



## HPm

Headphone Monitoring Amp in a Dual Slot 500 Series Rack Module

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## ► Version 1.0 – 09/2016

Developer: Bastian Neu

This manual contains a description of the product. In no way it represents a guarantee of particular characteristics or results of use.

The information in this document has been carefully compiled and verified and, unless otherwise stated or agreed upon, correctly describes the product. 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.

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## ► Scope of Delivery

HPm – 500 Series Rack Module

Quickstart/Product Overview

## ► Measurement & Weight

Dual Slot 500 Series Rack Module

Weight: 1.76 lbs (0.8 kg)

Please keep the original packaging. In a service case the original packaging ensures a safe transport.

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## ► Welcome

and thank you for purchasing the Headphone Monitoring Amp HPm. With the HPm the Phonitor Matrix is making headway into the world of 500 series rack modules.

Each of the two headphone outputs is fed with a separate amplifier to allow independent operation of two headphones with high-quality amplification.

With the Phonitor Matrix you control Crossfeed, Speaker Angle and Center Level to create speaker-like listening and monitoring on headphones.

The HPm can easily be inserted between the DAW and a monitor controller because the input signals of the HPm are slaved through to the outputs of the 500 series rack.

Phase Inversion of left or right channel as well as a Stereo/Mono/Mute switch round off the feature set of the HPm.

## ► General

Frequency Response: 10 Hz - > 100 kHz

Noise: -92.3 dBu (A-weighted)

Total Harmonic Distortion: 0,0024% (0 dBu output level//600 Ohm)

Current consumption: 260 mA at +/- 16 Volt DC

## ► Input

Electronically balanced

Impedance: approx. 10 kOhm

Max. Input Level: +21 dBu

## ► Output

Max. Output Level:

+18 dBu @ 600 Ohm

+15 dBu @ 300 Ohm

## ► Installation into a 500 series rack

- Please read the manual that comes with the 500 series rack. You should gain all information necessary for the installation process.
- Your 500 series rack should be switched off and the power cable should not be connected.
- Insert the HPm module into two adjacent free slots of your rack. Make sure the connectors of the HPm is precisely aligned with the rack connectors.
- Press the HPm module carefully into the rack connectors and tighten the screws.
- Connect the HPm module with your audio environment using the connections from your 500 series rack.
- Insert the power cable to the 500 series rack and switch it on.

**Note:** The HPm can easily be inserted between the DAW and a monitor controller because the input signals of the HPm are slaved through to the outputs of the 500 series rack.

# Control Elements



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## ► Phase Inversion Ø

With the Phase Inversion switch you invert the phase of the left or the right channel (180°). In position “L” the phase of the left channel is inverted. In position “R” the phase of the right channel is inverted.

In position “Off” no channel is phase inverted.

The phase inversion is used to check whether phantom center signals are precisely positioned in the stereo center. Invert the phase of one channel and engage mono. All phantom center signals should disappear.



## ► Crossfeed

The Crossfeed defines the interaural level difference. It approximates the influences of room size, reflections and absorption characteristics of the room your speakers are in.

The higher the Crossfeed the more the stereo image is shrinking. To mimic a dry room use lower Crossfeed settings whereas to mimic a wet room the Crossfeed should be set to higher values.

See also “Phonitor Matrix” on page 17 cont.

You’ll find more information about the setting of Crossfeed and Speaker Angle under “Setting of Crossfeed and Speaker Angle” on page 20.



## ► Speaker Angle

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

You can choose one of three angle values: 20°, 30° and 40°.

See also “Phonitor Matrix” on page 17 cont.

You’ll find more information about the setting of Crossfeed and Speaker Angle under “Setting of Crossfeed and Speaker Angle” on page 20.



## ► Volume

With these two detented controls you regulate the amplification for each headphone output individually.



## ► Stereo/Mono/Mute

The headphone playback can be switched between Stereo and Mono. In the Mute position no signal passes through to the headphones.

In Mono position the Mono compatibility can accustically be checked. Voices and instruments which appear quieter or disappear completely in mono have phase problems within the stereo signals.

The phase inversion is used to check whether phantom center signals are precisely positioned in the stereo center. Engage mono and invert the phase of one channel. All phantom center signals should disappear.



## ► Matrix On/Off

With the Matrix switch you activate or deactivate the Phonitor Matrix (Crossfeed, Speaker Angle and Center Level).

If switched off the settings of Crossfeed, Speaker Angle and Center Level have no influence on the headphone playback and the HPm operates as a “normal” headphone amplifier.





## ► Center Level

With the Center Level you control the monitoring intensity of the signals positioned in the phantom center.

