

Professional Fidelity

Mastering Grade Listening



This User Manual is optimized for Acrobat Reader.

Interactive buttons may not appear in other applications.

Phonitor xe – User Manual

Headphone Amplifier



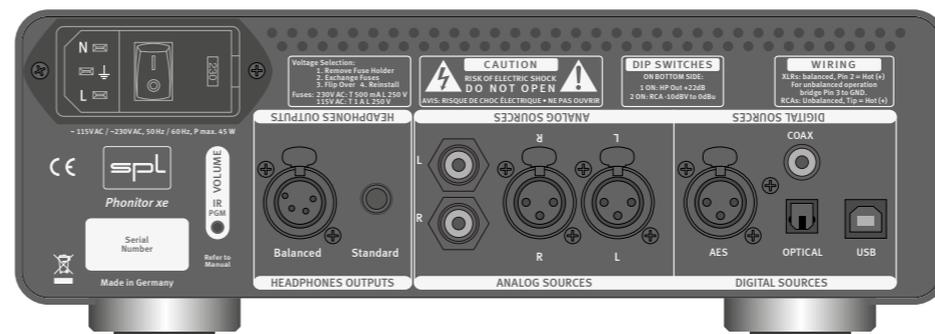
Welcome

and thank you for choosing the Phonitor xe.

The Phonitor xe is the ultimate standalone device for headphone enthusiasts. It offers connections for headphones operated both balanced and unbalanced. With up to 3.7 W output power the Phonitor xe delivers an impressive performance.

The Phonitor xe is the first Phonitor headphone amplifier which can be equipped with the brand-new SPL DAC768. This optional internal Uber-DAC qualifies the Phonitor xe to convert with outstanding sonic performance both PCM up to 768 kHz sample rate and 32 bit as well as DSD up to DSD 4.

VOLTAiR technology is what we also call the SPL 120V Rail Technology within the Professional Fidelity series. This makes the Phonitor xe an outstanding device in terms of dynamic range, signal-to-noise ratio and headroom delivering an exceptional sound experience with invincible serenity, transparency and realness.



Content

Getting started	4	Output selection	22
Front view	5	MODE switch	23
Rear view	6	Laterality	23
Bottom view	7	VU meters	24
DIP switches	7	IR Remote control	25
VOLTAiR – 120V Rail Technology	8	DIP switches	27
Comparisons	9	Level increase of the headphone output	27
Phonitor Matrix	11	RCA input sensitivity	27
Basics of stereo listening	11	Specifications	28
Stereo listening with an “traditional“ headphone preamplifier	12	Inputs	28
How does the Phonitor Matrix work?	13	Outputs	29
Angle	14	Internal operating voltages	31
Crossfeed	15	Power supply	31
Setting of Crossfeed and Angle	16	Dimensions (incl. feet)	32
Adjustment of the Phonitor Matrix	18	Weight	32
Matrix On/Off	19	Important Notes	33
Source selection	20	Declaration of CE Conformity	33
SPL DAC768	21		



Getting started

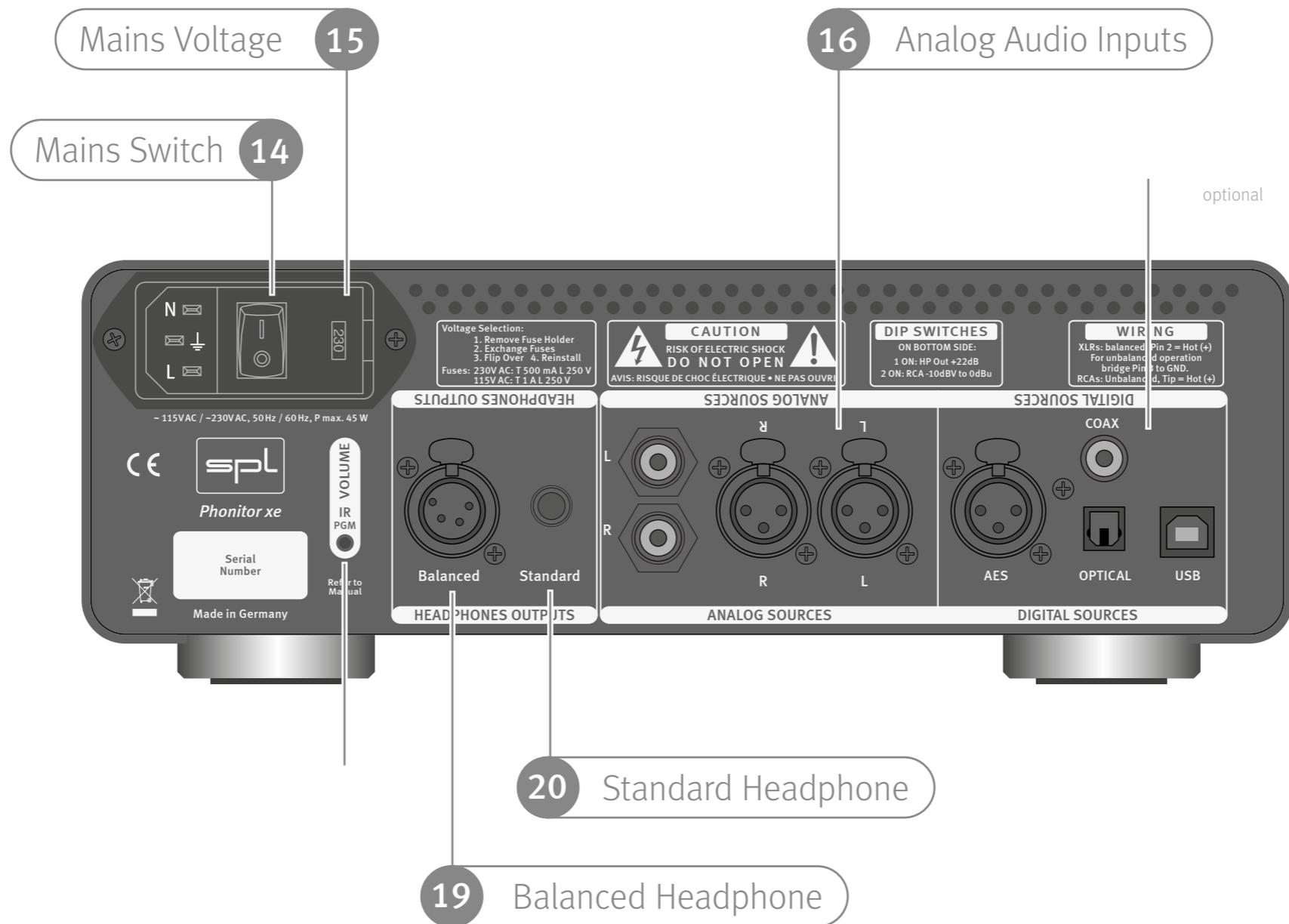
Read thoroughly and follow the instructions as well as the security advices of the Quickstart which is enclosed in the scope of delivery! You can also download the Quickstart [here](#).

