PL-audio

USER MANUAL

PowerPac 4003 DSP

FREE PROGRAMMABLE SYSTEM AMPLIFIER

- ✔ 3-Channel Amplifier with DSP „Handmade in Germany“
- ✔ massive Power (1 x 2.500W + 2 x 800W at 4Ohm)
- ✔ free programmable DSP with 80 Memorypresets
- ✔ audiophile presence & light weight

Table of content

Introduction

Congratulations on purchasing a PL-audio product! Your investment in the PL-audio brand guaranteed quality and products "Made in Germany", excellent functionality, an almost unbeatable price / performance ratio, as well as direct and uncomplicated customer service.
We created this manual to ensure an easy start with your newly purchased product. Before you start using your new product please read this manual carefully and keep it at your hands for future reference

Safety instructions and intended usage

In order to enjoy your device for a long time please make sure to follow the informations noted hereunder:

- The device complies with the necessary directives of the EU and therefore it carries a CE mark.
- This device left our factory in perfect technical condition. In order to ensure safe opereation, the user must absolutely observe the following safety and warning notices:

- The devicve is supplied with dangerous mains voltage (>50 Volt AC). Therefore never intervene on the device on yourself! There is a risk of electric shock! Connection cables has to be protected against crushing, tensile load and bending. Cables and wires are to be laid or secured in such a way that no one can trip over it or may fall.

- Use the device only for the applications recommended by PL-audio or which can be found in this manual. In the event of improper use any warranty claims become obsolet and void.

- Use the device only indoor and protect it against dripping and splashing water, high humidity, heat and direct sunlight.

- Do not place any objects filled with liquids, such as drinking water glasses,…, on the product.

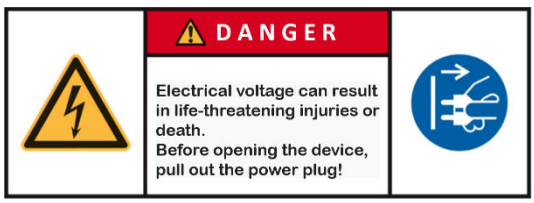
- The heat generated by the amlipier modules must be dissipated by technical forced ventilation. The built in fan switches on at a device temperature exceeding 60 and switches of at a device temperature of 40 degrees. For this reason, do not cover the ventilation openings on the housing under any circumstances. The device exhausts the warm air through the front grille.

- Do not put the device into operation and immediately pull the power plug of the device out of the socket:
    1. if there is visible damage to a device or to the power cord,
    2. if after a crash or compartable mishandling there is a suspicion of a defect,
    3. if malfunctions occur.

- In any case, send the devices back to PL-audio for inspection / repair. Please send any devices in sufficient outer packaging to the PL-audio production site. You can find this on the website www.pl-audio.de. Transport damage due to insufficient packaging on the part of the sender cannot be claimed. A corresponding pre-registration of a claim with a precise description of the fault - so that the devices sent in are correctly assigned - is inevitable.

- Never pull the power plug out of the socket by just pulling on the cable, always take hold of the power plug.

- Only use a dry, soft cloth for cleaning; never water or chemicals. When using compressed air please pay attention to lubricant-free compressed air and keep a minimum distance of 20 cm to the individual parts.



Transport and storage
Secure and smart handling of our products helps you to keep the value of your device. In addition to this you benefit for a longer time from the quality of your product.
For this reason, we ask you to note the following information in relation to above mentioned content point:
It is essential to install the device in a – ideally shock-absorbing – 19“-Flightcase, to protect the device from transport- and handling damage. Please note that these flight cases are not the proper housing for shipping with parcel services. Please ensure that there is sufficient air ventilation when installed. Make sure to handle the device as gently as possible during transport. We recommend to transport the unit in a horizontal position as shown on the cover (page 1). Always store the device at a minimum temperatrure of 05° Celsius with low humidity and without large temperature fluctuations. Avoid to expose the device to permanent direct sunlight.

Guarantee terms and conditions
PL-audio gives its customers a manufacturer's guarantee of 2 years on the PowerPac 4003 DSP product. This guarantee is retained even if the product is resold within the EU and Switzerland. The guarantee period begins with the purchase from an authorized sales or distribution partner or directly ex works. Please keep the original invoice. This must be submitted for the submission and acceptance of any warranty claims. This manual is an essential part of the product. Devices without a serial number (illegible or removed serial numbers) cannot be accepted under any guarantee.

PL-audio disclaims liability for transport damage, rough handling and / or incorrect use, external manipulation on and inside the housing, unauthorized repair attempts, faulty mains voltage or mains connection, operation of the amplifier below the minimum ohmic value specified in the operating instructions, effects of moisture, massive contamination from dust, incorrect operation of emergency power systems (power generators, UPS systems, ...) and faulty feeds into the device. Furthermore, PL-audio does not recognize any warranty or guarantee claims for any direct or indirect damage caused by installation, configuration, manipulation or storage of the specified software and its components.

Devices which are covered under the guarantee conditions must be sent back to PL-audio after prior notification. Please send the devices in sufficient outer packaging (ideally in the original packaging) to the PL-audio production site. You can find this on the website www.pl-audio.de. Please note that any service manipulation can lead to data errors or complete data loss on the device sent in. Data errors and / or data loss are not covered by warranty or guarantee. You should therefore save your presets several times on different storage media in the course of the configuration in your own interest.

In the event of any claim, no guarantee or subsidiary liability is assumed for upstream / downstream products.

Individual goodwill decisions on the part of PL-audio are always related to the respective individual case and in no case represent an acknowledgment of any defects. In a recognized warranty case, PL-audio decides on repair or replacement at its own discretion.

Product short description
The PowerPac, low weight and top performance
The PowerPac 4003 DSP product is a digital 3-channel amplifier with integrated DSP G-2.3 controller. The PowerPac 4003 DSP is ideal as a base for a multitude of applications from solo entertainers to small PA-solutions, fixed installations up to medium-sized PA-systems. Using several PowerPac 4003 DSPs, these can be customized very easily to multiple system solutions. The power of 2.5kW on the bass-channel and 2 x 0.8kW on the Fullrange-channels offers versatile configuration possibilities which offers highest flexibility to your rental equipment as well as to any personalized PA-system. Easy programming and operation plus small mechanic dimensions are an additional benefit which makes the PowerPac 4003 DSP a very interesting solution for almost any requirement.

Scope of delivery

Beside the PowerPac 4003 DSP you can find following components in the carton box:

- Mains cable with PowerCon®-male connector. Please do just use this cable without any manipulation on the cable itself.

3 CHANNEL CLASS D AMPLIFIER: 1 X 2500 W + 2 X 800 W	INPUT-LIMITER AND PEAKLIMITER
switch-on current limitation	Protection circuit
Mains fuse protection	Under- and overvoltage protection
DC – protection	temperature monitoring
silent fan	Damping factor >1000 (8 Ohm, 1Khz)
Distrotion THD+N under 0,05% (20 Hz – 20 Khz)	Signal-noise rate < 120 db (20 Hz – 20 Khz)
Wide range power supply with voltage detection and automatic switching 120V – 230V	2 HE aluminum casing
Weight 4,7 kg	Detph 230 mm
Powercon In – out	Switch on/off on front
2 x XLR in and out	2 x Speakon® 4 pole out
1 x Speakon® out as Bi-Amp	1 x Speakon® out as separate Bass

HIGH END DSP, ON BOARD	ETHERNET AND USB
Simple operation	Manual operation on front
80 Presets internally	96 Khz Sampling-Rate
120 db Dynamic Range	flexible Routing
X – Over Function	20 parametric EQ's
Limiter- and Noisegate-Function	Short-Delay and long delay
Phase	Firmware – Upgrade over interface
APP in in preparation	

Product detailed description

As described above, the PowerPac 4003 DSP is a system output amplifier with a total of 3 amplifier channels. Here, the two smaller dimensioned amplifier channels 2 + 3 are offering 800 watts at 4 Ω each for the operation of classic passive tops, as well as a drive for 1 bi-amp top (e.g. banana array, TS 42, TS 61, TS 62, LA206, LA208, LA210).The amplifier channel 1 is 2500 watts at 4Ω for driving a subwoofer (8Ohms) and the connection of corresponding additional subwoofers (B12 Sub, B15 Sub, B18 Sub,etc.) with a nominal impedance of at least 8 ohms. The signal distribution in the device takes place by means of a built-in DSP controller DSP G-2.3. This has 2 signal inputs (Input A + Input B) and 3 signal outputs (Out 1, Out 2, Out 3). The signal outputs of the DSP are internally connected to the respective amplifier modules. The signal output Out 1 is for the 2500 watt amplifier module - bass applications - occupied. The signal outputs Out 2 + 3 are awarded for the smaller amplifier modules of 800 watts each.The XLR input signal can be looped through to other devices via the XLR Out socket. Depending on the operating mode of the device, both XLR inputs are processed, or if in mono mode, only the Input A used.