If the stereo width is narrowed through changes in Crossfeed and Speaker Angle (so as to correspond to your actual loudspeaker setup), the phantom center may likely sound too intense while mixing on headphones. You normally would counteract by lowering the phantom center signals in the mix. When listening to that mix on loudspeakers the phantom center appear to quiet.

Therefore Center Level gives you the possibility to lower the phantom center playback level by 0.5, 1.0 or 1.5 dB. The phantom center gains the correct level in relation to the L/R stereo image on loudspeakers.



## ► Headphone Jacks

Connect headphones to the standard 1/4" (TRS) stereo jack plugs.



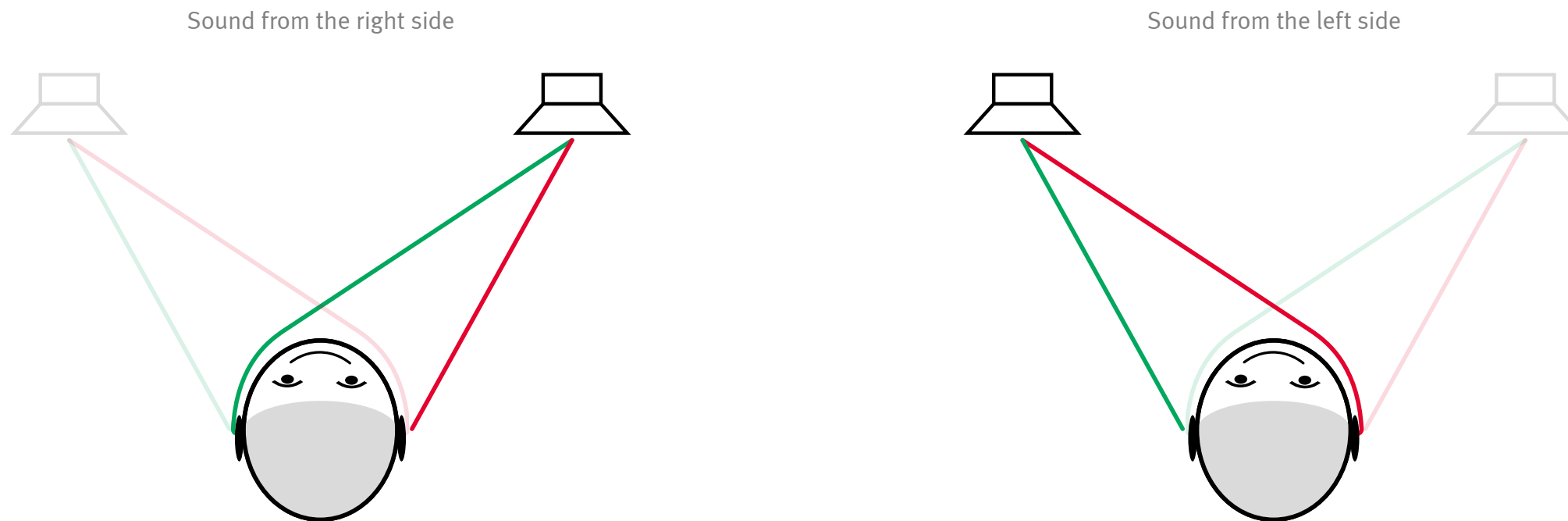
Warning: Never connect a mono jack cable to the headphone output (front panel stereo jack). Make sure that the stereo jack is fully inserted, otherwise a short circuit might damage the headphone amplifier!





## ► 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.

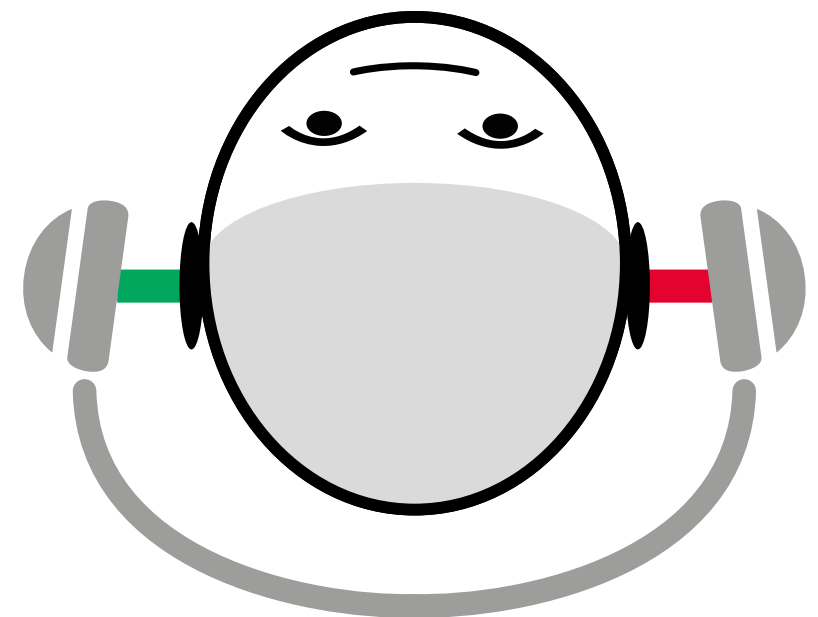
Our brain determines the direction of the sound by perceiving the time delay (interaural time difference) and the level difference (interaural level difference).

