DSP Amplifiers

DI-4.1000 / DI-2.2000 / DI-4.2000 / DI-2.4000

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

Congratulations on the purchase of your **FOHHN®** DSP amplifier. Like all products in our **AMP CONTROLLER-SERIES, DI-SERIES** amplifiers are equipped with the latest CLASS D technology. These amplifiers have been developed to meet the highest demands for sound quality and reliability.

All DSP functions on a **DI-SERIES** amplifier can be controlled using a single piece of software, **FOHHN AUDIO SOFT**.

In order to benefit from all the advantages of your DSP amplifier and to guarantee trouble-free operation, please read the following instructions carefully before starting up the system and keep this manual for future reference!

1.1 Important Safety Instructions

Please read the following safety instructions in their entirety before starting up 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 Definition 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 lower risk level, which, if not avoided, could result in minor or 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 type of system have read and understood the contents of this manual.

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

Warning:

To avoid injury,

⚠ the device must be stored, installed and operated well away from children.

To avoid injuries, 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. Our contact details can be found in the appendix to this user manual.

1.1.3 Electrical Safety Information

FOHHN DSP amplifiers 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, as confirmed by the attached CE marking.

The relevant standards can be found in the appendix to this user manual.

Warning:

To minimize the risk of electric shock,

⚠ the mains contact 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 your 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 will not be used for a prolonged period. (Remove the plug from the mains socket in order to completely disconnect the device!)

1.1.4 Acoustic Safety Information

FOHHN 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!

The wiring up of loudspeakers should only be done by suitably qualified personnel!

Important: To enable communication between a Windows PC with **FOHHN AUDIO SOFT** installed and DI-Series amplifiers, a **FOHHN** network adapter (e.g. **NA-11 FOHHN-NET USB ADAPTER** or **NA-3 FOHHN-NET ETHERNET ADAPTER**) is recommended.

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

1.2 Operating Conditions

Please note the following when operating your system:

- ⚠ The permitted ambient temperature of the device during operation ranges from 0 °C to +40 °C.
- ⚠ The device is intended for use in a dry environment with normal levels of dust and humidity in the air.
- ⚠ If moisture has built up on the device's rear panel, either during transportation or storage, let the device acclimatise for ca. 2 hours before use.
- ⚠ Never expose the device to aggressive chemical fluids or vapours.
- ⚠ Always make sure that heat can be dissipated via the outer surfaces 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 vibrations.

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 be switched on again.

The temperature of the **FOHHN** system is 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 my 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 a minimum of two hours in the environmental temperature before use.

2. The Product

2.1 Product Description

The digital, multi-channel DSP amplifiers belonging to the **DI-SERIES** are equipped with **FOHHN AUDIO DSPs** (**d**igital **s**ignal **p**rocessors). These DSPs contain (per amplifier channel) a programmable EQ, Delay, X-Over and dynamic processor.

DI-SERIES DSP amplifiers are equipped as standard with four digital AES/EBU inputs and four Link Outs. Digital inputs for Dante™ networks, digital AES/EBU XLR inputs and analogue XLR inputs are also optionally available. The standard outputs are terminal blocks designed for leads of up to 6 mm² – the amplifiers are also optionally available with Speakon output connectors. All amplifiers (regardless of the number of their output channels) always have four inputs with DSP input processing – in other words: their four input channels can each be mixed in the DSP.

In addition, presets are stored that contain loudspeaker protection data and sound optimization data for all **FOHHN** loudspeaker systems. These optimisations, together with multiband limiting, ensure the best possible sound performance and operational safety. Custom created user presets can also be stored.

Thanks to their integrated **FOHHN AUDIO DSP,** the amplifiers can be networked, remotely controlled and remotely monitored. A single piece of control software, **FOHHN AUDIO SOFT**, provides access to all DSP functions and presets. **(The current version of this software can be downloaded free of charge at: www.fohhn.com.)**

At the heart of each amplifier is an in-house developed digital power supply that is significantly responsible for the sound. It constantly analyses the supply voltage and processes this accordingly (Power Factor Correction). The power supply enables the amplifier to deliver as much energy as possible in the shortest possible time, thus enabling the full dynamic range to be reproduced over the entire audible frequency spectrum during live music applications – while also turning the least amount of energy into heat. The result is a significant increase in the available peak power over several seconds. An integrated microprocessor equips the power supply with measuring, monitoring and communications functionality. As a result, important factors such as temperature, supply voltage and capacity can be monitored and controlled accordingly. In the event of mains overvoltage, the amplifier will shut down.

The amplifier's fans are temperature controlled and optimised for extremely quiet operation. The fans are not used when the amplifier is in an idle state. The fan and filter foam can be manually cleaned, without the need for tools.

An integrated Power-Up Delay enables sequential (remote) power-up of a number of connected amplifiers within a rack. For larger installations and live sound applications involving multiple systems, this function significantly eases the general handling.

The amplifiers are additionally equipped with two programmable switching contacts as well as a fault contact for easy integration into building services.

Overview of the different DI-SERIES product versions

The amplifiers are available as 2- or 4-channel product versions with respective power outputs of 1000 W / 2000 W / 4000 W at 4 ohm.

MODEL	POWER per channel and load				
	2 Ω	3 Ω	**4 Ω**	8 Ω	16 Ω
DI-4.1000	-	1300 W	**1000 W**	500 W	250 W
DI-2.2000	-	-	**2000 W**	1000 W	500 W
DI-4.2000	-	-	**2000 W**	1000 W	500 W
DI-2.4000	-	-	**4000 W**	2000 W	1000 W

These models are currently available.

2.2. Contents

Every product is examined in accordance with 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 **FOHHN** system contains the following:

- **1 × DI-SERIES DSP amplifier**
- **All plugs for rear panel connectors (inserted)**
- **1 × mains cable with PowerCON connector**
- **1 × Quick Start Guide**

If the contents are incomplete, please contact your FOHHN dealer!

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 transport company immediately. A claim for transport damage can only be made by the recipient (i.e. 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 Professional Rack Mounting

For professional installation in mobile 19-inch racks or cabinets, the amplifier is equipped with the appropriate front and rear mounting brackets. The enclosure is torsion resistant. Please therefore take care that the amplifier is well ventilated and cooled from both the front and the back during use.

3.2 Connection Instructions and Controls

Each amplifier has a Power On/Off switch on the right side of the enclosure front panel.

Power On/Off switch on a DI-SERIES amplifier

Further connection of any cabling should be done while the amplifier is switched off. Similarly, the mixing console should be switched on before the amplifier. This will avoid annoying and often dangerous switch-on noises.

3.2.1 USB-C Configuration Port

Some **DI-SERIES** amplifiers come with an USB-C socket on the front panel of the enclosure. This allows for optional direct configuration of the device via PC and **FOHHN AUDIO SOFT** control software – without using a **FOHHN** network adapter.

To connect a network consisting of several devices, a **FOHHN** network adapter (e.g. an **NA-11 FOHHN-NET USB ADAPTER** or **NA-3 FOHHN-NET ETHERNET ADAPTER**) must be employed.

For more information, please see chapter 3.3.3 "FOHHN-NET Cabling and ID Allocation"!

USB-C socket on the left side of the front panel

3.2.2 Standard Connections

The following connectors can be found as standard on the rear panels of **DI-SERIES** amplifiers:
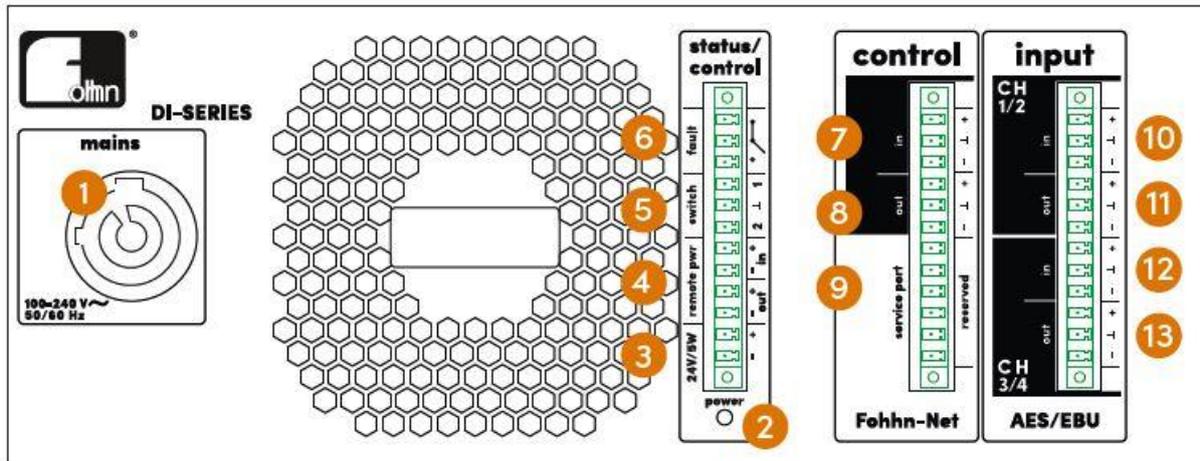
(1) mains

The mains cable is connected to this PowerCON power socket. The universal power supply (with Power Factor Correction [PFC]) permits a supply voltage of 100 – 240 Vac / 50/60 Hz, thus enabling worldwide use of the amplifier.

The amplifier is only fully disconnected from the mains if the PowerCON plug is removed from the socket!

(2) LED AUX power

This LED displays the current status of the 24 V / 5 W power supply for external small devices. When it lights up green, the device is active.

(3) 24 V / 5 W AUX

This terminal block enables an additional external device (e.g. a small mixer or the **AIREA ABX-1, ABX-2** or **ABX-3 Break Out Extensions**) to be supplied with power.

(4) remote pwr

This terminal block enables multiple amplifiers within a rack to be connected to one another for a sequential (remote) switch on/off.

Further information on this can be found in Chapter 4 of the user manual!

(5) switch

These terminal blocks serve as switching contacts for changing presets. They can be configured in **FOHHN AUDIO SOFT (see Chapter 3.4.2 "Switching Contact")**.

(6) fault

Error status can be reported via this isolated open/close contact. The error contact relais (1 x UM) can be operated with a maximum 50 V and 500 mA.

(7) Fohhn-Net input

This terminal block is used to connect the amplifier to the **FOHHN-NET** remote control network.

Only use a FOHHN network adapter for this (NA-11 FOHHN-NET USB ADAPTER or NA-3 FOHHN-NET ETHERNET ADAPTER).

(8) Fohhn-Net output

This terminal block allows **FOHHN-NET** control signals to be looped through.

(9) service port

This in an internal test connection, which must only be used for service purposes.

Nothing must be connected to this port, otherwise the functionality of the device may be adversely affected!

(10) CH 1/2 input

Digital audio signals (AES/EBU) can be fed in using these terminal blocks. The terminals are intended for both input channels **CH 1** and **CH 2**.