1.2 Technical data / detailed

Output Power 8Ω @ 1% THD+N 1kHz Ch 1 1550W –8Ω Ch 2/ Ch 3 450W –8Ω Ch2+3 Bridge 1600W – 8Ω	**Output Power 4Ω @ 1% THD+N 1kHz** Ch 1 2500W –4Ω Ch 2/ Ch 3 800W –4Ω
Amplification factor: Ch 1 32dB Ch 2/ Ch 3 26dB (Ch2+3 Bridge 32dB)	Amplifier-Technology Class D

DSP-Technology	DSP-G2.3
Preset memory (internal)	80
Input-Impedancy	20kΩ
Max. Input level	+24dBu / 12V RMS
Bit rate	64Bit
Sampling rate	96kHz Sample-Rate
Input Dynamic Range	120dB (A)
Latency DSP	0,6 ms
Distortion factor THD+N	0,005% /8Ω, 1kHz
Signal to noise-rate	118dB (A) / 8Ω, 1kHz
Frequency range	10Hz-25kHz
USB	USB 1.1
Ethernet	10MBit, with DHCP Server, Auto/Manual IP-Adress
Input-Delay	800 ms / 274m (Input 1+2)
Output-Delay	5 ms / 1,715m (Output 1+2+3)

Voltage range	Automatic voltage detection
AC Range 1 / 120V	85V - 138V AC (US-Voltage)
AC Range 2 / 230V	170V- 265V AC (Europe-Voltage)
Frequency range	45Hz – 65Hz
Power consumption at 230V	
Standby	6 Watt / 0,026A
Idle = Amplifier ON – operation ready with no Input/Output-signal	35 Watt / 0,15A
Rated power consumption (without reactive current)	480 Watt / 1,73A (Ch1 4Ω, Ch 2+3 **8Ω**)
	685 Watt/ 2,97A (Ch1 4Ω, Ch 2+3 **4Ω**)
Maximum	2400 Watt / 10,43A
Switch on peak voltage @230V	32,5A pk
Switch on peak voltage @115V	17,0A pk

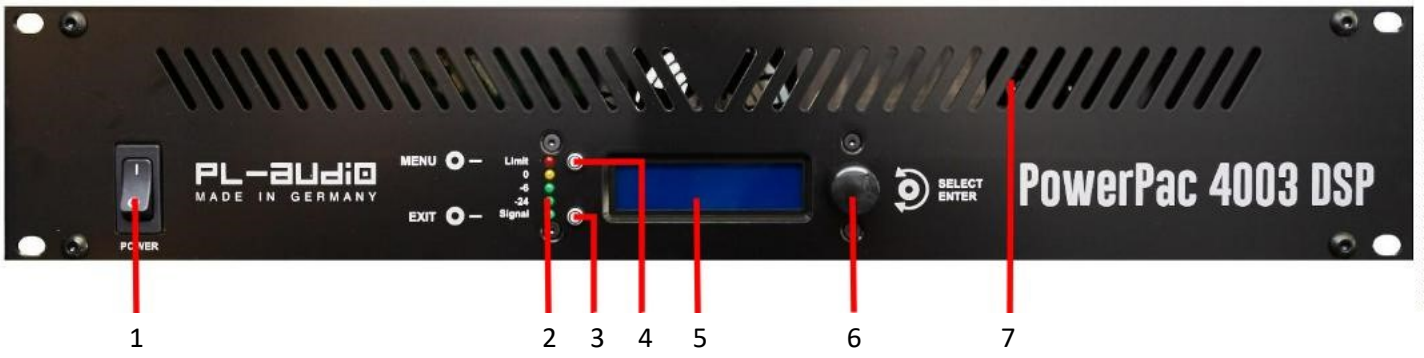
Temperature range	
Environment tempereature	-5°C bis +40°C not condensing!
Fan switch on temperature	60 °C
Fan switch off temperature	40 °C
Output power reduction	85 °C
Temperature – Emergency shut down	95 °C
Colling concept	Air, back to front, 1-speed
Fan	80mm, 30cbm/h, 35db(A)

Measurements	
Width	482mm (19“)
Heigth	89mm (2HE) – with rubber feets 92mm
Depth	225mm – with operation controls 245mm
Weight	4,7 kg

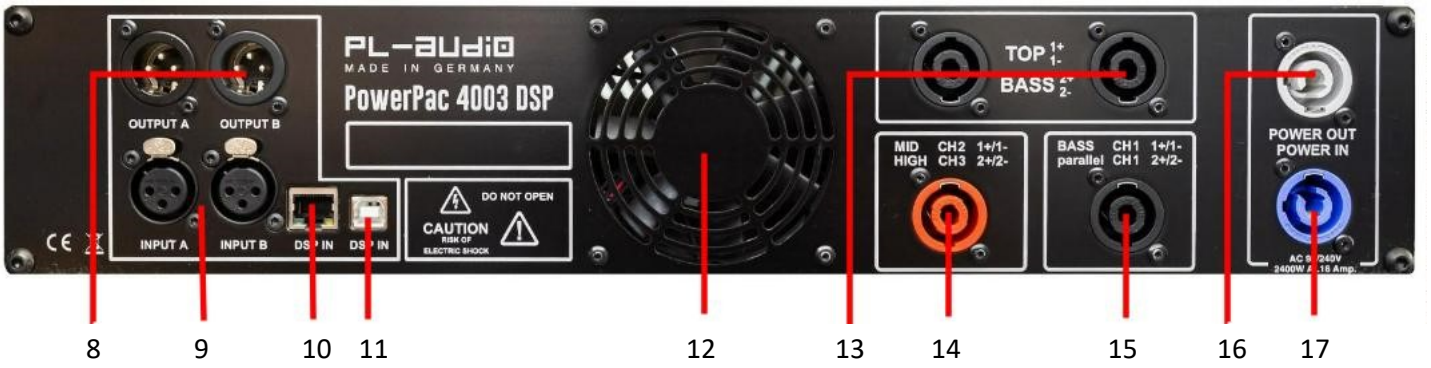
Protection circuits
True-RMS Compressor & Limiter for all Inputs and Outputs
Switch On and Switch Off-Delay of Outputs
ICL Inrush Current Limiter
Intelligent current limitation prevents the triggering of fuses
Peak current Limiter on the speaker outputs
DC-Protection on the speaker outputs
High frequency protection on the outputs (>30kHz, 2Sek)
Temperature observation with output power reduction by overheating

2. Construction and control interface

2.1 Following elements are located on the front side of the device (from left to right):



2.2 Following connectors and elements are located on the **backside of the unit** (from left to right):



Nr.	Element
1	Mains switch
2	LED Signal chain / Signal -24dB to -6dB / yellow 0dB / Red Clip/Limiter (red blinking = Mute)
3	Button Exit / leaving the menue
4	Button Menu / call up the menue and confirmation of a name or password
5	LCD Display / upper line: device name lower line: loaded preset
6	Encoder selector / turn=Select, push=confirmation/execute
7	Ventilation slots
8	XLR Out symmetric signal pass through
9	XLR Input symmetric
10	Ethernet connector for network connection to the DSP via Router or Computer
11	USB Buchse Typ USB B for connection of the DSP to an external computer
12	Fan
13	4 pol. Speakon® connector for system cabling L+R (1+/1- Top, 2+/2- Bass)
14	4 pol. Speakon® connector for Bi-Amp operation (CH 2= 1+/1-; CH3= 2+/2-) red
15	4 pol. Speakon® connector only for Subwoofer (CH1= 1+/1- and 2+/2-)
16	Mains pass through connection 16A Powercon® OUT grey
17	Mains connection 16A Powercon® IN blue

2.3 Connections/Operating options

The PowerPac 4003 DSP offers the user numerous possible uses:

The power amplifier has 3 output channels, 1x 2500W @ 4Ω and 2x 800W @ 4Ω. A second subwoofer á 8 ohms and up to 4 top parts á 8 ohms can be connected. Channel 1 of the PowerPac 4003 DSP drives the subwoofer (8Ω). This receives 1250W into 8Ω. (see application 1)

If you add another subwoofer (8Ω) to channel 1, the impedance is reduced to 4Ω. The 2500W (which are available on 4Ω) are now shared between both subwoofers and each speaker receives 1250W into 8Ω. (see application 2)