- By pressing the -Button you get to the **table of contents**.
- By pressing the -Button you get to the **front view** of the unit.
- By pressing the -Button you get to the **rear view** of the unit.
- By pressing the -Button you get to the **bottom view** of the unit.
- By pressing the -Button you get to the **previous content**.

Front view

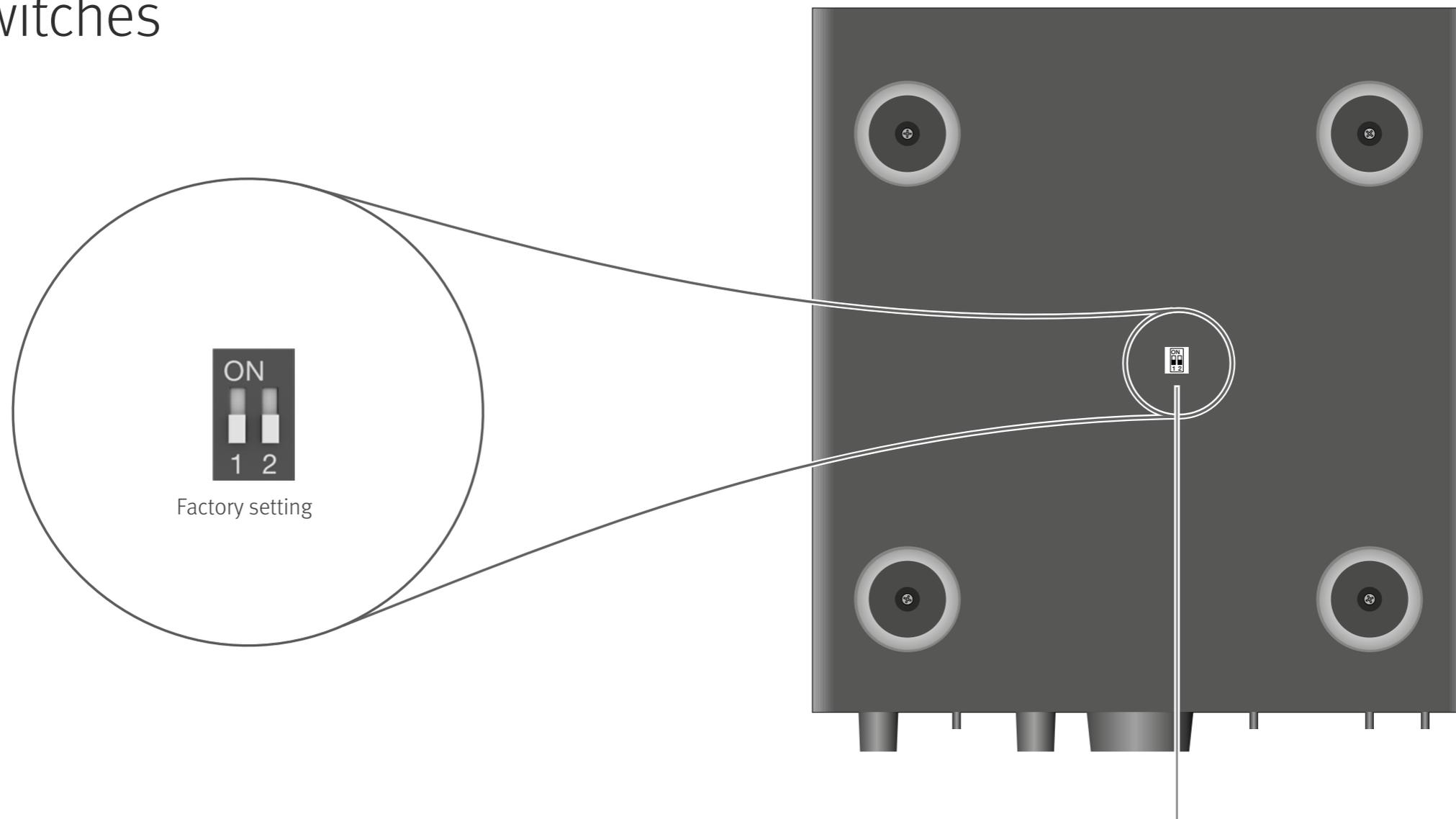


Rear view



Bottom view

DIP switches



VOLTAiR – 120V Rail Technology

VOLTAiR is the synonym for our 120V Rail Technology within the Professional Fidelity series. The audio signals are processed with an unequalled $\pm 60V$ DC, which corresponds to twice that of discrete operational amplifiers and four-times that of semiconductor operational amplifiers.