(11) CH 1/2 link out

Digital audio signals (AES/EBU) can be looped through using these terminals. The terminals are intended for both input channels **CH 1** and **CH 2**.

(12) CH 3/4 input

Digital audio signals (AES/EBU) can be fed in using these terminal blocks. The terminals are intended for both input channels **CH 3** and **CH 4**.

These inputs are also available on 2-channel amplifiers!

(13) CH 3/4 link out

Digital audio signals (AES/EBU) can be looped through using these terminals. The terminals are intended for both input channels **CH 3** and **CH 4**.

These outputs are also available on 2-channel amplifiers!
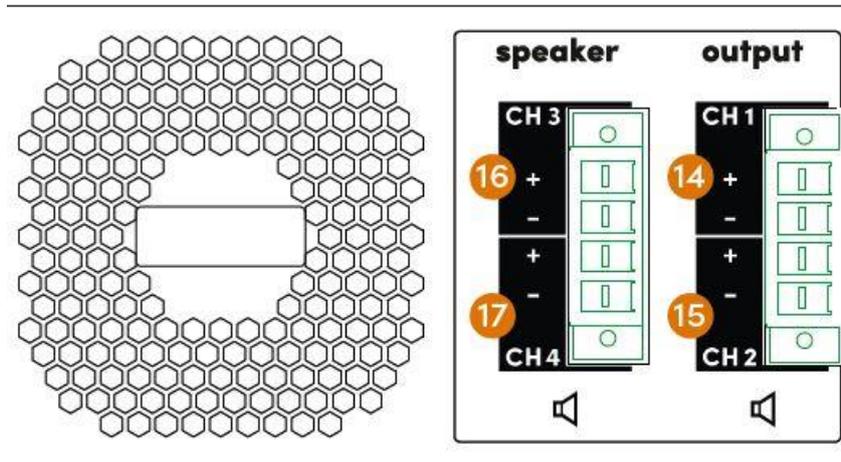
(14) + (15) Speaker Output CH 1 / CH 2

Loudspeaker systems are connected to these terminals (up to 6 mm² flexible or 10 mm² rigid conductor cross-section).

**(16) + (17) Speaker Output CH 3 / CH 4**

Loudspeaker systems are connected to these terminals (up to 6 mm² flexible or 10 mm² rigid conductor cross-section).

These outputs are only available on 4-channel amplifiers!

3.2.3 Optional Connection Interfaces

All **DI-SERIES** product versions are optionally available with input interfaces for the Dante™ audio network, as well as with XLR Interfaces for AES/EBU or analogue audio signals. Besides the standard version terminal blocks, it is also possible for outputs to have Speakon connectors. Any input option can be combined with any output option.

Input option AES/EBU XLR Interface
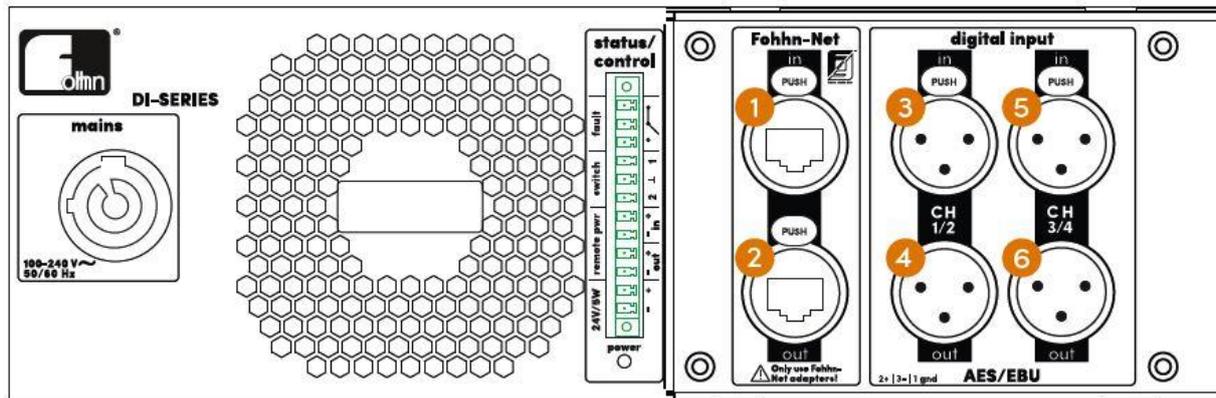
(1) Fohhn-Net input
The amplifier is connected to the **FOHHN-NET** remote control network via this EtherCON socket.

Only use a FOHHN network adapter for this (NA-11 FOHHN-NET USB ADAPTER or NA-3 FOHHN-NET ETHERNET ADAPTER).

(2) Fohhn-Net link out
FOHHN-NET control signals are looped through via this Link Out socket.

(3) CH 1/2 in
Digital audio signals (AES/EBU) can be fed in via this XLR socket. The socket is intended for both input channels **CH 1** and **CH 2**.

(4) CH 1/2 link out
Digital audio signals (AES/EBU) can be looped through via this XLR socket. The socket is intended for both input channels **CH 1** and **CH 2**.

(5) CH 3/4 in
Digital audio signals (AES/EBU) can be fed in via this XLR socket. The socket is intended for both input channels **CH 3** and **CH 4**.

These inputs are also available on 2-channel amplifiers!

(6) CH 3/4 link out
Digital audio signals (AES/EBU) can be looped through via this XLR socket. The socket is intended for both input channels **CH 3** and **CH 4**.

These outputs are also available on 2-channel amplifiers!

Input option Analog XLR Interface
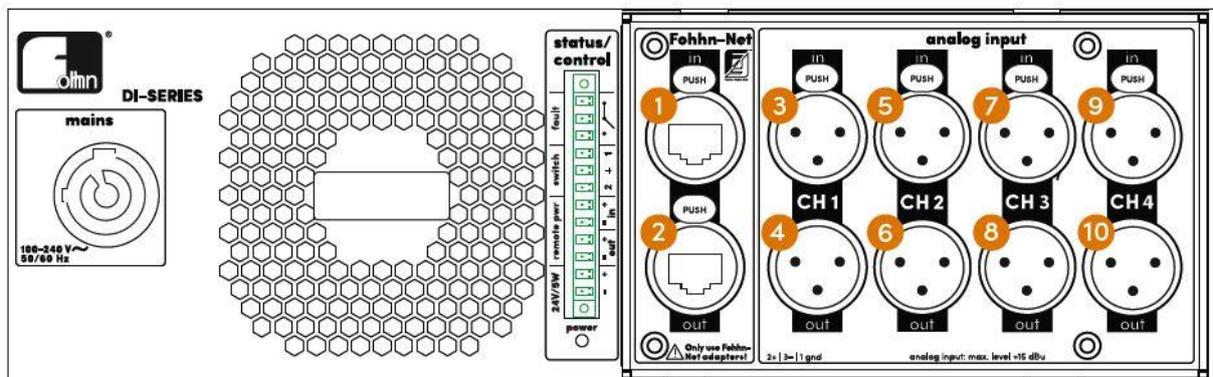
(1) Fohhn-Net input
The amplifier is connected to the **FOHHN-NET** remote control network via this EtherCON socket.

(2) Fohhn-Net link out
**FOHHN-NET** control signals are looped through via this Link Out socket.

(3), (5), (7), (9) analog in
Analog audio signals can be fed in via these XLR sockets. Each of the sockets is intended for one input channel (**CH1** to **CH4**) respectively.

(4), (6), (8), (10) link out
Analog audio signals can be looped through via these XLR sockets. Each of the sockets is intended for one input channel (**CH1** to **CH4**) respectively.

Input option Dante™ Interface
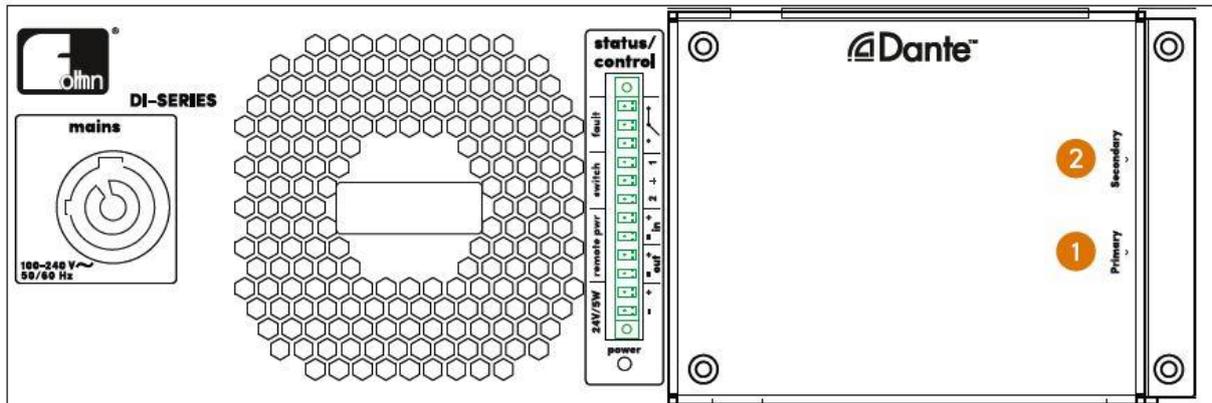
(1) Primary

Digital audio signals (Dante™) and remote control signals (**FOHHN-NET**) can be fed in via this RJ-45 input (1000 Base-T Ethernet).

(2) Secondary

This RJ-45 input (1000 Base-T Ethernet) is exclusively used for redundant cabling.

Output option Speakon sockets
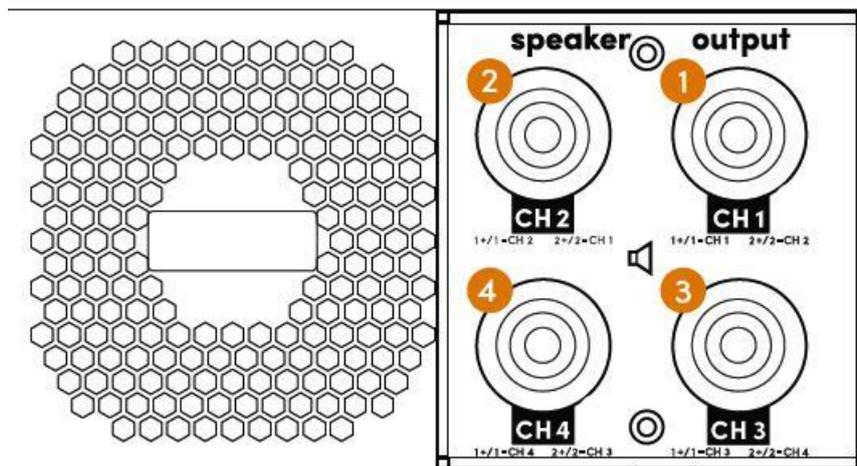
(1) + (2) Speaker Output CH 1 / CH 2

Loudspeaker systems are connected to these Speakon connectors.

