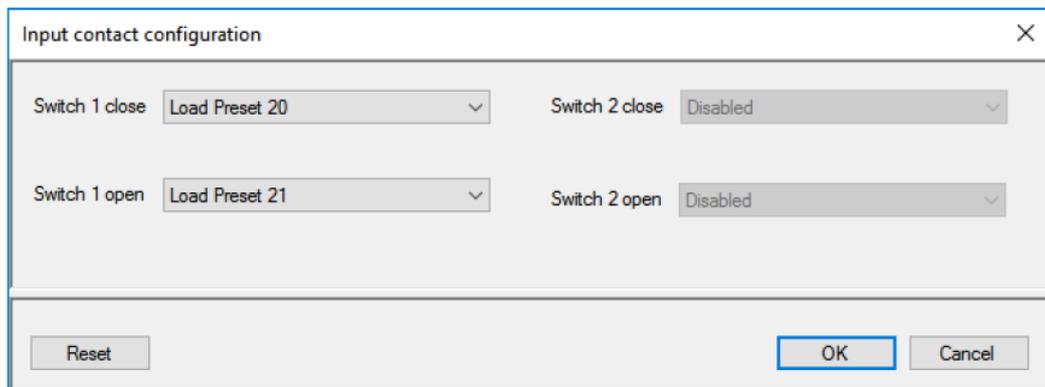
5. Click in the *Error on pilot tone fault* box (bottom left) to add a check mark and confirm this setting by clicking *OK*.

### 3.4.3 Switching Contacts

DLI-130/230/330/430 AES and DLI-130/230/330/430 ANA product variants have a contact input that enables loudspeaker system preset changes to be triggered via an open/close contact, (see Chapter 3.2.1 “DLI-130 and DLI-230 Connections”).

This switching contact can be configured in **Fohhn Audio Soft**:

1. Select one or more **Linea Focus** system(s) in the *Device List*, then with a right mouse click open the context menu.
2. In here, select the *Options* entry. This will open the *Advanced device settings configuration* dialog.
3. In here, select one or more **Linea Focus** system(s), then with a right mouse click open a further context menu.
4. Select the entry *Set switch config*. This will open the *Input contact configuration* window.



The screenshot shows a dialog box titled "Input contact configuration". It contains four dropdown menus arranged in a 2x2 grid. The top row has "Switch 1 close" set to "Load Preset 20" and "Switch 2 close" set to "Disabled". The bottom row has "Switch 1 open" set to "Load Preset 21" and "Switch 2 open" set to "Disabled". At the bottom of the dialog, there are three buttons: "Reset", "OK", and "Cancel".

5. Select a setting from both drop-down lists for the “close” (*Switch 1 close*) and “open” (*Switch 1 open*) status: for example, you can deactivate the current status (*Disabled*) or load one of up to 100 presets (*Load Preset*).
6. Confirm your selection by clicking *OK*.

When the loudspeaker is switched on, the selected presets will be loaded according to the current “close” or “open” status of the switching contact.

**Before configuring the switching contacts, we recommend that you first save all user presets.**

Further information on saving user presets can be found in the Fohhn Audio Soft user manual. You can download this from the Fohhn website: [www.fohhn.com](http://www.fohhn.com)

### 3.4.4 Password Lock

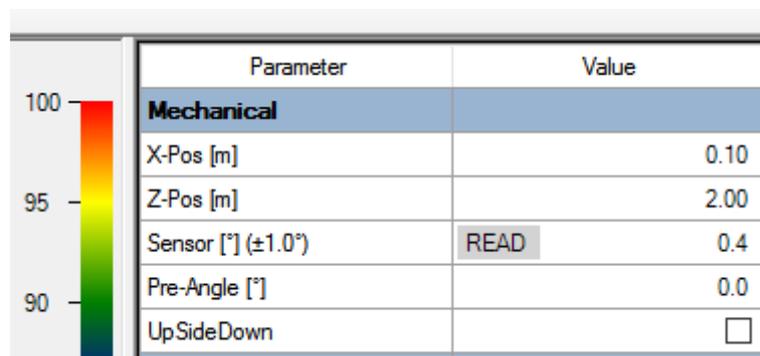
**Linea Focus** loudspeaker systems (and their parameter settings) can be password protected (or locked) to prevent any inadvertent changes. This password protection can be set up in **Fohhn Audio Soft**.

Further information on password protection can be found in Chapter 6.6 “Password Lock” of the **Fohhn Audio Soft** user manual. You can download this from the Fohhn website: [www.fohhn.com](http://www.fohhn.com)

### 3.4.5 Tilt Sensor

All systems have a tilt sensor whose data can be read out in **Fohhn Audio Soft**. This lets you determine the actual mechanical tilt of the installed loudspeaker systems. Please note that the tilt sensor has a tolerance of  $\pm 1.0^\circ$ .

Simply open the *Beam Steering* view and click on the *READ* button to the right of the parameter area.



Parameter	Value
<b>Mechanical</b>	
X-Pos [m]	0.10
Z-Pos [m]	2.00
Sensor [°] ( $\pm 1.0^\circ$ )	0.4
Pre-Angle [°]	0.0
UpSideDown	<input type="checkbox"/>

The displayed sensor data can be updated by clicking on the *READ* button again.

You can transfer these determined tilt values into the Focus Simulation: Simply enter the value in the *Pre-Angle [°]* parameter field below.

You can find further information on the Focus Simulation in Chapter 4.2 “Set-up in the Beam Steering View”.

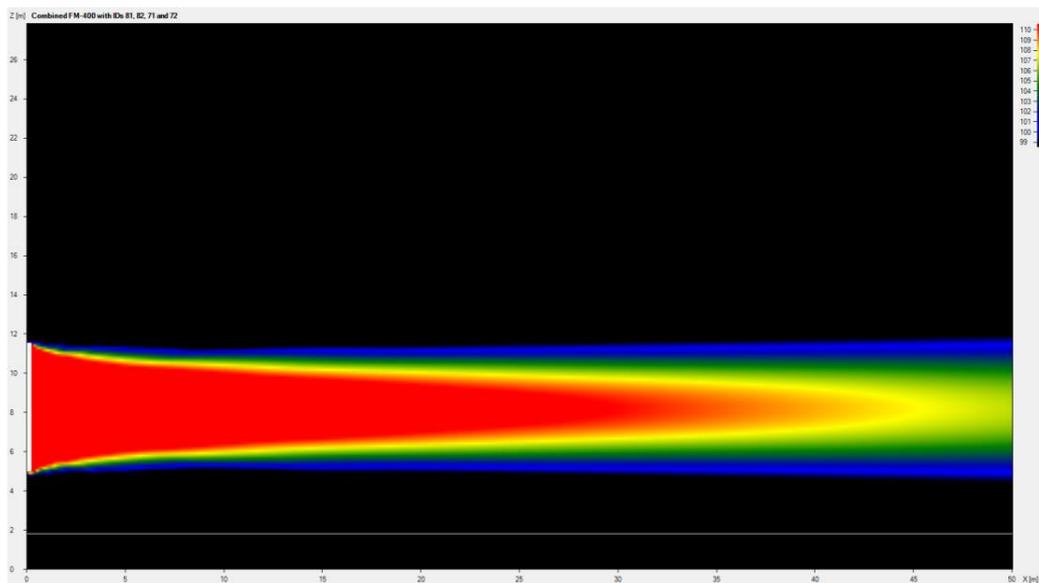
## 4. Control via Fohhn Audio Soft

The complete control of your **Linea Focus** systems can be exclusively carried out via **Fohhn Audio Soft**.

A comprehensive description of the software and all its functions can be found in the separate **Fohhn Audio Soft** user manual. You can download this free of charge from our website: [www.fohhn.com/downloads](http://www.fohhn.com/downloads)

### 4.1 Beam Steering – the functional principle

In the audio processing world, the term “Beam Steering” refers to the process of controlling the beam dispersion characteristics of loudspeaker systems using electronics and software. Through specific manipulation of signal sources that are tightly positioned in close proximity to one another, it is possible to precisely control the vertical beam width and inclination angle of the loudspeaker system over a wide frequency range. In general: the longer the loudspeaker, the lower the frequencies that can be included in the “bundle”. Because each speaker driver can be individually controlled and adjusted, via use of a dedicated algorithm or DSP, this in turn influences the sound dispersion capability of the entire loudspeaker.



