



HEADPHONE AMPLIFIER

HPA V281



USERS MANUAL

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CAUTION !!

**THE HIGH OUTPUT LEVELS ACHIEVABLE
WITH THIS UNIT MAY
DAMAGE YOUR HEARING OR THE HEADPHONES
IF OPERATED CARELESSLY !!**

Cordial thanks for your decision in favour of a

VIOLECTRIC product !

VIOLECTRIC is a trademark and product line of Lake People electronic GmbH. Lake People electronic GmbH develops, manufactures and distributes products in the professional range, for broadcast, television, airports, exhibition halls, festival venues, theatres, large-scale installations, private studios and more. In the private sector as well, Lake People products become increasingly popular due to their outstanding quality.

The **VIOLECTRIC** trademark and product line is specially intended to supply the Hi-Fi and High-End market with its specific requirements.

Who develops **VIOLECTRIC equipment ?**

VIOLECTRIC devices are exclusively developed in Germany by the engineers of Lake People electronic GmbH. In doing so, the team of developers can draw on twenty years of experience and countless products for the pro-audio domain.

Among others, the first German-made 20-bit A/D and D/A converters were developed by Lake People in the early nineties of the past century.

Who manufactures **VIOLECTRIC equipment ?**

VIOLECTRIC devices are exclusively manufactured in Germany by Lake People electronic GmbH or contractors in the company's vicinity.

Lake People - and by association **VIOLECTRIC** - put high emphasis on domestic manufacturing. As well, all component suppliers are chosen in order to achieve the main part of added value inland.

How do **VIOLECTRIC** devices get to the customer ?

VIOLECTRIC devices can be obtained from respective specialist suppliers. If there is none such accessible regionally, the customer is supported by transregional distribution partners (google may help...) and, of course, by Lake People electronic GmbH themselves.

... and if it doesn't work like it should ?

VIOLECTRIC devices are covered by a 24-month warranty. In case of any malfunction during this period, they can be shipped to the manufacturer directly. Of course, the client will benefit from **VIOLECTRIC**'s and Lake People's full technical support even when warranty has expired. Any technical questions or need for advice is welcome.



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General Safety Instructions

WARNING

For your protection, please read the following:

Water, Liquids, Moisture:

This appliance should not be used near water or other sources of liquids. Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

Power Sources:

The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.

Grounding:


Care should be taken that this appliance is operated with proper grounding only.

Power Cord:

Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

This unit is equipped with a 3-pole mains cable with German 3-pin mains plug. In some countries this unit must be operated with a mains adaptor, supplied by the owner.

Please refer to the table below to connect a mains plug:

OVERVIEW: POWER CORD FUNCTION AND COLORS			
CONDUCTOR		COLOR	Alternativ
L	LIVE	BROWN	BLACK
N	NEUTRAL	BLUE	WHITE
E 	PROTECTIVE EARTH	GREEN+YELLOW	GREEN

U.K. Mains Plug Warning:

A moulded mains plug that has been cut off from the cord is unsafe. Discard the mains plug at a suitable disposal facility.

NEVER UNDER ANY CIRCUMSTANCES SHOULD YOU INSERT A DAMAGED OR CUT MAINS PLUG INTO A 13 AMP POWER SOCKET. Do not use the mains plug without the fuse cover in place. Replacement fuse covers can be obtained from your local retailer. Replacement fuses are 13 amps and **MUST** be ASTA approved to BS 1362.

Mains Fuse:

The mains fuse of this appliance is soldered in place and accessible from the inside only!!

A blown fuse may indicate an internal problem and should be replaced during qualified servicing or repair work !!

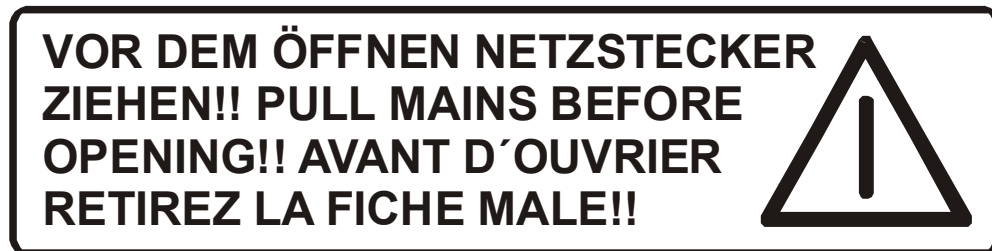
Switchable Power Supply:

Connect this unit to the power source indicated on the equipment rear panel only to ensure safe operation !!

This unit is provided with an internally settable mains supply for 115 / 230 V AC.

Service / Repair:

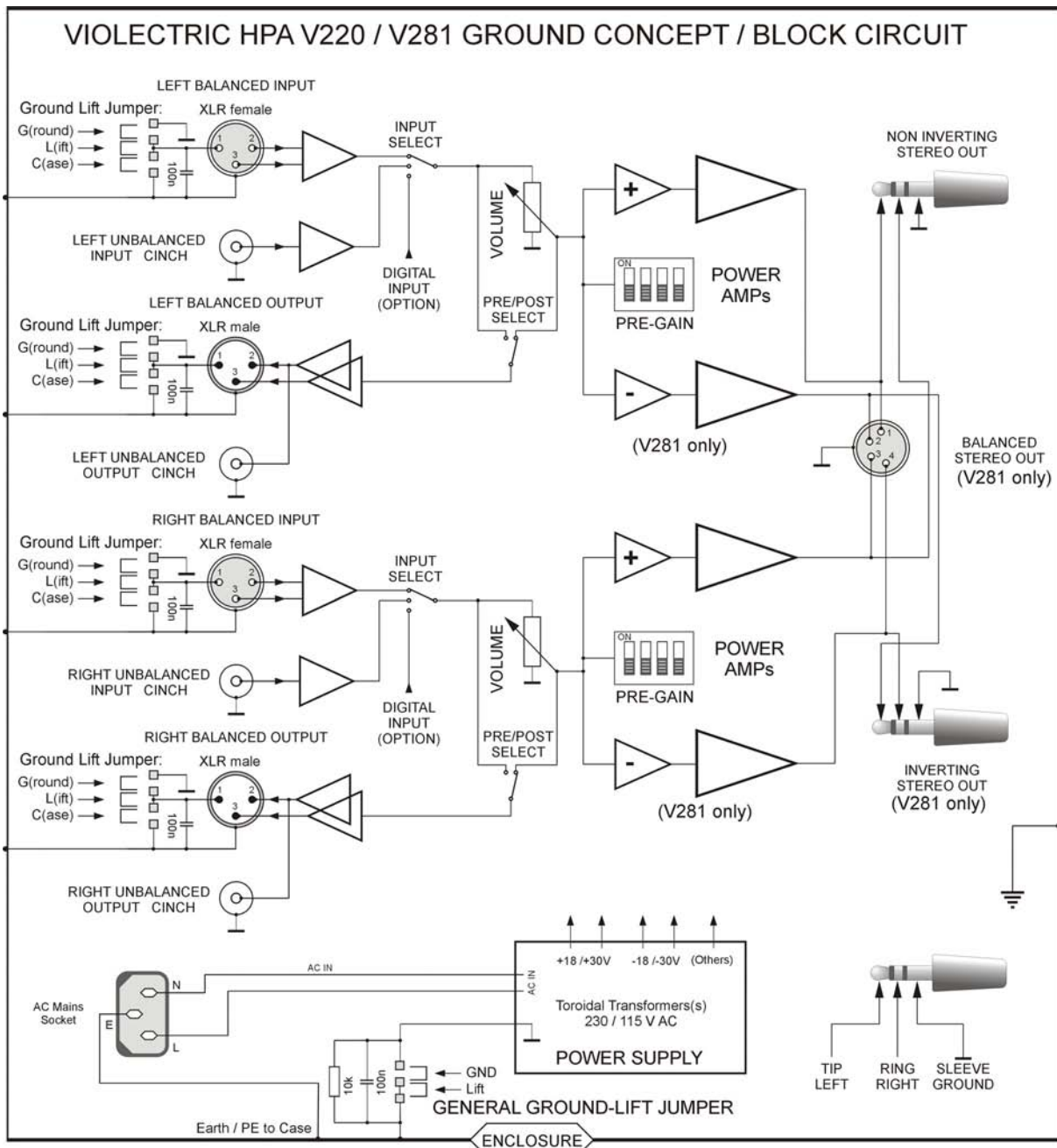
To reduce the risk of fire or electric shock, the user should not attempt to service the appliance beyond the measures described in the operating manual. All other servicing or repair should be referred to qualified personnel !!