- Calculation example: 1250W 8Ω + 1250W 8Ω = 2500W 4Ω

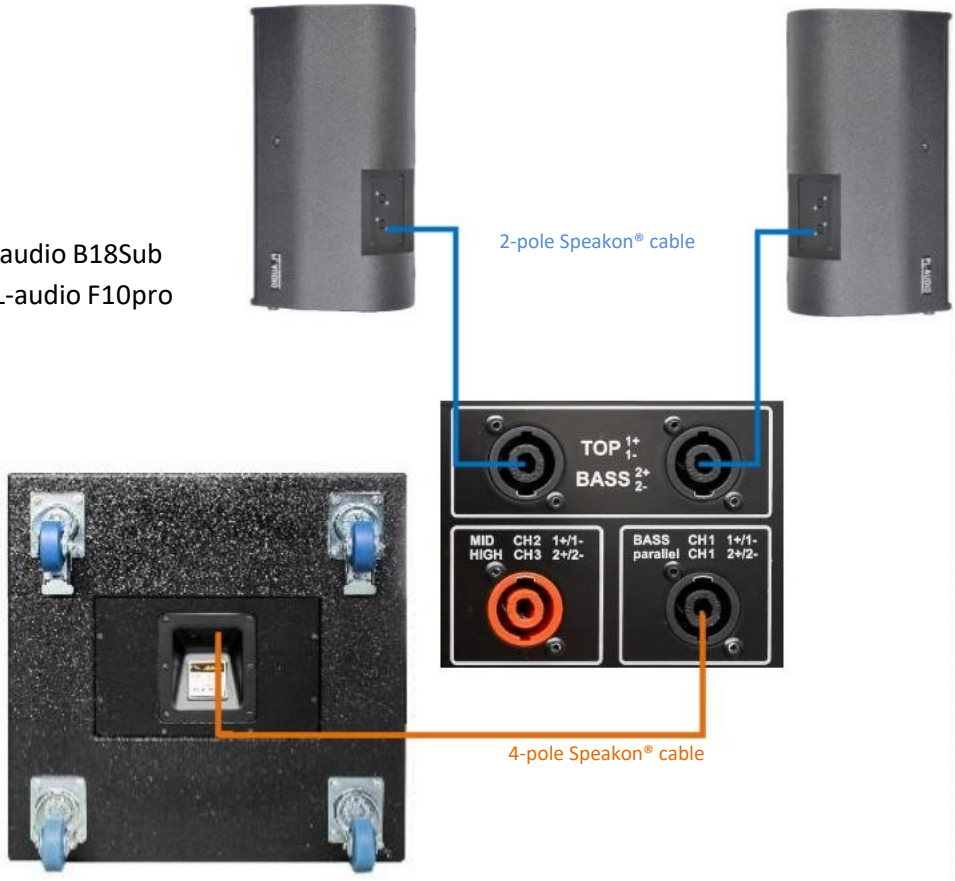
For all stereo applications the LINE signals from the mixer has to be connected to the PowerPac 4003 DSP as follows:

2.3.1 Stereo + Sub operation

– Application 1 –

2.1 PA-System

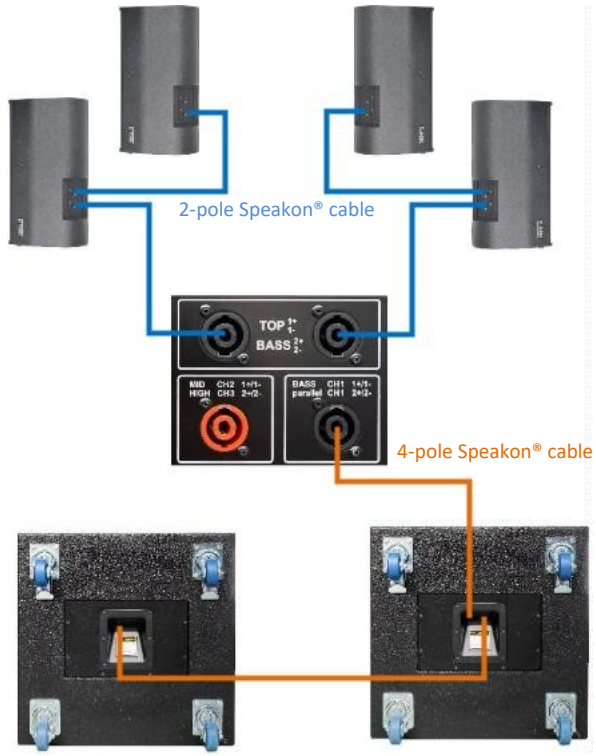
- 1 x PowerPac 4003 DSP
- 1 x Subwoofer passive, eg. PL-audio B18Sub
- 2 x Fullrange-Tops á 8Ω, eg. PL-audio F10pro
- 2 x 2pole-Speakon® cables
- 1 x 4pole-Speakon® cable



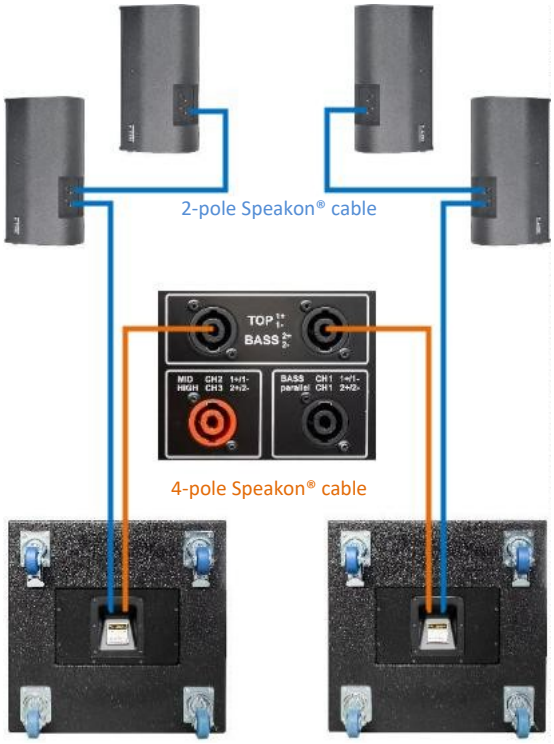
– Application 2 –

2.2/4 PA-System :

- 1 x PowerPac 4003 DSP
- 2 x Subwoofer passive 8Ω, eg. PL-audio B18Sub
- 2-4 xFullrange Tops á 8Ω eg.PL-audio F10pro
- 2-4 Stk 2pole-Speakon® cables
- 2 Stk 4-pole Speakon® cables



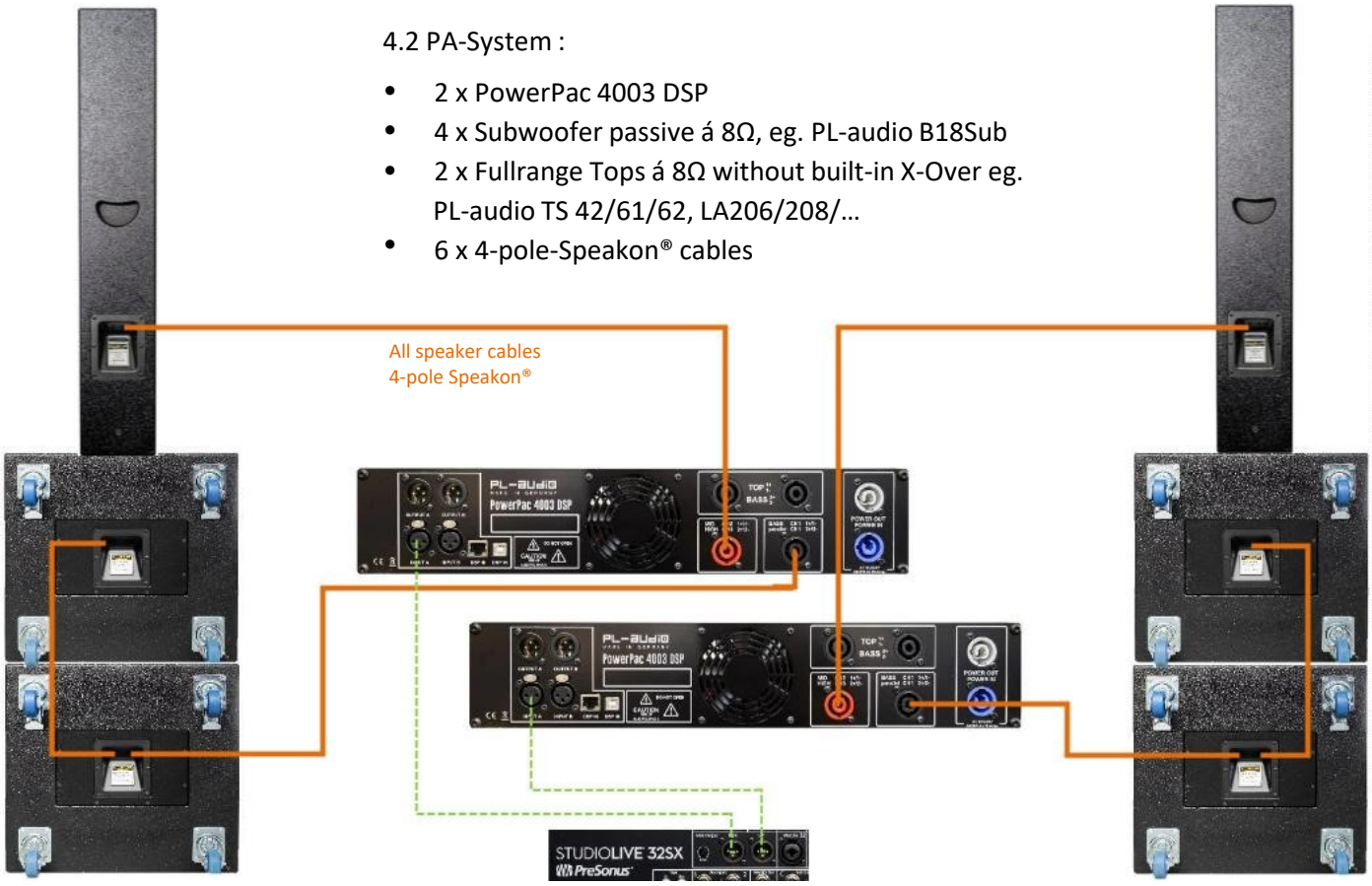
OR



2.3.2 Bi-Amp operation – Application 3 –

4.2 PA-System :

- 2 x PowerPac 4003 DSP
- 4 x Subwoofer passive á 8Ω, eg. PL-audio B18Sub
- 2 x Fullrange Tops á 8Ω without built-in X-Over eg. PL-audio TS 42/61/62, LA206/208/…
- 6 x 4-pole-Speakon® cables