## ► Stereo listening with a “traditional” headphone pre-amplifier

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).

In contrast to listening to speakers the delayed and quieter signal of the respective opposite side is missing.

As a result to this super-stereo-effect reverb and delay effects as well as EQ and panorama adjustments are perceived more intense resulting in an exaggerated playback on headphones which does not represent the music as approved by the artist and producer.



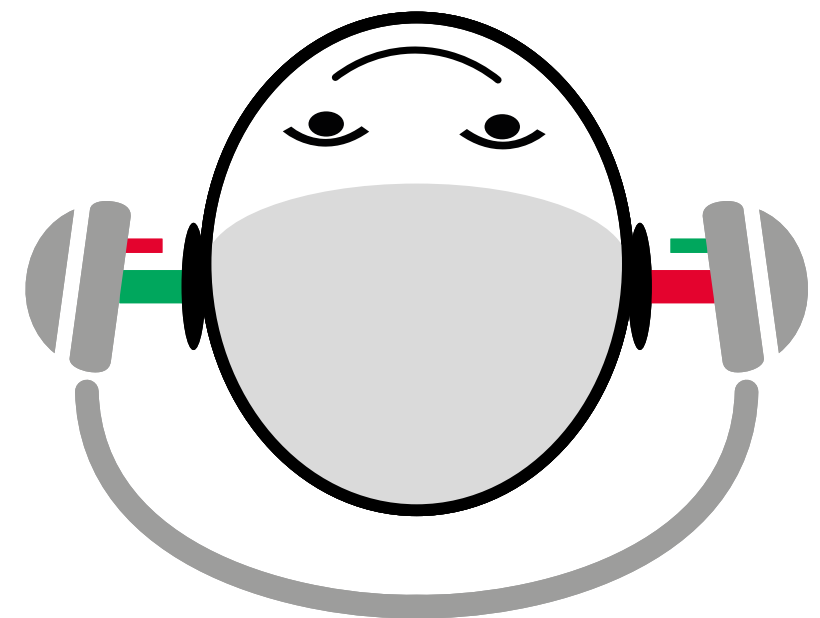
## ► How does the Phonitor Matrix work?

The Phonitor Matrix calculates the interaural time difference (Speaker Angle) and interaural level difference (Crossfeed) with their specific frequency responses to deliver a speaker-like listening experience on headphones.

The super-stereo-effect is eliminated and all reverb and delay effects as well as EQ and panorama adjustments are perceived correctly on headphones.

The headphone mix therefore translates well to speakers.

An analog filter design creates interaural time and level differences for three different speaker placements. This analog filter design is controlled by the crossfeed and angle parameters.

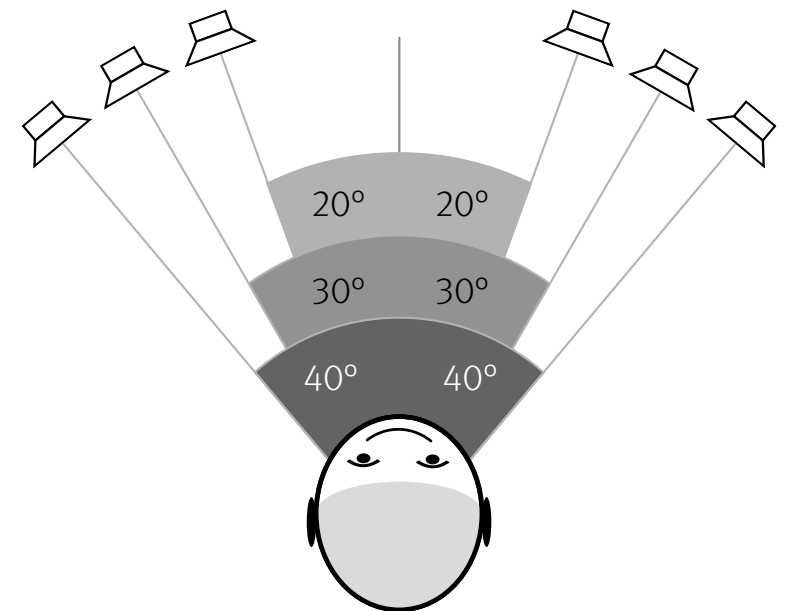


## ► Setting of Crossfeed and Speaker Angle

Both parameters (Crossfeed and Speaker Angle) define the interaural level difference and the interaural time difference.