(3) + (4) Speaker Output CH 3 / CH 4

Loudspeaker systems are connected to these Speakon connectors.

These outputs are only available on 4-channel amplifiers!

3.2.4 Status Displays

Status displays on **DI-SERIES** amplifiers take the form of illuminated symbols on the front panel of the enclosure:
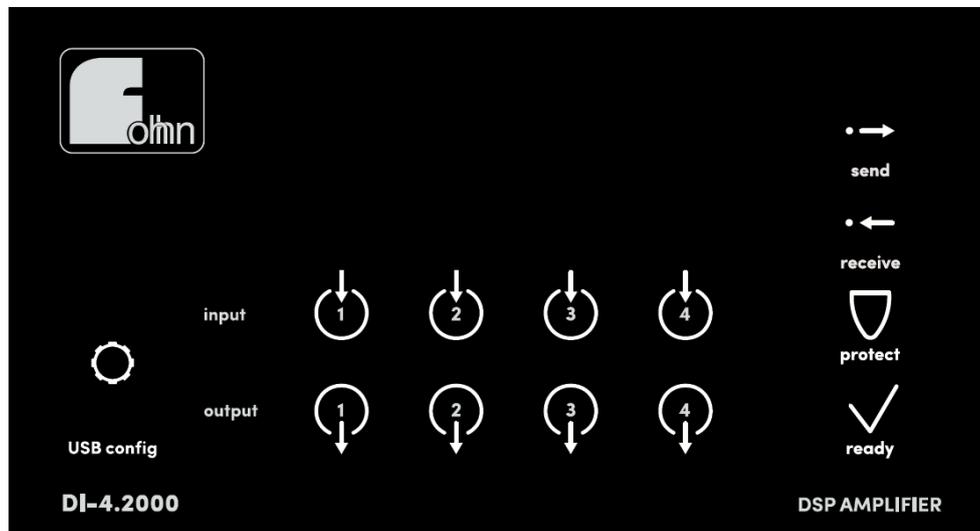
Status LEDs for a 4-channel amplifier

input 1 / 2 / 3 / 4
If audio signals are detected, the symbols for the corresponding input channels light up white. If there is a signal overload, the corresponding symbols turn red.

output 1 / 2 / 3 / 4
If audio signals are transmitted from the DSP amplifiers, the symbols for the corresponding output channels light up white.

The output 3 and output 4 symbols are only available on 4-channel amplifiers!

send
This symbol lights up if **FOHHN-NET** control signals are transmitted from the DSP amplifier.

receive
This symbol lights up if the DSP amplifier receives **FOHHN-NET** control signals.

protect
This symbol lights up if there is an error during operation.

ready

This symbol lights up when the amplifier is ready for use.

USB Config (gear symbol)

This symbol lights up when the amplifier is connected to a PC via the USB-C socket.

3.3 Configuration

Using the **FOHHN-NET** network, you can remotely control and monitor the functionality of your **FOHHN** amplifier's integrated digital signal processors (DSP). For this you will need a Windows PC with **FOHHN AUDIO SOFT** (Version 5.0.3 or later) installed.

3.3.1 System Requirements

To use **FOHHN AUDIO SOFT,** you need a commercially available computer with the following:

- **Computer and processor:** x86- or x64 multi-core system
- **Memory (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 user manual. You can download this from the FOHHN website www.fohhn.com

3.3.2 Downloading and Installing FOHHN AUDIO SOFT

FOHHN AUDIO SOFT is directly compatible with all **FOHHN** active DSP systems. Therefore, you do not need any special **DI-SERIES** version of the software. Regardless of the amplifier, 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.

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.

3.3.3 FOHHN-NET Cabling and ID Allocation

To control a number of **DI-SERIES** amplifiers, each system in the **FOHHN-NET** must be allocated its own specific ID. Using this ID, each individual **FOHHN** amplifier can be clearly identified and controlled from within **FOHHN AUDIO SOFT.**

> ⚠ **All amplifiers 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 amplifiers concerned.**

ID allocation for individual amplifiers:

In order for an ID to be allocated, each amplifier must first be connected to **FOHHN AUDIO SOFT**.

Proceed as follows:

1. Connect the **FOHHN** amplifier to the mains power.
2. Connect the amplifier to a PC via the USB-C socket.
3. As an alternative to step 2, you can also use an **NA-3** or **NA-11 FOHHN** network adapter. For amplifiers with a Dante interface, you need an Ethernet Switch.
4. Connect the USB-C socket, **FOHHN** network adapter or Ethernet Switch to the amplifier using an appropriate cable.

5. Switch on the amplifier.
6. Start **FOHHN AUDIO SOFT**. The selected **FOHHN** network adapter will automatically be recognized.
   For amplifiers with a Dante interface, this will be directly recognized. As a **FOHHN-NET** Node the IP Address of the Dante interface will be displayed. This will automatically be found, but it can also be manually configured.
7. When **FOHHN AUDIO SOFT** opens, an automatic search starts that results in the listing of all correctly connected **FOHHN** amplifiers.

If no amplifier is 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 amplifier is still not shown, check the mains power supply and/or the network cabling. Then repeat Step 1.

If an amplifier is recognized, it 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 amplifier. Make sure that this ID is not already in use.

Confirm this by clicking *Ok*: The **FOHHN** amplifier will now have a newly assigned ID.
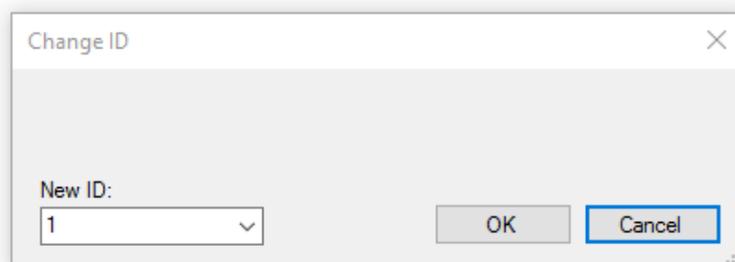
You can also change the ID of a **FOHHN** amplifier at any time while it is in use. To do this, the system must be in the **FOHHN-NET**. Proceed as follows:

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 an amplifier in the list display.
3. In the context menu select *Change Fohhn-Net ID*.
4. In the same dialog, give the amplifier a new ID
5. Confirm this by clicking *Ok*: The **FOHHN** amplifier 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.

3.3.4 Loading Loudspeaker Presets

In their ex-factory state, **DI-SERIES** amplifiers do not have any preset limiters. Therefore, to ensure safe operation of all connected loudspeakers, the appropriate loudspeaker presets must be loaded into **FOHHN AUDIO SOFT.** Examples are saved in a preset list on the device. All available loudspeaker presets can also be loaded from a database.

Further information on loading loudspeaker presets can be found in Chapter 4.2 "Presets" of the FOHHN AUDIO SOFT user manual.

3.3.5 Updating the Firmware

The range of functions in your **FOHHN** system depends not only on **FOHHN AUDIO SOFT,** but also on the firmware in your devices and on the loudspeaker database. From time to time, updates are available for these sets of data, which can be downloaded into **FOHHN AUDIO SOFT** (internet connection required!).

Further information on this can be found in Chapter 6.1 "Updating the Firmware" of the FOHHN AUDIO SOFT user manual.

3.3.6 Connecting All Devices

Connect your amplifier to the audio source and the loudspeakers, using the relevant inputs and outputs **(see Chapter 3.2 "Connection Instructions and Controls")**.
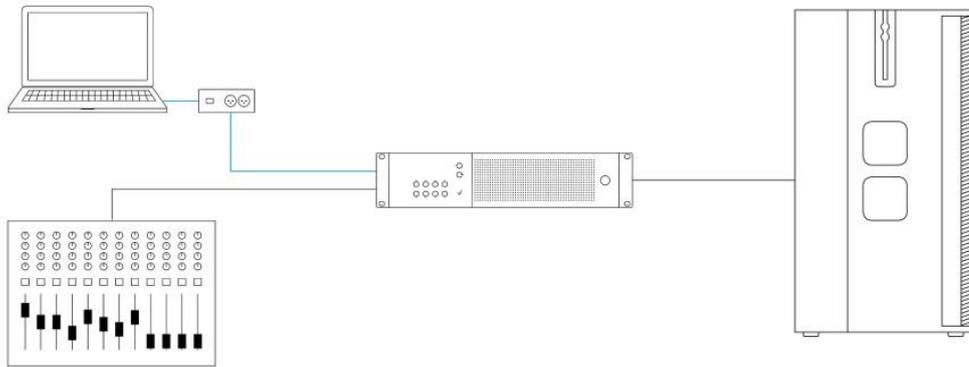
Connecting a DI-Series amplifier

3.3.7 Gain Structure and Signal Chain
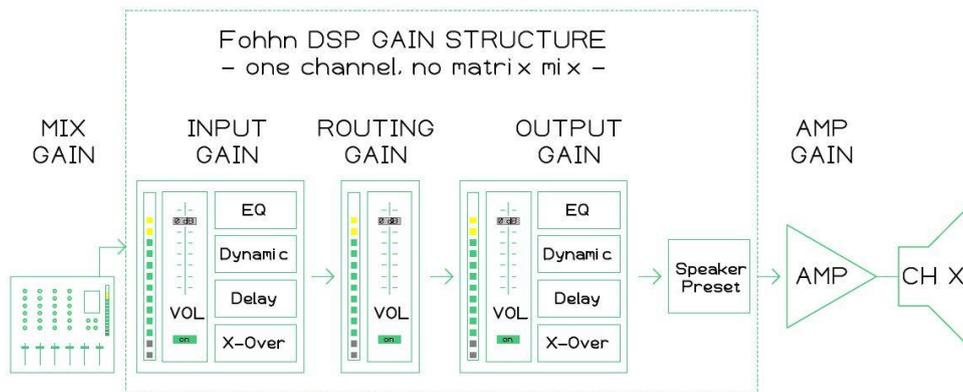
Fig. 1: Overview of the signal chain on a DI-Series amplifier channel

There are many gain options, both inside and outside the **FOHHN DSP**, that enable flexible handling of any application – even in complex situations where the matrix mixing functions are used.

Remember to check the level of all steps in the signal chain for each output channel in order to achieve best possible audio results.

The following tips and examples illustrate this approach.

Important tips

The best level is high enough to avoid noise and low enough to allow headroom for peaks!

SPEAKER PRESETS
Using **FOHHN** speaker presets ensures that, within the **FOHHN DSP**, no audible clipping can occur.

ANALOG INPUTS
Please pay particular attention to the levels when using analog input signals! Analog signals are converted into digital audio signals. This always presumes a definition for 0 dBFS. **FOHHN** defines +15 dBu as 0 dBFS. However, this definition can vary significantly among manufacturers of mixing consoles and other similar equipment.