Bridged mode

The bridged operation (BTL) couples the power from channel 2 (800W / 4Ω) and channel 3 (800W / 4Ω) to a strong 1x 1600W / 8Ω mono channel. The lowest impedance is 8Ω, do not connect less than 8Ω! The BTL bridge operation increases the voltage gain from 26dB to 32dB (+ 6dB)!

Attention: The bridged mode can NOT be set or recognized on the display of the amplifier!
A computer with the DSP software is required to set the BTL bridged mode.

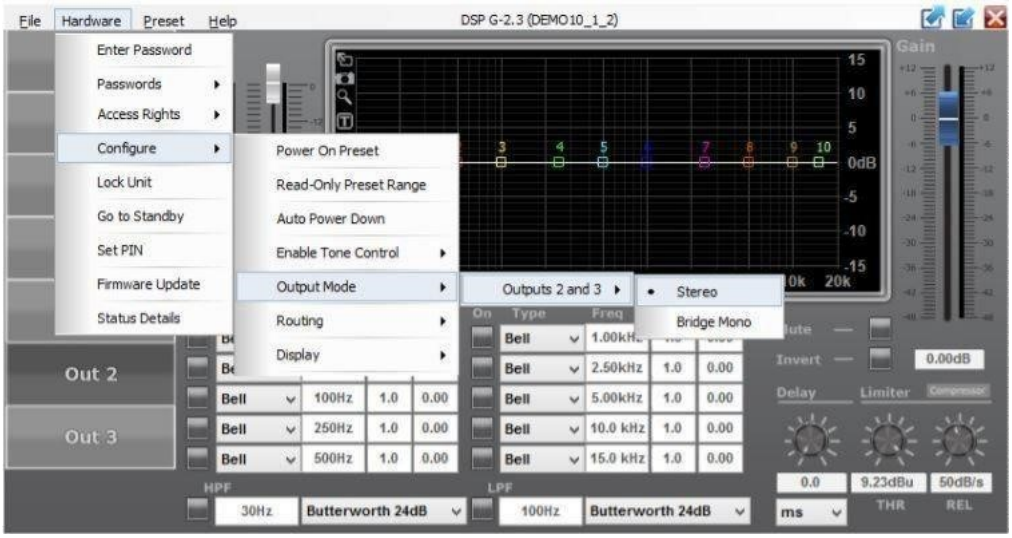
Method

1. Connect the DSP to the PC. Start the software and open the control window.
2. In the MAIN window, switch on the blue link button channel 2 + 3. (Linking Ch2 + 3)
3. Make all the settings for your loudspeaker in output Out 2 of the DSP.
4. Please calculate the limiter with a gain factor of 32dB and set it correctly!
5. Now switch on the bridge mode in the PC software:

a) In the menue click **Hardware**

b) Select **Configure** -> **Output Mode** -> **Outputs 2 and 3**

c) Click on **Bridge Mono**

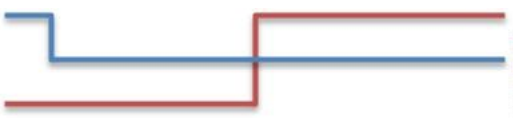


In the bridge-mono operating mode, all buttons of the Out 3 are out of operation on the software side!
All settings in the DSP controller must be made in Out 2.

Connecting the loudspeaker in BTL mode: Only use the red bi-amp socket in the connection panel for bridge operation! Make sure that the Speakon® connectors are wired properly and protected against short circuits.

Bi-Amp connector, red

1+ Pluspole, Output 2 (+)
1- Minuspole, Output 2 (-)
2+ Pluspole, Output 3 (+)
2- Minuspole, Output 3 (-)



Speaker,8Ω

\+ Plus pole speaker
\- Minus pole speaker

Never connect impedances with less than 8Ω to the amplifier in bridged mode !!!

These instructions are only valid for devices with a red or black bi-amp socket!

Mains connection

The device may only be connected to an electrical installation that complies with the VDE regulations DIN VDE 0100. The electrical installation must be equipped with a residual current circuit breaker (RCD) with> 30mA rated residual current.

The devicve is supplied with dangerous mains voltage (>50 Volt AC). Therefore never intervene on the device on yourself! There is a risk of electric shock! Connection cables has to be protected against crushing, tensile load and bending. Cables and wires are to be laid or secured in such a way that no one can trip over it or may fall.

Damaged Mains-Power cables must not be used and should immediately be rendered unusable against further use, e.g. cut off both plugs.

The device is powered by a Neutrik Powercon® connector. In contrast to a plug-in device (such as a safety plug), the Powercon® plug-in connection must not be plugged in or disconnected under load and also not under voltage! The consequences are stuck or burned-out contacts and the resulting loose contacts lead to failures or even destruction of the electronics or even the risk of fire. You should therefore only switch the device ON or OFF using the 2-pole power switch on the front panel of the unit.

The mains plug may only be connected to an earthed safety socket with the associated mains connection cable. If extension cables are used, it must be ensured that the wire cross-section is dimensioned and approved for the power supply required for the device! Make sure that the mains voltage of the socket corresponds to the permissible voltage values in this manual.

The power supply of the amplifier is equipped with an intelligent mains voltage detection. It allows worldwide operation on all power grids. After switching on, the electronics check the mains voltage and switches the power pack to the correct voltage range 115V AC or 230V AC.

If a three-phase current generator is used at events on which the device is to be operated, the correct mains voltage must be checked before connecting the amplifier! In the event of faulty three-phase power supplies without a neutral conductor, a so-called neutral point shift can result in up to 400 Volt being applied to the protective contact sockets. This overvoltage leads to the destruction of the electronics in the amplifier.

The device has a PowerCon®-Out (16) over the existing Powercon®-IN (17). This is provided for the option of connecting another device through a short interlink PowerCon®-cable eg. when built in in a rack with other amplifiers or other devices. Please make sure that the overall power consumption of all connected devices does not exceed the maximum power of 16 Ampere, or the maximum allowed power limited by the upstream line circuit breaker.
Please refer to the technical data for detailed information regarding power consumption of the PowerPac 4003 DSP.

Best option is to connect the PowerPac 4003 DSP to its own circuit with a 16A fuse (characteristic curve C).
Please refer to the technical data for the power consumption in the different operating states.

The device corresponds to protection class 1.
In the event of a thunderstorm or danger, pull the power plug out of the socket immediately.

To avoid ground loops, we recommend using symmetrical signal routing and the power distribution in the so-called star point earthing, which means, all ground connections meet at one single point.

Never interrupt the contact to the protective conductor (e.g. by cutting off the protective conductor, disconnecting the connection to the protective conductor through insulation, etc.), because in the event of a defect this increases the risk of a electric shock over the metal housing.

Power generator operation

If the amplifier is operated on a power generator, this is done at your own risk!
Extensive precautionary measures must be taken before connecting and operating your device on a power generator:

- Use only high-quality, generously dimensioned power generators
- per PowerPac **at least** 3kVA rated power
- If possible, switch on an under / overvoltage shutdown, this should be at U min.200VAC undervoltage and U max. 250VAC overvoltage!
- Always **load three-phase generators equally** to avoid unbalanced loads, e.g. PowerPac 1 on L1, PowerPac 2 on L2, PowerPac 3 on L3
- Load the generator permanently with a stable base load in order to absorb voltage fluctuations. e.g. 1000W halogen lamp, electric heater etc.

XLR connection

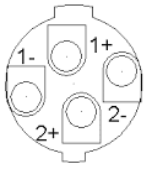
XLR inputs can be connected both balanced and unbalanced. Symmetrical cables are to be preferred, as they provide better protection against external interferences on long cable routes. The inputs Input A and Input B can be controlled with signals up to + 24dBu. The user has the option of further processing the fed-in XLR signals via the XLR Out socket, e.g. in another PowerPac. Pay attention to the following assignment of the XLR connection.