Graphic representation of a beam in the Fohhn Audio Soft Focus Simulation

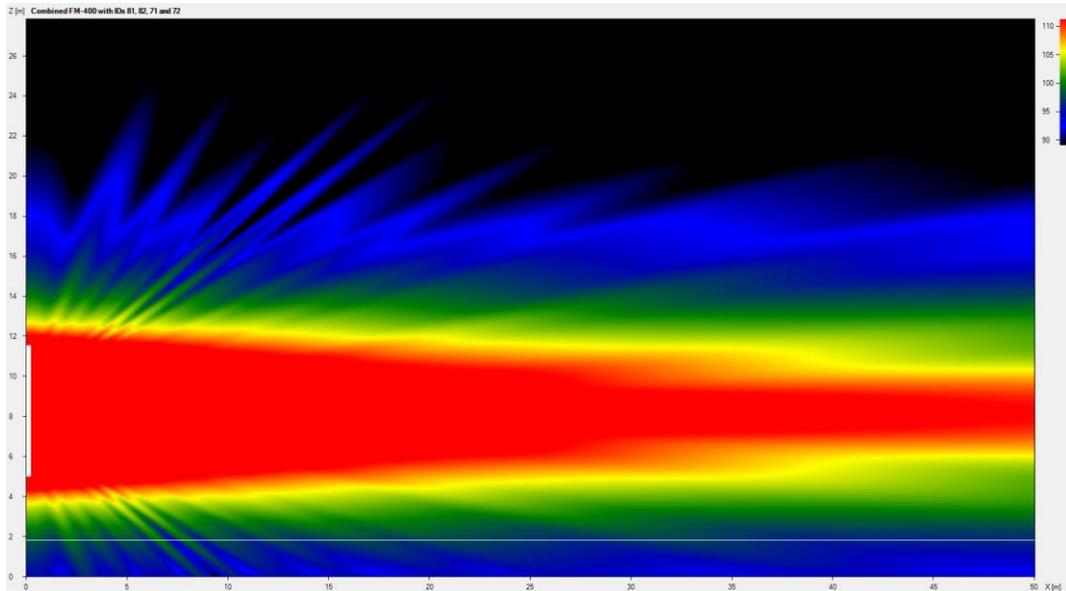
All **Fohhn FOCUS-SERIES** loudspeaker systems work with **Beam Steering Technology**.

Combining the DSPs with **Fohhn Audio Soft** makes it possible to electronically control the loudspeaker system’s vertical inclination angle and vertical beam width – in real time!

**Fohhn Audio Soft** enables the entire audio system to be configured in advance, before the systems themselves are put into operation at the venue.

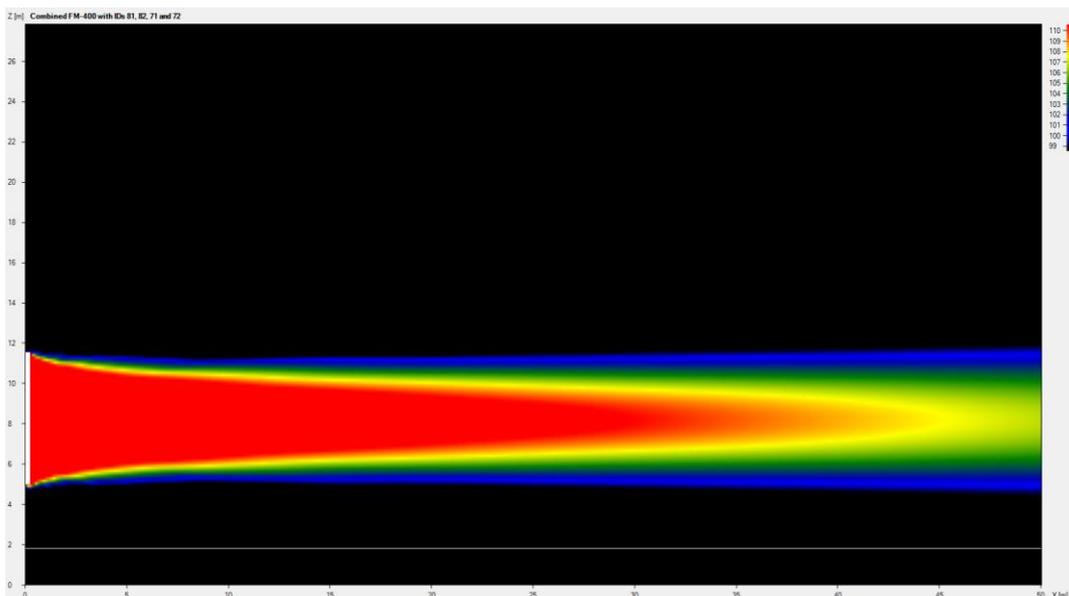
### 4.1.1 Side Lobe Free Technology

Due to their construction, line source and line-array speakers generate unwanted Side Lobes in their vertical axes. These result from the distances between the individual loudspeaker chassis and the finite length of an array.



Beam with Side Lobes

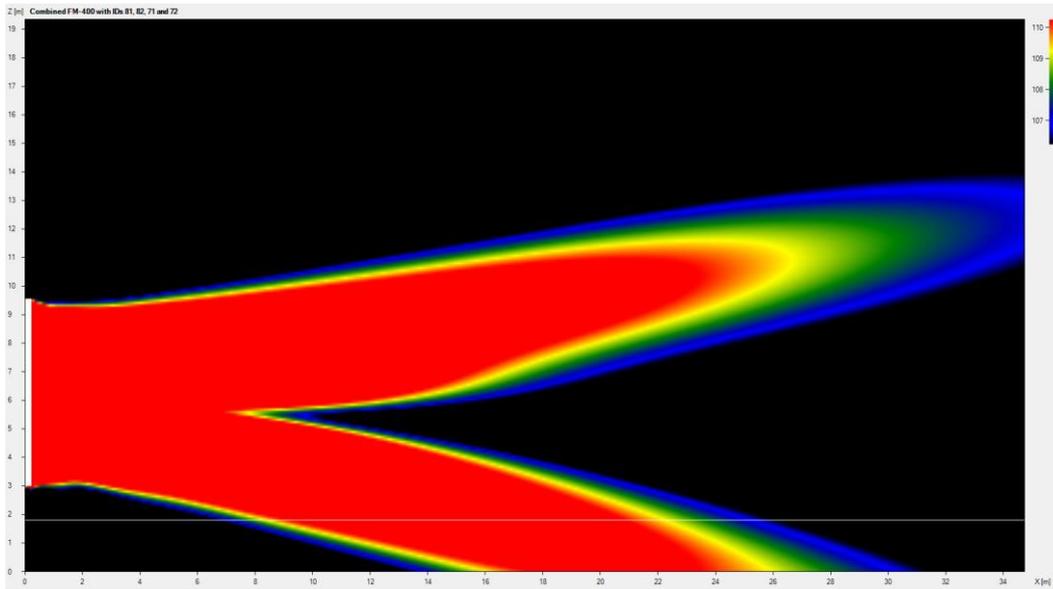
**Linea Focus** systems are equipped with **Fohhn Side Lobe Free Technology**: A specially developed algorithm effectively reduces the side lobes. This results in fewer unwanted sound reflections in the room. Consequently, levels of speech intelligibility are improved and feedback prevention is increased.



