

# **Audionet**

## **PAM G2**

Phono Preamp for MC / MM

### **User's Manual**



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# 1 Preface

The Audionet Team congratulates you on your purchase of this unit.

Audionet components are no marketing products, they are authentic. Conceived and developed with scientific inspiration, professional engineering expertise and a passion for achieving the perfect sound. They are unique creations designed to inspire musical enjoyment and have an excellent reputation amongst all connoisseurs throughout the world. Each and every one of our precision-manufactured devices are individually crafted at our factory located in Berlin, Germany by our experienced and passionate workforce.

But before you start listening to your new Audionet PAM G2, please read this manual carefully so you are able to use and enjoy all functions of this unit without drawback on music quality.

## **1.1 Included**

Included you will find the following items:

- the phono preamplifier PAM G2
- the user's manual (that you are currently reading)
- one standard mains cord
- one green-yellow cord for an additional earth connection

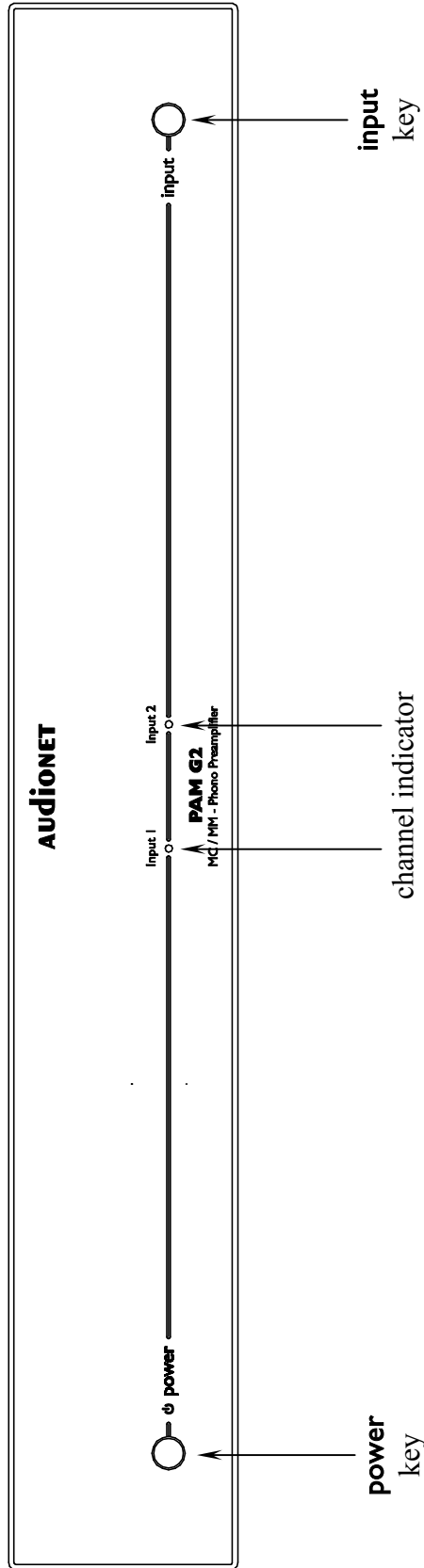
## **1.2 Transport**



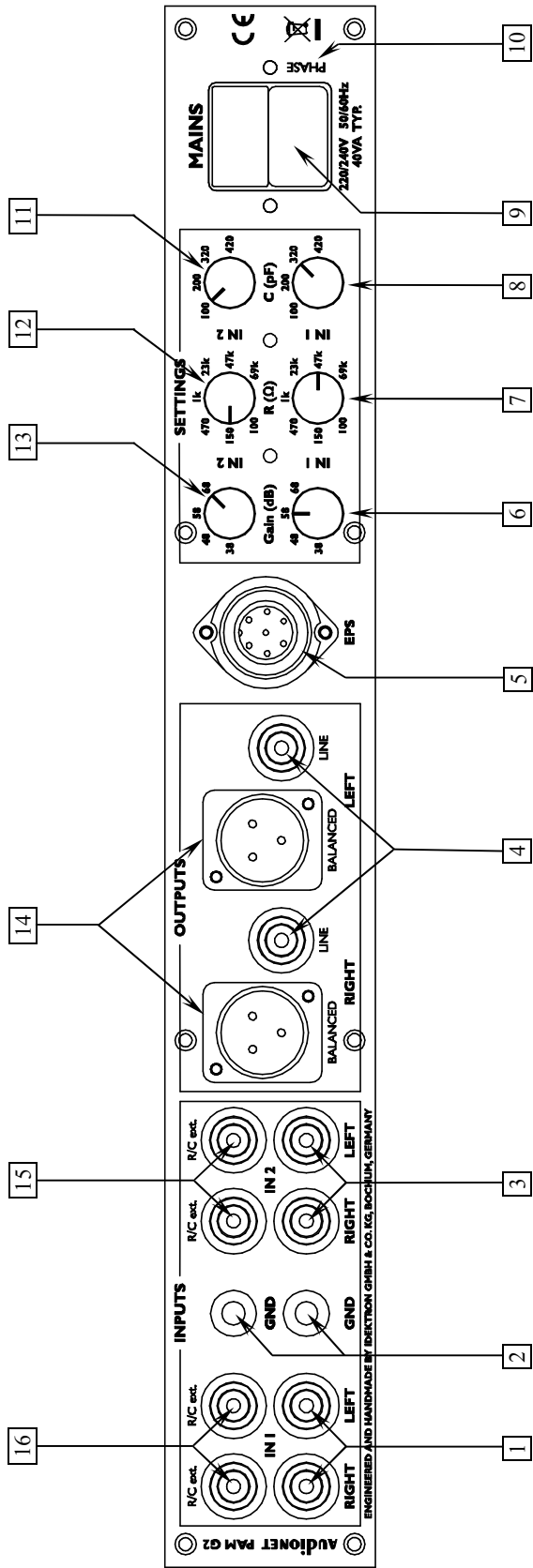
### **Important**

- Please transport the PAM G2 only in the included package.
- Always use the provided bag to prevent scratches on the casing.
- Please allow the PAM G2 to adapt to the climatic conditions in your listening room before you switch on the unit for the first time after transport.

## 2 Overview front panel



### 3 Overview back panel



- |   |   |   |
|---|---|---|
| <p>1 RCA input no. 1, left/right</p> <p>2 Earth connectors for turntables</p> <p>3 RCA input no. 2, left/right</p> <p>4 RCA output, left/right</p> <p>5 Connector for external power supply EPS</p> <p>6 Gain (dB), input 1</p> | <p>7 Input resistance - R(<math>\Omega</math>), input 1</p> <p>8 Input capacity - C(pF), input 1</p> <p>9 