**Electromagnetic Compatibility**

This unit conforms to the Product Specifications noted as **Declaration of Conformity** at the end of this manual. Operation is subject to the following conditions:

- this device may not cause harmful interferences
- this device must accept any interference received, including interference that may cause undesired operation
- this device must not be operated within significant electromagnetic field

The Earth / Grounding Concept



General GROUND-LIFT Jumper (accessible from the inside. Mind the SECURITY INSTRUCTIONS !!):

Ex-works this jumper is set to the **LIFT** position.

The internal ground potential is “lifted” by means of this jumper.

As a result, the interconnection for DC voltages and lower frequencies (< 150 Hz) will be cut. Higher frequencies will be bled off to earth potential through the RC filter. The LIFT position is helpful in case of

hum or jitter caused by different ground/earth potentials.

Of course full electrical protection is granted as the case is always connected to ground/earth potential !

See page 32 "Technical Appendix" for details.

Unfortunately there is no general recommendation how to solve hum and jitter problems - or even minimize them. The best way to succeed is to check different options !! In case of balanced cables, it should always been verified if the shield of the cable is connected to the shell of the XLR connector. The shell is ALWAYS connected to earth potential when the connector is inserted !!

Concerning ANALOG inputs and outputs, the relationship between ground and earth may be modified. Electrical safety is always ensured, since the earth conductor is permanently connected to the enclosure !!

XLR GROUD-LIFT Jumper (accessible from the inside.

Mind the SECURITY INSTRUCTIONS !!):

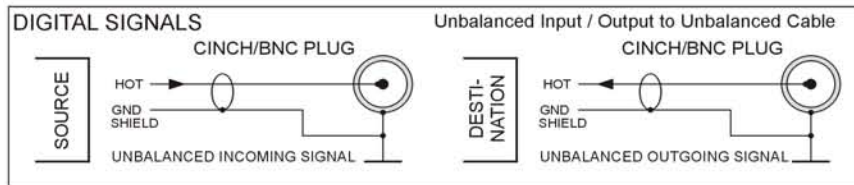
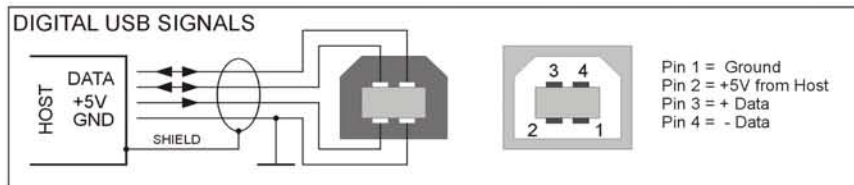
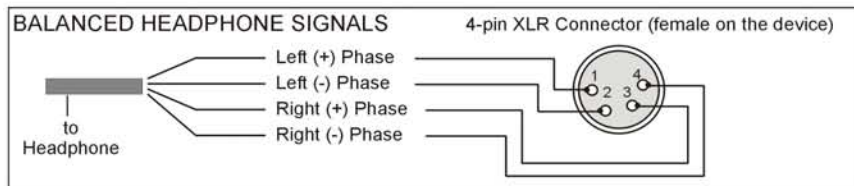
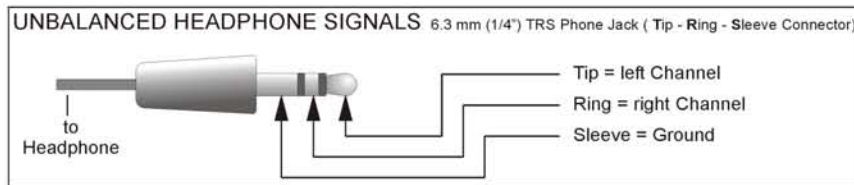
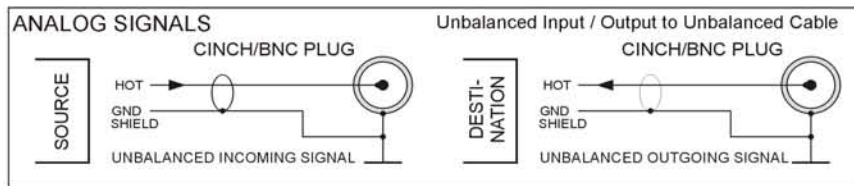
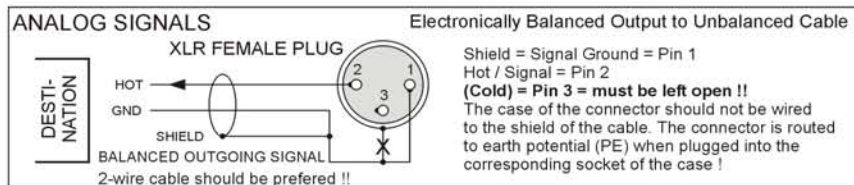
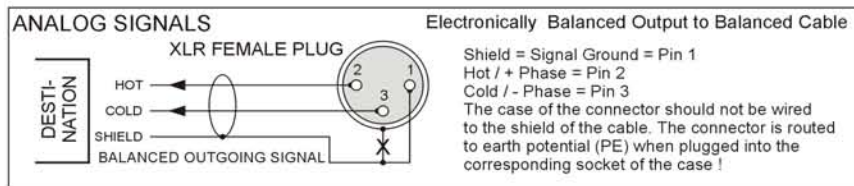
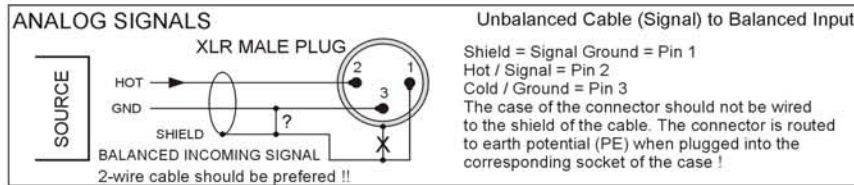
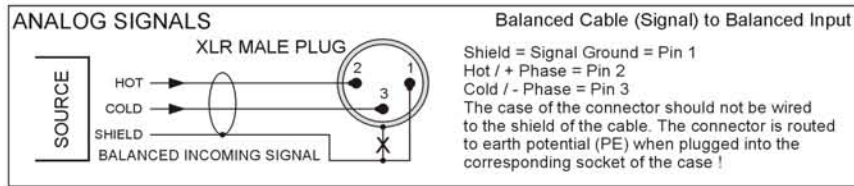
G(ROUND): Ex-works all jumpers are set to "G" (ground) position.
Pin 1 is connected to the internal ground reference.
High frequency interference is deflected to the case via a 100 nF capacitor.

L(IFT): The interconnection between Pin 1 and ground is open.
High frequency interference is deflected to the case via a 100 nF capacitor. This jumper position is specifically useful if the unit is equipped with transformers !!

C(ASE): Pin 1 is connected to the case, the 100 nF capacitor is bridged. This jumper position may be varied together with the **General GROUND-LIFT jumper**.

**Please note that with jumpers not in the ex-works position
EMC emission might occur,
for which the user is responsible only !**

Connection / Connectors for Analog Signals



GENERAL INFORMATION

The HPA V281 is a stereophonic headphone amplifier designed to drive low-, medium- and high-Z loads (16...600 ohms) as usually represented by high-quality headphones.

Because of its 4 built in amplifiers and the 4-pin XLR socket on the front it is also suited to connect balanced headphones.

Due to its specific, variable and low-noise and distortion circuit design especially optimised for dynamic headphones, the HPA V281 fulfils even highest demands.