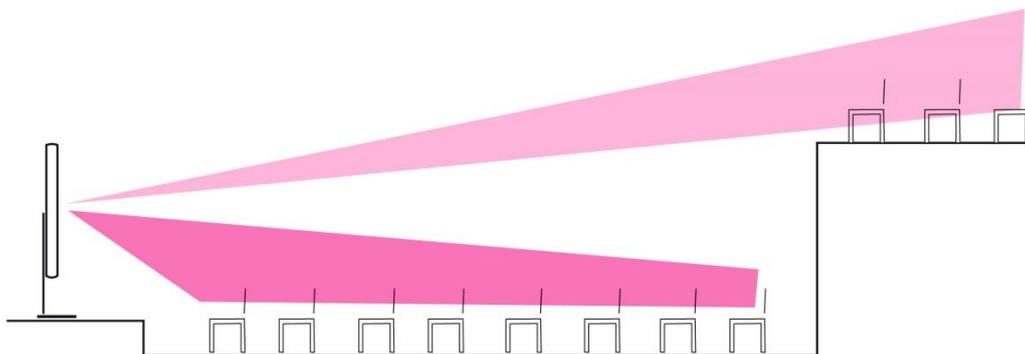
Optimized beam with Fohhn Side Lobe Free Technology

### 4.1.2 Two Beam Technology (Two Beam-Modus)

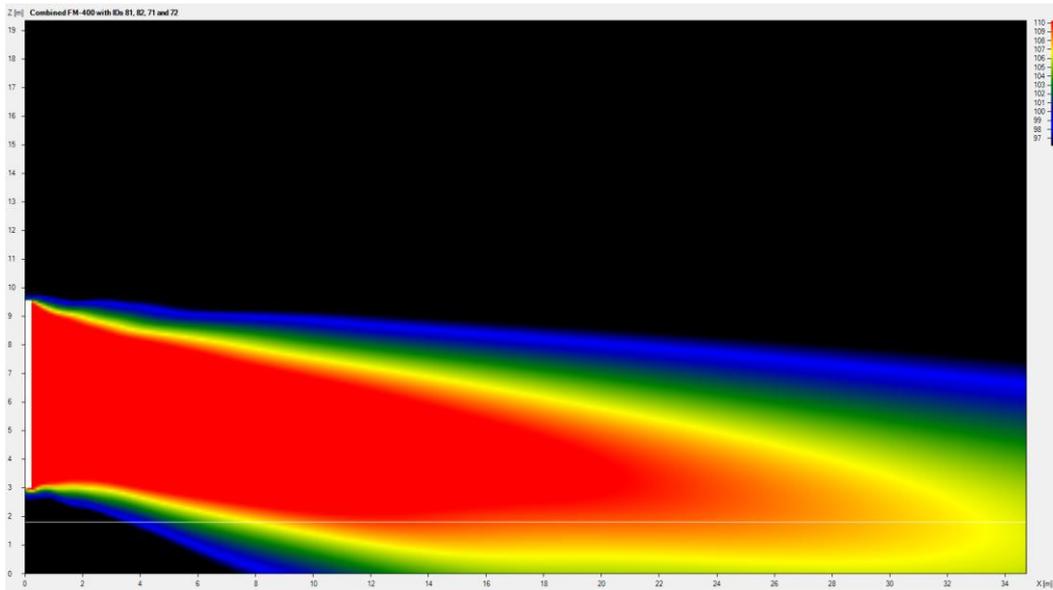
Fohhn's in-house developed **Two Beam Technology** enables the production of two independent beams with separately configurable parameters. In each case, the entire speaker line length is used for reproduction. So when activating the second beam, the sound dispersion still covers the entire frequency bandwidth. All parameters such as the vertical inclination angle and vertical beam width, the acoustic centre position, level and high pass filtering can be separately configured for each beam. This enables an asymmetric beam dispersion to be created for precise sound coverage of two separate listening areas (e.g. stalls and balcony).



Two Beam Mode: The production of two separate beams



Simultaneous sound coverage of stalls and balcony using two beams from a single Fohhn FOCUS-SERIES system

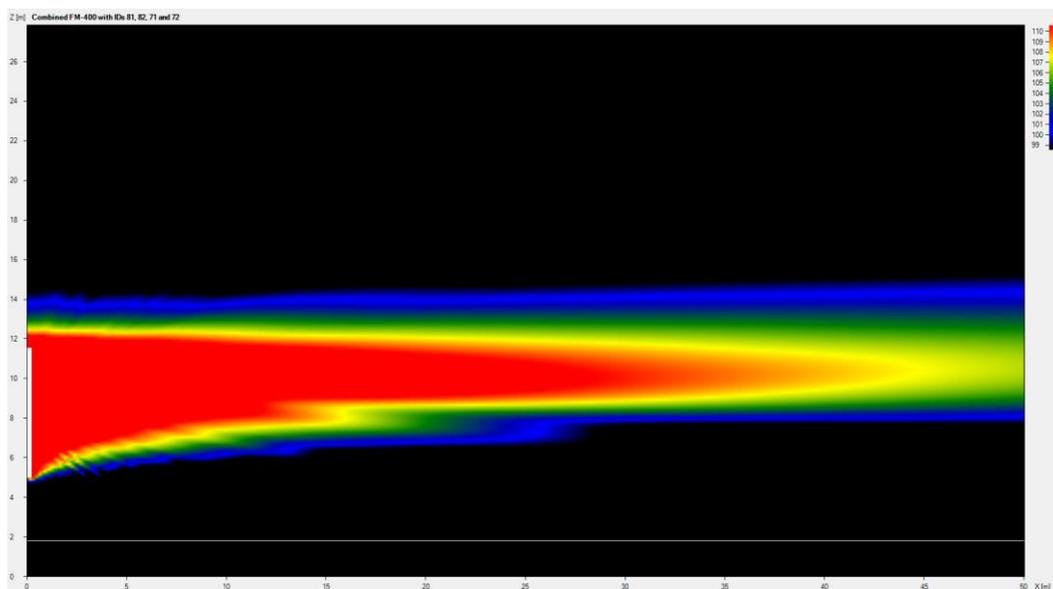


Example of an asymmetric beam

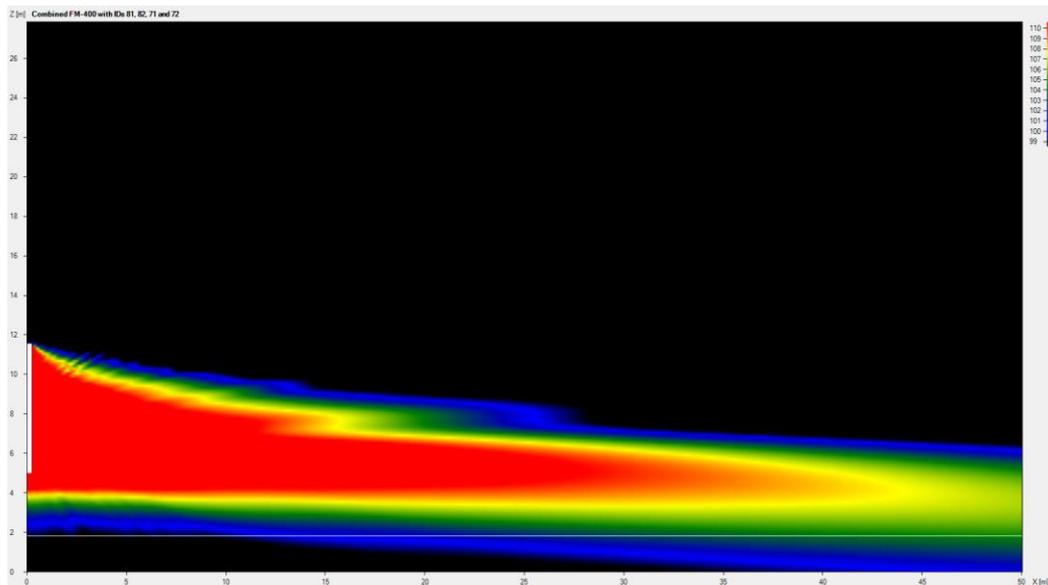
Further information on beam configuration and its associated parameters can be found in section 4.7.3 “System Setup (FOCUS-SERIES)” of the Fohhn Audio Soft user manual.

### 4.1.3 Acoustic Centre

This function allows you to move the vertical position of a beam’s acoustic centre over the loudspeaker’s entire line length.



Acoustic centre at the top



Acoustic centre at the bottom

Further information on setting the acoustic centre can be found in section 4.7.3 “System Setup (FOCUS-SERIES)” of the Fohhn Audio Soft user manual.

## 4.2 Setup in the Beam Steering View

To adjust your **Linea Focus** system to the venue and the particular application, open the *Beam Steering* view in **Fohhn Audio Soft**: This display lets you set all the parameters that are relevant to Beam Steering.

