

# USER'S MANUAL

## PHONE-AMP G109-A

**30 Years of Excellence**  
**Anniversary Edition 1986 - 2016**



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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 only properly grounded.

### 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						
Leiter / CONDUCTOR			Farbe	COLOR	Alternativ	Alternativ
L	Phase	LIVE	Braun	BROWN	Schwarz	BLACK
N	Null	NEUTRAL	Blau	BLUE	Weiss	WHITE
E 	Erde	EARTH GND	Grün-Gelb	GRN+YLW	Grün	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 only accessible from the inside !!

A burnt fuse may be an indicator of internal problems and should be replaced during a qualified servicing or repairing works !!

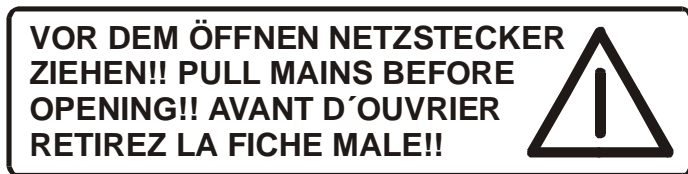
### **Switchable Power Supply:**

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

This unit is provided with a internally solderable mains supply of 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 that described in the operating manual. All other servicing or repair should be referred to qualified personal !!

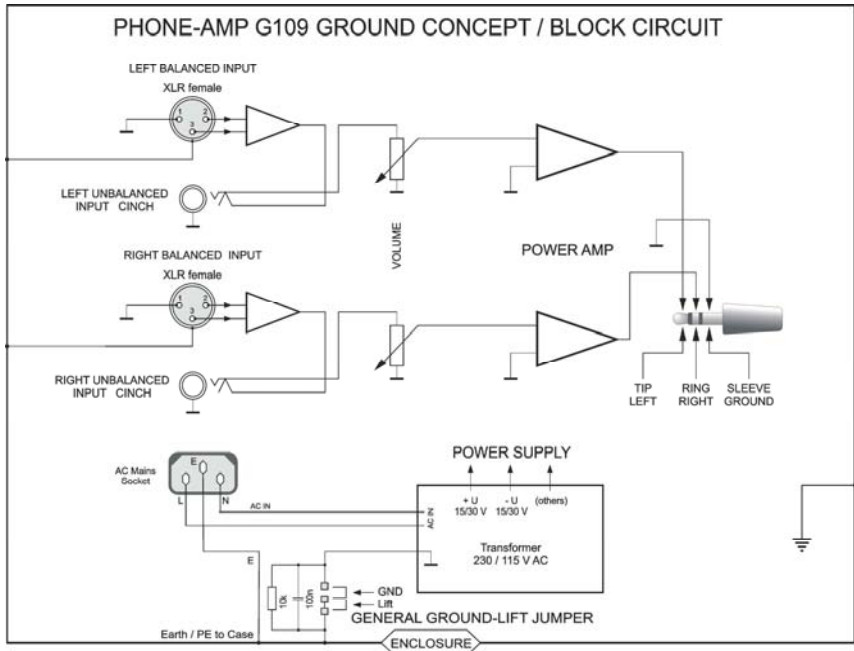


### **Electromagnetic Compatibility**

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 (see also page 15)

#### Mind the SECURITY INSTRUCTIONS !!

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

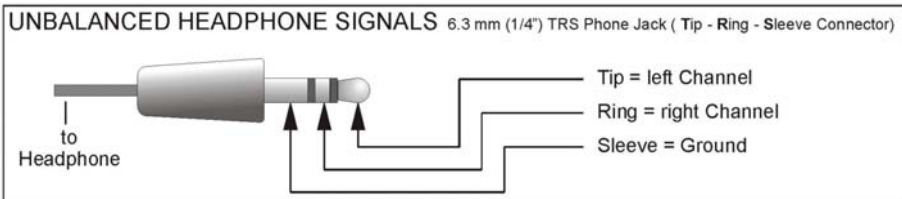
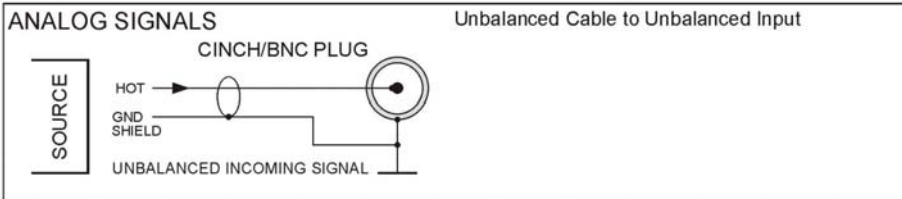
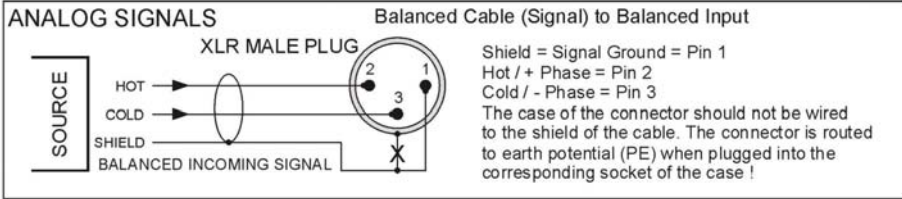
The internal ground potential is normally connected to the external earth reference at this point and is lifted by means of this jumper.