Features:

- Balanced inputs with gold-plated Neutrik XLR connectors
- Unbalanced inputs with gold-plated premium RCA connectors
- **Digital input as an option, coaxial, optical, USB, up to 192 kHz**
- inputs selectable on the front panel
- **PRE-GAIN** = switchable input gain in five steps
- Balanced and unbalanced line outputs with RCA resp. XLR sockets, gold plated, pre-post fader assignable
- Independent-channel design
- ALPS RK27 High-Grade volume control
- **Remote controlled and motorized volume control, input/output selection, mute as an option**
- High-Quality op-amps in the signal path
- High-quality MKP capacitors in the signal path
- 0.1 and 1% metal film resistors throughout the unit
- **4 Discrete-design power amps with 8 transistors per channel**
- Output management: headphones active / line-out active / both active / none active (mute)
- 2 silver-plated Neutrik headphone outputs
- 1 4-pin XLR socket, gold plated for balanced headphones
- delayed relay-based headphone output cut-off
- 2 x Toroidal transformers, 25 + 15 W
- Large filtering capacitors in the power supply (36.000 uF)
- Switchable ground lift
- Rugged aluminium case with Nextel coating
- Solid, laser-engraved aluminium front panel

With its small dimensions, the HPA V281 ensures optimum flexibility combined with high output power. During design, high emphasis was put on operational safety even when the unit is operated inappropriately. The HPA V281 is equipped with internal filters to prevent damage to the connected headphones due to high-frequency overload beyond the audible range.

THE CASE

The HPA V281's case as well as the front / rear panels are made of solid aluminium. This choice of material ensures high mechanical stability and resistance.

EARTH AND GROUND

The HPA V281's case is grounded. Internal reference ground is set to "LIFT" position ex works but may be reconfigured to "GROUND" position if required. (see also: page 7 "Earth/Ground concept", page 32 "Technical Appendix").

POWER SUPPLY

Mains power is provided via a three-pin IEC/CEE socket and mating "cold-appliance" mains cord with Schuko-type plug for units purchased in middle Europe.

The device is set to 230V mains, whereas the actual voltage may vary between 190 and 240 volts for flawless operation.

The mains voltage may be altered to 115 V AC supply inside the unit with the aid of a mains voltage selector. In this case stable operation is granted in a range of 85 to 120 V (see page 32).

Two toroidal transformers with 15 and 25 Watt are providing the internal operating voltages of +/-30 V. Out of these voltages some more operating voltages are generated.

MAINS FUSE

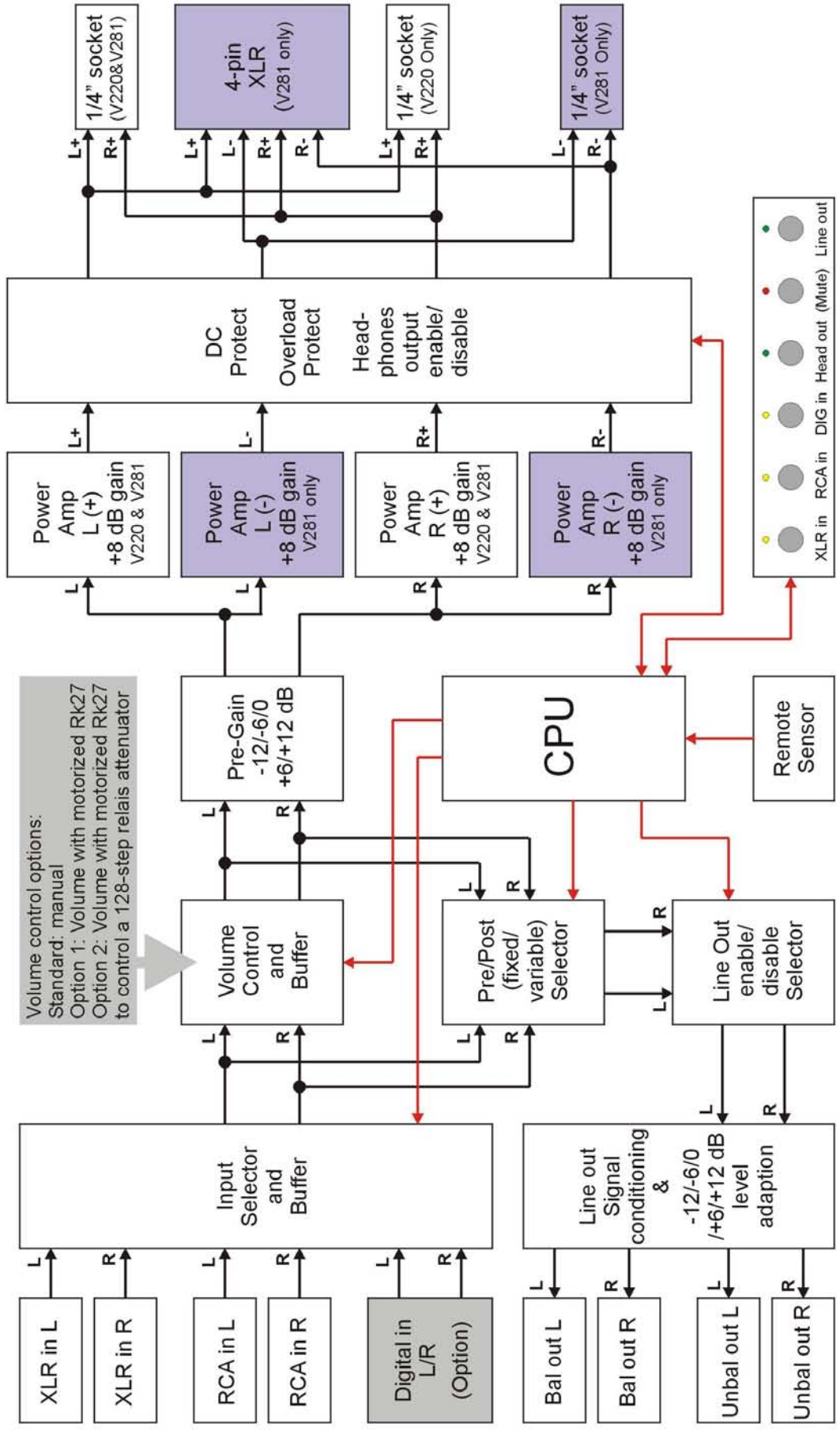
The 0.25A time-lag fuse is soldered in place on the circuit board. In case, it must be replaced with a fuse of the same type only.

CAUTION !!

MIND THE SAFETY INSTRUCTIONS:

A blown fuse indicates an internal fault and should be replaced during qualified repair or servicing only !!

HPA V220 / HPA V281 block circuitry



POWER SWITCH



The unit is put into operation by means of the power switch.

Power-on status is indicated by the blue LED below.

The power-on procedure takes about 5 seconds.

During this time the LED of the last selected input is flashing and the outputs are muted.

Always the last setting is recalled.

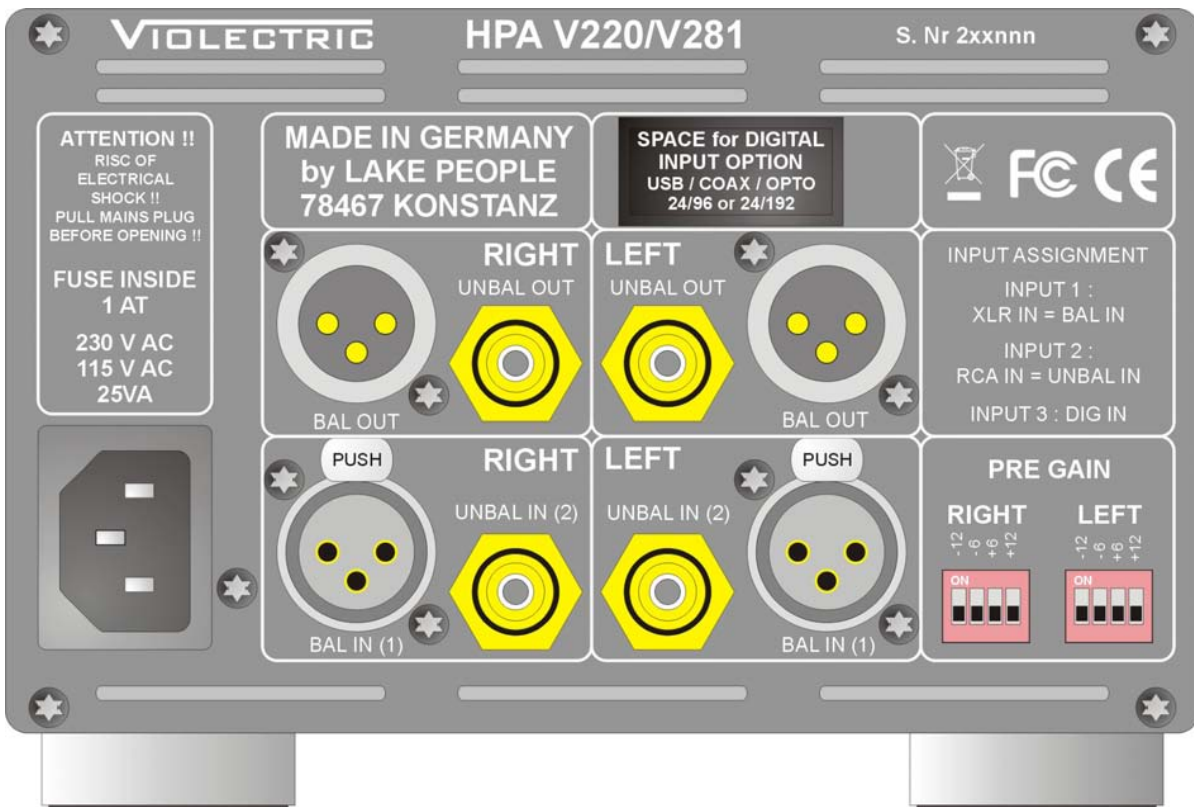
BALANCED SIGNAL INPUTS

The balanced signal inputs are situated on the rear panel of the unit and are labelled as "BAL IN LEFT" and "BAL IN RIGHT". They are fitted with gold plated XLR sockets with metal flange from Neutrik.