To connect a XLR-connection with non-symmetrical Signal, Pin 1 and Pin 2 must be bridged.

Speaker connection

Before loudspeakers are connected to the Speakon® outputs of the PowerPac 4003 DSP, reduce the output level of the upstream components to the lowest possible value (e.g. fader down or left stop; ∞) in order to reduce/avoid any unwanted and possibly damaging noises in the connected loudspeakers. Make absolutely sure that any upstream crossover or any upstream limiter is set correctly. Due to the high output power of the PowerPac 4003 DSP, non complete or incorrect settings can damage the connected loudspeakers due to overload!

The Speakon® sockets (13, black) on the back of the device (page 9) are intended for the loudspeaker system cabling. The sockets transmit the signal processed by channel 2 and 3 via pins 1 + / 1- on the Speakon® connector, while the processed signal of channel 1 via pins 2 + / 2 + on the Speakon® connector.
With this system cabling from PL-audio (also from numerous other manufacturers), only a single 4-pin Speakon® cable is laid between the power amplifier and a sub / top combination to each side of the system. With PL-audio, pins 1 + / 1- are wired for the tops, pins 2 + / 2- for the bass.



Speakon® connector Backside

The Bi-Amp socket (14, red) provides the processed signal of channel 2 on the pins 1+ / 1- and the processed signal of channel 3 on pins 2+ / 2-. This socket is the easiest way to connect bi-amped fullrange tops via bi-wiring using a 4-pole Speakon® cable.

Socket 15 provides the processed signal of channel 1 on pin 1+ / 1- AND 2+ / 2- for easy connection of subwoofers or high power fullrange tops.

When connecting the system using prefabricated connection panels, patchbays or adapter plugs / adapters, make sure that the signals are correctly assigned to the correct components! This is of top importance when using the PowerPac 4003 DSP for wiring bi-amp systems. Special care must be taken, as possible incorrect cabling can quickly lead to the destruction of the mid-range or high-frequency driver!

Important notice: Do never load the output channels with less than 4Ω!

2.6 Speaker connection

Before loudspeakers are connected to the Speakon® outputs of the PowerPac 4003 DSP the corresponding preset must be loaded on the signal processor! Only with the correct presets specially developed for the loudspeakers by PL-audio reach their maximum performance, the best possible sound and the necessary operational reliability. By loading the wrong the speakers my sound bad and / or may be damaged through overload!

If you want to operate loudspeakers from other manufacturers on the PowerPac 4003 DSP, there are enough free preset memory spaces available on the device! As a starting point we recommend the "01. Sub + Top Standard“ preset to be loaded and sent to your speakers plus conducting the absolutely necessary adjustments (gain, HPF, LPF, EQ, limiter, etc.).

The Speakon® sockets (13) on the rear of the device (section 2.2.) are for the system cabling intended. The system cabling is between the power amplifier and a sub / top combination and only a single 4-pole Speakon® cable has to be laid to each side of the system. Pins 1 + / 1- are wired for the tops, while pins
2 + / 2- are wired for the bass. 2-way actively separated loudspeakers do not have a built-in passive crossover. On such loudspeakers, each path has its own amplifier channel. An amplifier channel operates the midrange speaker (s) (e.g. channel 2 - mid) while another amplifier channel drives the Tweeter(s) (e.g. channel 3 - high). This Bi-Amp system uses a 4-pole Speakon® cable between Speakon® connector (14, red) and loudspeaker, where pins 1 + / 1- transmit the processed and amplified signal of channel 2, while the processed and amplified signal of channel 3 is transmitted via pins 2 + / 2-. When wiring bi-amp systems it must be worked out with particular care, as incorrect cabling quickly leads to possible destruction of the high-frequency driver!

SELECTING THE CORRECT PRESET IS ABSOLUTELY CRUICAL FOR CORRECT OPERATION, CORRECT CONFIGURED OUTPUT AND MAXIMUM SOUND QUALITY!!!

PL-audio Bi-Amp presets are usually locked in the signal processor with password protection in order to prevent unintentional changing of the parameters. If you make changes here do this very carefully, with caution and expertise! The signal processor allows very deep and detailed, but also serious changes in the transmission parameters of the speaker system! To change the bi-amp presets, log in with the password:"Admin1" in the administrator user level of the signal processor. Now you have full access to change all necessary parameters.

This is easy and convenient with the PL-audio DSP-CONTROL software on the PC.

PL-audio Bi-Amp speakers without built in X-Over are:

TS 42	Banana Array	Line Array LA206
TS 61	Big Banana Array Line	Line Array LA208
TS 62	Array LA210	

2.6 Speaker connection

IMPORTANT NOTICE FOR NORMAL OPERATION:
NEVER LOAD THE OUTPUT CHANNELS IN NORMAL MODE WITH LESS THAN 4Ω!!!

Example: 2 x 8Ω loudspeakers, connected in parallel result in 4Ω
2 x 16Ω loudspeakers, connected in parallel result in 8Ω

IMPORTANT NOTICE FOR BRIDGED MODE ON CHANNEL 2+3:
NEVER LOAD OUTPUT CHANNEL 2+3 IN BRIDGED-MODE WITH LESS THAN 8Ω!!!

2.7 USB / Network communication

- 2.2 Bild (Item 11) USB-Interface

You can connect the DSP controller with a commercially available USB cable (USB A to USB B).
Connect your PC or Mac via USB interface to use the PL-audio DSP-CONTROL software to make software configurations and settings.

Please note that the length of USB signal transmission is limited. We only recommend to use USB cables up to a maximum length of 3m.

The USB-Interface is designed as USB 1.1.

<u>If ever possible please preferably use the Ethernet connection (RJ 45 socket).</u>

- 2.2 (Item 10) Netzwork-/ Ethernet Interface

With the network interface you can integrate the DSP controller into a local network, to control and operate it remotely through longer distances with the PL-audio DSP-CONTROL software. If you connect a wireless router to the network port, you can take advantage of wireless remote control with a W-LAN-enabled device!

The network port also offers the option of connecting the DSP directly via a commercially available network cable (up to 100m in length, CAT5e or higher) directly to a computer.

If the DSP is not automatically registered in the IP universe of the computer through the direct connection PC → DSP , an intermediate router is required, which has DHCP server functionality that automatically assigns an IP address that can be located by the computer.

The network port is designed as 10-Mbits Ethernet. RJ-45 connector standard.

2.8 Installation

Please note that if the device is cold and transported into a warm environment, condensation will form inside the device. To avoid damage and malfunctions due to condensation / moisture, let the device acclimatise first.
To avoid unpleasant and possibly damaging noises in the loudspeakers, always switch the individual components on in the direction of the signal path. So first the player, then the mixer and only at the end the power amplifiers. When switching off, just proceed in reverse order.

After switching on the device, a self-test and initialization are carried out. The fan runs up once for approx. 4 seconds. During the start-up process, the loudspeaker outputs of the power amplifier are muted and are activated automatically as soon as the power amplifier is ready for operation. This protective circuit prevents unpleasant "cracking" noises in the loudspeakers.

The amplifier is ready for operation approx. 10 seconds after switching on.

ATTENTION: The power amplifier has no gain control on the front panel! The setting of all output levels is made in the Digital Signal Processor (DSP) either by using the built in encoder wheel and the display or the PL-audio DSP-Control Software on a computer.

Before switching on the power amplifier for the first time, it is not possible to check which volume or which speaker preset is set! Therefore, please always turn the volume level of your signal source (mixer) to a minimum.

When you have made all connections, switch on the amplifier, check whether the correct preset is loaded and increase volume gently until you hear the signals from your speaker system. If you do not hear an output signal on the connected loudspeakers, check the cabling again before turning the level up any further. In any case, avoid the limiter LED lighting up continuously (page 9, upper figure, item 2). This not only leads to a loss of sound, but can also damage connected speakers!

Limiter settings

If you program your own presets in addition to the factory presets, we strongly recommend that you calculate and set the limiter settings for the respective channels precisely in order to protect your connected speakers from overload! The limiters are already set at the factory presets.