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 may be helpful in case of hum or jitter caused by different ground/earth potentials.

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 !! Electrical safety is always ensured, since the earth conductor is permanently connected to the enclosure !!

**When the ex-work settings are altered, EMC problems might occur,  
Theses are in the field of the user's responsibility !**

## Connection / Connectors for Analog Signals



## CAUTION

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

## GENERAL

The PHONE AMP G109-A is a stereo headphone amplifier designed for low-, medium- and high-Z loads (16 ... 600 ohms), as typical for most high-quality headsets.

Due to its circuitry layout optimized in terms of noise/THD and specially adapted to the headphones mentioned above, the PHONE-AMP G109-A fulfils highest quality demands.

The following features in combination are only to find inside Lake People amps:

### LOW-NOISE

because of low internal gain.

Therefore the self generated noise from the amplifier is not audible.

### HIGH OUTPUT VOLTAGE

through 60 Volt internal operating voltage.

Therefore best suited for high impedance headphones.

Over 90 % of all headphone amplifiers in the market offer not half that voltage !!

### HIGH OUTPUT POWER

because of powerful amplifiers able to deliver much more current a headphone needs. Therefore best suited for low impedance headphones and even magnetostatic cans !!

### HIGH DAMPING FACTOR

through lowest output impedance.

Therefore best suited for full control even over critical headphones with the guarantee to have flatest possible response.

Its features comprise:

- Special front panel in a limited edition
- Unbalanced inputs via gold plated RCA connectors
- **PRE-GAIN** = three selectable gain presets
- DC coupled
- Discrete amplifier design
- RK27 High-grade volume control for best linearity and lowest crosstalk
- Two headphone sockets
- Relay muted headphone outputs
- 10 VA toroidal transformer with low-ESR Nichicon Capacitors

Despite its compact dimensions, the PHONE-AMP G109-A offers optimum flexibility and highest output power. Reliability even under rough or improper handling conditions has been another important goal of development. In addition, the PHONE-AMP G109-A is equipped with internal filters to prevent overload by inaudibly high or low frequencies.

## **THE CASE**

The case of PHONE-AMP G109-A is made of black anodized aluminium, including the front- and back panels.

This provides high mechanical stability and resistance against rough handling.

The cases surfaces are providing excellent electrical conductivity for optimum EMC characteristics.

## **EARTH AND GROUND**

The Case of PHONE-AMP G109-A is connected to earth potential. The internal ground potential is set to %LFT+ position but may be connected to earth by means of a jumper. If required, the jumper may be set to %GND+ position (see page 5: "The earth/grounding concept" and page 15: "Jumper settings+").

## **THE POWER SUPPLY**

Mains is connected via a three-pin IEC/CEE socket and a matching three-wire mains cable with Schuko-type mains connector.

The unit is factory-set to a mains voltage of 230 VAC and may be set to 115 Volt operation internally.

Mains voltage may vary between 190 and 250 (85 ÷ 125V in case of 115 V AC) without any effect on flawless operation.

The built-in toroidal mains transformer provides the internal supply voltages of +/- 30 Volt. G109-A incorporates special low-ESR capacitors from Nichicon in its power supply.

## **SETTING TO 115 V AC**

When G109-A is purchased to 115 Volt countries (USA, Japan, Taiwan) normally it is set to 115 Volt operation before shipping.

This is marked by 115 Volt sticker on the back of the unit.



# Operation PHONE-AMP G109-A

Please note that the operation of 230 V equipment in a 115 V environment is NOT dangerous at all. Under most circumstances the unit will refuse to work properly.

When this amp is set to 115 V AC operation but is accidentally plugged to a 230 power outlet the internal fuse will be blown immediately !!

## THE MAINS FUSE

The 0,25 AT fuse is internally soldered in place on the power supply PCB.

## ATTENTION !!

### FOLLOW THE SAFETY INSTRUCTIONS:

A blown fuse may refer to internal problems and should only be replaced during qualified servicing works !!



## THE INPUTS

For unbalanced signals, two gold plated RCA connectors are provided. They are marked %UNBALANCED INPUTS+, "LEFT" and "RIGHT" resp.

## POWER SWITCH

This switch activates the unit. Operation is indicated by the green %ON+ LED below the switch.