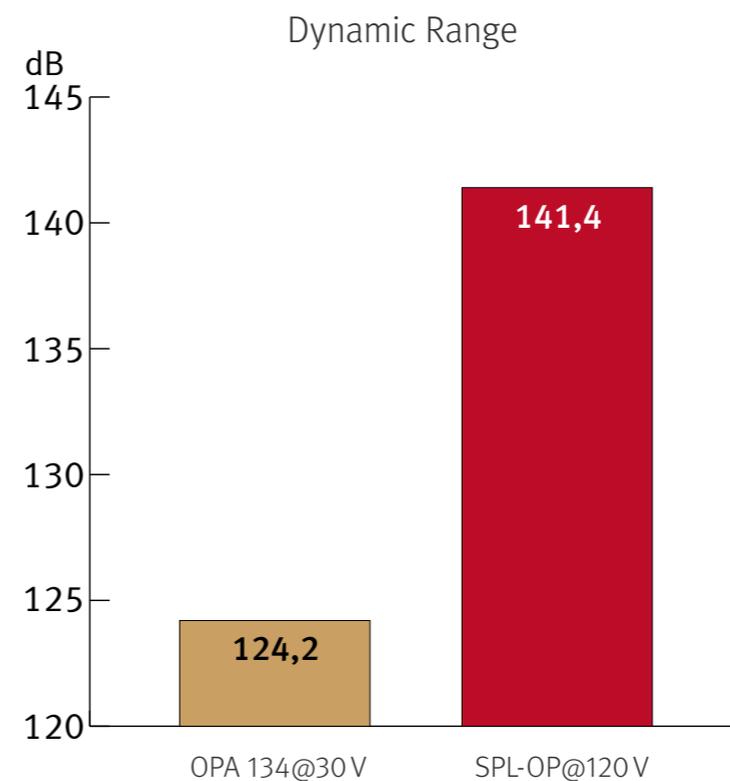
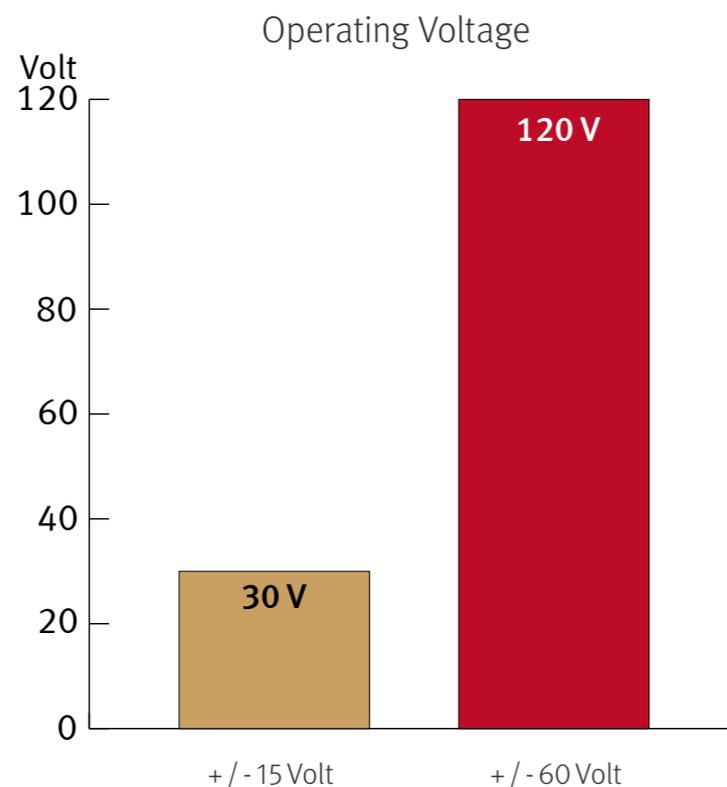
VOLTAiR Technology reaches outstanding technical and sonic performances. Technically especially in terms of dynamic range and headroom and sonically especially in reproducing the finest details and delivering a totally relaxed sounding audio experience. Music sounds absolutely natural.

SPL's 120V Rail Technology is the internal audio processing voltage ($\pm 60V$ DC).
It is not to be confused with the external mains voltage (e.g. 115V or 230V AC).

Comparisons

These diagrams show how our VOLTAiR Technology compares to other circuits.

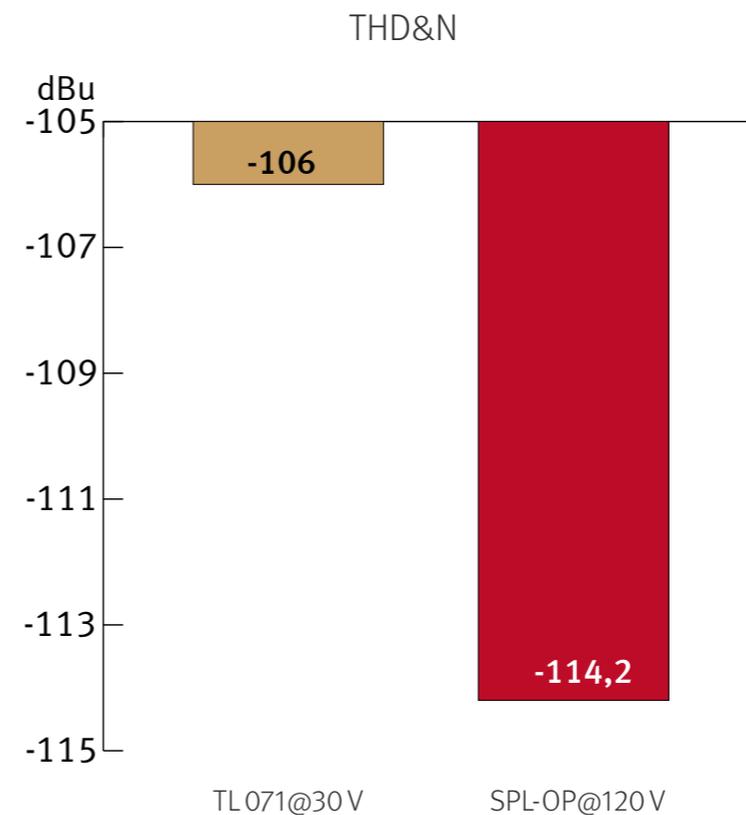
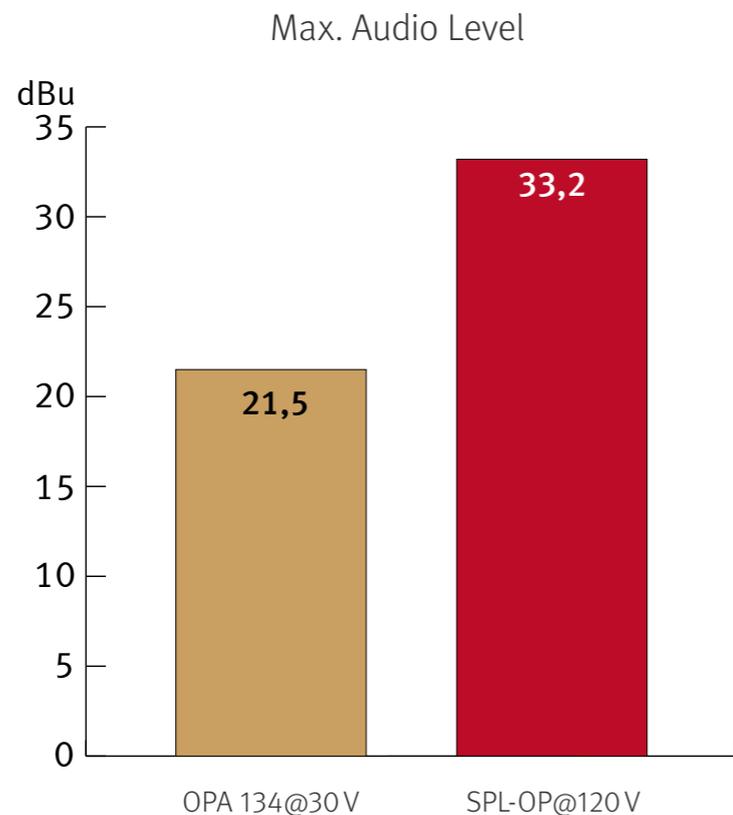
The direct relation between operating level and maximum level is fundamental for the classification: the higher the operating level, the higher the maximum level a circuit can handle. And since virtually all essential acoustic and musical parameters depend on this relation, a higher operating voltage also has a positive impact on the dynamic range, distortion limit and signal-to-noise ratio.