Digital levels
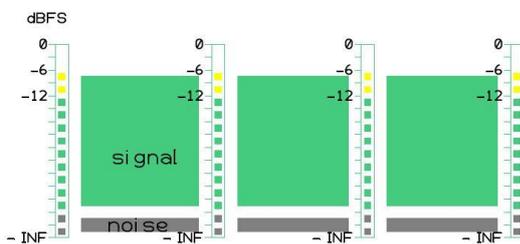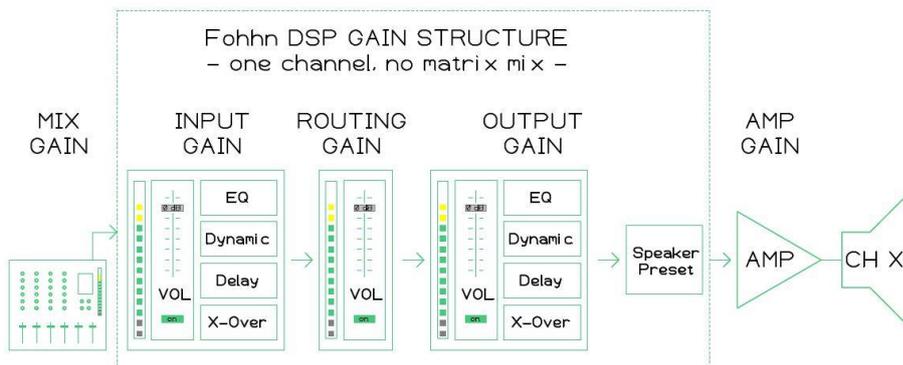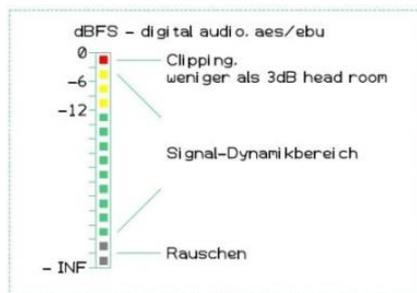
Example 1
Standard signal chain, input-, routing- and output-gain 0 dB
-> no change of input signal level
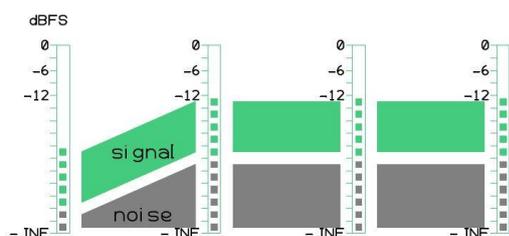
Example 2
Mix level too low; higher input gain also amplifies noise
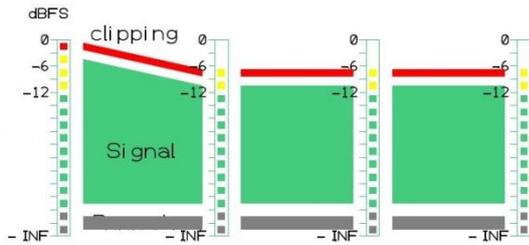
Example 3

Mix level too high leading to input signal clipping.
Lower input gain does not prevent audible clipping!
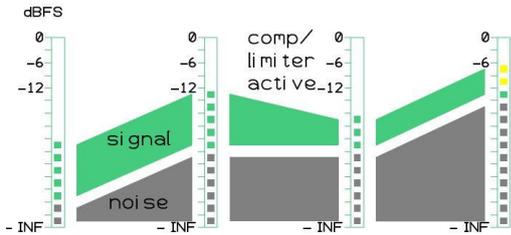
Example 4

Incorrect gain structure leads to loss of signal
integrity; noise level rises!
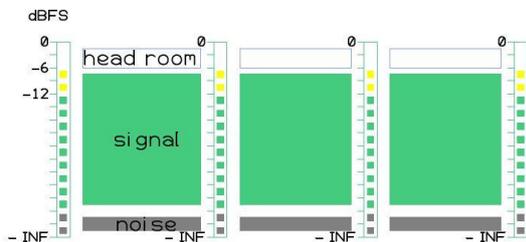
Example 5

Optimum level for full signal integrity and sufficient
headroom for peaks.

3.3.8 Matrix Functions and DSP Routing

Fohhn DSP – Routing Matrix Functions
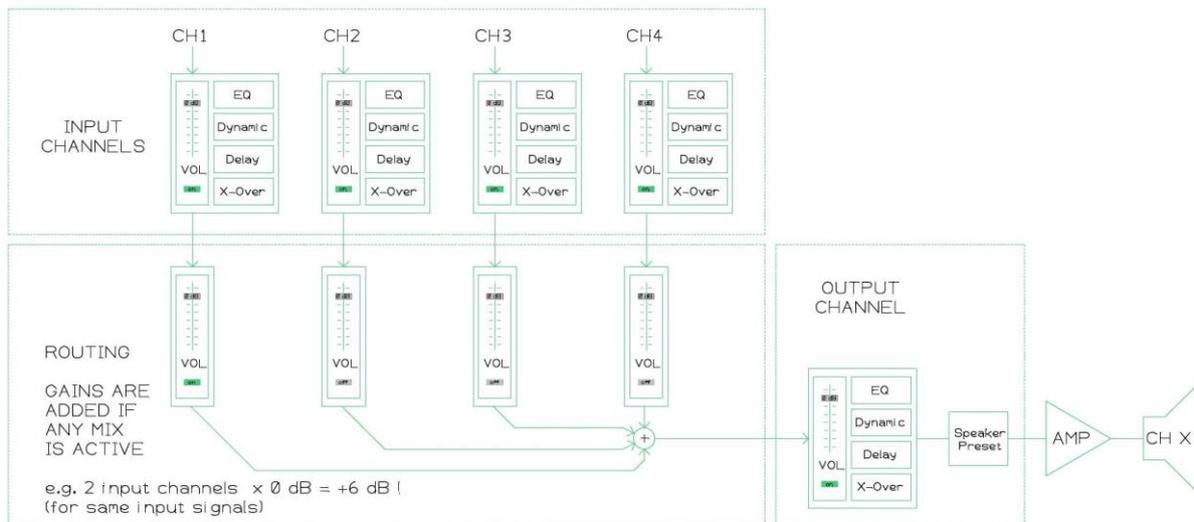
Fig. 1: Four input channels are mixed to one output channel.
The mix volume of each input can be adjusted by one routing gain.
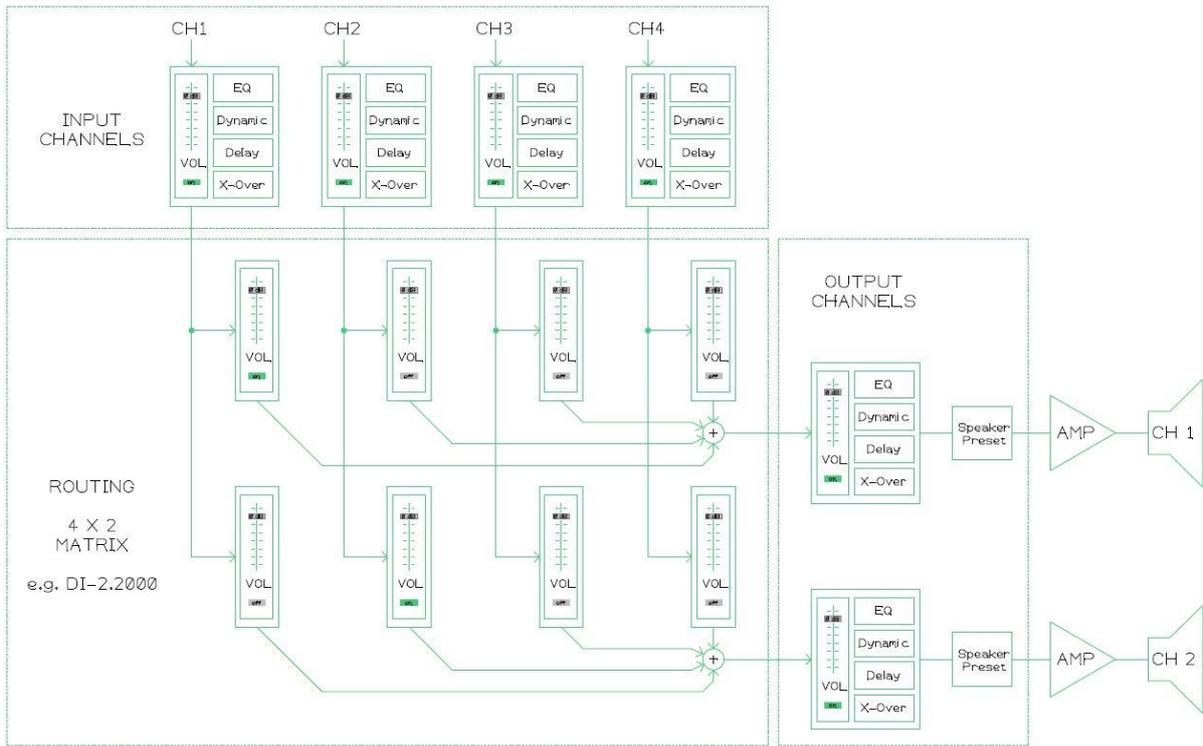
Fig. 2: Four input channels are mixed to two output channels.
The mix volume of each input to a specific output can be adjusted via one routing gain.
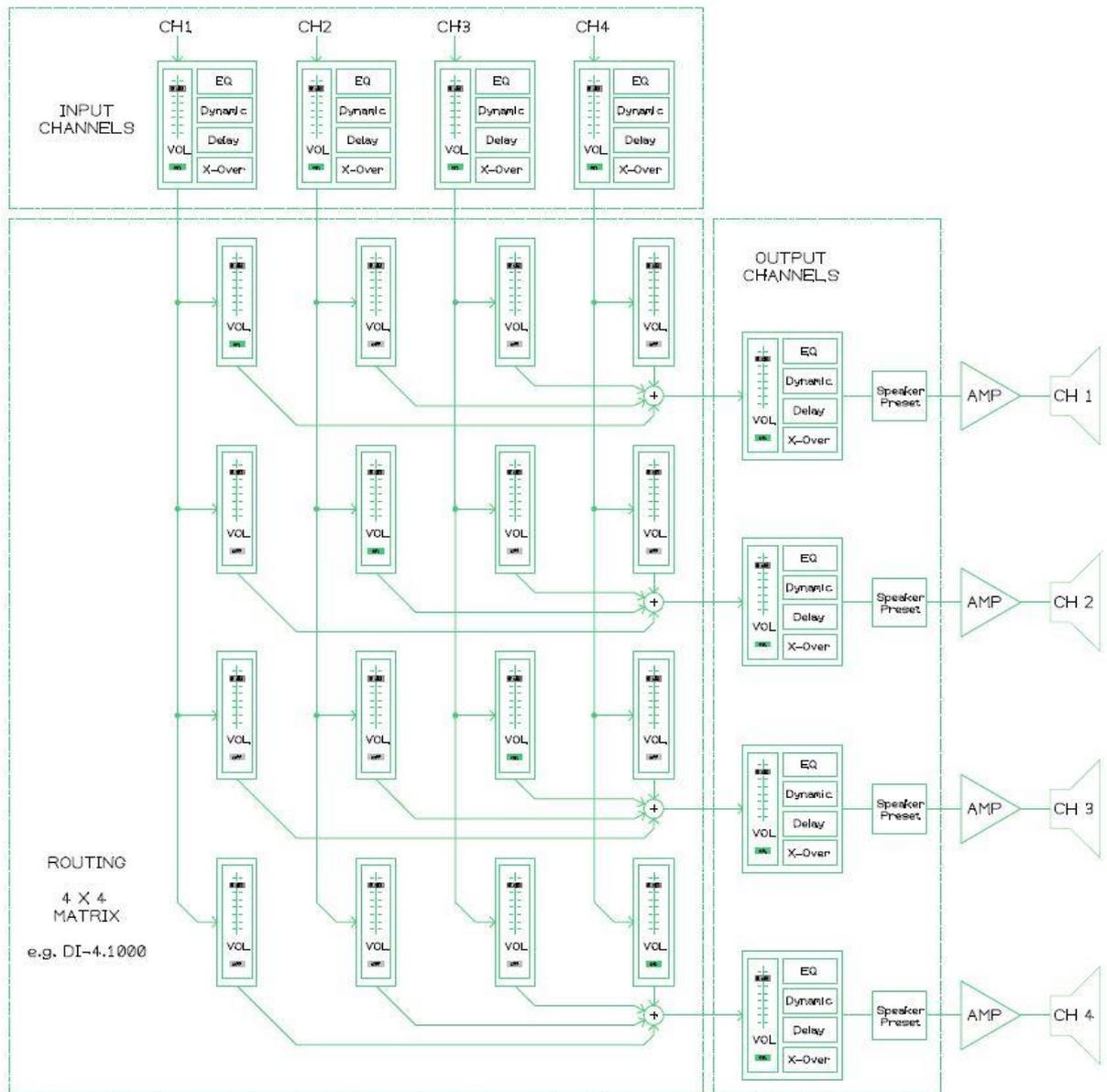
**Fig. 3: Four input channels are mixed to four output channels.**
The mix volume of each input to a specific output can be adjusted via one routing gain.