Mains input</p> <p>10 Marking mains phase</p> <p>11 Input capacity- C(pF), input 2</p> <p>12 Input resistance - R(<math>\Omega</math>), input 2</p> | <p>13 Gain(dB), input 2</p> <p>14 Balanced (XLR) output, left/right</p> <p>15 RCA input for additional input resistance or input capacitance on input 2, left/right</p> <p>16 RCA input for additional input resistance or input capacitance on input 1, left/right</p> |
|---|---|---|



## 4 Installation and power supply



### Important

- **During connecting and removing of turntables or preamplifiers to the PAM G2 all units of your audio system have to be switched off to prevent damage of the PAM G2 or any of the other connected units.**
- **Please make sure that all cables are in absolute best conditions! Broken shields or short-cut cables could damage the PAM G2 and/or any other connected unit.**

### 4.1 Placement



### Important

- It is recommended to place the PAM G2 into a high quality rack or onto a stable table.
- Do not expose the unit to direct sunlight.
- Do not cover the ventilation slots.
- Do not place the PAM G2 in close range to heat sources like radiators.
- Do not place the PAM G2 on top of other units, especially not on top of power amplifiers, preamplifiers or similar that produce heat. Both units could suffer damage from thermal overload.
- Transformers in amplifiers and other powerful devices may create interfering fields. Therefore, put the PAM G2 as far away as possible from such devices.
- Do not use the unit in places where it is exposed to vibrations.
- Do not place the unit close to loudspeakers or into the corner of a room where it is exposed to high levels of sonic energy, which might reduce the sound quality of the unit.
- If the PAM G2 is used with the external power supply EPS it is recommended to put the EPS to the right or at least 20 cm above/below of the PAM G2. Increasing the distance of both units, will minimize the influence of the mains transformers in the EPS.