Do bear in mind that dB scales do not represent linear but rather exponential increases. A 3 dB increase corresponds to doubling the acoustic power, +6 dB correspond to twice the sound pressure level, and +10 dB correspond to twice the perceived loudness.

When it comes to volume, the VOLTAiR Technology exhibits a performance, in regard to maximum level and dynamic range, that is twice that of common components and circuits given that its values are approximately 10 dB higher.

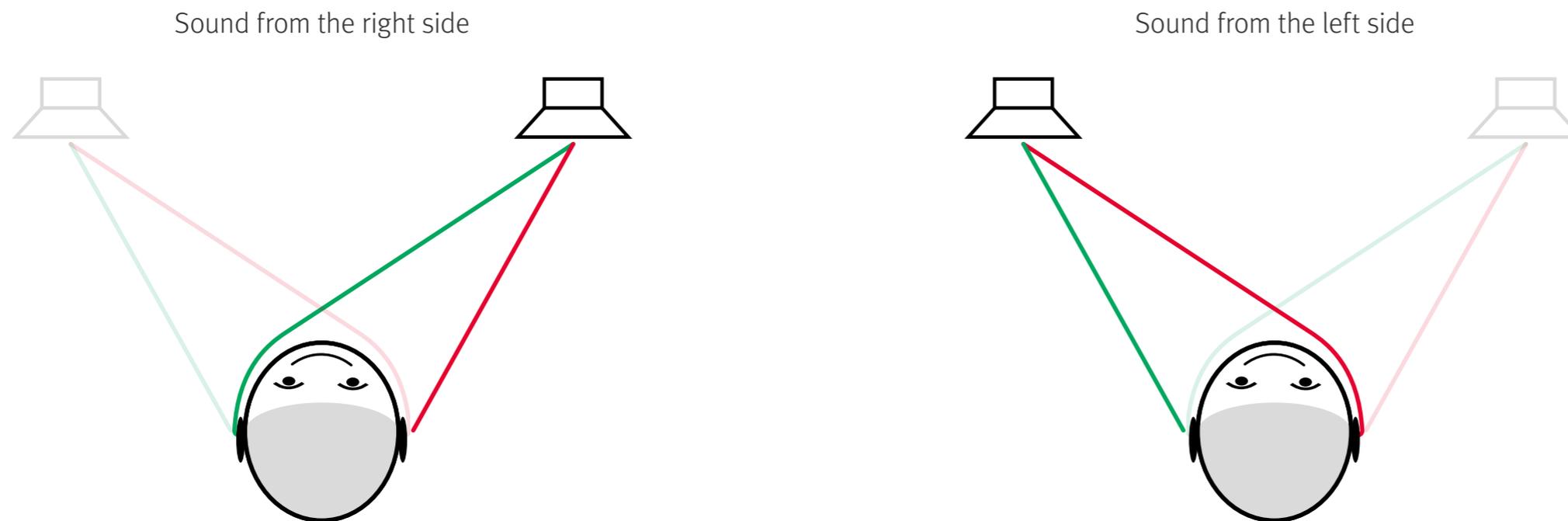
THD measurements show a difference of more than 8 dB compared to the TL071 at 30 V — in terms of sound pressure level, that corresponds to an improvement of more than 130%. The operating level most commonly used for audio equipment is +/- 15 volts.



Phonitor Matrix

Basics of stereo listening

When listening to speakers sound coming from the right is not only perceived with the right ear (red line) but it is also perceived with the left ear (green line). The sensation is time delayed, lower in level and has a reduced frequency range (this applies to the left speaker accordingly).



It arrives later because the signal travels a distance of approx. 340 meters per second and the distance from the right speaker to the left ear is longer than it is to the right ear. It is quieter and does not deliver the full frequency range, because the signal of the right speaker does not directly arrive at the left ear but is partially reflected and absorbed by the head.

Our brain determines the direction of the sound by perceiving the time delay (interaural time difference) and the level difference (interaural level difference).

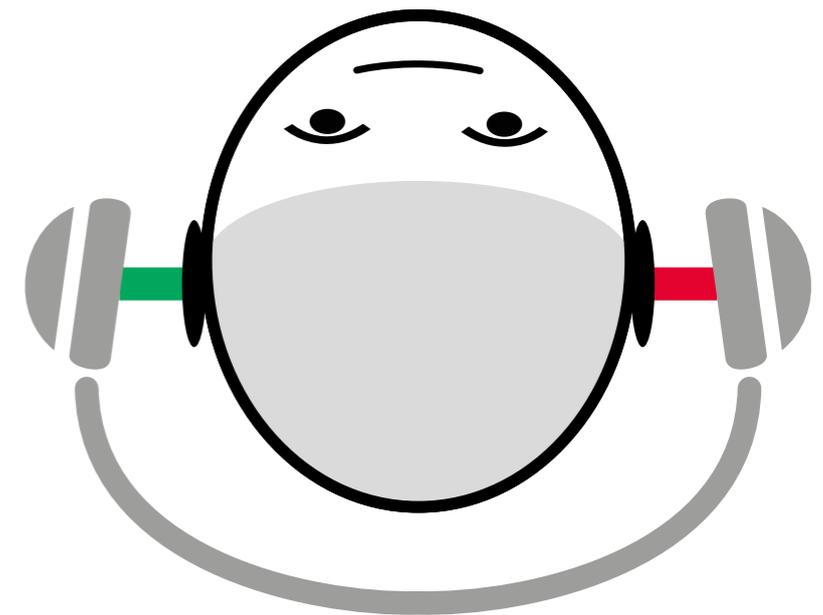
Stereo listening with an “traditional” headphone preamplifier

When listening to music with a traditional headphone amplifier, the right ear only perceives the right signal (red line) and the left ear only perceives the left signal (green line).

