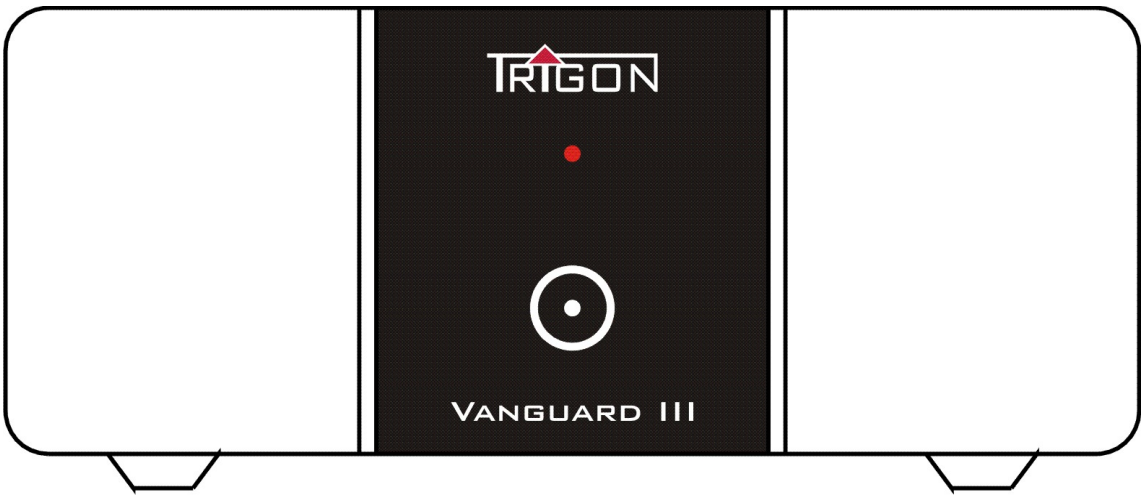
TRIGON
ELEKTRONIK GMBH

OPERATING INSTRUCTIONS

FOR PHONO PREAMPLIFIER

Vanguard III



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Analogic

Even more than two decades ago, so the propagandists of the new medium Compact Disc wanted it, the record had retired. The number of sold records removed from year to year, those of the CD's increased, until apparently now eternally of yesterday ones and the nostalgic people at unexplainable expenditure maintained and supplemented their record collections and had still no CD player. Yes, in addition maintained they their record player makes more music... and harvested a pitiful smile.

But parallel to this development remarkable happens - and the smiled at record lover and convinced analogue fan formulated not without sneers:
"The claiming already in the year 1980 perfect CD player is constantly improved and to the yardstick of this striving the music rendition becomes similar good analogue record player but not only this. At public demonstrations once CDs were thrown in the surprised public for the demonstration of the insensitivity by Compact Discs then today the realization made itself broad that they want to be treated just as carefully as records, even more, demagnetised, frozen, painted or ground and with coatings provides to sound only correct to be supposed. A similarity or an agreement with living disk washing machines, pucks, disk platelayers and needle cleaners is purely coincidental and not intended.
If the first CD Player made music apparently still in each situation in life and on each underground perfectly, then its descendants received beside constantly improved digital/analogue transducers always more complex housings, damping and, a beggar who thinks bad thereby, sub chassis drives or belt drives.
Almost exorbitantly expensive CD drive assemblies with separate digital/analogue transducers recruit for itself with the statement, now, finally, in such a way to sound like the best record players. But the uneasiness, which in-crept in things CD in the course of the years, seems remained. New digital formats, like SACD and DVD, urge on the market and are to now reach, what was already promised twenty years ago: "SACD has a transmission range as large up to 64 times as the CD. Thus results a refinement of the signal, which corresponds to analogue technique. (dpa/dwe, 14.11.2001)

We consider the evaluation of memory procedures, which work with data reduction, before this background simply renounce able**.** Rational at this newest stage of the development of digital music storage media, which increases not the transmission range, but the scanning rate, is the insight that people had underestimated substantially the quantity and quality of musical information from the record groove, once again the new wasn't even the. In the age of the permanent announcement of technical sensations and revolutions we form an analogy: High End Audio won't invent each month again. Persistent, consistent advancement **and** innovation in smaller and larger steps, which is relevant before the introduction on the market, define High End for us at the last state of things.