Its depiction and management are covered in the following sections:

### ***The Device Selection***

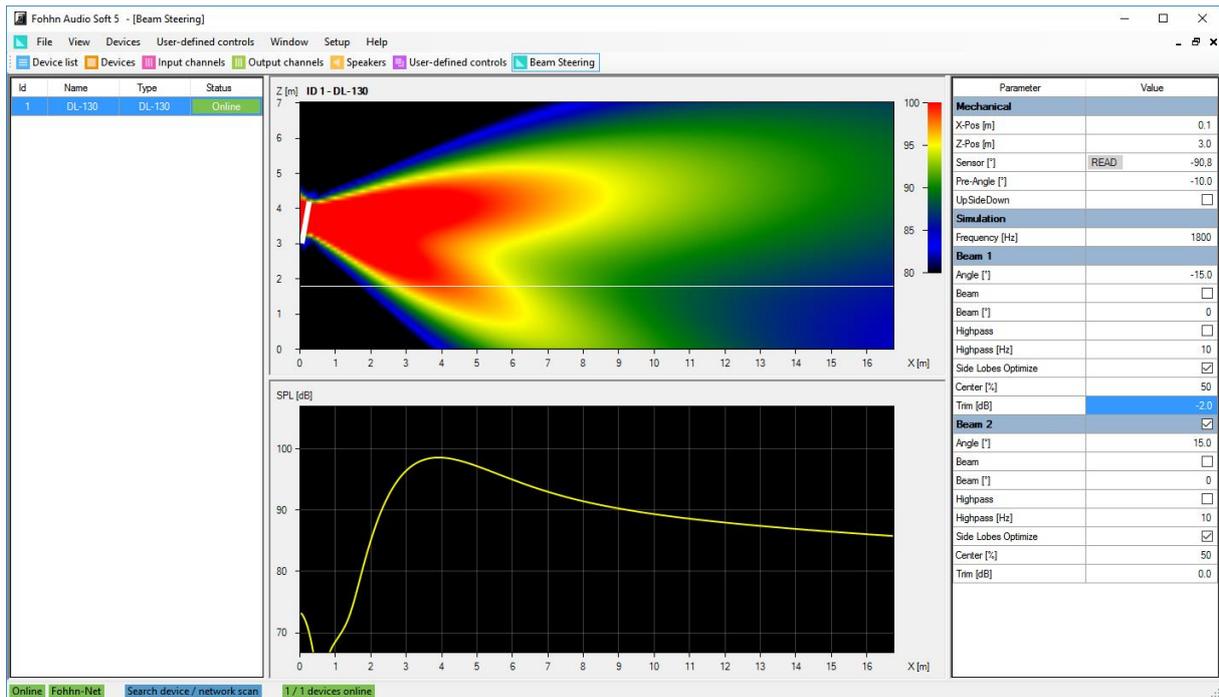
This shows all the **FOCUS-SERIES** devices that are in the system, along with their **Fohhn-Net** IDs, names, type/model classifications and current operating status.

### ***The Parameter Field***

This lets you configure the beam dispersion characteristics of the chosen module in the Device Selection.

### ***The Focus Simulation***

This shows a graphic representation of your selected module’s beam dispersion characteristics, based on the settings made in the Parameter Field.



The Device Selection (left), Focus Simulation (centre) and Parameter Field (right)

### Beam Steering settings in the Parameter Field:

- X-Pos (m)**  
 This defines the distance of the selected speaker (in metres) in relation to the vertical back wall.
- Z-Pos (m)**  
 Defines the height of the selected speaker's lower edge (in metres) in relation to the floor.
- Pre-Angle (°)**  
 Here you can enter the mechanical inclination of the loudspeaker. This value only influences the display in the Focus Simulation.
- Freq. (Hz)**  
 Here you can input the reference frequency for calculation and display in the neighbouring Focus Simulation. The frequency you input here will have no effect whatsoever on the sound being reproduced by your loudspeaker!
- Upside Down**  
 Adding a check mark to this field means that the loudspeaker effectively turns upside down. This can be useful if your **FOCUS-SERIES** loudspeakers have to be installed head first.
- Beam 2 (previously: Split)**  
 Adding a check mark to this field creates a second beam for the loudspeaker in question. The following parameters can then be set for both beams, individually and independently from each other.
- Angle (°)**  
 Here you can enter the beam's vertical inclination angle – in 0.1° increments - within a range of +/-40°.

- **Beam (°)**  
Adding a check mark to this field lets you set the vertical width of the beam – in 0.1° increments - within a range of +/-90°.
- **High-pass (Hz)**  
Adding a check mark to this field lets you enter the frequency threshold (10 Hz to 10 kHz): The fundamental tone below this frequency will be attenuated by 24 dB / Octave (fourth order). The high-pass is recommended for effective masking of the fundamental tone.
- **Side Lobes > Optimize**  
When adding a check mark to this field, Side lobes will be removed, as far as is possible, by means of a dedicated **Fohhn** algorithm. Because this makes the room less “excited”, levels of speech intelligibility will be significantly improved. With the overall volume level of the system now somewhat lower as a result, you can use the volume control in **Fohhn Audio Soft** to compensate for this.
- **Center (%)**  
When *Optimize* is active, you can change the acoustic centre of the loudspeaker. 0 % means that the acoustic centre moves to what is virtually the bottom end of the speaker, whereas 100 % takes it to the top end. In its default setting of 50 % (or if *Optimize* is not active) the acoustic centre sits at what is basically the optical centre of the speaker.
- **Trim (dB)**  
Here you can attenuate the level of the selected beam over a range of 0 to -90 dB. If two beams are active, you can use these fields to set the relative levels of both in parallel.

Detailed descriptions of the individual fields can be found in section 4.7.3 “System Setup (Focus-Series)” of the Fohhn Audio Soft user manual.

### 4.3 Adjustment of DSP Functions

In addition to configuring the vertical beam dispersion characteristics of your **Linea Focus** systems, **Fohhn Audio Soft** also give you direct access to the parameters of the **Fohhn AUDIO DSP** (digital signal processor).

The following DSP functions are available:

- **Input level**
- **Output level**
- **Routing**
- **Delay**
- **High-pass- and Low-pass filter**
- **Equalizer**
- **Dynamics**
- **Signal Generator**

Further information on the individual functions can be found in section 4.5 “DSP Functions” of the Fohhn Audio Soft user manual.

## 4.4 Saving projects

To save the settings on the computer as a **Fohhn Audio Soft** Project (*.fap*), proceed as follows:

1. In the *File* menu, select *Save Project As*.
2. Select the location in which you want to save your project. Click on *Save* to confirm your choice.

## 5. Technical documentation

### 5.1 Technical Specifications

#### 5.1.1 DLI-130 (all product versions)

##### Electroacoustic features

Acoustic design	electronically steerable line source speaker
Components	8 x 4" impregnated (fully neodymium)
Operational mode	active, 8 x DSP amplifiers, Class-D
Max. SPL (1 m) [1]	124 dB
Frequency range [2]	60 Hz – 17 kHz
Beam dispersion angle, horizontal [3]	110°
Vertical beam width, digitally controlled	0° to +90° in 0.1° increments
Vertical inclination angle, digitally controlled	-40° to +40° in 0.1° increments
Acoustic centre	both beams moveable between 0 – 100 % (from speaker bottom to top)

##### Loudspeaker features

Enclosure	aluminium housing
Protection grille	ball impact resistant, steel, powder coated
Mounting points	continuous T-slot at rear
Standard colours	black or white powder coated
Front design	front grille in housing colour
Dimensions (W x H x D) (DLI-130 AES/ANA/DAN)	133 x 1358 x 128 mm
Weight [4] (DLI-130 AES/ANA/DAN)	approx. 9.4 kg

##### Optional features

Special colours [5]	all RAL Classic colours, Fohhn Texture Design
---------------------	---

##### Electronic features

Amplifier power	8 x 100 W
Amplifier type	Pure Path Digital PWM
DSP channels, Fohhn Audio DSP	8
Gain	25 dB
Input sensitivity (DLI-130 AES/DAN)	0 dBFS
Input sensitivity (DLI-130 ANA)	1.4 V
Frequency response	20 Hz – 20 kHz
Signal/Noise ratio	>105 dB/A
Protective circuit	softstart, overheating, short circuit, overload
Power supply	100 V – 240 V AC 4 A 50/60 Hz switching power supply with Power Factor Correction (PFC)
Power consumption	Standby 5 W, max. 400 W
Heat dissipation	70 W, 239 BTU/h, 60 kcal/h (Pink Noise, 6 dB crest, 1/4 Pmax)
Power factor (PFC)	> 90 %
Low Power	Green Power Standby Mode
Temperature range	0 – 40 °C
Cooling	temperature-controlled fan
Weight of electronics	approx. 2 kg

##### Audio signal inputs and outputs (DLI-130 AES)

Audio inputs	1 x AES/EBU or 1 x Airia powered
Audio input channels DSP	2
Audio link	-
Redundancy	-

##### Audio signal inputs and outputs (DLI-130 ANA)

Audio inputs	2 x analogue, transformer balanced
Audio input channels DSP	2
Audio link	2
Redundancy	-