The table below shows the limiter settings for the majority of the loudspeakers from PL-audio:

Lautsprecher	Leistung (RMS)	Impedanz (ohm)	Limiter CH1 (32dB Verstärkung)	Limiter CH2/3 (26dB Verstärkung)
F5 (8ohm)	100	8	-0,76	5,24
F5 (16 ohm)	100	16	2,26	8,26
F25	200	8	2,26	8,26
F8 / F8 pro	250	8	3,22	9,22
F10	300	8	4,02	10,02
F10 pro	400	8	5,27	11,27
F121	400	8	5,27	11,27
F12	700	8	7,70	13,70*
TS41	600	4	4,02	10,02
TS61/62 High	500	4	3,22	9,22
TS61/62 Mid	700	4	4,69	10,69
M10CX	300	8	4,02	10,02
M121CX	300	8	4,02	10,02
M12CX	450	8	5,78	11,78
M15CX	500	8	6,23	12,23*
Uniray	650	8	7,37	13,37*
Pigbox	1200	4	7,03	13,03*
LA210	600	8	7,03	13,03*
LA206	400	16	8,28	14,28*
LA12SUB	500	8	6,23	12,23*
B12SUB	1000	8	9,24	---
B15SUB	1000	8	9,24	---
B18SUB	1200	8	10,04	---
B18DL	1200	8	10,04	---
B18HXL	1200	8	10,04	---
B2-18	2400	4	10,04	---
B3	3200	4	11,29	---

*maximal zulässiger Ausgangspegel bei Powerpacs: +12dBu

3. DSP control via Display & Encoder wheel

Note: Certain settings can only be configured using the PL-audio DSP-Control software.

Push the MENÜ-button once to call up the main menue.

The main menue contents 5 menue points:

– Load Presets

– Save Presets

– Password protection / Access Level

– Device informationen read out (5 additiopnal points in this sub menue)

– Routing, configuration (Input routing to Outputs) Mixer in OUT 1,2,3

By pushing the MENÜ-button you can navigate in the main menue in an endless loop.

Encoder-wheel turn to select parameters and navigate in the sub menue.

Encoder-wheel pushing to confirm a setting or to jump to the next module.

EXIT-button: push once to jump back to previous menue point.

EXIT-button pushing several times to exit the configuration menue and take over the changed parameters.

Upper line: Name of the individual PowerPac: PL-audio 4003
Lower line: Number of Preset 2& short description of the preset B18+F10pro L

3.4 Loading and editing of presets on the device / Routing

In the flash memory of the DSP-controler up to 80 presets can be stored. With the encoder wheel and the MENÜ-button the presets can be loaded. Presets can be named with up to 16 characters.
Please use NO special characters for naming the presets.

Load preset:

– Push the MENÜ-Button one time

– Choose the desired preset by turning the encoder wheel. The presets stored in the memory will one by one appear on the display.

– For loading the selected preset push the encoder wheel.

– Confirm the appearing security query by turning the encoder wheel to the right until YES will appear in the display with capitalisation.

– By pushing the encoder wheel again the selected preset will be loaded into the DSP.

Routing, pre setting (Input to Outputs) Mixer in → Out 1,2,3

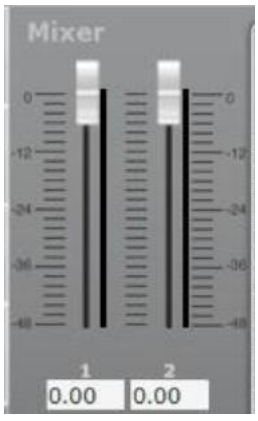
By pushing the MENÜ-button five times the sub menue „Routing“ will be called up on the display.
This consist of two settings:

1) Stereo + Sub

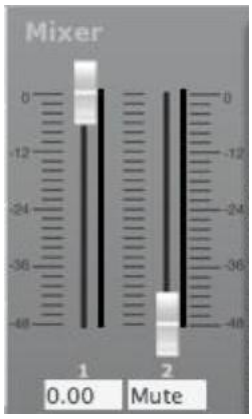
2) Mono 3-Way **By selecting 2 (Mono 3-Weg) only XLR-Input A is active!**

This pre-selection changes the mixer for the signal selection in the outputs 1, 2 and 3.

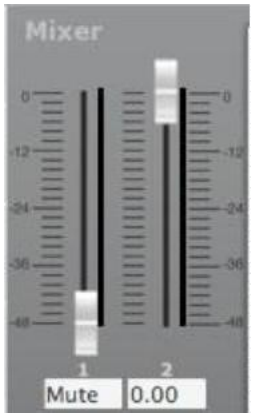
Stereo + Sub:



Out 1

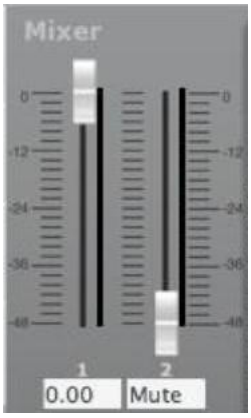


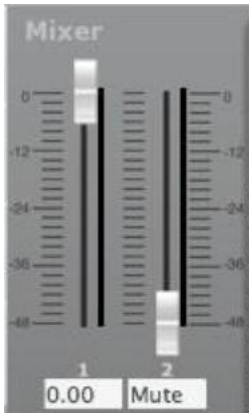
Out 2

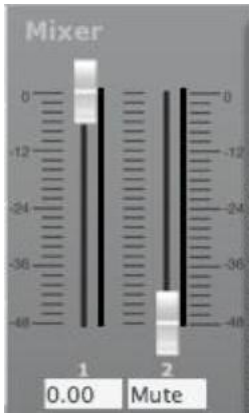


Out 3

Mono 3-way:







4. DSP control via Software PL-audio DSP Control

4.1 User levels / Access-Level (Password protection)

To prevent inadvertent or undesired changes to the signal processor during operation or when renting / lending, the DSP can be locked with password protection. (Access Level: Locked)

In the PL- Audio DSP-Control software click in the control window on the menu item:

Hardware → Lock Unit → Confirm the upcoming advise with OK.

The DSP has 3 user levels, which can be called up by entering the corresponding password.

1: Locked – Level	**DSP Locked**
2: User – Level	**Password: PLAudio1**
3: Admin – Level	**Password: Ad_min**

If you have blocked DSP access via the display or the control window on the PC, all setting options in the controller cannot be configured.

To regain access, enter the passwords for either the user or admin level via the display or the control window on the PC and activate the user rights. All setting options can now be called up again.

The input field for the password in the computer software can be found in the control window under the menu item

Hardware → Enter Passwort→ now the input window opens in the software.

4.2 Firmware update process

In order to always have the latest firmware on the signal processor, you should carry out a firmware update regularly. The update can only be carried out with a PC. Please always download the latest DSP control software from the PL-audio homepage and install it on your computer.

This application contains 2x the firmware uploader.

Once in the network manager for a complete new installation and in the control window under the menu item Hardware → Firmware Update

Important: Please note that with a firmware update all presets saved on the flash memory of the DSP will be lost. It is therefore essential to save these presets on your computer BEFORE an update!

For the firmware update you should preferably use the network interface on the DSP, since the bootloader of the network chip is updated at the same time.

Attention: There are exceptions where an update via network is not possible. In this case, please use the USB port on the DSP.

To check whether your controller can receive an update via the network port, you must first check the hardware version on the display. To do this, press the MENU button four times on the display and press the encoder wheel twice.
The display now shows: Version Info / HW: 3.6.x

HW: 3.6.4 = update ONLY possible via USB port
HW: 3.6.5 = update via network & USB possible
HW: 3.6.6 = update via network & USB possible

4.2 Firmware update process

After you have established the network / USB connection, start the PL-audio DSP-Control software on your computer. The network manager now opens, in which the connected PL-audio DSPs in the network or at the USB ports are listed. Now click on "Tools" in the menu bar of the network manager and select „Enable Update“

If firmware version 3.8.7 or higher is installed on your DSP, you can carry out an update directly from the "USER" level. After click on the orange button on the right in the window, the software will carry out the update after confirming the message window with OK.
If an older firmware version such as 3.1.5 is installed on your DSP, no user rights are available for the update. The update button is gray in this case. To do this, you must first open the control window with the start button (green arrow) and then click on *Hardware → Enter Password* in the menu bar at the top of the control window.
Enter the password "Ad_min" here. After you have entered the correct password, you will find the message (administrator) in the status bar. You can now close the control window again.
The update button is now orange in the network manager. Press this orange button to start the update.
After confirming the message window with OK, the software carries out the update. The firmware update takes about 60 seconds, depending on the interface speed.

IMPORTANT NOTICE: Please do not interrupt the power or data connection to the device during the update process. This leads to the deletion of the firmware on the DSP!

4.3 Erased / faulty firmware

If the computer system is interrupted, crashed or hung up during the update process, first close the application.

Then switch off the PowerPac 4003 DSP.

Check the network or USB connection and restart the PL-audio software.
Now switch the PowerPac 4003 DSP back on. The fan will now start up briefly. If the display is dark and does not work, the DSP does not have any firmware.

4.3 Restore erased or faulty Firmware

You can upload the firmware to the DSP at any time via the network or USB interface using the firmware upload function of the network manager.

Click in the network manager „Tools“ → „Enable Update“

As soon as the DSP has been recognized on the computer, the DSP control software will locate the device. It is displayed in the network manager as "No Name".
In order to upload the software just click the orange button.
After confirming the upcoming message with OK, the software carries out the update.