## 4.2 Mains connection

The mains input **9**\* is on the back panel of the PAM G2. To connect the unit to mains use the included mains cord. If you prefer to use a different power cord make sure that it meets the specifications for your home country.



### Important

- The electrical specifications of your home country must meet the electrical specifications printed onto the back panel.
- The PAM G2 is a Class I unit and must be earthed. Please ensure a stable earth connection. Phase ('hot' pin) is marked on the back panel ("**PHASE**") **10**
- Never pull the mains plug while the PAM G2 is switched on! Before you pull the mains cord off the socket, power down the unit to stand-by mode.

Only in cases of extended absence (like vacations) or if massive trouble on the mains power is to be expected you should remove the PAM G2 from the mains. To disconnect the unit completely from mains pull the mains plug.



### Note

- Using high-quality mains cords as the Audionet P10, may improve the sound quality. Please consult your local Audionet dealer.

## 4.3 External power supply EPS

In order to use the optional external precision power supply Audionet EPS (Enhanced Power Supply) with you PAM G2 please proceed as follows:

1. Make sure both PAM G2 and EPS are switched off and disconnected from the mains.
2. Connect the EPS with the included cable to input jack **EPS 5** on the back panel of the PAM G2. The shape of the plug prevents any wrong polarity. Now screw the ring of the plug onto the EPS input jack **5**
3. Connect only the EPS to the mains.
4. First, switch on the EPS on its back panel.

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\* see numbers in section 'Overview back panel' on page 8.

5. Use the **power** key on the front panel to switch on the PAM G2. The PAM G2 is now ready to use and gets its power from the external power supply EPS.
6. To switch off the PAM G2 into stand-by mode, use the **power** key on the front panel



### **Important**

- Use only EPS G2 devices (with serial number 12.21.10 or higher) if your PAM G2 is powered by the optional external power supply. Noncompliance may cause damage to both units.



### **Tip**

- Place the external power supply EPS to the right or at least 20 cm above/below of the PAM G2. Increasing the distance of both units, will minimize the influence of the mains transformers in the EPS.
- Use a high quality cable (for example the Audionet P10) to connect the EPS to mains. The sound will improve.



### **Important**

- Never switch on or off the EPS on its back panel while the PAM G2 is operating.
- For further information referring to the external power supply EPS please consult its user's manual.

## 5 Inputs and outputs



### Important

- **During connecting and removing of turntables or preamplifiers to the PAM G2 all units of your audio system have to be switched off to prevent damage of the PAM G2 or any of the other connected units.**
- **Please make sure that all cables are in absolute best conditions! Broken shields or short-cut cables could damage the PAM G2 and/or any other connected unit.**

### 5.1 Inputs

The PAM G2 has two stereo line inputs **1** and **3** to connect two pick-up arms or turntables. The maximal adjustable input capacity is 420 pF and the minimal adjustable input resistance is 100 Ω. If other values are needed to meet the electrical characteristic of the pick up, the RCA sockets C/R EXT. **15** and **16** can be used to add external resistors or capacitors (see section "*Further adjustments*" on page 17).

The gold plated screws (GND) **2** are for connecting the turntable grounds.



### Note

- The PAM G2 is optionally available with one or two input channels. Depending on the model, one or two pick-up arms or turntables can be connected.

### 5.2 Outputs

The PAM G2 is equipped with one RCA output **LINE 4** as well as one balanced (XLR) output **BALANCED 14** for the left and right channel to connect the unit to your preamplifier.

Use the RCA output **LINE 4** to connect the PAM G2 to your preamplifier using high quality interconnectors (e.g. Audionet C100). Alternatively, you may connect the preamplifier using the balanced (XLR) outputs **BALANCED 14** in case your preamplifier does not support RCA (line) inputs.

## 6 Usage

### 6.1 Powering up

First of all, please make sure your PAM G2 is connected correctly to your turntable, preamplifier and mains (see section "*Installation and power supply*" on page 9 and section "*Inputs and outputs*" on page 12).

The PAM G2 is a stand-by unit. As soon as the amplifier is connected to the mains, the unit is in stand-by mode

Only in cases of extended absence (like vacations) or if massive trouble on the mains power is to be expected it is recommended to disconnect the PAM G2 from mains.