##### Audio signal inputs and outputs (DLI-130 DAN)

Audio inputs	Dante Primary and Dante Secondary
Audio input channels DSP	2
Audio link	-
Redundancy	Yes

**Remote control, remote monitoring (DLI-130 AES)**

Remote control  
Remote monitoring

Pilot tone monitoring  
Fault message contact  
Switching contact

Fohhn-Net over RS-485, Fohhn Audio Soft  
Temperature, Protect, AES/EBU Signals, Power Supply, Fohhn-Net,  
Fohhn Audio Soft, Tilt sensor, Pilot tone  
activatable, detectable in Master (on both inputs)  
1 x relay 2 x alternate, 3-pin Phoenix  
Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-130 ANA)**

Remote control  
Remote monitoring

Pilot tone monitoring  
Fault message contact  
Switching contact

Fohhn-Net over RS-485, Fohhn Audio Soft  
Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio  
Soft, Tilt sensor, Pilot tone  
activatable, detectable in Master (on both inputs)  
1 x relay 2 x alternate, 3-pin Phoenix  
Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-130 DAN)**

Remote control  
Remote monitoring

Pilot tone monitoring  
Fault message contact  
Switching contact

Fohhn-Net over IP, Fohhn Audio Soft  
Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio  
Soft, Tilt sensor, Pilot tone  
activatable, detectable in Master (on both inputs)  
-  
-

**Controllers**

Digital Signal Processors  
Independent Limiters  
Selective 3-band limiting  
Band-specific time constants  
Filter technology  
AD (DLI-130 AES/DAN)  
AD (DLI-130 ANA)  
FIR  
Gain  
Volume  
EQ input

2  
6  
bass/mid/high  
yes  
80-bit double precision  
-  
24 bit / 96 kHz  
yes  
-80 dB – +12 dB  
-80 dB – +12 dB  
10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1  
– 100

EQ output

10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1  
– 100

Limiter/Compressor  
Noise Gate  
X-Over

2 x Input, 1 x Output  
2 x Input, 1 x Output  
Linkwitz-Riley 4th order, 24 dB / octave, high pass 10 Hz – 20 kHz, low  
pass 10 Hz – 20 kHz, 2 x input, 1 x output in each case

Delay input  
Delay output  
Tilt sensor  
Password protection

0.01 – 350 ms or 3.4 mm – 120 m each  
0.01 – 650 ms or 3.4 mm – 220 m each  
yes  
yes

Auto Power Save  
User presets

adjustable from 1 s to 12 h, or permanently active  
100

Simulation beam  
Latency (DLI-130 AES)  
Latency (DLI-130 ANA)  
Latency (DLI-130 DAN)

Fohhn-Net, Fohhn Audio Soft  
1.80 ms  
2.40 ms  
Dante + 1.80 ms

**Connections (internal) (DLI-130 AES)**

Signal inputs  
Signal link  
Mains connection  
Fault message contact  
Switching contact

1 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net, or 1 x RJ-45  
Airea  
1 x Phoenix 3-pin, Fohhn-Net  
1 x WAGO 2-pin, grounding screwed  
1 x Phoenix 3-pin, 1 x Phoenix 3-pin link  
1 x Phoenix 3-pin

**Connections (internal) (DLI-130 ANA)**

Signal inputs  
Signal link  
Mains connection  
Fault message contact  
Switching contact

2 x Phoenix 3-pin analogue, 1 x Phoenix 3-pin Fohhn-Net  
2 x Phoenix 3-pin, 1 x Phoenix 3-pin Fohhn-Net  
1 x WAGO 2-pin, grounding screwed  
1 x Phoenix 3-pin, 1 x Phoenix 3-pin link  
1 x Phoenix 3-pin

**Connections (internal) (DLI-130 DAN)**

Signal inputs  
Signal link

2 x RJ-45 1000BASE-T Ethernet, Dante and Fohhn-Net  
-

Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	-
Switching contact	-
<b>Displays (internal) (DLI-130 AES)</b>	
Power on/off (stand-by)	green = on, red = stand-by, red flashing = fault, blue = sign
Network control	receive/send remote control LED
<b>Displays (internal) (DLI-130 ANA)</b>	
Power on/off (stand-by)	green = on, red = stand-by, red flashing = fault, blue = sign
Network control	receive/send remote control LED
<b>Displays (internal) (DLI-130 DAN)</b>	
Power on/off (stand-by)	-
Network control	-
<b>CAAD Simulation data</b>	
Simulation data	EASE

- [1] peak, 20 ms with band filtered pink noise in accordance with IEC 60268-2, one octave above the lowest cut-off frequency  
[2] -10 dB under reflection-free half-space conditions  
[3] horizontal x vertical at -6 dB  
[4] net weight without optional extras  
[5] further colours such as RAL Design or NCS only available on request

### Performance Data DLI-130

U = 230 VAC	Conditions	Performance Current (A)	Performance Watt ohmsch	Performance VA
Standby		0.08	5.3	18.5
Idling time without signal		0.085	6.1 <sup>[2]</sup>	20
Idling time with Signal -50 dBV		0.12	15	28
Maximum mean power <sup>[1]</sup>	Beam Optimize, Sin 200 Hz	0.54	120	124 <sup>[2]</sup>
Maximum mean power	Beam Optimize, Pink Noise	0.33	70	76
Maximum mean power	Sin 200 Hz	0.72	150	167
Peak power	Sin 200 Hz, 1 s	1.04	230	240
Inrush current		5 A	<50 ms	

<sup>[1]</sup> optimized for speech intelligibility in reverberant acoustics (airports, railway stations, stadia etc.)

<sup>[2]</sup> recommended values for calculating energy consumption

The manufacturer reserves the right to make technical modifications according to legal regulations stipulating the continual improvement of product features.

## 5.1.2 DLI-230 (all product versions)

### Electroacoustic features

Acoustic design	electronically steerable line source speaker
Components	16 x 4" impregnated (fully neodymium)
Operational mode	active, 16 x DSP amplifiers, Class-D
Max. SPL (1 m) [1]	130 dB
Frequency range [2]	60 Hz – 17 kHz
Beam dispersion angle, horizontal [3]	110°
Vertical beam width, digitally controlled	0° to +90° in 0.1° increments
Vertical inclination angle, digitally controlled	-40° to +40° in 0.1° increments
Acoustic centre	both beams moveable between 0 – 100 % (from speaker bottom to top)

### Loudspeaker features

Enclosure	aluminium housing
Protection grille	ball impact resistant, steel, powder coated
Mounting points	continuous T-slot at rear
Standard colours	black or white powder coated
Front design	front grille in housing colour
Dimensions (W x H x D) (DLI-230 AES/ANA/DAN)	133 x 2308 x 128 mm
Weight [4] (DLI-230 AES/ANA/DAN)	approx. 15.1 kg

### Optional features

Special colours [5]	all RAL Classic colours
---------------------	-------------------------

### Electronic features

Amplifier power	16 x 100 W
Amplifier type	Pure Path Digital PWM
DSP channels, Fohhn Audio DSP	16
Gain	25 dB
Input sensitivity (DLI-230 AES/DAN)	0 dBFS
Input sensitivity (DLI-230 ANA)	1.4 V
Frequency response	20 Hz – 20 kHz
Signal/Noise ratio	>105 dB/A
Protective circuit	softstart, overheating, short circuit, overload
Power supply	100 V – 240 V AC 4 A 50/60 Hz switching power supply with Power Factor Correction (PFC)
Power consumption	Standby 5 W, max. 400 W
Heat dissipation	140 W, 478 BTU/h, 120 kcal/h (Pink Noise, 6 dB crest, 1/4 Pmax)
Power factor (PFC)	> 90 %
Low Power	Green Power Standby Mode
Temperature range	0 – 40 °C
Cooling	temperature-controlled fan
Weight of electronics	approx. 3 kg

### Audio signal inputs and outputs (DLI-230 AES)

Audio inputs	1 x AES/EBU or 1 x Aira powered
Audio input channels DSP	2
Audio link	-
Redundancy	-

### Audio signal inputs and outputs (DLI-230 ANA)

Audio inputs	2 x analogue, transformer balanced
Audio input channels DSP	2
Audio link	2
Redundancy	-

### Audio signal inputs and outputs (DLI-230 DAN)

Audio inputs	Dante Primary and Dante Secondary
Audio input channels DSP	2
Audio link	-
Redundancy	Yes

### Remote control, remote monitoring (DLI-230 AES)

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, AES/EBU Signals, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-230 ANA)**