Please note:

Unbalanced signals can be injected as well by means of an adaptor. Also see page 9.

Balanced XLR Pin-out:	
PIN 1	GND
PIN 2	(+) PHASE
PIN 3	(-) PHASE



UNBALANCED INPUTS

For the use with unbalanced signals, gold plated premium RCA sockets are provided. They are labelled as "UNBAL IN LEFT" and "UNBAL IN RIGHT".

Input impedance for all inputs is 10 kohms.

Maximum input level should not exceed +21 dBu.

This value is reduced to +15/+9 dBu if **PRE-GAIN** is set to +6/+12 dB !!

THE OPTIONAL DIGITAL INPUT

Currently the HPA V281 can be fitted with one out of six D/A converter types, with three different inputs and a max. sample rates of 96 or 192 kHz:

The **COAX** input accepts digital PCM audio data in S/P-DIF format, at sample rates from 28 to 108 kHz (or 210 kHz resp.).

The **OPTO** input, fitted with a TOS-LINK interface, accepts digital audio data at sample rates from 28 to 108 kHz (or 210 kHz resp.).

The **USB** type "B" input can be connected to a host computer (PC or laptop). The USB module will automatically be detected as an audio device.

The **USB 96** input is compatible with USB 1.1 and 2.0 standards. It accepts digital audio formats up to 24 bit at sample rates of 44.1, 48 and 96 kHz, while 88.2 kHz is not supported.

The **USB 192** input is compatible with the USB 2.0 standard. It requires a proprietary driver, which can be downloaded from www.vioelectric.de. Digital audio formats up to 24 bit at sample rates of 44.1, 48, 88.2, 96, 176.4 and 192 kHz are supported, as well as the so-called "asynchronous mode".

The 96 kHz digital modules comprise a D/A converter with a dynamic range of 110 dB and -100dB THD+N, thus ranging in the upper-mid performance class.

The 192 kHz modules are equipped with a top-notch converter offering a 115 dB dynamic range and -103 dB THD+N, along with significantly improved analog output circuitry.

NOTES:

- After inserting the USB connector, it may be necessary to close and restart running media applications on the host computer.
- Volume of the host application should be set to 100%.



INPUT SELECTION / ACTIVATION

By means of the “XLR / RCA / DIG” pushbuttons on the HPA V281’s front panel, either of the analog inputs or the digital input (if present) can be activated. The LED next to the corresponding button will light up accordingly.

Inputs can also be switched by means of the remote control:

- press “1” on the remote control to select the XLR input
- press “2” on the remote control to select the RCA input
- press “3” on the remote control to select the DIG input.

Alternatively, the “channel up/down” rocker button or “up/down” on the directional pad can be used to step inputs through.

THE VOLUME CONTROL

The desired volumes for left and right channel are set simultaneously by means of the "VOLUME" control.

Volume can also be set via remote control. For this purpose, the volume control is actuated by a servo motor. Manual operation of the knob at the same time is possible without the risk of damage (although not useful...).

Press the rocker button "Volume Up/Down" in order to increase or decrease volume. Pressing "left/right" on the directional pad will have the same effect.

BALANCE CONTROL

is provided to compensate moderate level differences between left and right channel. These may root in the recorded material itself, noticeable differences between left and right headphone system, or differences in the user's individual hearing.

All of the above can be carefully compensated.

The balance control offers a precise center detent in case no adjustment is necessary. In order not to impair the V281's perfect crosstalk specs, it takes effect on the right channel only.

THE AMPLIFIER

The input signals are fed to an amplifier stage especially designed for this application, with eight transistors per channel. The V281 houses no less than four of those ! Channels are physically separated from each other to ensure optimum crosstalk rejection.

The frequency range covers 5 Hz ... 70 kHz (-0.5 dB) or 3 Hz...200 kHz respectively (-3 dB), in order to ensure fully linear performance within the entire audible range. Overall gain is set to +8 dB (unbalanced) or +14 dB resp. (balanced) to ensure sufficient volume reserve also for high-impedance headphones.

Too loud ? Too soft ? The PRE-GAIN method

The V281 is specially designed to drive headphones. Headphones however can present load impedances from 8 to 2000 ohms and efficiency ratios from 85 to 115dB per milliwatt. Thus it can be quite tricky to fulfil all demands, since...

... owners of high-efficiency headphones will rarely set the volume control higher than 9 o'clock in order to exclude hearing damage, while ... the maximum setting may still be too soft for low-efficiency headphones, but

... all users expect highest quality at lowest noise and distortion.

Thus, the *circuitry* must adapt itself as the headphone won't !

WE CALL THE SOLUTION TO THIS PROBLEM PRE-GAIN

The alignment between amplifier and headphone is provided by the preamp stage, which can boost or attenuate the input signal in four steps of 6dB each. For this purpose, two switching devices are located on the rear panel for left and right channel individually.

CAUTION !!

The switch settings should be altered under the following conditions only:

- The unit must be switched OFF
- the "VOLUME" control must be set to minimum
- left and right channel settings should ALWAYS be set the same
- never increase the setting by more than ONE switch per channel

If you find your HPA V281's volume could be somewhat softer (in order to improve volume control range e.g.), push the switch labelled "-6 dB" (half gain) or "-12 dB" (quarter gain) in upward direction.

If you find your HPA V281 should provide more gain, do so with the switch labelled "+6 dB" (double gain) or "+12 dB" (quadruple gain).

Ex-factory, all switches are set to their lowest position - i.e. 0 dB or unity gain - which should be sufficient for most applications.

DE- / ACTIVATING THE HEADPHONE OUTPUTS



The headphone outputs can be activated or deactivated by pressing the “HEAD” button on the front panel.

The green LED displays the activated status.

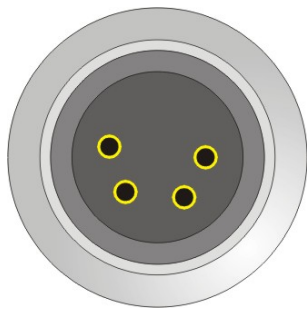
This function can also be switched via remote control.

Press „RED“ (the red button).

THE BALANCED HEADPHONE OUTPUT

The HPA V281 offers a balanced headphone output.

This is equipped with a gold plated female 4-pin XLR connector.