3.3.9 Integration into a Dante™ Network

For amplifiers with a Dante™ interface, connection to the **FOHHN-NET** is 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 3.3.3 "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
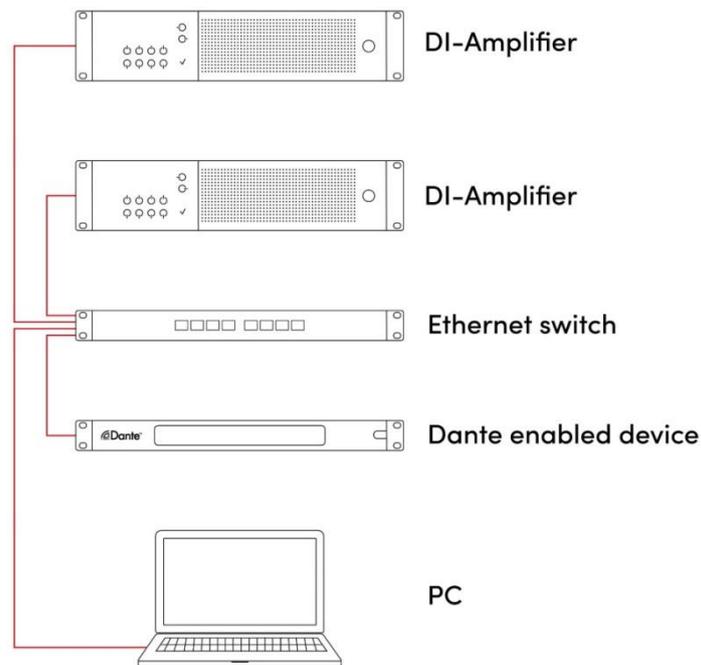
Example: Control of DI-Series amplifiers via computer and Ethernet switch using simple cabling.

DI-Amplifier

DI-Amplifier

Ethernet switch

Ethernet switch

Dante enabled device

PC
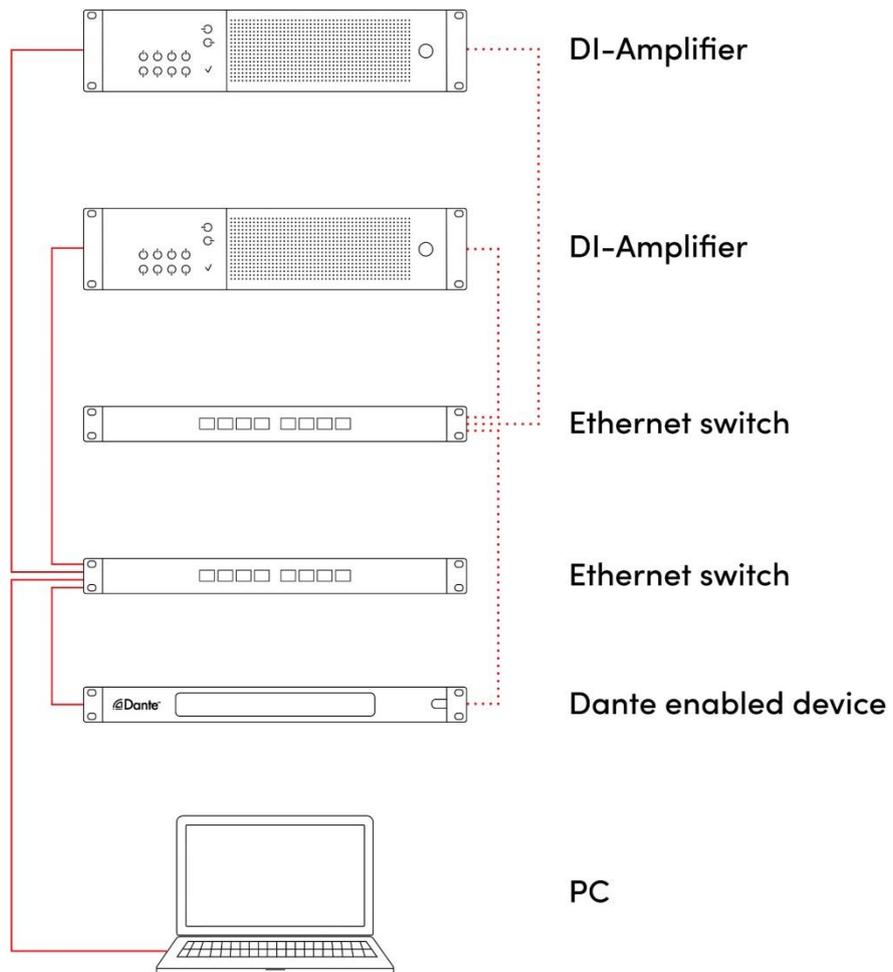
Example: Control of DI-Series amplifiers via computer and Ethernet switch using redundant cabling.
(Here, all devices must be in "Redundant Mode".)
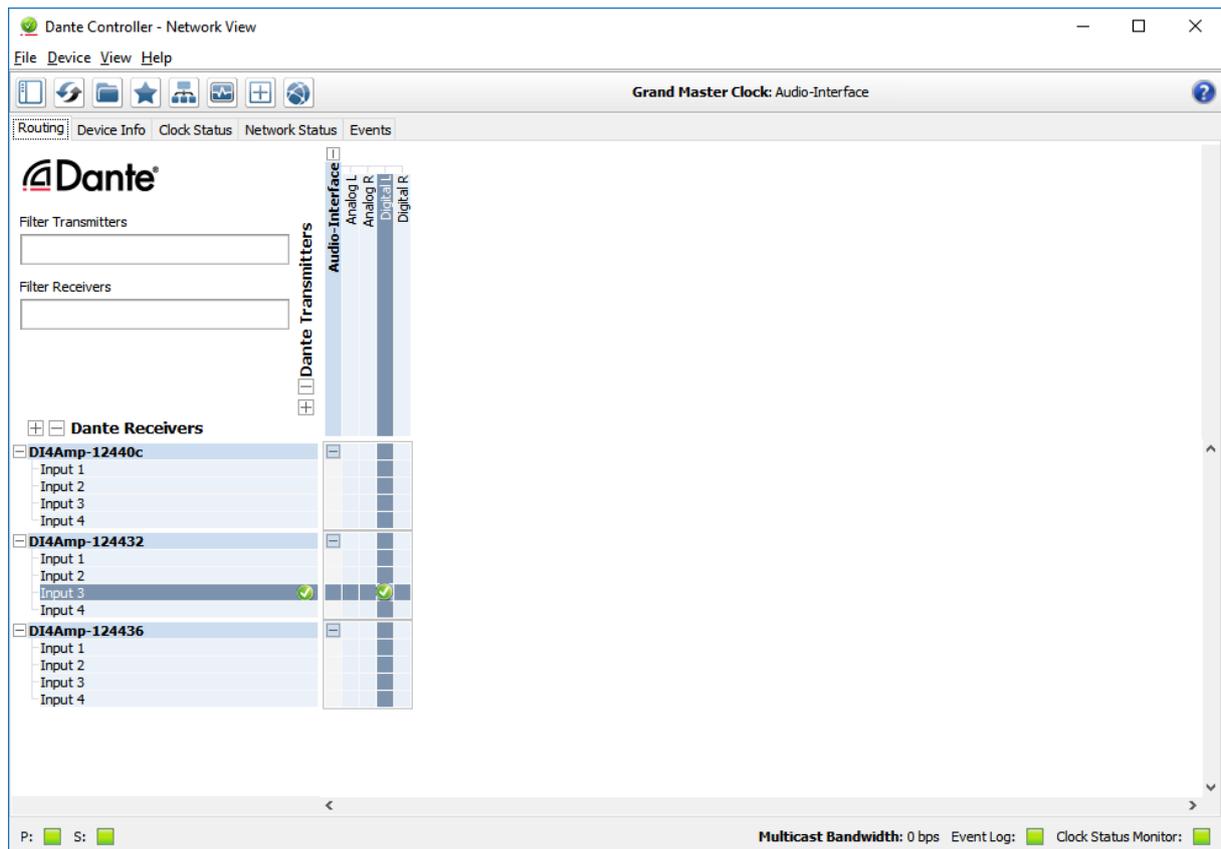
All Dante™ input interface parameters (e.g. the audio routing within a Dante network) must be configured with the Dante Controller software.

Dante™ Interface Firmware Update

To update the interface's Dante firmware, the **Dante Firmware Update Manager** software is required. 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.fohhn.net/download/dante/

Example: **DI4Amp_1.0.0.dnt** for Dante devices in the **DI-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*.