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-230 DAN)**

Remote control	Fohhn-Net over IP, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	-
Switching contact	-

**Controllers**

Digital Signal Processors	2
Independent Limiters	6
Selective 3-band limiting	bass/mid/high
Band-specific time constants	yes
Filter technology	80-bit double precision
AD (DLI-230 AES/DAN)	-
AD (DLI-230 ANA)	24 bit / 96 kHz
FIR	yes
Gain	-80 dB – +12 dB
Volume	-80 dB – +12 dB
EQ input	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
EQ output	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
Limiter / Compressor	2 x Input, 1 x Output
Noise Gate	2 x Input, 1 x Output
X-Over	Linkwitz-Riley 4th order, 24 dB / octave, high pass 10 Hz – 20 kHz, low pass 10 Hz – 20 kHz, 2 x input, 1 x output in each case
Delay input	0.01 – 350 ms or 3.4 mm – 120 m each
Delay output	0.01 – 650 ms or 3.4 mm – 220 m each
Tilt sensor	yes
Password protection	yes
Auto Power Save	adjustable from 1 s to 12 h, or permanently active
User presets	100
Simulation beam	Fohhn-Net, Fohhn Audio Soft
Latency (DLI-230 AES)	1.80 ms
Latency (DLI-230 ANA)	2.40 ms
Latency (DLI-230 DAN)	Dante + 1.80 ms

**Connections (internal) (DLI-230 AES)**

Signal inputs	1 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net, or 1 x RJ-45 Airea
Signal link	1 x Phoenix 3-pin, Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-230 ANA)**

Signal inputs	2 x Phoenix 3-pin analogue, 1 x Phoenix 3-pin Fohhn-Net
Signal link	2 x Phoenix 3-pin, 1 x Phoenix 3-pin Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-230 DAN)**

Signal inputs	2 x RJ-45 1000BASE-T Ethernet, Dante and Fohhn-Net
Signal link	-
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	-
Switching contact	-

**Displays (internal) (DLI-230 AES)**

Power on/off (stand-by)	green = on, red = stand-by, red flashing = fault, blue = sign
Network control	receive/send remote control LED

**Displays (internal) (DLI-230 ANA)**

Power on/off (stand-by)

Network control

green = on, red = stand-by, red flashing = fault, blue = sign  
receive/send remote control LED**Displays (internal) (DLI-230 DAN)**

Power on/off (stand-by)

Network control

-

-

**CAAD Simulation data**

Simulation data

EASE

[1] peak, 20 ms with band filtered pink noise in accordance with IEC 60268-2, one octave above the lowest cut-off frequency

[2] -10 dB under reflection-free half-space conditions

[3] horizontal x vertical at -6 dB

[4] net weight without optional extras

[5] further colours such as RAL Design or NCS only available on request

**Performance Data DLI-230**

U = 230 VAC	Conditions	Performance Current (A)	Performance Watt ohmsch	Performance VA
Standby		0.24	9.1	56
Idling time without signal		0.25	11 <sup>[2]</sup>	60
Idling time with Signal -50 dBV		0.28	26	65
Maximum mean power <sup>[1]</sup>	Beam Optimize, Sin 200 Hz	1.08	240	248 <sup>[2]</sup>
Maximum mean power	Beam Optimize, Pink Noise	0.66	140	152
Maximum mean power	Sin 200 Hz	1.44	300	334
Peak power	Sin 200 Hz, 1 s	2.08	460	480
Inrush current		5 A	<50 ms	

[1] optimized for speech intelligibility in reverberant acoustics (airports, railway stations, stadia etc.)

[2] recommended values for calculating energy consumption

## 5.1.3 DLI-330 (all product versions)

### Electroacoustic features

Acoustic design	electronically steerable line source speaker
Components	24 x 4" impregnated (fully neodymium)
Operational mode	active, 24 x DSP amplifiers, Class-D
Max. SPL (1 m) [1]	133 dB
Frequency range [2]	60 Hz – 17 kHz
Beam dispersion angle, horizontal [3]	110°
Vertical beam width, digitally controlled	0° to +90° in 0.1° increments
Vertical inclination angle, digitally controlled	-40° to +40° in 0.1° increments
Acoustic centre	both beams moveable between 0 – 100 % (from speaker bottom to top)

### Loudspeaker features

Enclosure	aluminium housing
Protection grille	ball impact resistant, steel, powder coated
Mounting points	continuous T-slot at rear
Standard colours	black or white powder coated
Front design	front grille in housing colour
Dimensions (W x H x D) (DLI-330 AES/ANA/DAN)	133 x 3377 x 128 mm
Weight [4] (DLI-330 AES/ANA/DAN)	approx. 24.3 kg

### Optional features

Special colours [5]	all RAL Classic colours
---------------------	-------------------------

### Electronic features

Amplifier power	24 x 100 W
Amplifier type	Pure Path Digital PWM
DSP channels, Fohhn Audio DSP	24
Gain	25 dB
Input sensitivity (DLI-330 AES/DAN)	0 dBFS
Input sensitivity (DLI-330 ANA)	1.4 V
Frequency response	20 Hz – 20 kHz
Signal/Noise ratio	>105 dB/A
Protective circuit	softstart, overheating, short circuit, overload
Power supply	100 V – 240 V AC 4 A 50/60 Hz switching power supply with Power Factor Correction (PFC)
Power consumption	Standby 5 W, max. 400 W
Heat dissipation	210 W, 717 BTU/h, 180 kcal/h (Pink Noise, 6 dB crest, 1/4 Pmax)
Power factor (PFC)	> 90 %
Low Power	Green Power Standby Mode
Temperature range	0 – 40 °C
Cooling	temperature-controlled fan
Weight of electronics	approx. 4 kg

### Audio signal inputs and outputs (DLI-330 AES)

Audio inputs	1 x AES/EBU or 1 x Aira powered
Audio input channels DSP	2
Audio link	-
Redundancy	-

### Audio signal inputs and outputs (DLI-330 ANA)

Audio inputs	2 x analogue, transformer balanced
Audio input channels DSP	2
Audio link	2
Redundancy	-

### Audio signal inputs and outputs (DLI-330 DAN)

Audio inputs	Dante Primary and Dante Secondary
Audio input channels DSP	2
Audio link	-
Redundancy	Yes

### Remote control, remote monitoring (DLI-330 AES)

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, AES/EBU Signals, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-330 ANA)**

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-330 DAN)**

Remote control	Fohhn-Net over IP, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	-
Switching contact	-

**Controllers**

Digital Signal Processors	2
Independent Limiters	6
Selective 3-band limiting	bass/mid/high
Band-specific time constants	yes
Filter technology	80-bit double precision
AD (DLI-330 AES/DAN)	-
AD (DLI-330 ANA)	24 bit / 96 kHz
FIR	yes
Gain	-80 dB – +12 dB
Volume	-80 dB – +12 dB
EQ input	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
EQ output	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
Limiter / Compressor	2 x Input, 1 x Output
Noise Gate	2 x Input, 1 x Output
X-Over	Linkwitz-Riley 4th order, 24 dB / octave, high pass 10 Hz – 20 kHz, low pass 10 Hz – 20 kHz, 2 x input, 1 x output in each case
Delay input	0.01 – 350 ms or 3.4 mm – 120 m each
Delay output	0.01 – 650 ms or 3.4 mm – 220 m each
Tilt sensor	yes
Password protection	yes
Auto Power Save	adjustable from 1 s to 12 h, or permanently active
User presets	100
Simulation beam	Fohhn-Net, Fohhn Audio Soft
Latency (DLI-330 AES)	1.80 ms
Latency (DLI-330 ANA)	2.40 ms
Latency (DLI-330 DAN)	Dante + 1.80 ms

**Connections (internal) (DLI-330 AES)**

Signal inputs	1 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net, or 1 x RJ-45 Airea
Signal link	1 x Phoenix 3-pin, Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-330 ANA)**

Signal inputs	2 x Phoenix 3-pin analogue, 1 x Phoenix 3-pin Fohhn-Net
Signal link	2 x Phoenix 3-pin, 1 x Phoenix 3-pin Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-330 DAN)**

Signal inputs	2 x RJ-45 1000BASE-T Ethernet, Dante and Fohhn-Net
Signal link	-
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	-
Switching contact	-

**Displays (internal) (DLI-330 AES)**

Power on/off (stand-by)	green = on, red = stand-by, red flashing = fault, blue = sign
Network control	receive/send remote control LED