#### Important

- **Never pull the mains cord while the PAM G2 is switched on! Before you pull the mains plug, power down the unit to stand-by mode first.**

### 6.2 Switching on/off

To power up the PAM G2 from stand-by mode, press the **power** key on the front panel. Now the PAM G2 is in normal operating mode.

If you would like to switch off the unit, please press the **power** key on the front panel.

### 6.3 Control elements on the front panel

The front panel has two keys to control the PAM G2 (see section "*Overview front panel*" on page 7).

<b>power</b>	Use this key to switch on/off the unit.
<b>input</b>	Push this key to select the input channel.



#### Important

- If your PAM G2 is equipped with only one channel, the **input** key is disabled and channel switching is not possible. In this case, only **Input 1** is available.

## 6.4 Mains phase detection

The correct polarization of mains is important for reasons of audio clarity and stability. Please connect the mains cord that the 'hot' pin of the wall outlet is connected to the pin marked 'phase' [10] of the mains input [9] on the back panel. The PAM G2 recognizes the incorrect polarization of the mains plug automatically. After pressing the **power** key, the two LEDs on the front panel will flash in different rhythms:

- If the polarization is correct, the LEDs flash slowly: ⊗\_\_⊗\_\_⊗ ...
- If you see the LEDs flashing rapidly: ⊗\_⊗\_⊗\_⊗\_⊗... please switch off the unit and flip the mains plug. If you now switch on the PAM G2 again, the unit should show the correct mains polarization by a slowly flashing LEDs.



### Important

- If the PAM G2 issues the mains polarization warning or no warning at all for both positions of the mains plug, check the connection to earth of your mains socket and mains cord. **You have to ensure a stable connection to earth for the mains phase detection of the PAM G2 to work correctly!**

## 6.5 Input selection

Push the **input** key on the front (see section "*Overview front panel*" on page 7) to select the desired input channel. Depending on the selected input channel, the corresponding LED on the front panel is activated.



### Important

- If your PAM G2 is equipped with only one channel, the **input** key is disabled and channel switching is not possible. In this case, only **Input 1** is available.

## 7 Settings

### 7.1 Matching the pick-up's electrical characteristic

At the back of the PAM G2 (see section: "Overview back panel" on page 8) are six rotary switches for the basic configuration of both input channels. The lower row is for the configuration of input 1, the upper row is for the configuration of input 2.

The next section covers the configuration of input 1, the setup of input 2 is the same with the rotary switch in the upper row.

With the rotary switch labelled **Gain (dB)** 6 the gain of input 1 is selected to 38 dB, 48 dB, 58 dB or 68 dB.



#### Important

- Excessive gain could lead to overdrive and distortion!

Set the gain so that the output voltage of the PAM G2  $U_{\text{PAMG2}}$  is approx. 1...1.5 V. With a given pick-up voltage  $U_{\text{pick-up}}$  the gain calculates to:

$$\frac{U_{\text{PAMG2}}}{U_{\text{pickup}}} = \text{gain} .$$

Refer to the following table to get the gain in dB from the calculated gain factor:

<b>Gain in dB</b>	38	48	58	68
<b>Gain factor</b>	80	250	800	2500

#### Example:

Output voltage:  $U_{\text{PAMG2}} = 1.2 \text{ V}$

Pick-up voltage:  $U_{\text{pick-up}} = 1.5 \text{ mV}$

Gain:  $\frac{1.2\text{V}}{1.5\text{mV}} = 800 \Rightarrow$  set the PAM G2 to 58 dB

The rotary switch **R ( $\Omega$ )** 7 in the middle is used to set up the input resistance of input 1, which acts as terminating resistance of the pick-up. Please select this value carefully; it will affect high frequency response.

With the third rotary switch **C (pF)** 8 the input capacitance of input 1 can be set. This setting is critical for MM systems only.



### Note

- If other values are needed to adjust the electrical characteristic of the pick up, the RCA inputs C/R EXT. [15] and [16] can be used to add external resistors or capacitors (see section "*Further adjustments*" on page 17).



### Tip

- On our website [www.audionet.de](http://www.audionet.de) you will find an online tool to calculate the optimum settings of the PAM G2 for your pick-up.
- If you have the specifications of your pick-up not available, you will probably find the technical data at the following website: [www.vinylengine.com/cartridge\\_database.php](http://www.vinylengine.com/cartridge_database.php)

## 7.1.1 MM Systems

For MM pick-up systems set the gain to 38 dB. For the settings of input resistance and capacitance please refer to the recommendations of the manufacturer of your pick-up.