To reproduce the exact placement of the loudspeakers, first choose the Speaker Angle parameter representing your real speaker placement.

Then play some audio you know well. Adjust the Crossfeed until the headphone playback comes closest to your loudspeaker listening experience.



## ► Exclamation mark within a triangle

An exclamation mark within a triangle is intended to make you aware of important operational advice and/or warnings that must be followed.

Be especially attentive to these and always follow the advice they give.



## ► Lightning symbol within a triangle

In this Manual a lightning symbol within a triangle warns you about the potential for dangerous electrical shocks – which can also occur even after the device has been disconnected from a power source.



## ► Symbol of a lamp

The symbol of a lamp directs your attention to explanations of important functions or applications.



## ► Connections

Only use the connections as described.

Other connections can lead to health risks and damage the equipment.



## ► Water and humidity

Do not use this device anywhere near water (for example in a bathroom, a damp cellar, near swimming pools, or similar environments). Otherwise you are dealing with an extremely high risk of fatal electrical shocks!



## ► Insertion of objects or fluids

Be careful to not insert any object into any of the chassis openings. You can otherwise easily come into contact with dangerous voltage or cause a damaging short circuit. Never allow any fluids to be spilled or sprayed on the device. Such actions can lead to dangerous electrical shocks or fire!



## ► Air ventilation

Chassis openings offer ventilation and serve to protect the device from overheating. Never cover or otherwise close off these openings. Never place the device on a soft surface (carpet, sofa, etc.).



## ► Electrical power

Operate the device only from power sources that can provide proper power. When in doubt about a source, contact your dealer or a professional electrician. To be certain you have isolated the device, disconnect all power and signal connections. Make sure that the power supply plug is always accessible. When not using the device for a longer period, make sure to unplug it from your wall power socket.



## ► Opening the unit

Simply put: DON'T, if you are not a certified SPL technician or engineer. Really: Do not open the device housing, as there is great risk you will damage the device, or – even after being disconnected – you may receive a dangerous electrical shock.



## ► Power connection overloads

Avoid any kind of overload in connections to wall sockets, extension or splitter power cords, or signal inputs. Always keep manufacturer warnings and instructions in mind.

Overloads create fire hazards and risk of dangerous shocks.



## ► Lightning

Before thunderstorms or other severe weather, disconnect the device from wall power; do not do this during a storm in order to avoid life threatening lightning strikes.

Similarly, before any severe weather, disconnect all the power connections of other devices and antenna and phone/network cables which may be interconnected so that no lightning damage or overload results from such secondary connections.





## ► Controls and switches

Operate the controls and switches only as described in the manual. Incorrect adjustments outside safe parameters can lead to damage and unnecessary repair costs. Never use the switches or level controls to effect excessive or extreme changes.



## ► Repairs

Unplug the unit from all power and signal connections and immediately contact a qualified technician when you think repairs are needed – or when moisture or foreign objects may accidentally have reached inside the housing, or in cases when the device may have fallen and shows any sign of having been damaged. This also applies to any situation in which the unit has not been subjected to any of these unusual circumstances but still is not functioning normally or its performance is substantially altered.

In cases of damage to the power supply and cord, first consider turning off the main circuit breaker before unplugging the power cord.



## ► Replacement/substitute parts

Be sure that any service technician uses original replacement parts or those with identical specifications as the originals.

Incorrectly substituted parts can lead to fire, electrical shock or other dangers, including further equipment damage.



## ► Safety inspection

Be sure always to ask a service technician to conduct a thorough safety check and ensure that the state of the repaired device is in all respects up to factory standards.



## ► Cleaning

Do not use any solvents, as these can damage the chassis finish.

Use a clean, dry cloth (if necessary, with an acid-free cleaning oil).

Disconnect the device from your power source before cleaning.



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## ► Declaration of CE Conformity

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



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## ► Notes on Environmental Protection

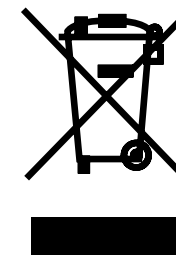
At the end of its operating life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment.

The wheelie bin symbol on the product, user's manual and packaging indicates that. The materials can be reused in accordance with their markings.

Through reuse, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment.

Your local administrative office can advise you of the responsible waste disposal point.

WEEE Registration: 973 349 88



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