**Displays (internal) (DLI-330 ANA)**

Power on/off (stand-by)

Network control

green = on, red = stand-by, red flashing = fault, blue = sign  
receive/send remote control LED**Displays (internal) (DLI-330 DAN)**

Power on/off (stand-by)

Network control

-

-

**CAAD Simulation data**

Simulation data

EASE

[1] peak, 20 ms with band filtered pink noise in accordance with IEC 60268-2, one octave above the lowest cut-off frequency

[2] -10 dB under reflection-free half-space conditions

[3] horizontal x vertical at -6 dB

[4] net weight without optional extras

[5] further colours such as RAL Design or NCS only available on request

**Performance Data DLI-330**

U = 230 VAC	Conditions	Performance Current (A)	Performance Watt ohmsch	Performance VA
Standby		0.32	14.4	74.5
Idling time without signal		0.335	17.1 <sup>[2]</sup>	80
Idling time with Signal -50 dBV		0.4	41	93
Maximum mean power <sup>[1]</sup>	Beam Optimize, Sin 200 Hz	1.62	360	372 <sup>[2]</sup>
Maximum mean power	Beam Optimize, Pink Noise	0.99	210	228
Maximum mean power	Sin 200 Hz	2.16	450	501
Peak power	Sin 200 Hz, 1 s	3.12	690	720
Inrush current		5 A	<50 ms	

<sup>[1]</sup> optimized for speech intelligibility in reverberant acoustics (airports, railway stations, stadia ...)<sup>[2]</sup> recommended values for calculating energy consumption

The manufacturer reserves the right to make technical modifications according to legal regulations stipulating the continual improvement of product features.

## 5.1.4 DLI-430 (all product versions)

### Electroacoustic features

Acoustic design	electronically steerable line source speaker
Components	32 x 4" impregnated (fully neodymium)
Operational mode	active, 32 x DSP amplifiers, Class-D
Max. SPL (1 m) [1]	136 dB
Frequency range [2]	60 Hz – 17 kHz
Beam dispersion angle, horizontal [3]	110°
Vertical beam width, digitally controlled	0° to +90° in 0.1° increments
Vertical inclination angle, digitally controlled	-40° to +40° in 0.1° increments
Acoustic centre	both beams moveable between 0 – 100 % (from speaker bottom to top)

### Loudspeaker features

Enclosure	aluminium housing
Protection grille	ball impact resistant, steel, powder coated
Mounting points	continuous T-slot at rear
Standard colours	black or white powder coated
Front design	front grille in housing colour
Dimensions (W x H x D) (DLI-430 AES/ANA/DAN)	approx. 133 x 4316 x 128 mm
Weight [4] (DLI-430 AES/ANA/DAN)	approx. 29.3 kg

### Optional features

Special colours [5]	all RAL Classic colours
---------------------	-------------------------

### Electronic features

Amplifier power	32 x 100 W
Amplifier type	Pure Path Digital PWM
DSP channels, Fohhn Audio DSP	32
Gain	25 dB
Input sensitivity (DLI-430 AES/DAN)	0 dBFS
Input sensitivity (DLI-430 ANA)	1.4 V
Frequency response	20 Hz – 20 kHz
Signal/Noise ratio	>105 dB/A
Protective circuit	softstart, overheating, short circuit, overload
Power supply	100 V – 240 V AC 4 A 50/60 Hz switching power supply with Power Factor Correction (PFC)
Power consumption	Standby 5 W, max. 400 W
Heat dissipation	280 W, 955 BTU/h, 240 kcal/h (Pink Noise, 6 dB crest, 1/4 Pmax)
Power factor (PFC)	> 90 %
Low Power	Green Power Standby Mode
Temperature range	0 – 40 °C
Cooling	temperature-controlled fan
Weight of electronics	approx. 4 kg

### Audio signal inputs and outputs (DLI-430 AES)

Audio inputs	1 x AES/EBU or 1 x Aira powered
Audio input channels DSP	2
Audio link	-
Redundancy	-

### Audio signal inputs and outputs (DLI-430 ANA)

Audio inputs	2 x analogue, transformer balanced
Audio input channels DSP	2
Audio link	2
Redundancy	-

### Audio signal inputs and outputs (DLI-430 DAN)

Audio inputs	Dante Primary and Dante Secondary
Audio input channels DSP	2
Audio link	-
Redundancy	Yes

### Remote control, remote monitoring (DLI-430 AES)

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, AES/EBU Signals, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-430 ANA)**

Remote control	Fohhn-Net over RS-485, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	1 x relay 2 x alternate, 3-pin Phoenix,
Switching contact	Load preset, Standby On/Off

**Remote control, remote monitoring (DLI-430 DAN)**

Remote control	Fohhn-Net over IP, Fohhn Audio Soft
Remote monitoring	Temperature, Protect, Signal, Power Supply, Fohhn-Net, Fohhn Audio Soft, Tilt sensor, Pilot tone
Pilot tone monitoring	activatable, detectable in Master (on both inputs)
Fault message contact	-
Switching contact	-

**Controllers**

Digital Signal Processors	2
Independent Limiters	6
Selective 3-band limiting	bass/mid/high
Band-specific time constants	yes
Filter technology	80-bit double precision
AD (DLI-330 AES/DAN)	-
AD (DLI-330 ANA)	24 bit / 96 kHz
FIR	yes
Gain	-80 dB – +12 dB
Volume	-80 dB – +12 dB
EQ input	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
EQ output	10 fully parametric filters, Gain +/-12 dB, Frequency 10 Hz – 20 kHz, Q 0.1 – 100
Limiter / Compressor	2 x Input, 1 x Output
Noise Gate	2 x Input, 1 x Output
X-Over	Linkwitz-Riley 4th order, 24 dB / octave, high pass 10 Hz – 20 kHz, low pass 10 Hz – 20 kHz, 2 x input, 1 x output in each case
Delay input	0.01 – 350 ms or 3.4 mm – 120 m each
Delay output	0.01 – 650 ms or 3.4 mm – 220 m each
Tilt sensor	yes
Password protection	yes
Auto Power Save	adjustable from 1 s to 12 h, or permanently active
User presets	100
Simulation beam	Fohhn-Net, Fohhn Audio Soft
Latency (DLI-430 AES)	1.80 ms
Latency (DLI-430 ANA)	2.40 ms
Latency (DLI-430 DAN)	Dante + 1.80 ms

**Connections (internal) (DLI-430 AES)**

Signal inputs	1 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net, or 1 x RJ-45 Airea
Signal link	1 x Phoenix 3-pin, Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-430 ANA)**

Signal inputs	2 x Phoenix 3-pin analogue, 1 x Phoenix 3-pin Fohhn-Net
Signal link	2 x Phoenix 3-pin, 1 x Phoenix 3-pin Fohhn-Net
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	1 x Phoenix 3-pin, 1 x Phoenix 3-pin link
Switching contact	1 x Phoenix 3-pin

**Connections (internal) (DLI-430 DAN)**

Signal inputs	2 x RJ-45 1000BASE-T Ethernet, Dante and Fohhn-Net
Signal link	-
Mains connection	1 x WAGO 2-pin, grounding screwed
Fault message contact	-
Switching contact	-

**Displays (internal) (DLI-430 AES)**

Power on/off (stand-by)	green = on, red = stand-by, red flashing = fault, blue = sign
Network control	receive/send remote control LED

**Displays (internal) (DLI-430 ANA)**

Power on/off (stand-by)

Network control

green = on, red = stand-by, red flashing = fault, blue = sign  
receive/send remote control LED**Displays (internal) (DLI-430 DAN)**

Power on/off (stand-by)

Network control

-

-

**CAAD Simulation data**

Simulation data

EASE

[1] peak, 20 ms with band filtered pink noise in accordance with IEC 60268-2, one octave above the lowest cut-off frequency

[2] -10 dB under reflection-free half-space conditions

[3] horizontal x vertical at -6 dB

[4] net weight without optional extras

[5] further colours such as RAL Design or NCS only available on request

**Performance Data DLI-430**

U = 230 VAC	Conditions	Performance Current (A)	Performance Watt ohmsch	Performance VA
Standby		0.48	18.2	112
Idling time without signal		0.5	22 <sup>[2]</sup>	120
Idling time with Signal -50 dBV		0.56	52	130
Maximum mean power <sup>[1]</sup>	Beam Optimize, Sin 200 Hz	2.16	480	496 <sup>[2]</sup>
Maximum mean power	Beam Optimize, Pink Noise	1.32	280	304
Maximum mean power	Sin 200 Hz	2.88	600	668
Peak power	Sin 200 Hz, 1 s	4.16	920	960
Inrush current		5 A	< 50 ms	

<sup>[1]</sup> optimized for speech intelligibility in reverberant acoustics (airports, railway stations, stadia ...)<sup>[2]</sup> recommended values for calculating energy consumption

The manufacturer reserves the right to make technical modifications according to legal regulations stipulating the continual improvement of product features.