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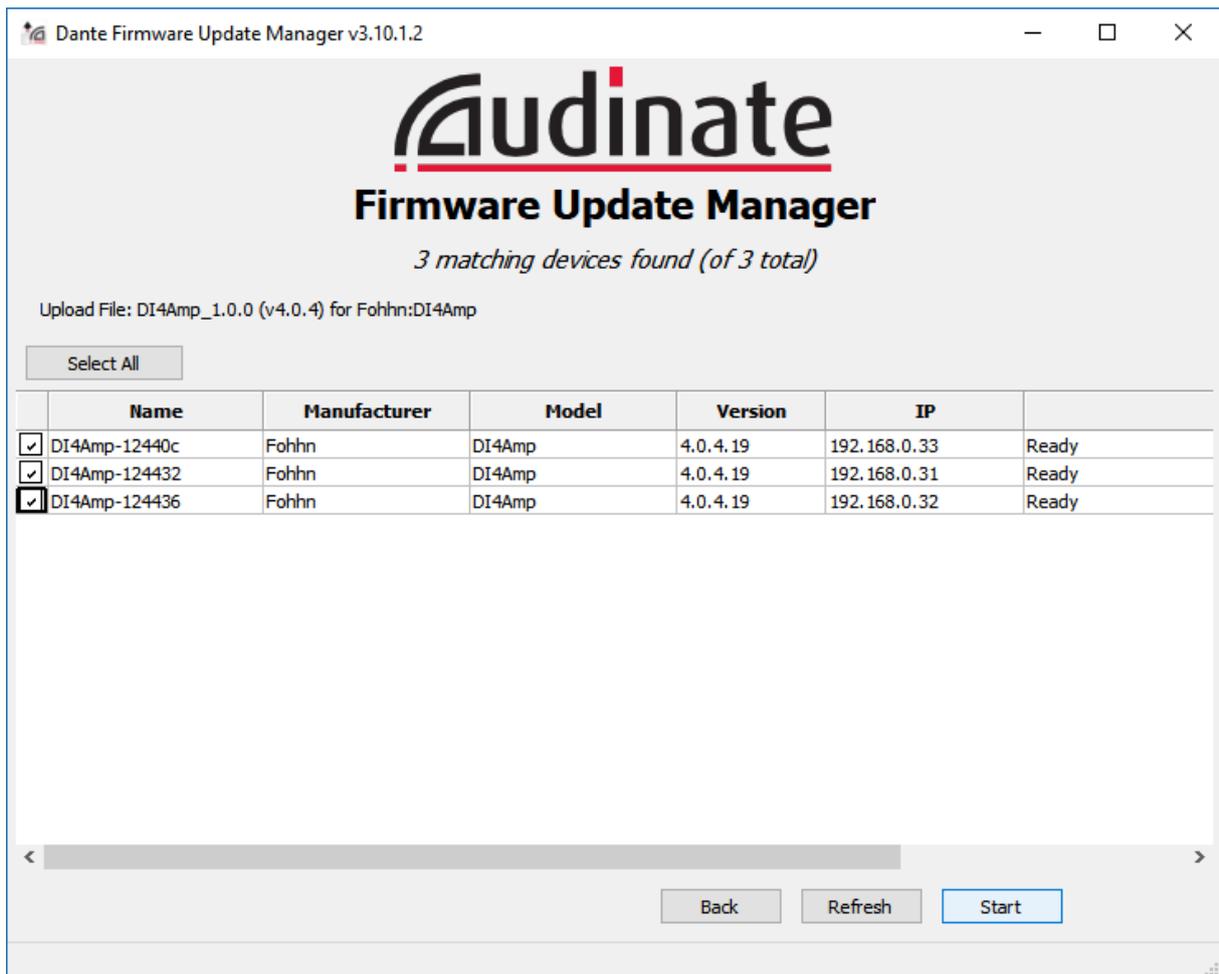
6. After a full update, the Dante devices should be restarted by switching off then on.

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

3.3.10 Integration into the AIREA-NET

Amplifiers with an AES/EBU XLR Interface have the possibility of being integrated into a **FOHHN AIREA** system: The system has its own network for transmitting supply voltage, digital audio signals (AES/EBU) and **FOHHN-NET** control signals – the **AIREA-NET**. For connection to this, an **AIREA BREAK OUT EXTENSION ABX-4** is required.

3.3.11 Renaming Devices and Output Channels

For better identification within **FOHHN AUDIO SOFT** it is recommended that, in an installation involving a number of **DI-SERIES** products, the individual amplifiers and/or their output channels are each 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 workspace (*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*.
5. To name individual output channels: In the *Devices* view, click on the desired amplifier with the right mouse button and select the *Rename Channels* option. Renaming individual output channels is also possible in the *Output Channels* view.

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

3.4 Further Functions

3.4.1 Auto Power Save

DI-SERIES amplifiers 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 amplifier switches into Power Save Mode. As soon as an audio signal is detected, the amplifier is immediately ready for use again. In Power Save Mode, the amplifier's power consumption is < 10 W and no fans are used.

The amount of time before the device switches to Auto Power Save can be set as required – between 1 second and 12 hours. The mode can also be completely deactivated.

We recommend using the *Auto Power Save* function with a switch-off time of 10 seconds! This function keeps the amplifier cool, even during short pauses and, as such, prevents thermal limiting. Furthermore, any noise will be fully suppressed.

Proceed as follows to set up *Auto Power Save* in **FOHHN AUDIO SOFT**:

1. Select one or more amplifiers in the *Device List* and, with a right mouse click, open the context menu.
2. Select the *Options* entry. This opens the *Advanced device settings configuration* dialog.
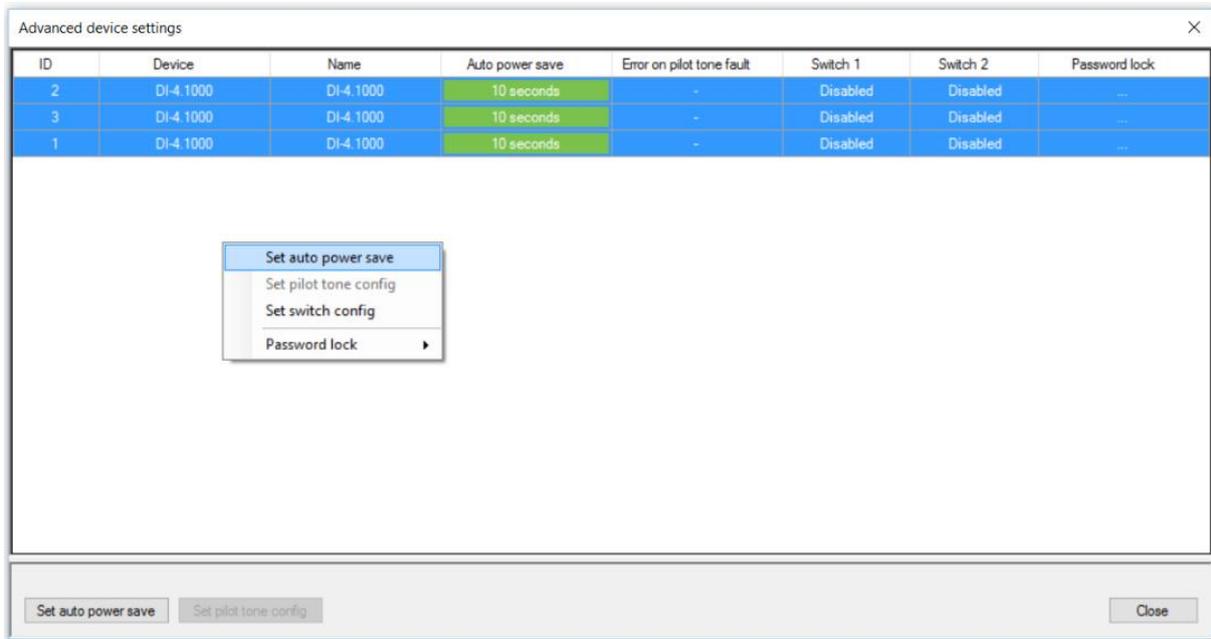
3. In here, select one or more amplifiers and, with a right mouse click, open the context menu.
4. Select *Set auto power save*. The *Set auto power save time* window will open. (You can also open this window via the corresponding button at the bottom left of the *Advanced device settings* dialog.)
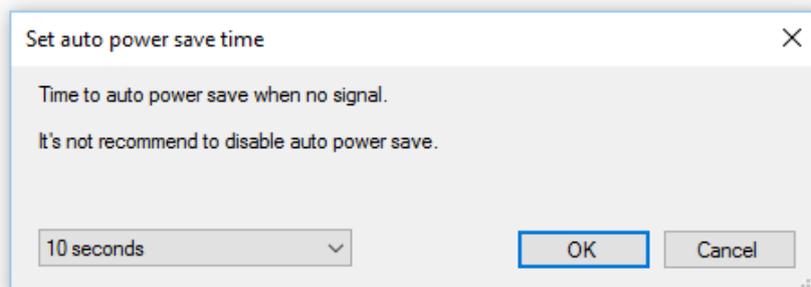
5. From the drop-down list (bottom left), select the desired switching time and confirm your selection by clicking *OK*.

Note: During acoustic measurement of your loudspeaker systems, too short a switch-off time can lead to inaccuracies. We recommend a switch-off time of one hour or longer while you carry out your measurements.

3.4.2 Switching Contact

DI-SERIES amplifiers have two contact inputs **(see Chapter 3.2 "Connection Instructions and Controls")**, via which a preset change can be triggered.

This switching contact can be configured in **FOHHN AUDIO SOFT**:

1. Select one or more amplifiers 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 amplifiers 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.
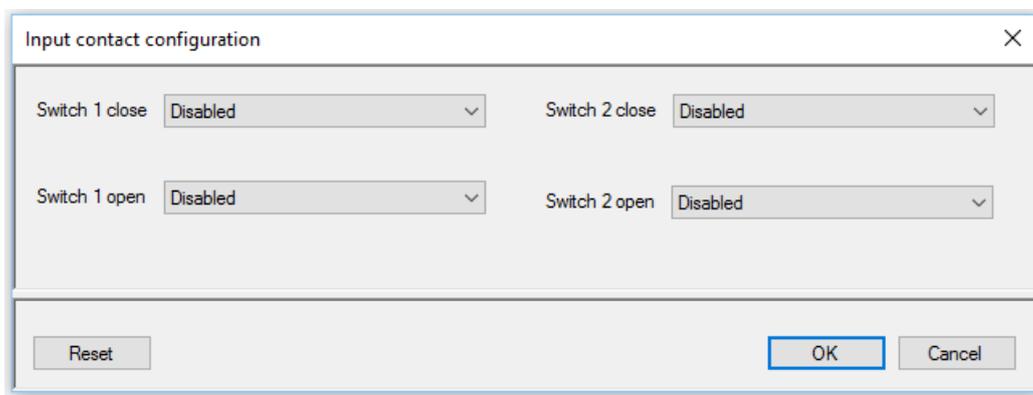
5. Select a setting from the drop-down menus for the "close" (*Switch 1/2 close*) and "open" (*Switch 1/2 open*) status: for example, you can deactivate the current status (*Disabled*) or load one of up to 100 presets (*Load Preset*).
6. Confirm your selection by clicking *OK*.