The delayed and quieter signal of the respective opposite side is missing. This unnatural sound irritates the ear and is stressful for our brain, because it constantly is busy trying to locate the direction of the sound.

Besides, this super-stereo-effect leads to an exaggerated stereo width. Instruments that are placed in the stereo field appear to be located much further outside than desired.

These unnatural effects are corrected by the Phonitor Matrix.



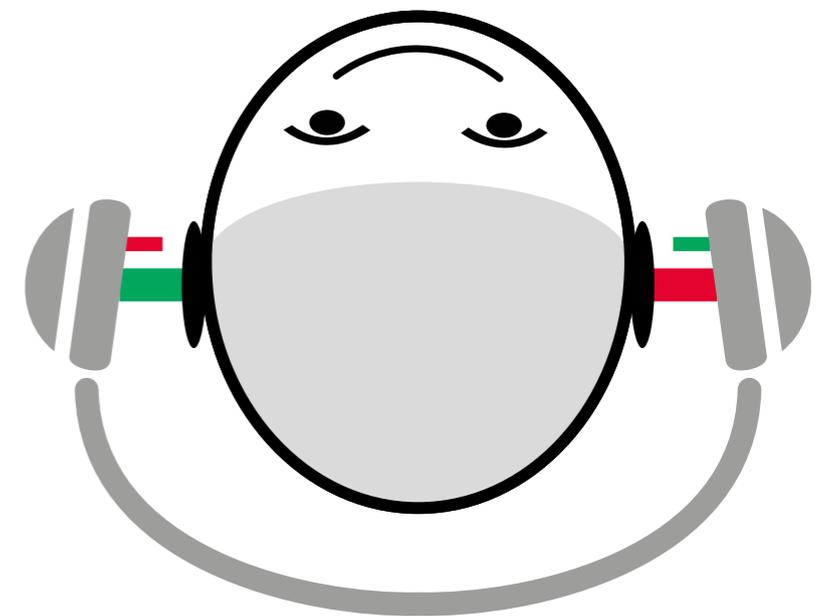
How does the Phonitor Matrix work?

In simple terms, the Phonitor Matrix creates a speaker-like listening experience on headphones. It calculates the time and level differences with their specific frequency responses to deliver a true rendition of a speaker playback.

Because time and level differences are set like real loudspeaker placement, the brain is able to correctly identify the direction of the sound.

You can perceive a speaker-like listening experience.

All instruments appear at the correct position within the stereo image – just like it was intended when it was mixed in the studio. In comparison to a traditional headphone amplifier it provides the best conditions minimizing hearing fatigue.



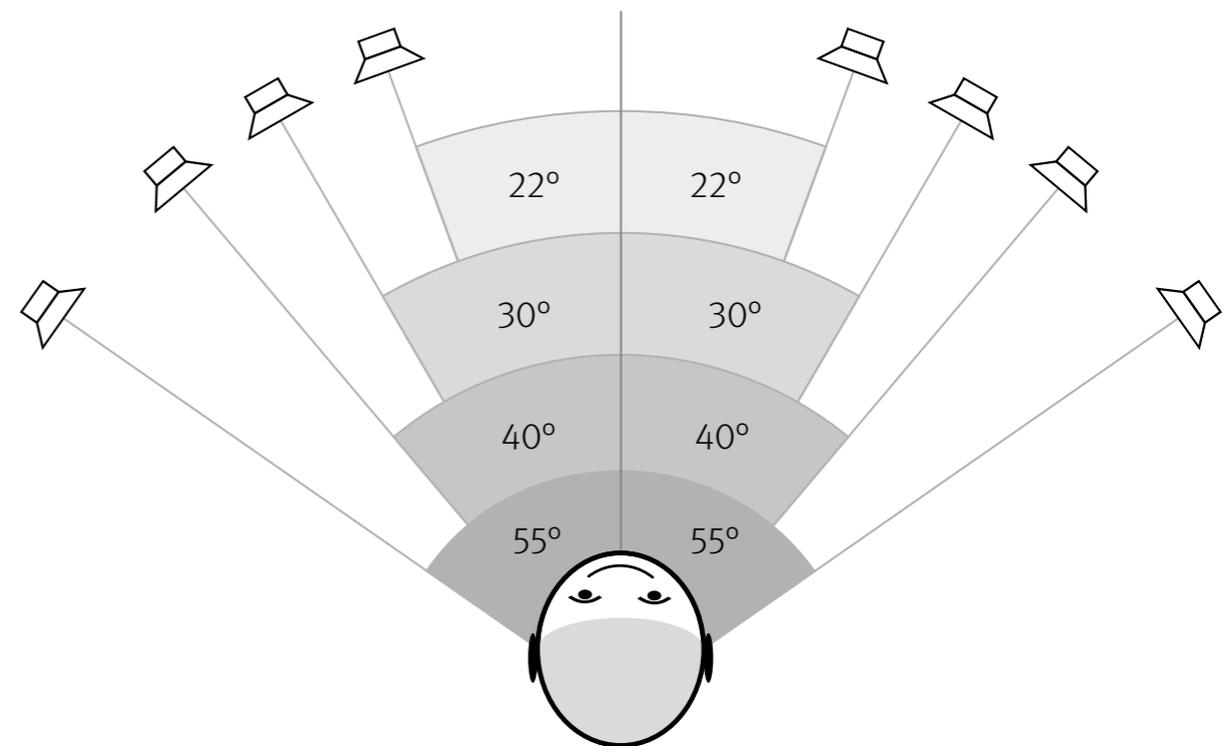
In Detail

An analog filter design creates interaural time and level differences for four different speaker placements.

This analog filter design is controlled by the crossfeed and angle parameters.