What now? Sell all CDs as once unfortunately, the record collection? Perhaps the view continues to help that tone carriers and their artful packing are more than only technical, exchangeable canned goods. The speech is about cultural properties and time documents, which are not to be excluded straight from the individual Biography. In this regard the record already furnished the proof of their, also technical, longevity as canned goods, that of the CD isn't done yet. There it is nevertheless reassuring that in the year 2001 the number of the sold records doubled itself to more than in relation to the previous year. (dpa/dwe, 14.11.2001).

The latter makes at the same time hope for a further creative next to each other, which we, apart from the conservative aspect, agree with. Because like the attempt of the CD to be finally records heir had lead to ever better CD-players, without which already in view of the existing software only few can to do and want seriously, then the competition of the new medium has the similar record rendering again accelerated and on, at the gloss times of the old tone carrier,

a probably non-existing level elevated. Never before there were as good drive assemblies, tone arms and pick-up systems as today. Oh, and phono amplifiers with which we would be finite with the topic.

How little has to do the complex task of an equalizer pre amplifier with pure opinion, you'll be told in the next chapter. Who doesn't want to know it so exactly **first**, may skip this chapter, but only this, to find out, how the Vanguard III wants to be up and adjusted, attached, served and treated, thereby it can helps to transform the high-quality, but sensitive phono signals of your records in the best possible way into music and to thank you itself in our name for your investment.

Little phono technology and technical description of the Vanguard III

With the Vanguard III concerns it a phono pre amplifier for the equalization and reinforcement of signal voltage coming from a record player.

Signal voltage coming from a pick-up system is unfortunately not as with CD-players or other audio devices over the shown frequency range linear, but contained with 20 cycles per second approx. 1000 time smaller signal than with 20 kHz. Without equalization the music would therefore sound itself extremely full of high tones.
The task of the phono amplifier or better said the equalizer pre amplifier is it now to produce a linear audio signal from this bent rendition characteristic, i.e. with all shown frequencies equivalent loud.
Thus however not enough, the signals of the pick-up systems are also still very weak (or quietly), so that a relatively high reinforcement is needed to raise the audio signal to the level, which is usually available with all other audio sources (except microphones). With MC pick-ups the task of the equalizer pre amplifier is more fastidious, because the output voltage of these systems is usually lower even again around the factor 10 (i.e. 20dB) than with MM pick-ups.
Furthermore the different pick-up systems need also another appropriate feed impedance, which can be adapted individually for each pick-up, to be able to unfold their qualities complete.
The demands, which are made against a phono amplifier, therefore are:

1. Exact equalization of the input signal
2. High, adjustable reinforcement
3. Individual adjustment of the feed impedance

The first task, **exact equalization of the input signal,** can be mastered only if you uses highly exact construction units in the equalizer part of the phono amplifier. Therefore we measure each construction unit for this stage with highly precise measuring instruments. The values of the assigned construction units are selected here on a deviation from less than 1%! Identical pairs of construction units are always formed for the two stereo channels, to exclude channel inequalities. In this way the Vanguard III produces an almost perfectly linear output voltage.

The second task, **high, adjustable reinforcement,** represents a problem of completely different kind. High reinforcement of the information signal means at the same time also high reinforcement of spurious signals. The main spurious signal is thereby the noise. This problem can be solved only satisfyingly with very efficient and at the same time low-noise amplifier stages. In the Vanguard III we use highly exact operation amplifiers, which besides exhibit extremely small distortion values.

The other spurious signal, which leads to problems in phono amplifiers again and again, is the so-called humming. This humming has usually three causes: Stray effect through nearby mains transformers, *careless* supply voltage and incorrect printed circuit board design.
Over to avoid the stray effects by the mains transformer the power pack of the Advance is accommodated in a separate housing and so it can be set up in some distance to the set.

The printed circuit board design is characterised among other things by a special star shaped arrangement of the pig pus courses, so that humming signals cannot disturb the sensitive amplifier stages.