When the amplifier 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

3.4.3 Password Lock

DI-SERIES amplifiers and their parameter settings can be password protected (or locked) to prevent any subsequent 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

4. Remote Switch-On and Sequential Switch-On

If multiple **DI-SERIES** amplifiers are being used, these can be linked to one another via the **remote pwr in** or **out** connector **(see Chapter 3.2.1 "Standard Connections")** and thus be sequentially switched on. Remotely controlled switch-on / switch-off is also possible.

Cabling
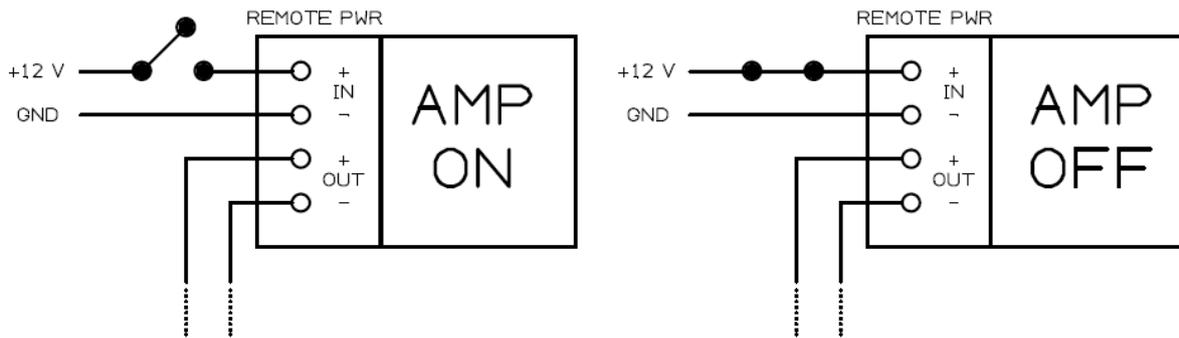
Switch states for 12 V control voltage

At the **remote pwr** input is a control voltage that shuts down the amplifier. The control voltage can be 9 – 48 V, the supply is therefore no greater than 10 mA per device.

4.1 Sequential Switch-On / -Off

In order to avoid an overload and the subsequent triggering of a circuit breaker, a number of amplifiers can be linked together in such a way that they are switched on one after the other – each time with a delay.
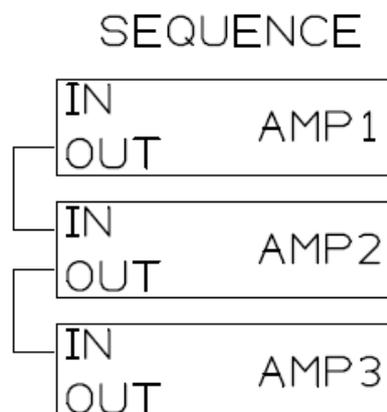
If the supply voltage for all three amplifiers is simultaneously and centrally switched on, amplifier 1 will delay the switch-on of amplifier 2. Amplifier 2 will, in turn, delay the switch-on of amplifier 3 etc.

4.2 Sequential Remote Switch-On / Switch-Off

The linked amplifiers can also be switched on and off via remote control.

If more than eight amplifiers are used in this configuration, we recommend a control voltage which is greater than 12 V to ensure reliable control!
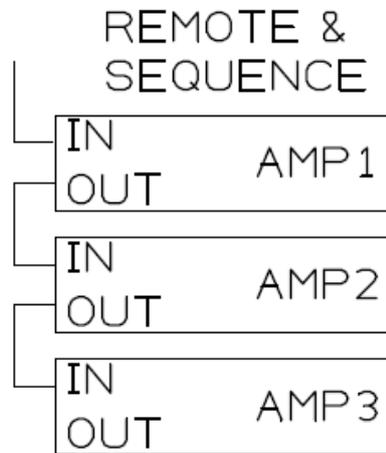
If a control voltage is not present at the *remote pwr in* of amplifier 1, all amplifiers will switch on one after the other. If a control voltage is present, all amplifiers will be/remain switched off.

Note:

⚠ **A remote switch-on/switch-off is only possible if the power switch on all the devices is turned on.**

⚠ **The remote activation has the same function as the power switch.**

4.3 Examples

In the following examples it is assumed that the power switches on the front panels of all the amplifiers are switched on, all devices are connected to a power supply and mains voltage is present!

Example 1: Sequential switch-on within an amplifier stack after connection to the mains power supply cable.
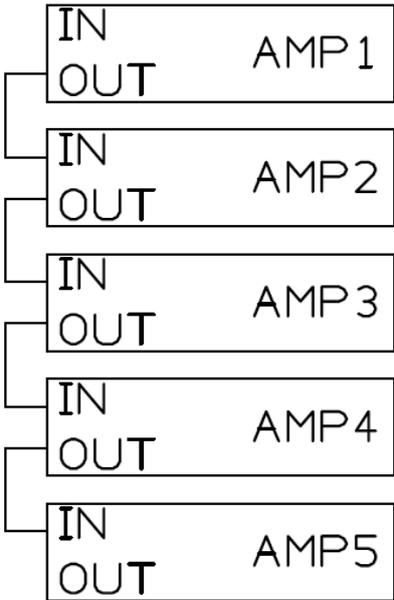
Example 2: Remote switch-on / switch-off of the stack while devices are connected with mains
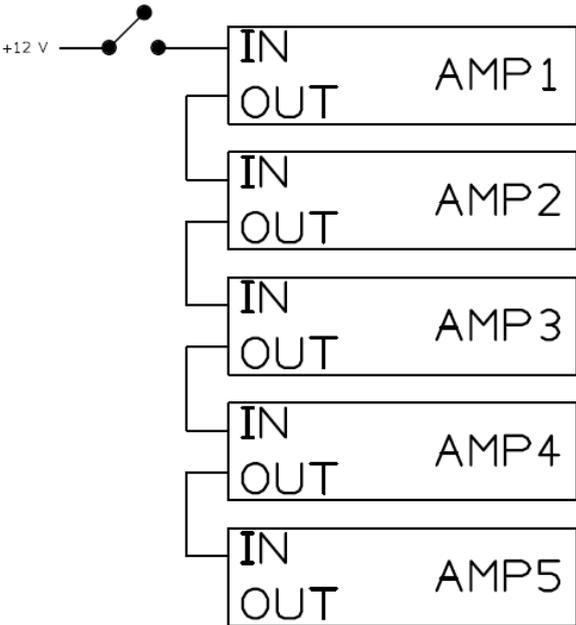
Example 3: Remote switch-on / switch-off of part of the stack while devices are connected with mains
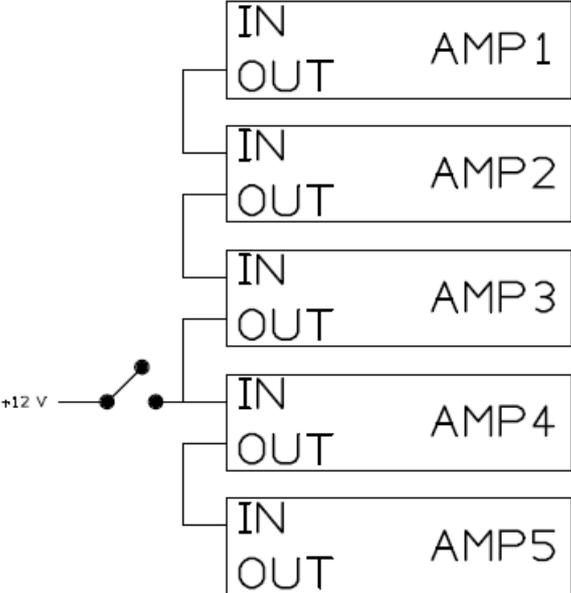
Example 4: Logical operation: Amplifiers 4 and 5 are switched on at the same time as amplifiers 1 to 3, but have a separate switch-off option.
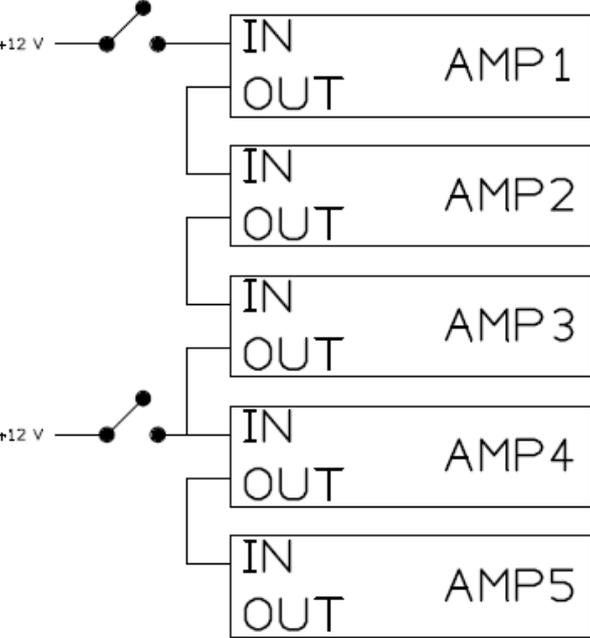
Example 5: Remote toggle switching of two stacks
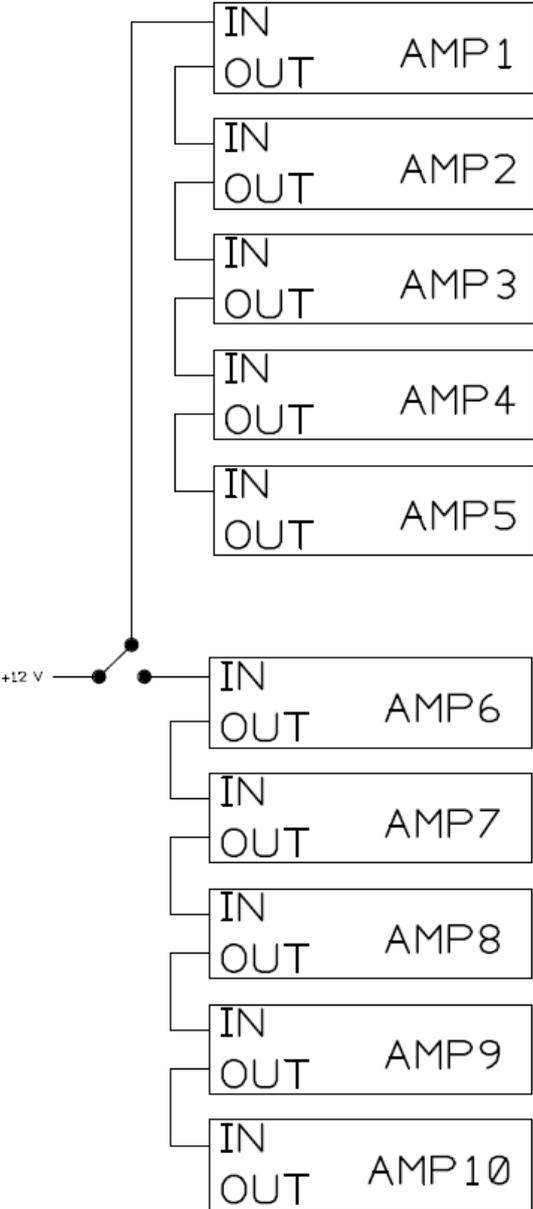
5. Technical Specifications