In case you have no recommendations from the manufacturer for input resistance and capacitance we recommend the values 47 k $\Omega$  and 200 pF. These settings offer suitable conditions for most MM pick-up systems.

## 7.1.2 MC Systems

MC pick-up systems cover a great range of different output levels. To achieve an output matching the level of your other sources, the PAM G2 offers 4 gain settings:

For pick-ups with a 'normal' output level (approx. 1...2 mV output voltage) set the **Gain (dB)** [6] to 58 dB. For high output pick-ups (3...5 mV) position 48 dB is better suited. In case you have a low output pick-up (<0.8 mV) set the gain to 68 dB. In case of doubt assume your pick-up working at a 'normal' output level.

For MC pick-up systems the input capacitance should be set to 100 pF. Select the input resistance recommended by the manufacturer or, if the information is not available, select position 100  $\Omega$ .



### 7.1.3 Typical setups

The following table outlines typical setups for miscellaneous pick-up systems:

System	Output voltage	Gain	Input resistance	Input capacitance
Low Output MC	< 0.6 mV	68 dB	100 $\Omega$	110 pF
MC High Output MC	~ 1...2 mV ~ 3...5 mV	58 dB 48 dB	100...470 $\Omega$	110 pF
MM	~ 4...6 mV	48 dB	47...68 k $\Omega$	160...220 pF
High Output MM	> 6 mV	38 dB	47...68 k $\Omega$	160...220 pF



#### Important

- **For optimum adjustment to your pick-up follow the recommendations of the manufacturer!** If necessary ask your dealer.

## 7.2 Factory defaults

Upon delivery of the PAM G2 following settings are configured by default:

Gain	38 dB
Input resistance	47 k $\Omega$
Input capacitance	200 pF

This configuration is suitable for most MM pick-up systems.

## 7.3 Further adjustments

### 7.3.1 Adjusting the input capacity

If the selectable capacity of  $C_0 = 420$  pF is not enough or the required capacity can not be selected, use an external capacitor to get the required value. Connect an additional high quality capacitor  $C_{\text{ext}}$  can be connected to the input C/R EXT. 15 and 16 using a RCA plug to increase the input capacity. In this case the capacities are added together.

**Example:**

If a capacity of  $C = 500 \text{ pF}$  is needed, select the base capacity of  $C_0 = 420 \text{ pF}$  with the rotary switch on the back panel. Then add an additional capacitor of  $C_{\text{EXT.}} = 82 \text{ pF}$  to the input C/R EXT. 15 or 16 to get the required input capacity of  $500 \text{ pF}$ .

**Note**

In the above example the arithmetically resulting value of  $80 \text{ pF}$  was replaced with the suitable capacitor of  $82 \text{ pF}$  from commonly available standard E12 series.

**7.3.2 Resistance reduction**

If the required input resistance is less than the minimum selectable base resistance of  $R_0 = 100 \Omega$  or the needed resistance value is not available, use an external resistor to get the required value. Connect an additional high quality resistor  $R_{\text{ext}}$  to the input C/R EXT. 15 and 16 using a RCA plug to reduce the input resistance. Attention! The reciprocal values of the resistors are added, so the input resistance is reduced!

$$R = \frac{R_0 * R_{\text{ext}}}{R_0 + R_{\text{ext}}} \Rightarrow R_{\text{ext}} = \frac{1}{\frac{1}{R} - \frac{1}{R_0}}$$

**Example 1:**

If a resistance of  $R = 33 \Omega$  is needed; choose the base resistance to  $R_0 = 100 \Omega$ , and add external resistor of  $R_{\text{ext}} = 50 \Omega$ .

$$R_{\text{ext}} = \frac{1}{\frac{1}{33} - \frac{1}{100}} \Omega = 50 \Omega$$

**Example 2:**

If a resistance of  $R = 200 \Omega$  is needed; choose the base resistance to  $R_0 = 330 \Omega$ , and add external resistor of  $R_{\text{ext}} = 510 \Omega$ .

$$R_{\text{ext}} = \frac{1}{\frac{1}{200} - \frac{1}{330}} \Omega = 510 \Omega$$

## **8 Technical information**

### ***8.1 Design***

The construction is optimized magnetically and capacitatively. The signal paths have absolute minimum lengths with no harmful components like coupling capacitors, coils or relays. Input and output circuits are immune to negative influences of connected devices. Consequently, SMD miniature technology ensures optimized high frequency properties.