Balanced Headphone socket pin-out:	
Pin 1	(+) Left channel
Pin 2	(-) Left channel
Pin 3	(+) Right channel
Pin 4	(-) Right channel

UNBALANCED HEADPHONE OUTPUTS

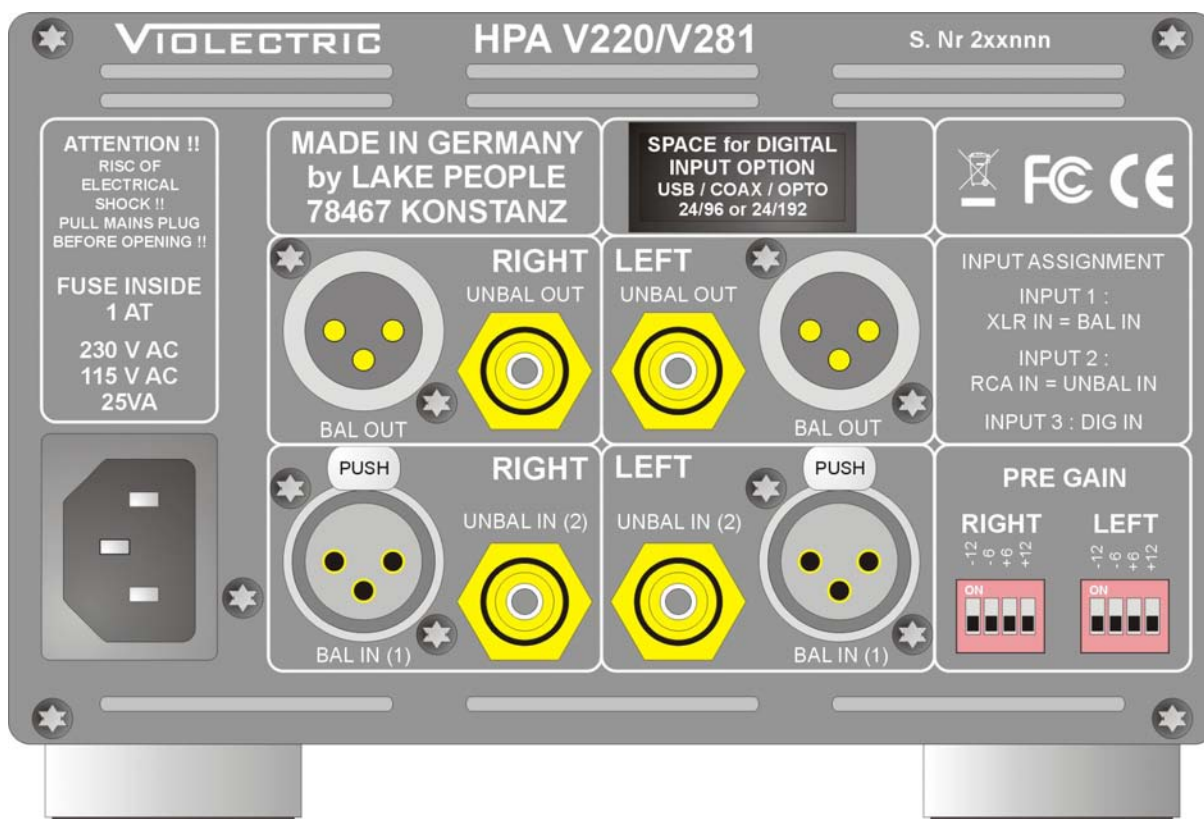
The HPA V281 offers two stereophonic headphone outputs, each equipped with a 1/4" (6.3mm) jack socket.

Because HPA V281 offers 4 channel amplifier (2 x stereo), each socket is driven by a dedicated stereo amplifier

Please note: the RIGHT phone jack is connected to the in-phase stereo signal, whereas the left phone jack is connected to the 180° phase shifted signal.

Unbalanced Headphone socket pin-out:	
TIP	Left channel
RING	Right channel
SLEEVE	GND

On power-up and power-down, the outputs are cut from the amplifier circuitry by relay.



THE BALANCED LINE OUTPUTS

are located on the rear panel of the unit and are marked as “BAL OUT LEFT” and “BAL OUT RIGHT”. Gold-plated, metal-flange Neutrik XLR connectors are implemented here.

Hint:

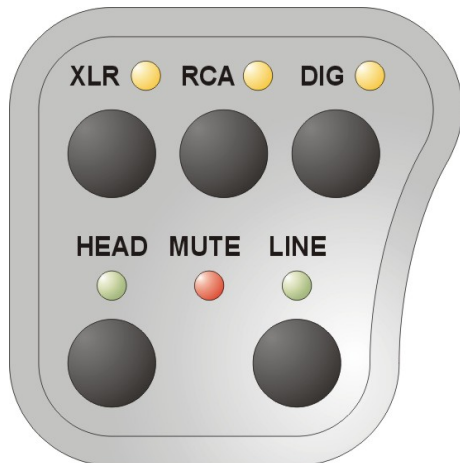
With a balanced-to-unbalanced adapter this connection may also be used for unbalanced cables. PLEASE NOTE THAT IN THIS CASE PIN 3 HAS TO BE LEFT OPEN ! See also page 9 for details.

Balanced interconnection of the XLR socket:		Unbalanced interconnection of the XLR socket:	
PIN 1	GND	PIN 1	GND
PIN 2	in PHASE	PIN 2	Signal
PIN 3	out of PHASE	PIN 3	OPEN !!

THE UNBALANCED LINE OUTPUTS

are located on the rear panel of the unit and are marked as “UNBAL OUT LEFT” and “UNBAL OUT RIGHT”. Gold-plated premium RCA connectors are implemented here.

ACTIVATING / DEACTIVATING THE LINE OUTPUTS



The line outputs can be activated and deactivated by means of the “LINE” push buttons on the front panel.

The green LED indicates the activated status.

This function can also be switched via remote control:

Press “GREEN” (the green button)

PRE-POST FADER or FIXED-VARIABLE

The line-out signal can be tapped at two different points within the V281’s signal path.

If you wish to make use of the input signal without any level change – for a device with its own level controls or recording purposes e.g. – the Fixed-Out or Pre-Fader path (prior to level control) is the right choice: In this case, the unaltered INPUT signal (prior to level control) is forwarded to the line output.

If you want to feed a power amplifier or active loudspeakers, Variable-Out or Post-Fader (including level control) should be used.

In this case, the line output provides the signal at the level set by the volume control.

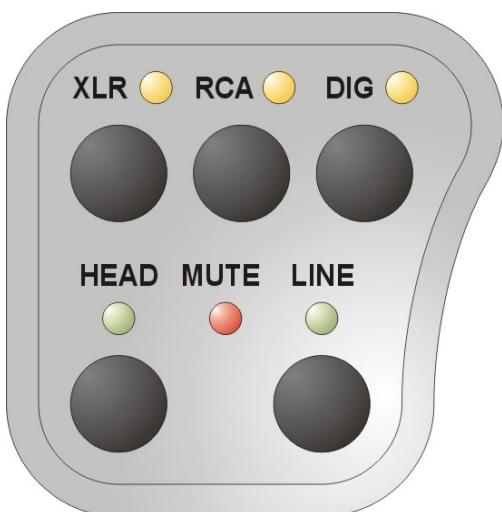
The V281’s line output offers further possibilities:

- balanced-in to balanced-out
- unbalanced-in to balanced-out
- balanced-in to unbalanced-out
- unbalanced-in to unbalanced-out

PLEASE NOTE:

It is generally possible to use the unbalanced and balanced outputs simultaneously, but slight sound deterioration might occur depending on the following devices connected. In order to ensure optimal sound quality, only one output type should be made use of at a time.

Switching between “Pre” and “Post”



is effected via software:

Press and hold the “LINE” push button for about two seconds until the green LED starts flashing. The present status is displayed by the “XLR” LED (pre fader) or the “DIG” LED (post fader). The setting can be altered now by pressing the corresponding button. To complete the setting procedure, just press and hold the “LINE” button again until the green LED stops flashing.

LINE-OUTPUT LEVEL

can be set by means of internal DIP switches located on the line-out circuit board. See page 33 for further details.

Generally, the level at the unbalanced output will equal the input level in pre-fader mode, or with the level control set fully clockwise in post-fader mode. By means of the DIP switches however, relative attenuation/gain can be set to -12 , -6 , 0 , $+6$ or $+12$ dB.

Please note that output level at the balanced output is generally $+6$ dB higher than at the unbalanced output.

THE “MUTE” FUNCTION

serves to mute ALL outputs. On the V281, it can only be activated via remote control.

Muted status is indicated by the red “MUTE“ LED. The activated / de-activated status of the amp’s outputs however - as indicated by the green LEDs - remains unchanged !

ERROR EVALUATION

In order to guarantee flawless operation and optimum protection of your valuable headphones, the V281 is equipped with various protection circuits:

- the delayed activation of the headphone outputs upon power-up prevents your headphones from potentially adverse signal peaks from the preceding circuitry.

In a similar manner, the headphone outputs are instantly disconnected when turning power off.