## 6. Troubleshooting

The following table describes how you can determine errors and shows the corrective measures that are recommended.

Problem	Possible Cause	Possible Remedy
No sound can be heard. However, there is an audio signal.	The in- and output routing in the User DSP is not correct.	Check the DSP Settings in <b>Fohhn Audio Soft</b> .
The loudspeaker system is not recognised by <b>Fohhn Audio Soft</b> .	Several products may have the same <b>Fohhn-Net</b> ID. (An ID conflict will be displayed in <b>Fohhn Audio Soft</b> .)	Change the ID – no ID can appear twice (see 3.3.4 “ <b>Fohhn-Net Cabling and ID Allocation</b> ”).
	The ID search range is restricted.	Extend the search range from ID 1 to 254.
	The <b>Fohhn-Net</b> plug (see 3.2 “ <b>Cabling</b> ”) is not inserted.	Depending on the product variant, connect the system to either the <b>NA-4</b> or <b>NA-11</b> , or to an Ethernet Switch ( <b>DLI-130/230/330/430 DAN</b> ).
The <i>power</i> , <i>send</i> and <i>receive</i> LEDs are not lighting up.  <b>(Not applicable to DLI-130/230 DAN products!)</b>	There is no supply voltage.	Check whether a supply voltage is present.
	230 V not available, or fuse tripped.	Measure the supply voltage at the socket, check the fuse.
The <i>send</i> and <i>receive</i> LEDs are not lighting up.  <b>(Not applicable to DLI-130/230 DAN products!)</b>	The cable for the <b>Fohhn-Net</b> connection (see 3.2 “ <b>Cabling</b> ”) is defective or not plugged in.	Check the cable or connect the system to the <b>NA-4</b> or <b>NA-11</b> .
The <i>power</i> LED flashes alternate red and green.	There is a hardware error.	Contact the Service department at <b>Fohhn Audio AG</b> immediately.

If your problem does not appear in the above table, or if it is not fixed after trying the suggested remedies, please contact us at the following address:

**Fohhn Audio AG**  
Großer Forst 15  
72622 Nürtingen  
Germany

Tel. +49 7022 93323-0  
Fax +49 7022 93324-0

[www.fohhn.com](http://www.fohhn.com)  
[info@fohhn.com](mailto:info@fohhn.com)

## 7. Service and Repair

Servicing and/or repairs should only be undertaken by suitably qualified, **Fohhn**-trained personnel.

Do not carry out any servicing or any repairs to the device beyond what is listed in the “Maintenance Measures” section below.

For details of a **Fohhn** Service provider in your area, please contact us at the address on the previous page.

Keep the packaging for your device so that, in the event of any problem occurring, it can be returned in its original packaging. This will minimize the risk of any potential damage during transportation.

### 7.1 Maintenance Measures

- To clean your **Linea Focus** system, only use a dry or slightly damp, well wrung out cloth.
- Do not use any aggressive cleaning agents, waxes or solvents (such as cleansing alcohol or paint thinner), as these could spoil the appearance of the device and/or affect the paintwork on the enclosure.
- There are no user-serviceable parts within the device.
- The device must only be repaired by suitably qualified personnel.

## 8. Glossary

Term	Explanation
Beam dispersion	Here, this refers to the directional characteristics of a loudspeaker: <i>Beam dispersion</i> describes the spread of the acoustic waves originating from a loudspeaker (with regard to a particular frequency). The vertical beam dispersion of your <b>Linea Focus</b> system can be adjusted electronically and in real time.
Acoustic centre	The <i>acoustic centre</i> of the beam can be moved along the full line length – electronically and in real time.
Beam Steering	The term <i>Beam Steering</i> denotes the control of loudspeaker system beam dispersion via electronics and software. Through the precise superimposition of closely positioned sound sources, it is possible to “bundle” the sound over a wide frequency and flexibly adjust a loudspeaker’s beam dispersion angle. <b>More on this in section 4.1 “Beam Steering – the Functional Principle”.</b>
DSP (Digital Signal Processor)	A <i>DSP</i> serves to process and control digitalized audio signals. Every <b>Linea Focus</b> system has three different areas of DSP functionality (User DSP, Speaker DSP und Beam Control DSP).
Fohhn-Net	Here, this refers to a control network that is based on the RS-485 protocol. <b>More on this in section 3.4.4 “Fohhn-Net Cabling and ID Allocation”.</b>
Fohhn-Net Adapter	To communicate with the <b>Linea Focus DLI-130/230/330/430</b> systems, <b>Fohhn Audio Soft</b> requires an adapter for the <b>Fohhn-Net</b> , which is connected to the control computer and transmits the data generated in <b>Fohhn Audio Soft</b> to the systems – e.g. an <b>NA-4</b> or <b>NA-11</b> . <b>More on this in section 3.4.1 “Configuration”.</b>
ID (Fohhn-Net)	Here, this refers to the assigned address of an active <b>Fohhn</b> device in the <b>Fohhn-Net</b> . <b>More on this in section 3.4.4 “Fohhn-Net Cabling and ID Allocation”.</b>
Side Lobes	Due to their construction, line arrays generate unwanted Side Lobes. These result from the finite distances between the individual loudspeaker chassis and the length of an array.
Side Lobe Free Technology	A specially developed algorithm suppresses the Side Lobes. As a result, relatively little reverberation is generated, as less acoustic energy is dispersed in unwanted directions.
Two Beam Mode	See “Two Beam Technology”
Two Beam Technology	Every <b>Linea Focus</b> System can generate two separate, completely independent acoustic beams over its entire line length. All parameters can be separately and individually set for each beam.

## 9. Appendix

### 9.1 Environmental Information

Please note that this product must not be disposed of in general household waste. It must be taken to a disposal centre for electrical/electronic waste. Please also note any applicable national or local regulations. Further information on these and on appropriate waste disposal facilities can be obtained from your city/town council as well as from your local distribution partner.

### 9.2 CE Marking and Declaration of Conformity

This loudspeaker complies with the currently applicable conditions of EMC law and as such, carries the CE marking.



The relevant Declarations of Conformity are available on request from

**Fohhn Audio AG**, 72622 Nürtingen

### 9.3 Trademarks

All trademarks and brand names referred to in this manual, which may be protected by third parties, are subject to the provisions of trademark law and the title rights of their respective owners. All trademarks, trade names or company names appearing here are, or may be, trademarks or registered trademarks of their respective owners. All rights are reserved, with the exception of those specifically granted.

In the absence of an explicitly labelled registered trademark in this manual, it cannot be necessarily concluded that a name is free of third-party rights.

### 9.4 Protection Classes and Protection Types



Protection Class I: All the equipment's electrical conductive components are connected with low resistance to the protective earth conductor of the installation.

**IP54**

The device's protection type (protection against dust in harmful amounts and protection against water spray)

## 9.5 Disclaimer and Copyright

### *Disclaimer*

The contents of this user manual have been created with great care. However, **Fohhn Audio AG** cannot guarantee that the information therein (images, text and other representations) is always complete, correct and current. **Fohhn Audio AG** therefore reserves the right to make changes or additions to the given information at any time. Neither **Fohhn Audio AG** (as a public limited company), nor its Executive Board or employees take any responsibility for direct or indirect damage, including loss of profit, which arises as a result of, or in connection with the information in this manual.

### *Copyright*

This manual as a whole, including its contents and works is, as such, subject to German copyright law. The reproduction, editing, distribution and any other kind of use outside the limits of the copyright requires the written consent of **Fohhn Audio AG**.

## 9.6 Contact Address

### **Fohhn Audio AG**

Großer Forst 15  
72622 Nürtingen  
Germany

Tel. +49 7022 93323-0  
Fax +49 7022 93324-0

[www.fohhn.com](http://www.fohhn.com)  
[info@fohhn.com](mailto:info@fohhn.com)

### **Fohhn on Social Media**



DB0061X 03/19