Angle

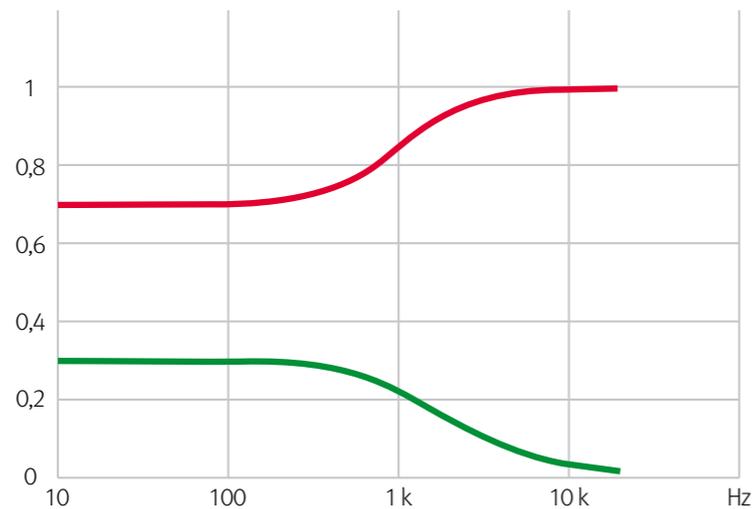
With the ANGLE switch you adjust the interaural time difference which is related to the placement of the speakers.



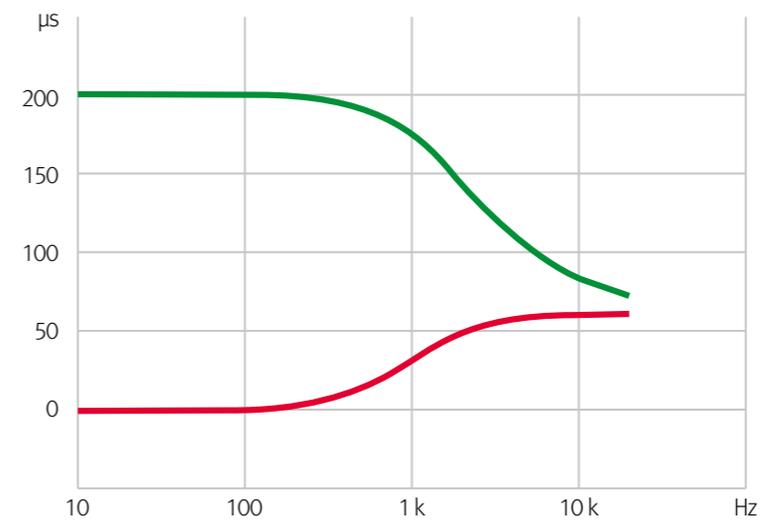
Crossfeed

Crossfeed defines the interaural level difference. The six crossfeed values approximate the influences of room size, reflection and absorption characteristics.

Frequency corrected level difference at max. Crossfeed and 30° Angle of the right channel (red = right signal, green = left signal)



Frequency corrected time difference at max. Crossfeed and 30° Angle of the right channel (red = right signal, green = left signal)



The interaural level difference and the interaural time difference are frequency-corrected because the sound is reflected and absorbed by the head in a non-linear fashion.

Setting of Crossfeed and Angle

Both parameters (Crossfeed and Angle) define the interaural level difference and the interaural time difference. To reproduce the exact placement of the loudspeakers, first choose the Angle parameter closest to your real speaker placement. Afterwards choose the recommended Crossfeed Parameter (see table on [page 17](#) e.g.: Angle: 30°, Crossfeed: 3).

A vast number of factors, e.g. type of loudspeakers, room acoustics or the individual perception, influence the stereo-listening. This is why the Phonitor x offers six different switch positions to finely adjust the Crossfeed and to best match to your speaker playback.

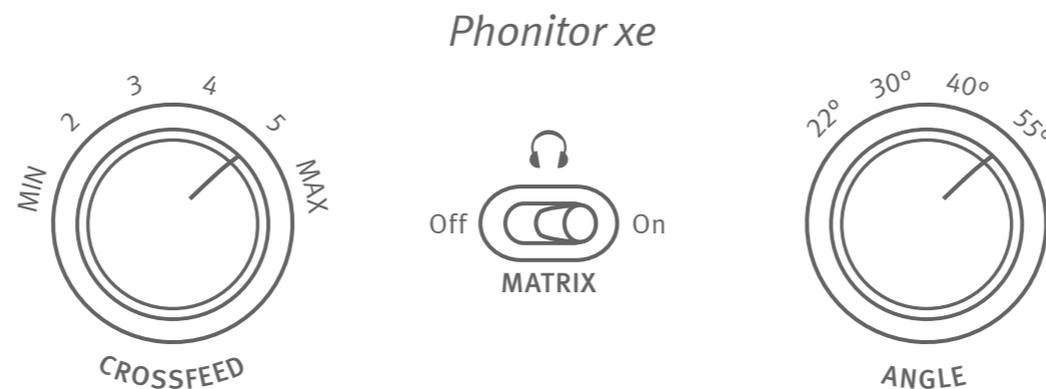


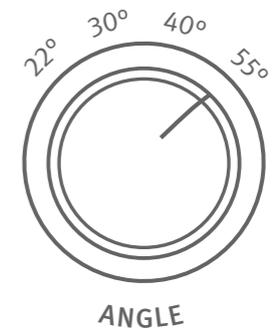
Table: Settings of Crossfeed and Angle

Angle parameter	Crossfeed parameter	Interaural level difference	Interaural time difference (μ s)	Speaker angle
22°	MAX	0,24	133	15°
	5	0,35	165	20°
	4	0,40	210	20°
	3	0,47	220	25°
	2	0,50	230	25°
	MIN	0,60	250	30°
30°	MAX	0,40	205	20°
	5	0,49	235	25°
	4	0,56	260	30°
	3	0,64	280	30°
	2	0,70	300	30°
	MIN	0,76	335	40°
40°	MAX	0,26	290	30°
	5	0,34	355	40°
	4	0,40	400	45°
	3	0,49	455	45°
	2	0,50	480	55°
	MIN	0,60	535	70°
55°	MAX	0,34	350	40°
	5	0,44	405	45°
	4	0,50	450	50°
	3	0,58	490	55°
	2	0,52	525	65°
	MIN	0,70	555	70°

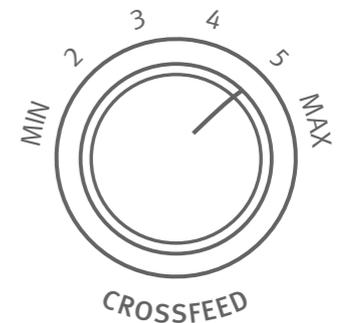
Adjustment of the Phonitor Matrix

By using the [CROSSFEED switch \(4\)](#) and the [ANGLE switch \(5\)](#) you can adjust the headphone playback through the Phonitor xe to your room with your loudspeaker setup.