- Adverse DC voltage should be kept from your headphones at all times. If DC is detected, the headphone outputs will be disconnected, indicated by the red “MUTE” LED flashing and the green “HEAD” LED lit. The detection interval is about five seconds. If DC disappears during this period, the unit will resume normal operation automatically.
- Overloading (i.e. increased distortion) must be avoided in favour of your headphones as well. If overload is detected, the headphone outputs will be disconnected, indicated by the red “MUTE” LED flashing and the green “LINE” LED lit. The detection interval is about five seconds. If overload conditions resolve during this period, the unit will resume normal operation automatically.

FACTORY RESET

of all software based settings can be done by pushing the “XLR” button during powering up.

Things to know ...

Why makes it sense to make such huge efforts ?

A headphone amplifier is a device designed to condition audio signals with regard to the very specific requirements of headphones. This doesn't sound too spectacular at the first glance and can be achieved relatively easily. As with many things however, the devil is in the details and much more effort is required to design **one** amplifier for **all** current headphone models.

Headphones per se are quite diverse, and there are two essential parameters: impedance and sensitivity.

In general, headphones with higher impedance can be regarded as less sensitive than headphones with low impedance (which is not generally true, but in the majority of cases). The sensitivity of headphones is usually stated in dB (sound pressure level) per Milliwatt.

Extremes in this sense are the AKG K1000 with 74dB/mW on the one hand, and the Sennheiser HD25 with 108 dB/mW on the other hand: The K1000 requires 2500 times the power to achieve the same sound pressure as the HD25.

There is also the fact that headphones with high impedance usually require much higher voltage to achieve high loudness. Thus the amplifier *must* be designed with high internal supply voltages.

Which advantages do balanced signals offer ?

In contrast to unbalanced signals, balanced signals are carried by two wires (plus ground/shield). In the transmitting device, a balanced signal is created by generating an inverted original signal (180° phase shifted). The "hot" wire carries the original signal (a), the "cold" wire the inverted signal (-a). In the receiving device, the balanced signal is processed by a differential amplifier, which detects the difference between both:

$$(a) - (-a) = 2a.$$

On its way between devices, the useful signal can be affected by interference (s). Interferences however are in phase on both wires and fed to the differential amplifier as well. Again, the amplifier detects the

difference between the interference contents: $(s) - (s) = 0$. Thus - in an ideal situation - all interference on the signal path is eliminated.

Why are discrete signal paths important ?

Twin op-amps are the most common design for operational amplifiers, i.e. two amplifier circuits are integrated in one device. If left- and right-channel signals are processed simultaneously by such a device, interaction between both cannot be excluded. This interaction is admittedly diminutive, but should be avoided whenever a different design offers the possibility.

Why are op-amps ideal for low-level signal processing ?

Discrete amplifiers (designed with transistors) are very popular in high-end audio design also for preamplifier stages. This is often marketed as an optimization measure, but the partially exorbitant extra expenses are of course to be paid by the customer. But an op-amp consists of transistors as well...

Moreover, its structure has the advantage of thermal coupling between its internal components. Also ageing issues play a much less important role. Due to the large number of op-amps types offered, it is possible to pick an optimum type for any specific application.

Why does PRE-GAIN make sense ?

Two extreme examples (with the HPA V281 at +14 dB gain (x 4,5), volume control set to full):

1st example:

The (pre-) amplifier provides 2V output voltage, whereas the headphone requires only 2V for 100 dB sound pressure level.

With the control fully turned up, the V281 would deliver 9 V output at +14 dB gain. Therefore the volume control would have to be operated very carefully in order to avoid hearing damage. Moreover, any interference at the input should be avoided since it would be "unforgivingly" amplified as well. With PRE-GAIN, the input level can be

reduced by 12 dB (a fourth), with 0,5 V instead of 2 V input as the result. This 0,5 V is again amplified by 4.5, then equalling 2.25 V. Now the volume control can be turned over almost the entire range.

2nd example::

The (pre-) amplifier provides 1 V, whereas the headphone requires 20 V to release 120 dB of sound pressure.

With the volume control fully clockwise, the V281 would provide 4.5 V at +14 dB gain only - much too low for the headphone. By means of PRE-GAIN, input level can be boosted by 12 dB (four times), resulting in effective 4 V input voltage instead of 1 V. These are again multiplied by 4.5, now equalling 18 V. This is still not enough, but far closer to the optimum value.

Why does frequency bandwidth limiting make sense ?

In signal processing, sound is represented by AC voltages. Sound is audible - for young people - from about 20 to 20000 Hz. The elder the listener, the less he will hear high frequencies in particular.

In order to transmit these frequencies at optimum quality, the frequency response of an amplifier should be as wide and as "flat" as possible. At the low end of the scale, this limit is represented by DC, as there is no frequency lower than zero. In upward direction, the limit can be set to practically any frequency, but the higher, the more susceptible the device becomes concerning electro-magnetic interference. This is not audible in the first place, but may interfere with the useful signal and then become evident. Therefore, unrestricted frequency response attests thoughtlessness rather than remarkable engineering skill.

Why is a good volume pot essential ?

A volume potentiometer is a mechanical control element, which can be obtained on the market at any low price. Meanwhile it is often replaced by electronic circuitry, exhibiting essential disadvantages concerning dynamic range, noise and distortion.

Conductive-plastic resistive tracks, high-quality multi-tap wipers and separated chambers for the individual sections are highly desirable for sophisticated applications, and high quality is inevitable to ensure trouble-free operation for years. Since the market for really good pots is a small one, manufacturers like Noble or Panasonic don't offer these any more. A current sample of top of the line pots is the RK27 by ALPS, which is also used in your HPA V281.

About the different volume control options of V281

V281 offers three methods to control the volume.

1. the standard manual control incorporates the above mentioned Alps RK 27 potentiometer with a 41-detent to ease the repositioning to a specific value / angle. Please note that these detents have nothing to do with a stepped attenuator !!!
2. the remote control version shows the same RK 27 potentiometer which can be actuated by a servo motor. Due to a friction clutch between motor and potentiometer, manual and remote operation of the knob at the same time is possible without the risk of damage (although not useful...).
3. the 128-step relay volume control avoids common problems of potentiometers like channel mismatch, crosstalk and scratching. The 128 steps are realized with 7 relays per channel because $2^7 = 128$. Each step is defined as 0.75 dB which totals in 96 dB attenuation range. The relays are switching between resistors with an accuracy of 1% or 0.1% to attenuate the signal. So best channel matching and minimal crosstalk is realized – and the relays will never scratch. To enable the same touch and feel of standard solutions we are using the same motor driven version of RK27 but this time the potentiometer generates a control voltage which is transferred into the digital domain by an A/D converter and fed to a micro controller which generates the digital signals to control the relays.

Why is a low output impedance essential ?

When actuated, electro-dynamic systems respond with a counterforce. When the voice coil of a headphone has been displaced by the signal, an (error-) current will be induced when it swings back to its initial position. This current must be suppressed as far as possible, which is effected best if the amplifier's output impedance is the lowest possible. The damping factor describes nothing but the ratio between output impedance of an amplifier and a given load.

Since there is no known technical specification, we define the load (voice coil impedance) as 50 ohms. With V281 having an output impedance of <0.2 ohms in balanced mode and <0.1 ohms in unbalanced mode this results in a damping factor of 250 (balanced) and damping factor of 500 (unbalanced).

Why are high supply voltages essential ?

A headphone doesn't really require high power, but from the equation $P = U^2 / R$ we can see that the square of the supply voltage determines the power into a given load resistance. The higher the headphone's impedance, the more voltage will be needed. But this deals with the achievable loudness to a limited extent only: Technically spoken, music lives on fast transients which put high demands on signal processing. And thus a fast transient can easily push an average amplifier with +/-15 volts supply to its limits (90 % of all headphone amps in the market are operated with these or even lower supply voltages). Due to the high supply voltage and the balanced operation mode of V281 you will benefit from more than 4 x output voltage swing capability compared to "standard" amps.

Why does a relay make sense when switching power ?

Amplifiers generate unwanted output signals when applying or removing power, which can damage the connected headphones. The relay breaks the connection between amplifier and headphone and thus protects the latter until electrical conditions have stabilized.

Some words about the different digital input options.

At the moment there are 6 different digital inputs for the V281.

These offer coaxial, optical or USB inputs and accept up to 24 bit digital data.

Coax & Opto 96 accept sample rates up to 110 kHz, the USB 96 accepts 44.1, 48 and 96 kHz, please note: NO 88.2 kHz.