After a few seconds, your DSP is ready for use again and you can start configuring or adding the presets.

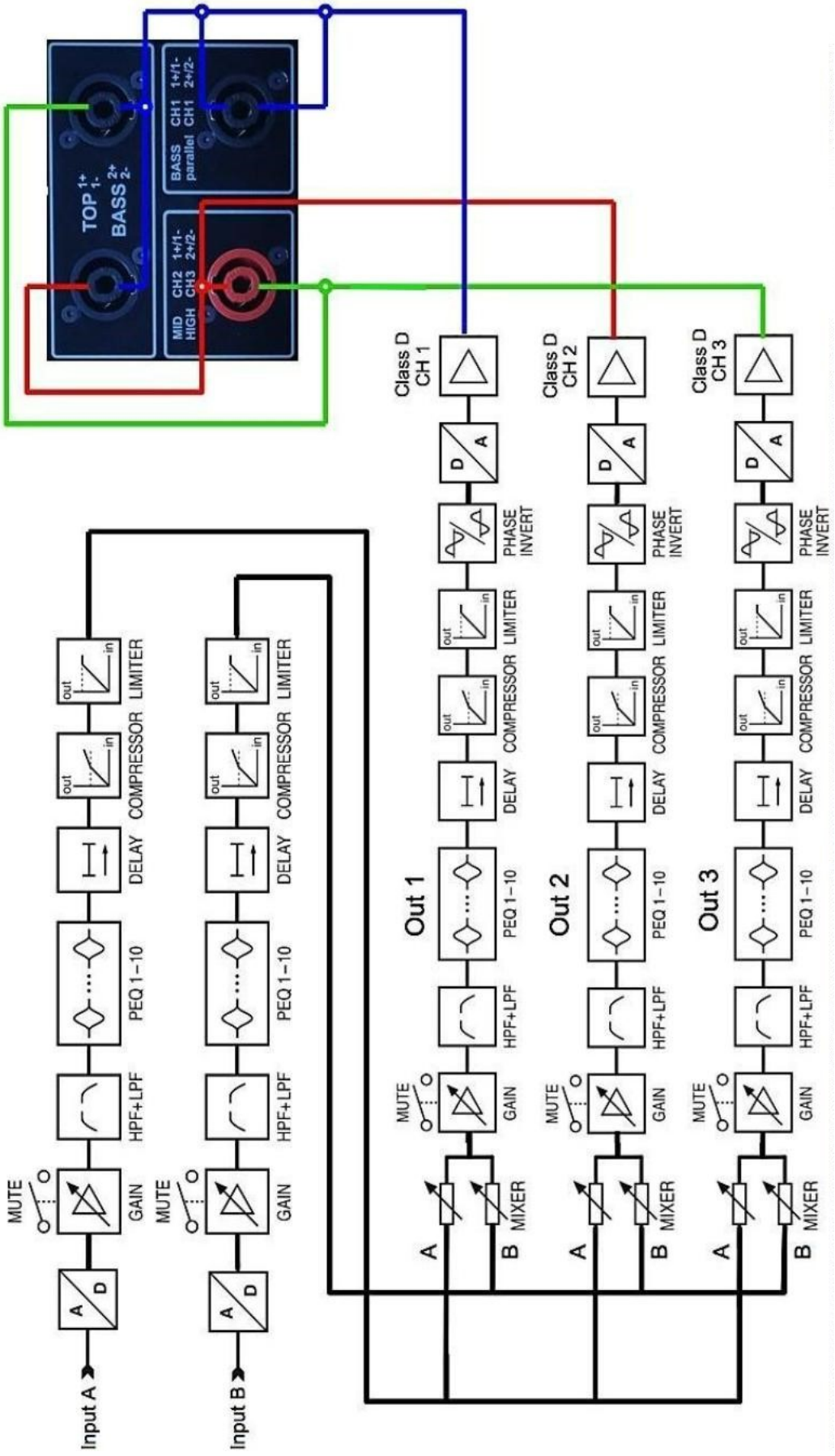
4.4 Restore deleted / faulty bootloader of the network chip

If the DSP can no longer be reached via the network interface, the cause may be a deleted bootloader in the network chip. You can upload it again within a few seconds, and your DSP will then be found again via the network manager of the DSP control software.

- Switch off your PowerPac 4003DSP.
- Connect to the DSP-Control Software.
- Open the DSP Control Software and choose in the menue „Tools“ the function „Enable Update“
- Switch on your PowerPac 4003DSP. Please be aware you have just some few seconds...
- Quickly push in the network manager in the line „Start up“ righthand the orange button and confirm the upcoming advise window with „OK“.
- The firmware-uploader opens and runs the upload of the bootloader (1).

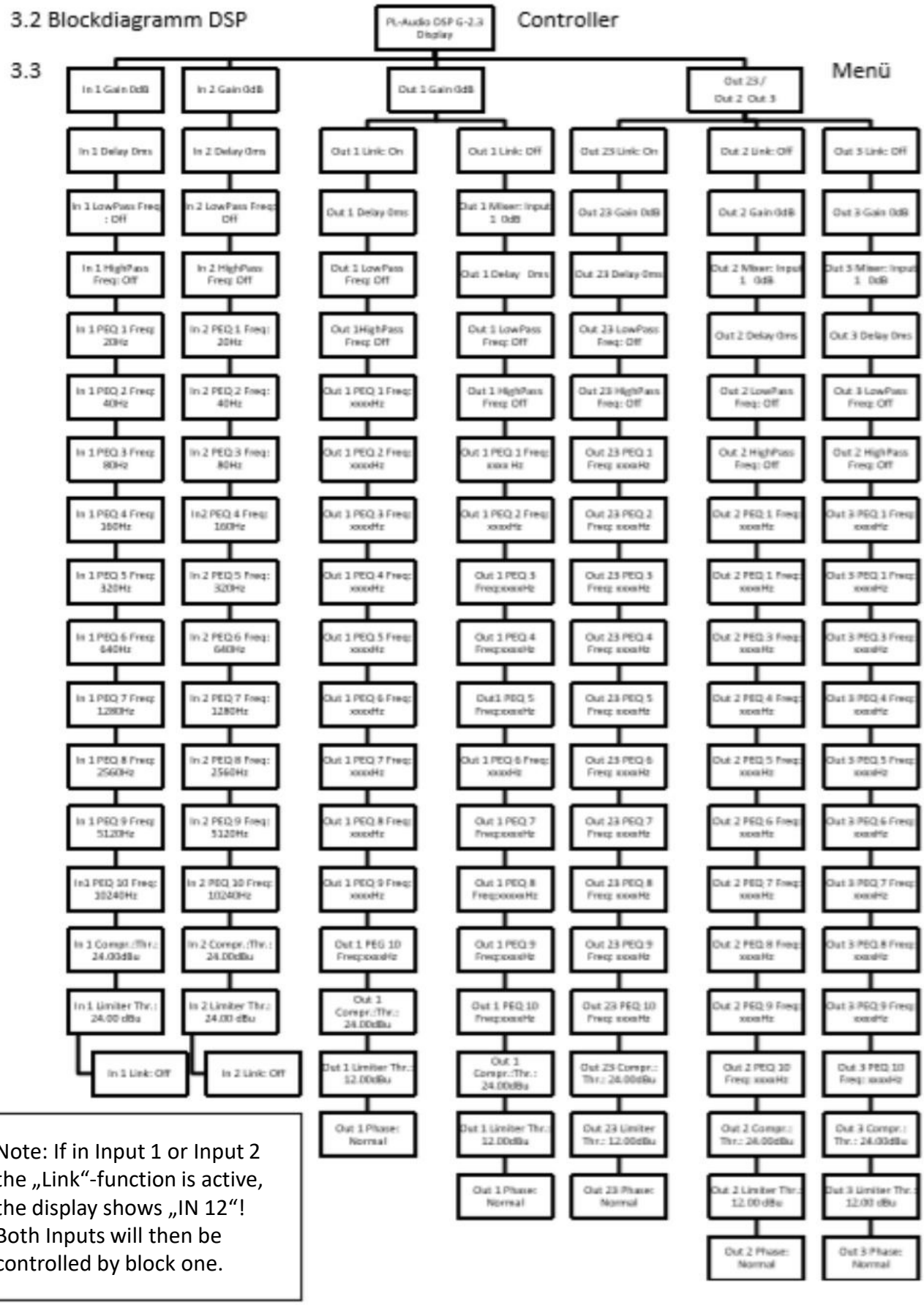
Note: while the firmware uploader is working, you can tell from (1) that the network chip is being updated and (2) that the DSP firmware is being uploaded.