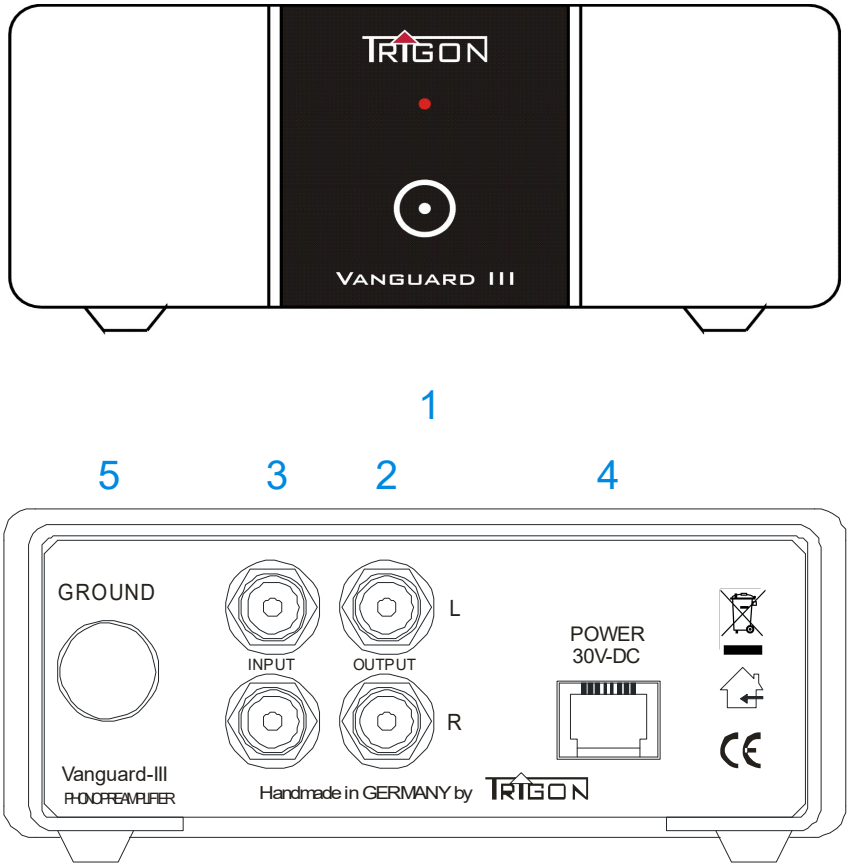
The reinforcement can be adjusted individually in 16 stages by small mini switches, which are attached on the lower surface of the set. With the help of that table indicated far down you could make the correct attitude for the respective pick-up system there.

The third task, **individual adjustment of the feed impedance**, can be settled with the Vanguard III by a mini switch on the lower surface of the set. Here are six different adjustment resistances and this means 64 combinations are for the adjustment of one MC pick-up and 2 capacities, so there are four combinations for the adjustment of a MM pick-up at the disposal. Information about all combinations gives a table indicated far down.
You recognize already by the larger number of possibilities of adaptation of a MC pick-up that the Vanguard III treats MC pick-ups preferentially. The reason lies in the fact that the majority of the offered High-end pick-up systems are nowadays of the type MC.

Because the Vanguard III is a separate phono amplifier that is connected with the pre- rather full amplifier via link cable, there are also placed high requirements to the output stages of the amplifier. Here we have decided us for an output stage, which makes a sufficiently small output resistance available, so that also cables of more than 2m lengths can be attached. This makes it possible to set up the Vanguard III in direct proximity of the record player and to keep so the cable length between record players and Vanguard III very small. This is of importance, because short cables can minimize transducer losses and offer at the same time external influences less attack region, so that the anyway very susceptible, low signal of the pick-up is impaired as little as possible.

The operation and wiring

In the picture down is shown the front and the back of the Vanguard III.



1. Operating key and control lamps

With a touch at the circle **(1)** the Vanguard III can be switched on and/or off. The red indicator LED over the circle signals the operating status.

2. Line OUT

The output signal rests against these sockets. Connect this exit with a high level or a line entrance of your pre and/or full amplifier. Prevalent are such entrances designated with AUX. But generally you could use the CD- or TAPE-entrance of the pre and/or full amplifier, too.

3. Line IN

At these sockets the record player (pick-up) will be attached. With the mini switches at the ground the feed impedance can be indicated adjusted, like shown in the table 1.