Gain and RIAA de-emphasis are carried out simultaneously in two stages. The operational amplifiers in the signal path are built up as discrete and optimized elements; they have a gain-bandwidth product of 1 GHz. The output operational amplifiers work in class "A" mode with a high bias current.

### ***8.2 Power supply***

All voltages are delivered by a 100 VA toroid core transformer and fast, impulse-stable audio high-current capacitors with a total capacity of 40,000 uF. The voltages are stabilized by 14 discrete and optimized MOS regulators.

### ***8.3 Circuitry***

Every operational amplifier is supplied by two fast, discrete voltage regulators. The amplification and input stages are switched by gold-coated precision relays. Special input impedances can be set individually.

## 9 Security advice



### Important

- Use only EPS G2 devices (with serial number 12.21.10 or higher) if your PAM G2 is powered by the optional external power supply. Noncompliance may cause damage to both units.
- Avoid packaging material, especially plastic bags, coming into children's hands!
- Store and operate the unit in a dry room at a reasonable room temperature only!
- Avoid moisture, any liquids, dirt or small objects getting into the unit!
- Set up the unit in a sufficiently ventilated environment!
- Do not cover the unit!
- Do not open the unit. Unauthorised opening will void warranty!
- Do not short-circuit the outputs!
- During connecting or removing the PAM G2 to/from sources and/or power amplifiers all units have to be switched off to prevent damage of the PAM G2 or any of the other connected units.
- Use dry cloth for cleaning!

## 10 Technical data

<b>Function</b>	Phono preamplifier
<b>Frequency response</b>	40 – 30.000 Hz (+/- 0.2 dB) 18 – 80.000 Hz (+/- 1.0 dB)
<b>Subsonic filter</b>	4 <sup>nd</sup> order high pass fg = 8 Hz
<b>Gain</b>	38 dB, 48 dB, 58 dB, 68 dB (@ 1 kHz)
<b>SNR</b>	< -103 dB @ 1 kHz (Gain = 38 dB) < -83 dB @ 1 kHz (Gain = 58 dB)
<b>Inputs</b>	2 pair WBT RCA jacks, gold plated 2 pair WBT RCA jackss, gold plated, for additional impedance adjustment
<b>Input impedance</b>	selectable at the rear
<b>Output</b>	1 pair WBT-NextGen line, gold plated 1 pair XLR (Neutrik) , gold plated
<b>Output impedance</b>	24 Ω real (RCA) 94 Ω real (XLR)
<b>Mains</b>	220..240 V or 110..120 V, 50..60 Hz
<b>Power consumption</b>	Stand-by < 0.5 W, max. 40 Watt
<b>Dimensions</b>	Width: 430 mm Height: 70 mm Depth: 310 mm
<b>Weight</b>	9 kg
<b>Finish</b>	<b>Front</b> : brushed aluminium, black anodised, white print or aluminium 'nature', anodised, black print <b>Top cover</b> : brushed aluminium, black anodised <b>Chassis</b> : steel, black coated, 2 mm

<b>Features</b>	<ul style="list-style-type: none"> <li>- individual adjustment to any pick-up without opening</li> <li>- active dual stage RIAA de-emphasis</li> <li>- no integrated operational amplifiers or capacitors in signal path</li> <li>- 14 fast, purely discrete realized MOS voltage regulators providing accumulator-like characteristics of power supply</li> <li>- 100 VA toroid transformer, shielded, 40.000 <math>\mu</math>F capacity</li> <li>- Class A output stage</li> <li>- DC-free outputs</li> <li>- FET inputs, no bias current</li> </ul>
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Errors and omissions excepted. Specifications and design are subject to changes without prior notice.

# AUDIONET

audionet GmbH

Brunsbütteler Damm 140 B

13581 Berlin, Germany

[www.audionet.de](http://www.audionet.de)

[kontakt@audionet.de](mailto:kontakt@audionet.de)

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