3.1 DSP Functions / internal wiring



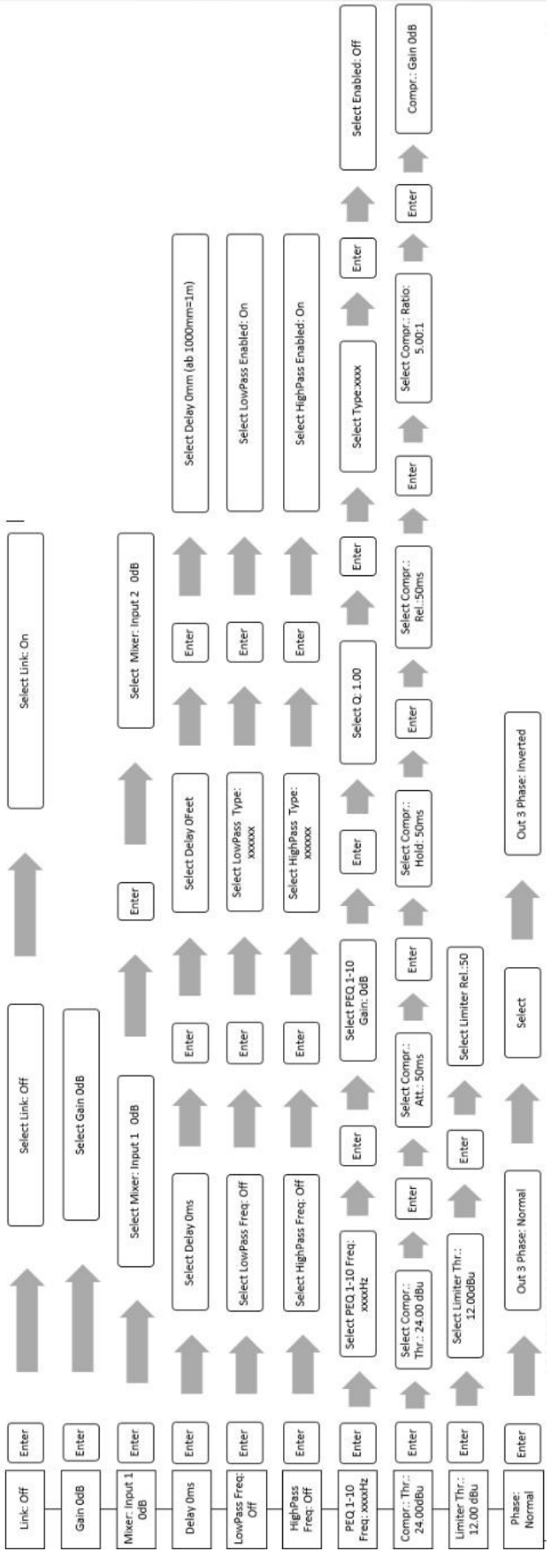
3.2 Blockdiagramm DSP

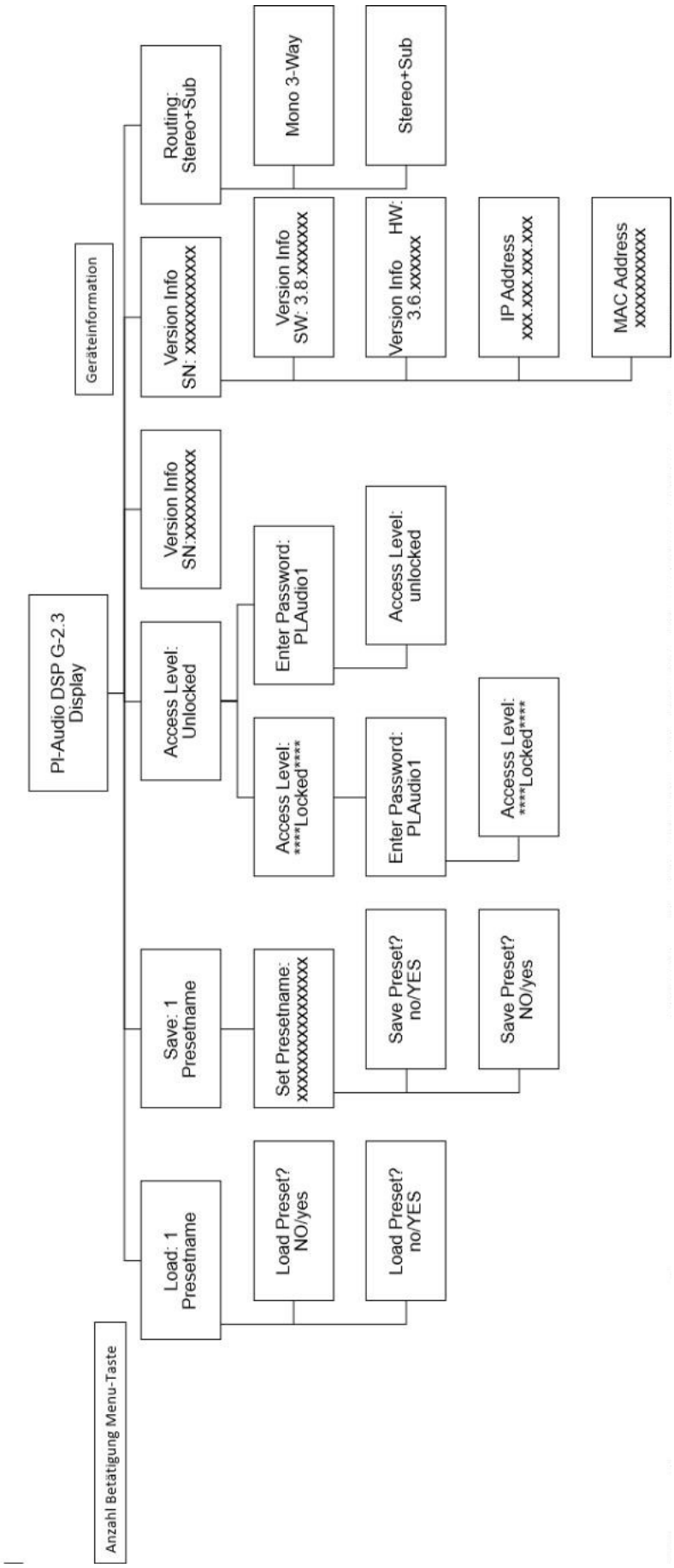
3.3 Controller Menü



Note: If in Input 1 or Input 2 the „Link“-function is active, the display shows „IN 12“! Both Inputs will then be controlled by block one.

3.2 Loading and editing Presets on the unit / Routing




Anzahl Betätigung Menu-Taste
PI-Audio DSP G-2.3
Display
Load: 1
Presetname
Load Preset?
NO/yes
Load Preset?
no/YES
Save: 1
Presetname
Set Presetname:
xxxxxxxxxxxxxx
Save Preset?
no/YES
Save Preset?
NO/yes
Access Level:
Unlocked
Access Level:
****Locked****
Enter Password:
PLAudio1
Enter Password:
PLAudio1
Accesss Level:
****Locked****
Version Info
SN:xxxxxxxxxx
Geräteinformation
Version Info
SN: xxxxxxxxxxx
Routing:
Stereo+Sub
Mono 3-Way
Stereo+Sub
Version Info
SW: 3.8.xxxxxxx
Version Info HW:
3.6.xxxxx
IP Address
xxx.xxx.xxx.xxx
MAC Address
xxxxxxxxxx
Access Level:
unlocked

Safety during operation

The PowerPac 4003 DSP carries a CE-Mark. According to the applicable accident preventation regulations, an annual VDE 0702 test must be carried out. Furthermore, the device has - in accordance with the ordinance of industrial safety – to be categorized in a company-specific risk assessment and be registered in a company specific document. For all other countries, pay attention to the local applicable ordinances, test regulations and test intervals. Keep the manual of this product freely available for all users of the product.

Maintenance

The PowerPac 4003 DSP is almost maintenance-free. However, keep the unit free of dust so that the necessary cooling air can circulate properly. There are no user-serviceable componments inside the PowerPac 4003 DSP.

Leave necessary maintainance work, such as cleaning with compressed air, to qualified specialists.

The following applies to all work in the device: Before opening the housing pull the power plug!!!

Please note that unauthorised opening of the housing automatically invalidates the warranty!

Disposal

According to the national electrical and electronic equipment law - ElektroG, PL-audio is a German manufacturer and EAR-registered (Registration office for waste electrical and electronic equipment register). The registration number of PL-audio in Germany is WEEE - Reg. No. DE 68629698. Please do not dispose any PL-audio products with household, residual or bulky waste or give them to the public collection points for disposal. PL-audio products are professional electrical devices, so-called business-to-business products (B2B). Old devices will be taken back by us and through our contract company Electrocycling GmbH, Landstrasse 91, 38644 Goslar, disposed professionally and in a resource-saving manner sent to the collection of recyclable materials. We have therefore marked all devices affected by the ElektroG with the crossed-out garbage can. This symbol indicates that it must not be disposed of with household waste. But also not known signed older PL-audio products, the disposal of which the owner would be responsible for, we are happy to take for disposal. To implement our obligations from the Packaging Ordinance, we have joined us to the dual system - EKO-PUNKT.

Impressum