4. Power pack entrance socket

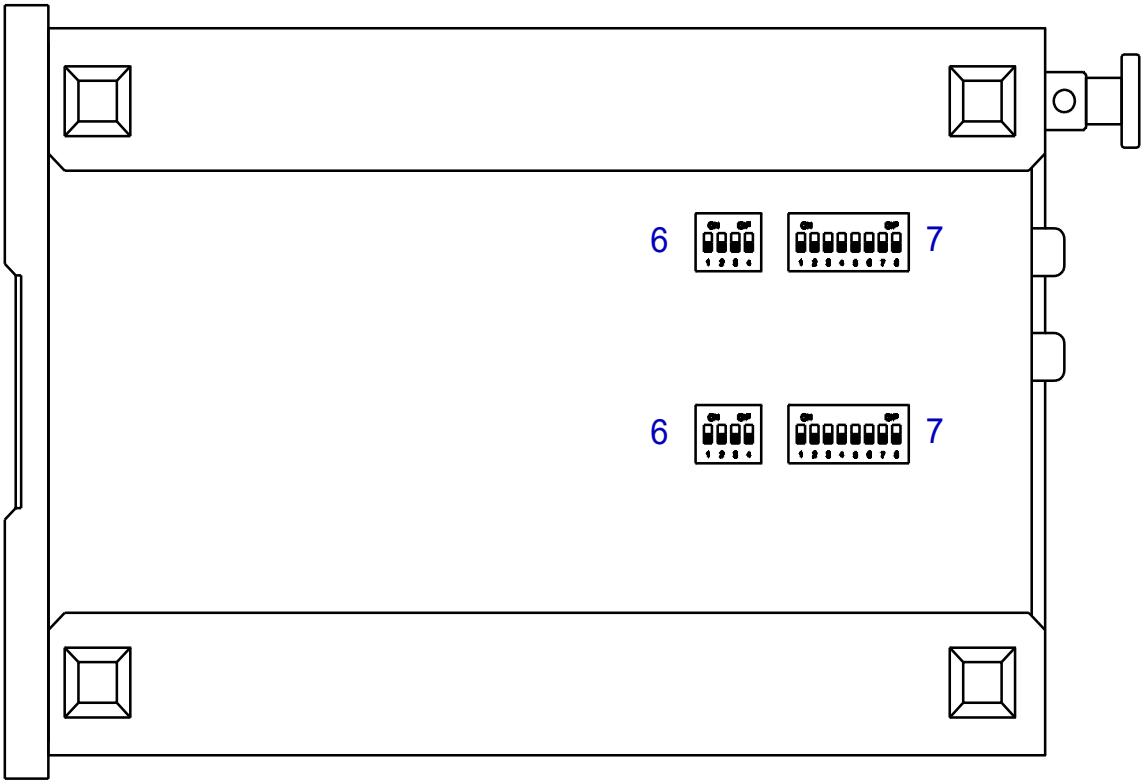
To this socket the ground power pack belonging to the scope of supply is attached. **Make first the connection between power pack and Vanguard III, before you connect the**

power pack with the lighting system. Thus it is guaranteed that it comes to no inadvertent short-circuits at the exit of the power pack.

5. Ground (ground terminal)

At this clamp the grounding- rather earth-cable, which is usually led out separately at record players, is attached. In most cases is at these grounding electrodes a fork-putting shoe. To be able to attach this *fork*, you untwist the knurled thumbscrew of the ground terminal a little and wedge then the *fork* through closing the knurled thumbscrew.
Simple stripped cable ends can be also attached by solving, after that they were put into the lateral drilling of the knurled thumbscrew and then likewise again with the knurled thumbscrew clamped.

Subsequent is the view of the ground of the Vanguard III with the channel separated mini switches for the reinforcement **(6)** and the feed impedance adjustment **(7)** illustrated.



6. Mini switch for the gain setting

With these switches for each channel the reinforcement is adjusted separately. For the attitude you use the following table as guideline assistance.

Table of the switching positions for the gain setting.

With the four-fold mini switch for each stereo channel on the lower surface of the Vanguard III the reinforcement can be adjusted separated. As this table shows, the reinforcement between 42 dB and 66.3 dB can be adjusted in 16 stages.

Reinforcement table for VANGUARD III

S4	S3	S2	S1	Reinforcement in dB	For systems with the following output voltages
0	0	0	0	42	4mV
0	0	0	1	47.5	2.2mV
0	0	1	0	51.3	1.4mV
0	0	1	1	53.6	1.1mV
0	1	0	0	55	0,89mV
0	1	0	1	56.5	0,75mV
0	1	1	0	58.1	0,63mV
0	1	1	1	59.2	0,55mV
1	0	0	0	62.2	0,39mV
1	0	0	1	63	0,36mV
1	0	1	0	63.8	0.33mV
1	0	1	1	64.3	0.31mV
1	1	0	0	64.8	0.29mV
1	1	0	1	65.3	0.27mV
1	1	1	0	65.8	0.26mV
1	1	1	1	66.3	0,24mV

A 1 means: Switch placed on position ON
A 0 means: Switch not switched

If you do not find the exact value of the output voltage of your pick-up in this table, you could select the value, which comes next to your pick-up.