- Play some audio material you know well with the Phonitor xe and go to a place where you usually listen to music through speakers.
- Set the ANGLE switch according to your loudspeaker placement (see [page 14](#)).

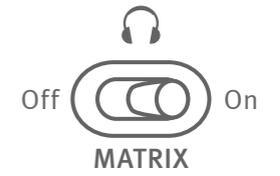


- Then set the CROSSFEED switch to the value that comes closest to your familiar loudspeaker-listening sound.
Listen to the instruments panned in the stereo field. These instruments shall have the same positions on headphones.



Matrix On/Off

With the [MATRIX switch \(3\)](#) you activate or deactivate the Matrix of the Phonitor x.



Source selection

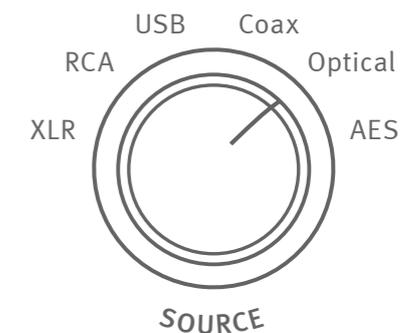
The Phonitor xe is a headphone amplifier with up to six audio sources.

It features two analog stereo inputs – [XLR and RCA \(16\)](#).

Phonitor xe can be equipped with the DA768 converter. With that installed the available inputs are expanded by [USB, coaxial, optical \(TOSLink\) and AES digital stereo inputs \(17\)](#).

- Select an analog audio source by using the [SOURCE switch \(9\)](#) – RCA or XLR.
- If the option DAC768 is installed you can select a digital audio source (USB, coaxial, optical or AES) by using the [SOURCE switch \(9\)](#).

Signals at analog [RCA input \(16\)](#), can be amplified from HiFi level to studio level with [DIP switch 2](#). The sources are then equal in level when you switch between XLR and RCA (provided that a studio signal is present at the XLR input).



SPL DAC768

If the optional SPL DAC768 is installed, the input count is increased by one USB, one coaxial, one optical and one AES/EBU connector.

The SPL DAC768 is based on the 2-channel 32 bit premium D/A converter AK4490 from AKM. The VELVET SOUND architecture guarantees highest dynamic range together with lowest distortion.

In composition with the analog VOLTAiR Technology this digital/analog converter is among the best what is technically feasible –and delivers outstanding sonic performance.

The coaxial SPDIF input is capable of PCM sample rates up to 192 kHz. Optical PCM digital audio on the TOSLINK connector will be converted at sample rates up to 96 kHz. USB digital audio will be automatically identified and converted as PCM up to 768 kHz or DSD up to DSD 4 (DSD256). Digital audio on the AES/EBU connector will be converted at sample rates up to 192 kHz.

Output selection

With the [Output F/R switch \(13\)](#) you send the headphone signal to the headhone connectors on the front or on the rear side.



Set to the R setting, the headphone signal passes through to both the headhone connectors on the rear side.

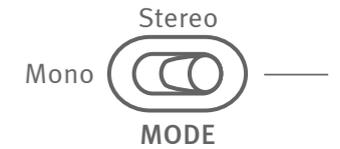
Please note that the [standard headphone output \(12\)](#) takes priority over the [balanced headphone output \(11\)](#). There is no signal at the balanced headphone output if a headphone is already plugged into the standard headphone output.

To protect the headphone power amplifier stage and guarantee a long and consistent performance please note:

- Turn down VOLUME before swapping headphones.
- Never insert a mono jack plug into the front panel stereo jack.
- Make sure that the headphones stereo jack is fully inserted.
- If you use an adapter from 3,5 mm to 1/4" (6,35 mm) on your headphone make sure that the adapter is fully screwed on respectively fully plugged in.

MODE switch

By using the [MODE switch \(6\)](#) you can switch the audio signal to Stereo, Stereo with Laterality control and Mono. In Mono mode, both stereo channels are summed. The mono signal maintains the same loudness, because both stereo channels are each reduced by 6 dB.



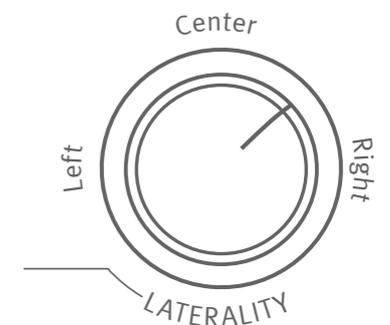
Laterality

Laterality refers to the deviation of sound perception to either side of the ears. With the [Laterality control \(10\)](#) you can compensate perceived volume differences between channels that may be due to a hearing impairment.

This control differs from conventional balance controls. If one channel is attenuated, the other one is increased at the same time. This means that, e.g. when hard left, the level of the left channel increases by 2.25 dB while the right channel is attenuated by 2.25 dB.

This control has a narrower range than conventional balance controls. Its resolution is very fine, which means it can be precisely adjusted.

Set the MODE switch to LATERALITY to control the laterality (see above).



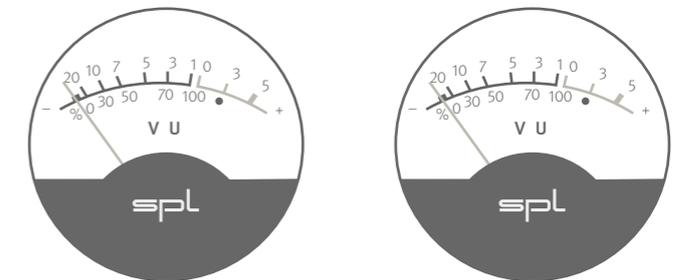
VU meters

The [VU meters \(2\)](#) display the input levels for the selected source. The meter indicates levels from -20 dB to +5 dB. 0 dB corresponds to +4 dBu.

If necessary you can lower the sensitivity by 6 or 12 dB so that the meters go up to +17 dB input level with the [VU level switch \(8\)](#).

The ballistics of the VU meters guarantee an optimal visual perception. The time calibration of the VU meters complies with the requirements of the BBC. The rise time up to 0 dB is about 300 ms.

If the VU meters light up red permanently, the protection circuit has been activated. The output connectors are disconnected from the amplifier via a relay to protect the connected headphones. Please contact your local dealer for repair service.



IR Remote control

The volume potentiometer can be remotely controlled using any infrared (IR) remote control.