|	DI-4.1000	DI-2.2000	DI-4.2000	DI-2.4000
Amplifier technology	Class D			
Output power	4 x 1000 W / 4 ohm 4 x 500 W / 8 ohm	2 x 2000 W / 4 ohm 2 x 1000 W / 8 ohm	4 x 2000 W / 4 ohm 4 x 1000 W / 8 ohm	2 x 4000 W / 4 ohm 2 x 2000 W / 8 ohm
	(1 kHz, THD+N < 1 %)			
Minimum impedance	3 ohm	4 ohm	4 ohm	4 ohm
Input channels	4			
Amplifier outputs	4	2	4	2
DSP routing (matrix)	4 x 4	4 x 2	4 x 4	4 x2
Frequency response	20 Hz – 20 kHz			
S/N ratio	>100 dB/A			
THD+N	0.08 %		0.15 %	
	(1 kHz, 8 ohm, 3 dB below clipping)			
Dynamic range	>120 dB			
Remote control	Fohhn-Net over RS-485, USB-C, Fohhn Audio Soft			
Remote monitoring	temperature, protect, AES/EBU signals, power supply, Fohhn-Net, Fohhn Audio Soft			
Fault contact	1 x Relais, 2 x UM, 3-pin Phoenix			
Switching contact	load preset, standby on/off			
Password protection	yes			
Auto Power Save	adjustable from 1 s to 12 h, or never active			
Protective circuit	over voltage protection, over current protection, over temperature protection, short-circuit protection, DC protection, power on delay, soft start and inrush current limit			
Power supply	100 – 240 V AC 50/60 Hz, universal power supply with Power Factor Correction (PFC)			
Power consumption: - maximum (RMS) - idle state - Auto Power Save - standby - power on/off switch / remote power off	1200 W 70 W 10 W 5 W 2 W	1200 W 50 W 10 W 5 W 2 W	1800 W 90 W 10 W 5 W 2 W	1800 W 80 W 10 W 5 W 2 W
Heat dissipation	maximal 200 W, 680 BTU/h, 172 kcal/h	maximal 200 W, 680 BTU/h, 172 kcal/h	maximal 300 W, 1020 BTU/h, 258 kcal/h	maximal 300 W, 1020 BTU/h, 258 kcal/h
	(Pink Noise, 6 dB crest, 1/4 Pmax)			
Temperature range	0 – 40 °C			
Cooling	temperature-controlled fan			
Weight	9.8 kg	9.6 kg	9.9 kg	9.8 kg
Dimensions (W x H x D)	2U / 19", 485 x 89 x 425 mm			
Controller				
Digital signal processors	2			
Independent limiters	20	12	20	12
Selective 3-band-limiting	bass/mid/high			
Band-specific time constants	yes			
Filter technology	80-bit double precision			
Input	AES/EBU 32 kHz – 96 kHz, 16/24 bit			
Input DSP processing	yes			
FIR	yes			
Input Gain	-80 dB – +12 dB			
Routing Gain	-80 dB – +12 dB			
Output Gain	-80 dB – +12 dB			
EQ	8 x 10 fully parametric filters	6 x 10 fully parametric filters	8 x 10 fully parametric filters	6 x 10 fully parametric filters
	Gain +/-12 dB, frequency 10 Hz – 20 kHz, Q 0.1 – 100			
Limiter, Compressor	8	6	8	6

Noise Gate	8	6	8	6
X-over	8 x Linkwitz-Riley 4th order (24 dB / octave)	6 x Linkwitz-Riley 4th order (24 dB / octave)	8 x Linkwitz-Riley 4th order (24 dB / octave)	6 x Linkwitz-Riley 4th order (24 dB / octave)
	high pass 10 Hz – 20 kHz, low pass 10 Hz – 20 kHz			
Delay	4 x 0 – 350 ms (0 – 120 m) outputs, 4 x 0 – 88 ms (0 – 30 m) inputs	2 x 0 – 350 ms (0 – 120 m) outputs, 4 x 0 – 88 ms (0 – 30 m) inputs	4 x 0 – 350 ms (0 – 120 m) outputs, 4 x 0 – 88 ms (0 – 30 m) inputs	2 x 0 – 350 ms (0 – 120 m) outputs, 4 x 0 – 88 ms (0 – 30 m) inputs
User presets	100			
Speaker presets	100			
System latency	1.2 ms			
Connections and controls				
Controls	power on/off switch			
USB Config	1 x USB-C socket			
Mains connection	1 x PowerCON			
Fault contact (open/close)	1 x Phoenix 3-pin			
Schaltkontakt 1 & 2	1 x Phoenix 3-pin			
Remote power in/out	2 x Phoenix 2-pin			
Power supply for extern small devices 24 V / 5 W	1 x Phoenix 2-pin			
24 V / 5 W Power LED	green = on			
Input Interface (AES/EBU)				
Inputs	2 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net			
Outputs	2 x Phoenix 3-pin AES/EBU, 1 x Phoenix 3-pin Fohhn-Net			
Signal inputs	AES/EBU 32 kHz – 96 kHz, 16/24 bit			
Signal outputs	AES/EBU link out from input			
Latency	0.0 ms			
Input Interface (AES/EBU XLR), optional				
Inputs	2 x XLR AES/EBU, 1 x etherCON Fohhn-Net			
Outputs	2 x XLR AES/EBU, 1 x etherCON Fohhn-Net			
Signal inputs	AES/EBU 32 kHz – 96 kHz, 16/24 bit			
Signal outputs	AES/EBU link out from input			
Latency	0.0 ms			
Input Interface (Analog XLR), optional				
Inputs	4 x XLR analogue, 1 x etherCON Fohhn-Net			
Outputs	4 x XLR analogue, 1 x etherCON Fohhn-Net			
Signal inputs	analog, max. level +15 dBu			
Signal outputs	analog link out from input			
Frequency response	20 Hz – 20 kHz			
THD	< 0.003 % typ. < 0.0005 % 1 kHz 0 dBu			
S/N ratio	> 110 dB/A			
Input impedance	10 k ohm			
Latency	1.0 ms			
Input Interface (Dante), optional				
Inputs	2 x RJ-45 1000BASE-T Ethernet, Dante and Fohhn-Net			
Outputs	-			
Latency	Dante +0.6 ms			
Output option (terminal blocks)				
Outputs	2 x Phoenix 4-pin	1 x Phoenix 4-pin	2 x Phoenix 4-pin	1 x Phoenix 4-pin
Conductor cross-section	max. 6 mm² flexible, 10 mm² rigid			
Output option (Speakon)				
Outputs	4 x Speakon	2 x Speakon	4 x Speakon	2 x Speakon
Display (front)				
Receive / Send LED	remote control, Fohhn-Net			
Ready LED	blue = power on, blue flashing = sign			
Protect LED	red = Error / Protect / Standby			
Input LED	4 x input signal LED, white = signal (> -50 dBFS), red = clip (> -3 dBFS)			

Output LED	4 x output signal LED	2 x output signal LED	4 x output signal LED	2 x output signal LED
	white = signal (> -50 dBFS)			
USB Config LED	configuration via USB			

6. Troubleshooting

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

Problem	Probable Cause	Possible Remedies
No sound is audible. However, there is an audio signal.	The In- and Output routing in the User DSP is not correct.	Check the DSP settings in **FOHHN AUDIO SOFT**.
	The cable connection between amplifier and loudspeaker is defective or not plugged in.	Check the cable or connect the loudspeaker to the amplifier.
The amplifier is not recognised by **FOHHN AUDIO SOFT**.	Several products have the same **FOHHN-NET** ID. (An ID conflict will be displayed in **FOHHN AUDIO SOFT**.)	Change the ID - no ID can appear twice **see 3.3.4 "Fohhn-Net Cabling and ID Allocation"**).
	The ID search range is restricted.	Extend the search range from ID 1 to 254.
	The **FOHHN-NET** plug **(see 3.3.1 "Configuration")** is not inserted.	Depending on the product variant, connect the system to the appropriate adapter.
The *Aux power* LED and the symbols on the device front panel are not lighting up.	There is no supply voltage.	Check whether a supply voltage is present.
	230 V not available. Mains fuse tripped.	Measure the supply voltage at the socket and check the fuse.
The *send* and *receive* LEDs are not lighting up.	The cable for the **FOHHN-NET** connection is defective or not plugged in.	Check the cable or connect the amplifier to an appropriate **FOHHN-NET** adapter.
The *protect* symbol lights up	There is an operational error.	Contact the Service department at **FOHHN AUDIO AG** immediately.
Distortion (Clipping) is audible.	No speaker preset loaded.	Load the preset for the speakers used in **FOHHN AUDIO SOFT**.
	The output impedance is too low. Short circuit.	Check the impedance of the loudspeakers (all outputs). Check all outputs for a short circuit.
	Input overdriven.	Check the input level.

If your problem does not appear in the above table, or if the problem is not fixed using the suggested solutions, please contact us at the following address:

FOHHN AUDIO AG

Großer Forst 15	Tel. +49 7022 93323-0	www.fohhn.com
72622 Nürtingen	Fax +49 7022 93324-0	info@fohhn.com
Germany		

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 under **"Maintenance Measures"** (below) or advised in the **"Cleaning Fan Filter Foam Without Tools"** section.

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 **FOHHN** amplifiers, 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.

7.2 Cleaning Fan Filter Foam Without Tools

Clean the filter foam regularly by blowing on it so that your **FOHHN** amplifier works smoothly over a long period. Impurities largely depend on the environment in which the amplifier is used.

To clean, proceed as follows:

1. Using your hands, remove the enclosure's front panel, which is attached with magnets. No tools are needed for this.

2. The filter foam that is to be cleaned can be found in the front panel's fan filter holder. Remove this filter foam and clean it, e.g. by blowing on it.

3. Put the cleaned filter foam back in the filter holder and re-attach the front panel to the front of the enclosure.

8. Appendix

8.1 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.

8.2 CE Marking and Declaration of Conformity

This DSP amplifier 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

8.3 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.

8.4 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.

IP21   The device's protection type (protection against solid objects with ≥ 12.5 mm in diameter, protection against manual contact and protection against dripping water)

8.5 Disclaimer and Copyright

Disclaimer

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