You reach in each case with the in the preceding table given attitudes a DIN-Output voltage of 500 mV. It's depended from the entrance sensitivity and reinforcement of your pre or full amplifier you need often only a clearly smaller output voltage to achieve the desired hearing volume. You should experiment in this regard because a lower reinforcement can be tonal more favourable.

Louder systems (output voltage more largely 8 mV) can be naturally also attached, however thereby the over-regulation reserve is reduced, i.e. it can come to the over-regulation of the amplifier, which expresses itself by higher distortions.
Quieter pick-ups (output voltage of small 0.24 mV) can be operated accordingly problem-free.

Frequently, pick-up manufacturer indicates the output voltage of their systems in the e.g. following way.

Output voltage = 1.2mV with 4.36 cm/s

The standardized output voltage refers usually however to a reference fast of 5.6 cm/s. In our case therefore the output voltage results to:

$$Outputvoltage = \frac{1.2mV}{4.36cm/s} * 5.6cm/s$$

Thus results an output voltage of approx. 1.54 mV, i.e. the reinforcement you should set the mini switch 2 to ON.

7. Mini switch for the feed impedance

These switches are adjusted separately for each channel the feed impedance. For the attitude you use the following tables 1.1 and 1.2 as guideline assistance.

Table 1.1 of the switching positions for the entrance capacity

Adjustment capacities can be connected to magnetic systems by depressing the switches S1 and S2. S3 to S8 are switched off with MM systems, because MM systems are usually operated at input impedance by 47KOhm.

S1	S2	S3	S4	S5	S6	S7	S8	Entrance capacity	Input impedance in ohm
0	1	0	0	0	0	0	0	100pF	47000,0
1	0	0	0	0	0	0	0	220pF	47000,0
1	1	0	0	0	0	0	0	320pF	47000,0

A 1 means: Switch placed on position ON
A 0 means: Switch not switched

The entrance capacity without connected capacity amounts to approx. 60 - 100pF with the Vanguard III.
Each capacity, which is connected, must be added to this entrance capacity. The cable capacitance of the cable connections between record players and preamplifiers must be added, too. Furthermore the cable capacitance of the cable in the tone arm pipe adds itself. In this way do values of more than 200pF - 300pF often already come without auxiliary capacities.
To be noted it should, however, that deviations by the pick-up manufacturer recommended of the adjustment capacity, in the order of magnitude of 20 - 30 % are acceptable, since during the production of pick-ups frequently similar tolerances develop.

Table 1.2 of the switching positions for the input impedances

100pF	220pF	1800	1000	470	220	100	47		
S1	S2	S3	S4	S5	S6	S7	S8		Input impedance computed in ohms
0	0	0	0	0	0	0	0		47000,0
0	0	1	0	0	0	0	0		1733,6
0	0	0	1	0	0	0	0		979,2
0	0	1	1	0	0	0	0		634,2
0	0	0	0	1	0	0	0		465,3
0	0	1	0	1	0	0	0		369,8
0	0	0	1	1	0	0	0		317,6
0	0	1	1	1	0	0	0		269,9
0	0	0	0	0	1	0	0		219,0
0	0	1	0	0	1	0	0		195,2
0	0	0	1	0	1	0	0		179,6
0	0	1	1	0	1	0	0		163,3
0	0	0	0	1	1	0	0		149,4
0	0	1	0	1	1	0	0		137,9
0	0	0	1	1	1	0	0		130,0
0	0	1	1	1	1	0	0		121,2
0	0	0	0	0	0	1	0		99,8
0	0	1	0	0	0	1	0		94,5
0	0	0	1	0	0	1	0		90,7
0	0	1	1	0	0	1	0		86,4
0	0	0	0	1	0	1	0		82,3
0	0	1	0	1	0	1	0		78,7
0	0	0	1	1	0	1	0		76,1
0	0	1	1	1	0	1	0		73,0
0	0	0	0	0	1	1	0		68,6
0	0	1	0	0	1	1	0		66,1
0	0	0	1	0	1	1	0		64,2
0	0	1	1	0	1	1	0		62,0
0	0	0	0	1	1	1	0		59,9
0	0	1	0	1	1	1	0		58,0
0	0	0	1	1	1	1	0		56,5
0	0	1	1	1	1	1	0		54,8
0	0	0	0	0	0	0	1		47,0
0	0	1	0	0	0	0	1		45,8
0	0	0	1	0	0	0	1		44,8
0	0	1	1	0	0	0	1		43,8
0	0	0	0	1	0	0	1		42,7
0	0	1	0	1	0	0	1		41,7
0	0	0	1	1	0	0	1		40,9
0	0	1	1	1	0	0	1		40,0
0	0	0	0	0	1	0	1		38,7
0	0	1	0	0	1	0	1		37,9
0	0	0	1	0	1	0	1		37,3
0	0	1	1	0	1	0	1		36,5
0	0	0	0	1	1	0	1		35,8
0	0	1	0	1	1	0	1		35,1
0	0	0	1	1	1	0	1		34,5
0	0	1	1	1	1	0	1		33,9
0	0	0	0	0	0	1	1		32,0
0	0	1	0	0	0	1	1		31,4
0	0	0	1	0	0	1	1		31,0
0	0	1	1	0	0	1	1		30,4
0	0	0	0	1	0	1	1		29,9
0	0	1	0	1	0	1	1		29,4
0	0	0	1	1	0	1	1		29,0
0	0	1	1	1	0	1	1		28,6
0	0	0	0	0	1	1	1		27,9
0	0	1	0	0	1	1	1		27,5
0	0	0	1	0	1	1	1		27,1
0	0	1	1	0	1	1	1		26,7
0	0	0	0	1	1	1	1		26,3
0	0	1	0	1	1	1	1		26,0
0	0	0	1	1	1	1	1		25,7
0	0	1	1	1	1	1	1		25,3