The USB 96 input is compatible to the USB 1.1 and 2.0 standard.

All the above modules own a D/A converter which we would judge to be “upper middle class” with a dynamic range of 110 dB and THD+N at -100 dB.

Coax & Opto 192 accept sample rates up to 210 kHz, the USB 192 accepts 44.1, 48, 88.2, 96, 176.4 and 192 kHz and supports the so called “asynchronous mode”.

The USB 192 input is compatible with the USB 2.0 standard. It requires a proprietary driver, which can be downloaded [from www.vioelectric.de](http://www.vioelectric.de).

The above modules are equipped with a top notch D/A converter with a dynamic range of 115 dB and THD+N at -103 dB, along with significantly improved analog output circuitry.

Which USB devices can be connected to the HPA V281 ?

Connections can be established to table-top or laptop PCs. MP3 players or similar gear cannot be connected.

Why does 100% host volume setting make sense ?

Volume control within the host is always accomplished digitally, i.e. bits are removed from the data stream. This may affect the signal quality because the resolution will become lower and the distortions may rise. In practise those effects will appear at such low levels which will not allow a valuation of the signal quality

DISPOSAL

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems)

This symbol on the product or on its packaging indicates that this



DE 26076388

product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment.

By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could

otherwise be caused by inappropriate waste handling of this product.

The recycling of materials will help to conserve natural resources.

For more detailed information about recycling of this product, please contact your local Civic Office, your household waste disposal service or the shop where you purchased the product.

TECHNICAL DATA HPA V281

All Measurements RMS unwtld., 20 Hz - 20 kHz, Pre-Gain set to 0 dB

Inputs: 2 x XLR female, balanced,
2 x RCA, unbalanced
1 x digital (Option)

Max.input voltage: + 21 dBu, Impedanz 10 kOhms

Input impedance: 10 kohms

Line outputsd: 2 x XLR male, balanced
2 x RCA unbalanced

Nominal input sensitivity: +6 dBu

Amplifier gain: +8 dB unbal. / 14 dB bal.

PRE-GAIN: -12 / -6 / 0 / +6 / +12 dB

Frequency range: 5 Hz ... 70 kHz (- 0,5 dB)
3 Hz ... 200 kHz (-3 dB)

Output impedance: < 0,1 Ohm unbal. / < 0,2 Ohm bal.

Damping factor (Load 50 Ohm): 500 unbal. / 250 bal.

Dynamic range: > 129 dB (A-wtd)

Noise: < -95 dBu (A-wtd)

THD+N (1kHz/2x10V/100R = 1W) < -102 dB / < 0,00079 %

THD+N (1kHz/2x4V/32R = 0,5W) < -100 dB / < 0.001 %

Crosstalk: -105 dB (1 kHz) / -103 dB (15 kHz)

Headphone outputs: 1 x 4-pol XLR
2 x ¼“ (6.3 mm) Phone Jack

Max. output level:

(1kHz / < 0.1% THD+N)

Balanced operation

Both channels driven

R _L (x 2)	U _a (dBu)	U _a (V)	P _a (mW)
600	34,3	40,2	2700
100	29,7	23,7	5600
50	25,4	14,5	4200
32	21,7	9,5	2800
16	16,0	4,9	1500

Power supply:

230 V AC / 115 VAC max. 40 VA

Case, Front, Back:

Aluminum

Dimensions:

170 x 112 x 320 mm (B x H x D)

Dismantling / Jumper Settings

Please note:

In the following, the internal settings of the HPA V281 are discussed. For changing these, a TORX T10 screwdriver or a 3mm Allen Key is required and you should by all means

PULL THE MAINS PLUG !!!

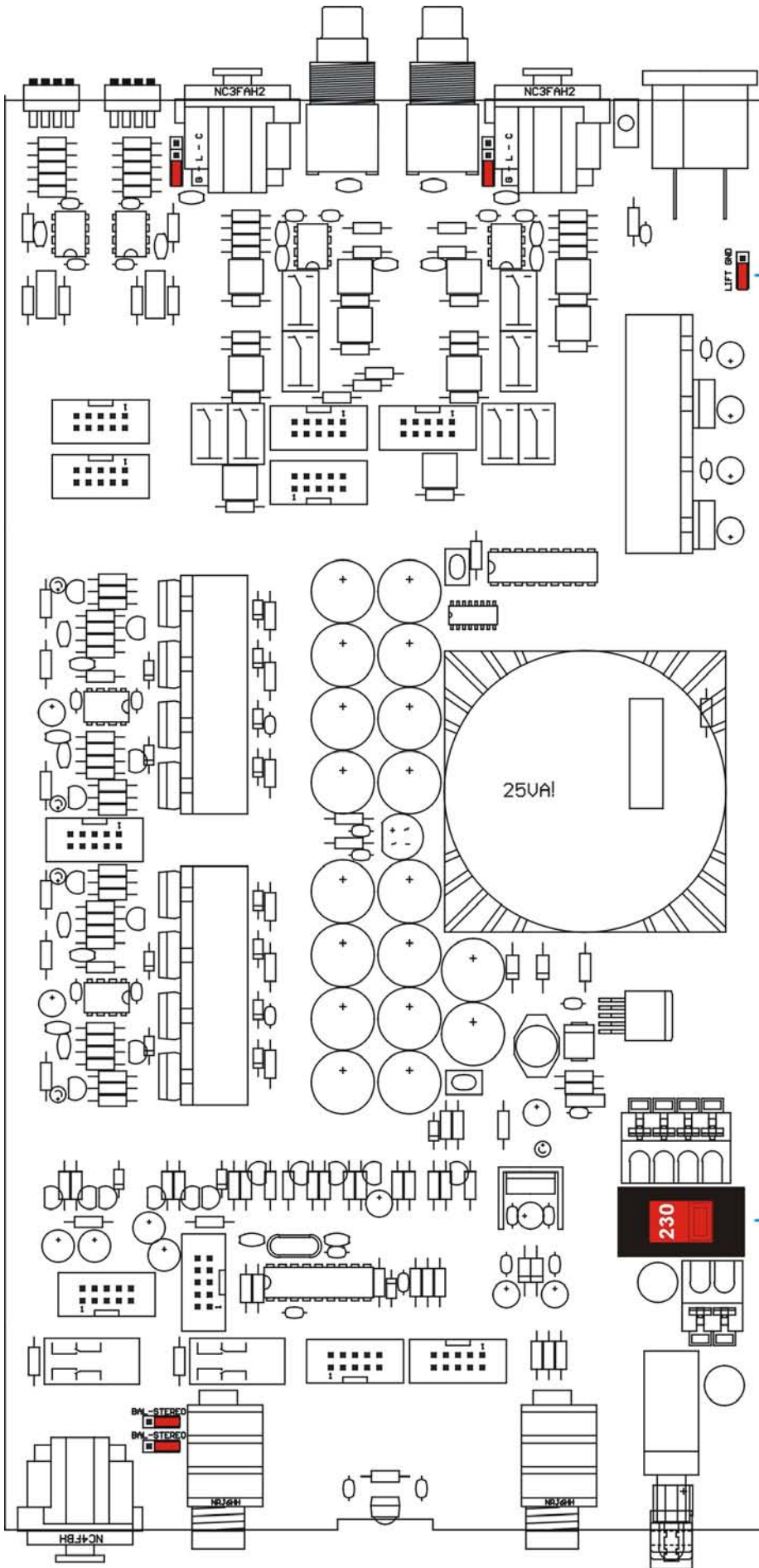
Only thereafter the settings can be altered without any hazard.