The special feature is that the Phonitor xe learns your remote and not the other way around. You do not need a universal remote control. Take, for example, the remote control of the CD player. Out of the many buttons there are two you hardly use if at all. Assign Volume up / Volume down to these two buttons and let the Phonitor xe learn them.

- Press the [IR PGM VOLUME button \(18\)](#) on the rear of the unit until you note the actuation point. The Power LED now lights up brighter.
- Point your remote control towards the [VU meters \(2\)](#) and push the button you wish to use to **lower the volume**. The power LED flashes once per push. Press the same button repeatedly until the power LED flashes three times within a short interval – programming this button is then completed.

- Point your remote control towards the [VU meters \(2\)](#) and push the button you wish to use to **increase the volume**. The power LED flashes once per push. Press the same button repeatedly until the power LED flashes three times within a short interval – programming this button is then completed.
- Learn mode ends automatically after the second button is learned.
- Please note: direct insolation of strong light (e.g. sun light, halogen lamps, neon tubes, fluorescent tubes, terrarium and aquarium lights as well as big flat screens) may lead to misoperation of the remote control functions.

DIP switches

With the [DIP switches \(21\)](#) on the bottom of the unit the following settings can be chosen:

Level increase of the headphone output

By using the DIP switch 1 you can increase the level of the headphone outputs to better feed power-hungry headphones.

DIP switch 1: ON = The headphone output is boosted to +22 dB.

RCA input sensitivity

With DIP switch 2 you can change the sensitivity of RCA input.

DIP switch 2: ON = The analog RCA input sensitivity is changed from -10dBV (HiFi level) to 0dBu (Studio level).

Specifications

Inputs

XLR inputs

- Neutrik XLR, balanced, Pin 2 = (+)
- Impedance: ca. 20 kohms
- CMR: -82 dBu (at 1 kHz)
- Max. Input level: +32.5 dBu

RCA inputs

- Unbalanced
- Impedance: ca. 10 kohms
- Max. Input level: +32.5 dBu

Digital inputs (optional) / sample rates

- Coaxial SPDIF (RCA) - sample rates PCM (kHz): 44.1, 48 , 88.2, 96, 176.4, 192
- Optical TOSLINK (FO6) – sample rates PCM (kHz): 44.1, 48 , 88.2, 96
- USB (B) – PCM sample rates (kHz): 44.1, 48 , 88.2, 96, 176.4, 192, 352.8, 384, 705.6, 768
– DSD 1, 2 and 4 (DoP)
- AES – sample rates PCM (kHz): 44.1, 48 , 88.2, 96, 176.4, 192

Outputs

Balanced headphone output

- Neutrik 4-pin XLR connector (front and rear side)
- Pin wiring: 1 = L (+), 2 = L (-), 3 = R (+), 4 = R (-)
- Impedance: 0.36 ohms
- Damping factor: 180 @ 40 ohms
- Frequency range: 10 Hz to 300 kHz (-3 dB)
- Crosstalk at 1 kHz: -90 dB
- THD & N: 0.00082 % (at 0 dBu, 1 kHz, 100 kohms load)
- Noise (A-weighted): -98 dBu
- Dynamic range: 130.5 dB

Standard headphone output



Warning: **Never** connect a **mono** jack cable to the standard headphone output (front panel stereo jack). Make sure that the stereo jack is fully inserted, otherwise a short circuit might damage the headphone amplifier!

- 6.35 mm TRS connector (front and rear side)
- Pin wiring: Tip = Left, ring = right, sleeve = GND
- Impedance: 0.18 ohm
- Attenuation factor: 180 @ 40 ohms
- Frequency range: 10 Hz to 300 kHz (-3 dB)
- Crosstalk at 1 kHz: -90 dB
- THD & N: 0.00082% (at 0 dBu, 1 kHz, 100 kohms load)
- Noise (A-weighted): -103 dB
- Dynamic range: 135.5 dB

Max. Output power (at +30 dBu @ 1 kHz)

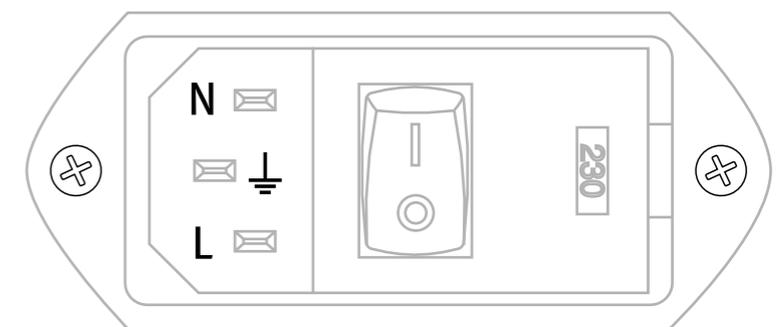
- 2 x 1 W at 600 Ohm impedance
- 2 x 2 W at 300 Ohm impedance
- 2x 3.7 W at 120 Ohm impedance
- 2x 2.9 W at 47 Ohm impedance
- 2x 2.7 W at 32 Ohm impedance

Internal operating voltages

- Analog: +/- 60 V
- Digital: + 5 V and + 3.3 V (optional DAC768)

Power supply

- Mains voltage (switchable): 230 V AC / 50 Hz or 115 V AC / 60 Hz
- Fuses: 230 V: T 500 mA; 115 V: T 1 A
- Power consumption: max 40 VA
- Stand-by power consumption: 0.7 W



Dimensions (incl. feet)

- (WxHxD) 10.94 x 3.94 x 12.99 in (278 x 100 x 330 mm)

Weight

- 11.24 lbs (5,1 kg), unit only
- 13.78 lbs (6,25 kg), shipping

Important Notes

Version 1.0 – 10 /2018

Developer: Bastian Neu

This manual includes a description of the product but no guarantee as for specific characteristics or successful results. Unless stated otherwise, everything herein corresponds to the technical status at the time of delivery of the product by SPL electronics GmbH. The design and circuitry are under continuous development and improvement. Technical specifications are subject to change.

© 2018 SPL electronics GmbH. This document is the property of SPL and may not be copied or reproduced in any manner, in part or fully, without prior authorization by SPL. Sound Performance Lab (SPL) continuously strives to improve its products and reserves the right to modify the product described in this manual at any time without prior notice. SPL and the SPL Logo are registered trademarks of SPL electronics GmbH. All company names and product names in this manual are the trademarks or registered trademarks of their respective companies.

Declaration of CE Conformity

 The construction of this unit is in compliance with the standards and regulations of the European Community.