A 1 means: Switch placed on position ON
A 0 means: Switch not switched

Set-up recommendations

As well as almost all electronic devices the Vanguard III shouldn't be exposed to the direct sunlight, too. Because the set warms up a little when it is in operation, you should pay attention to sufficient circulating air.
A phono amplifier is a device with high signal reinforcement. Unfortunately such devices amplify also any spurious signals. One of these radiated spurious signals is the 50Hz-hum by the transformers. To keep this humming as small as possible, we accommodated the power transformer of the Vanguard III in a separate housing, so that you can set up this power transformer in some distance from the Vanguard III. Of course our efforts are useless if the Vanguard III is placed now on other sets with internal power transformers.

Therefore you mustn't to place the Vanguard III on other HiFi-sets. Pay attention to sufficient distance (at least 50 cm) to other mains transformers.

Particularly transformers of halogen light systems and power-output stages have a strong humming scattering field and should be therefore as far as possible from the Vanguard III.
A rule is: The more largely the mains transformers the more largely should be laid out the distance to phono amplifier.
Even mains cables or the net wiring in the wall are breakdown emitters. You receive the best results by sufficient distance to these *disturbers*.
According to our experiences an installation close to the record player is the best solution. So the critical cable connection between record players and Vanguard III can be kept short and spurious signals had only few chances to affect the low pick-up signal. At the same time short signal paths means always-smaller transducer losses, too, in particular with sensitive pick-up signals.

Care references

Never treat the set with a scrubbing means etc. Easy contamination such as dust and finger marks can be wiped off with a fog-damp cloth or sponge. Water-dilute-cash contamination (jam, fruit juices, etc.) could be eliminated with a liquid household cleaner, especially with glass cleaners. Mineral oils as well as animal and vegetable fats are wiped off with white spirits or Isoprophylalkohol. Always make sure that no cleaning fluid arrives in the set inside.
The ground power pack you should be cleaned only with a fog-damp clothe or sponge and somewhat with a liquid household cleaner. Please pull the mains plug from the wall socket before cleaning the ground power pack. Make also sure that no cleaning fluid arrives in the power pack inside.

Technical data:

Reinforcement	: 42 – 66 dB in 16 stages adjustable
input impedance	: from 25 ohm to 1800 ohm in 31 stages (see table)
	: without connected resistances 47KOhm
capacity	: Basic capacity = 60 – 100pF
	: insert able capacity = 100pF, 220pF, 320pF
entrance	: 1x Cinch
exit	: 1x Cinch
Distance of weighted noise voltage	: -73dB with 60dB reinforcement and
	: -95dB with 36dB reinforcement
frequency response	: + - 0,2 dB RIAA equalized
distortion factor THD + N	: 0,02%
Crosstalk attenuation	: -96 dBA with 10KHz
power input	: < 10VA
Dimensions h x w x d	: 55mm x 133mm x 192mm

Subject to change

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