Dismantling



1. screw off both upper screws on the front panel
2. screw off both upper screws on the back panel.
3. unscrew both lower screws on the front panel by a few turns
in order to tilt the front panel a bit
4. now lift the upper lid
5. make your personal jumper settings
6. reassemble the unit in reverse order

To modify the Ground-Lift setting on the main PCB, you must also disassemble the Line-Out PCB on top

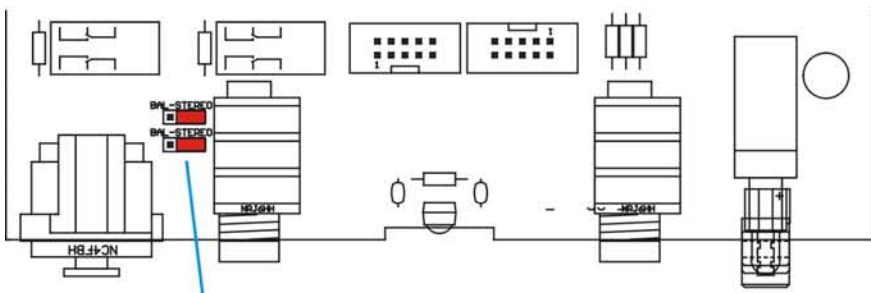
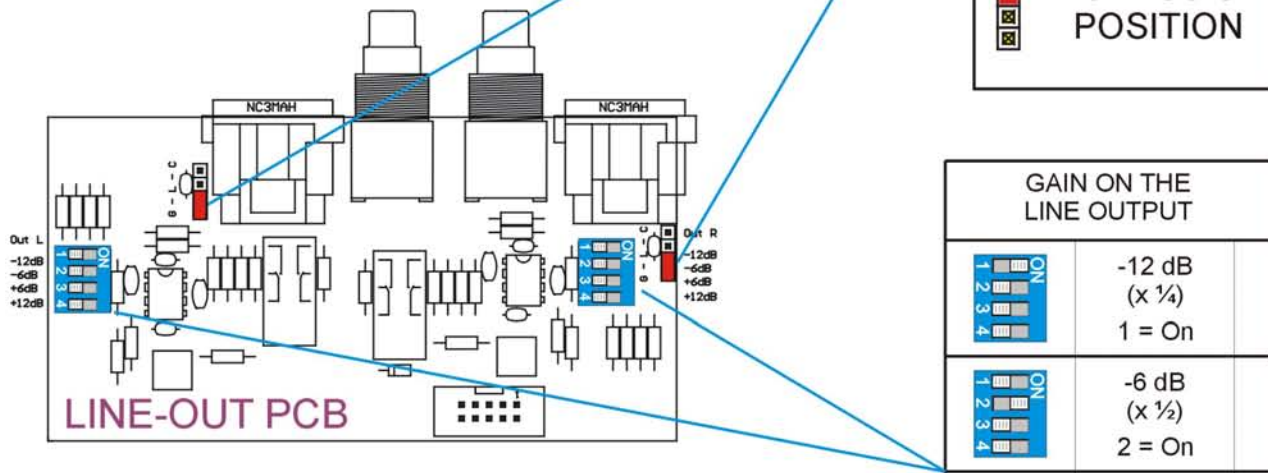
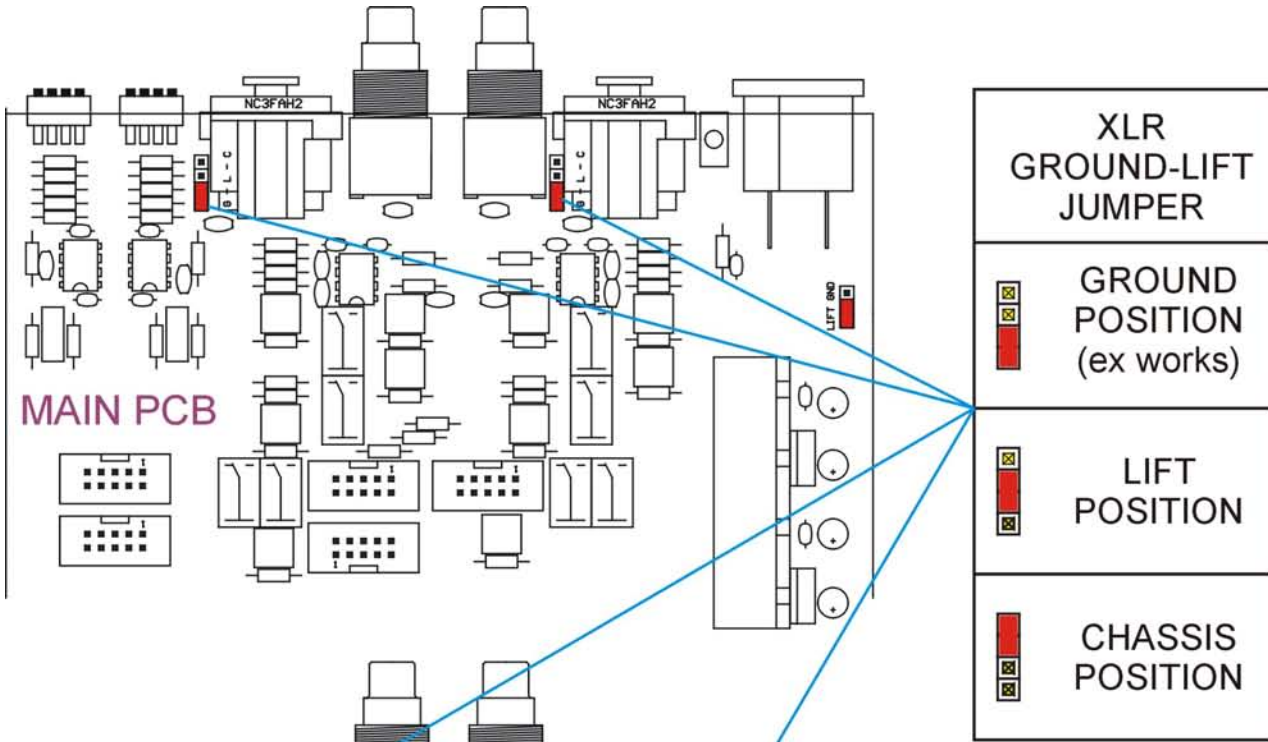
JUMPER SETTINGS HPA V281



GENERAL GROUND-LIFT JUMPER	
	LIFT POSITION (ex works)
	GROUND POSITION

MAINS VOLTAGE SELECTOR	
	POSITIONED TO 230 V (190-240 V)
	POSITIONED TO 115 V (85-120 V)

JUMPER SETTINGS HPA V281



Standard setting ex works		Balanced operation	
BAL / STEREO	The right socket carries the in-phase stereo signal. The left socket carries the out-of-phase signal.	BAL / STEREO	The right socket carries the right balanced signal. The left socket carries the left balanced signal.

EC CONFORMITY STATEMENT:

We herewith declare that the following unit

Name: **VIOLECTRIC HPA V281**

Serial No. : -all -

is in conformity with the following EC directives:

2006/95/EG	Low voltage directive
2014/30/EC	EMC directive
EN 60065:2002+A12:2011	Security directives for audio-, video- und similar electronic devices
JIS C6065:2013	
2001/95/EC	General Product Safety Directive

For verification of conformity with regard to electromagnetic compatibility the following harmonized standards are applied:

EN 50081-1:1992	Generic emission standard
EN 50082-1:1992	Generic immunity standard

Product family standard for audio, video, audio-visual entertainment apparatus:

EN 55013:2001	EN 61000-3-2:2000
EN 55020:2002	EN 61000-3-3:1995

2011/65/EU, RoHS directive

2012/19/EU, WEEE directive / Member No.: DE 26076388

This declaration is given under responsibility of:



LAKE PEOPLE

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Fax +49 (0) 7531 74998

A handwritten signature in blue ink that reads "Fried Reim".

Konstanz 26.09.2014 Fried Reim CEO

WARRENTY

Since 1986 we are constructing and manufacturing sophisticated electronics for ambitious customers.

Since the early beginnings we are trying hard by accompanying measures, the use of 1st choice components and multiple quality checks during production to avoid faults at large.

We are quiet effective in that and this is – amongst others - why we enjoy such a good reputation.

Despite all accurateness faults may appear which may derogate the proper operation of your product.

In this case your unit is protected by a **5-year Warranty !**

Needless to say that we will care for your product even after the expiration of the warranty. If it is necessary please dispatch your item to:

Lake People electronic GmbH
Turmstrasse 7a
D-78467 Konstanz

Fon +49 (0) 7531 73678
Fax +49 (0) 7531 74998
E-Mail info@lake-people.de

Your warranty claim begins with the date of purchase, which should be denoted on your proof of purchase.

Do not forget to include the receipt of sales or a copy of the receipt.

Please also include a short description of the fault(s).

For the reshipment we need you correct address !!

Care for a safe packaging. Best is to use the original packaging.

Please keep in mind that we cannot accept collect freight.

We will grant a quick repair and quick return of the unit.

In case of a warranty repair we will reship free of charge.

Please denote here the serial number and the date of purchase:

Serial Number

Date of Purchase