# Operation PHONE-AMP G109-A



## VOLUME CONTROL

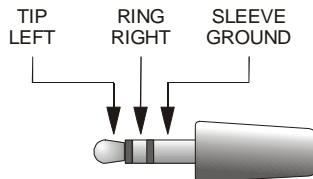
The %VOLUME+ control pot determines the headphone volume for both left and right channel.

## HEADPHONES OUTPUTS

PHONE-AMP G109-A offers two stereophonic headphone outputs. Each is equipped with a standard 1/4" phone jacks.

## PHONE JACK PINOUT

Both stereophonic phone jacks are connected as follows:



## The switch-on relay inside G109-A

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.

The relay will couple the output sockets to the amp some seconds after applying power to the unit and will immediately break the contact when the unit is switched off.

# Operation PHONE-AMP G109-A

## THE AMPLIFIERS

The input signals are buffered as soon as they enter the unit in order to care for stable and low impedances inside. The volume control follows and after it a transistorized amplifier specially designed to drive headphones.

For highest output voltage swing this amp is supplied by an unusual high operating voltage of +/- 30 Volt.

Its operating range covers DC to 200 kHz (-3dB corner frequency) in order to ensure optimum linearity within the audible frequency spectrum.

Overall gain is set to only +8 dB (factor 2.5) to ensure a (nearly) not audible noise entry. To match different headphone sensitivities the overall gain may be altered with the aid of jumpers.

(see %oo loud / too soft+page 12 and page 15 %umper Settings+for details).

The amp is able to output up to 2000 mW to drive even low sensitive headphones.

Because of the extremely low output impedance well below 1 Ohm (respectively a very high damping factor) it is provided that the influences of electro-dynamic counterforces are negligible.

## SPECIAL FEATURES

### Please note:

The following chapters refer to internal settings of the PHONE-AMP G109-A. To alter these settings, a TORX screwdriver T10 or a 2,5 mm allen key is required.

The more, you should by all means

## **PULL THE MAINS CORD !!!**

after which all settings can be performed without any hazard.

### **There's hum...**

Among other reasons, hum results from equalising currents caused by ground loops, e.g. due to the system being connected to separate mains outlets.

This can be avoided by "hard" grounding of the PHONE-AMP G109-A:

It is achieved by setting the ground lift jumper to the GND position.

**See page 15 in the technical appendix.**

# Operation PHONE-AMP G109-A

By this measure, the internal reference ground is directly connected to the case/earth potential. Whereas LIFT means that the unit becomes insensitive to low-frequency interference. High-frequency interference however is still bled off to ground or case respectively.

In all cases full electrical safety is maintained, since the case is permanently grounded via the 3-pin mains plug !!

## **Too loud ? Too soft ? Å the PRE-GAIN concept**

The G109-A is specially designed to drive headphones. However, these can present loads between 8 ... 2000 ohms and efficiency factors between 85 ... 115 dB/mW. This makes it a little bit difficult to fulfil all desires, because ...

... owners of high-efficiency headphones may rarely turn the volume control over the nine-o'clock position without risking hearing damage, while even the max setting may be too soft for low-efficiency headphones ...

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

Therefore the circuitry must be able to adapt to these conditions, since headphones won't !

## **THAT'S WHAT WE CALL PRE-GAIN**

The adjustment is made in the preamp section, where the signal can be boosted or attenuated in three steps.

**See page 15 in technical appendix.**

In case you find that the G109-A could well be somewhat softer - e.g. in order to widen the setting range of the volume control - set the corresponding jumper to the -12dB position.

If you find that your G109-A could do with some more gain, set the corresponding jumper to the +6dB position.

The unit is factory-preset to the center position (0dB), which should be suitable for the majority of applications.

## Frequency Range Limitations

The frequency range of your PHONE-AMP G109-A is rolled off at 200 kHz at the upper end. This is the so-called "-3 dB point", i.e. the corresponding frequency is reduced by -3dB.

On the one hand, this frequency is high enough to avoid any influence on the audible range. On the other hand, it is low enough to effectively suppress potential radio-frequency interference.

Towards low frequencies, the range of your G109-A is unrestricted. This means, that very low frequency or even DC will be passed through.

However, "DC coupling" isn't necessarily useful, as neither DC nor very low frequencies are audible at all. Nevertheless they might cause some harm to your headphones.

For this purpose, the G109-A offers the opportunity to filter the low-frequency response as well (AC coupling), by setting the jumpers situated on the left and right side of the %VOLUME+control to 4 Hz. These values again represent the -3dB point.

**See page 15 in technical appendix.**

The low-frequency response is factory-preset to AC !!

# Technical Data PHONE-AMP G109

All measurement RMS unwt'd., 20 Hz - 20 kHz, referred to +6 dBu

Pre-Gain set to 0 dB, Lo-Cut set to DC

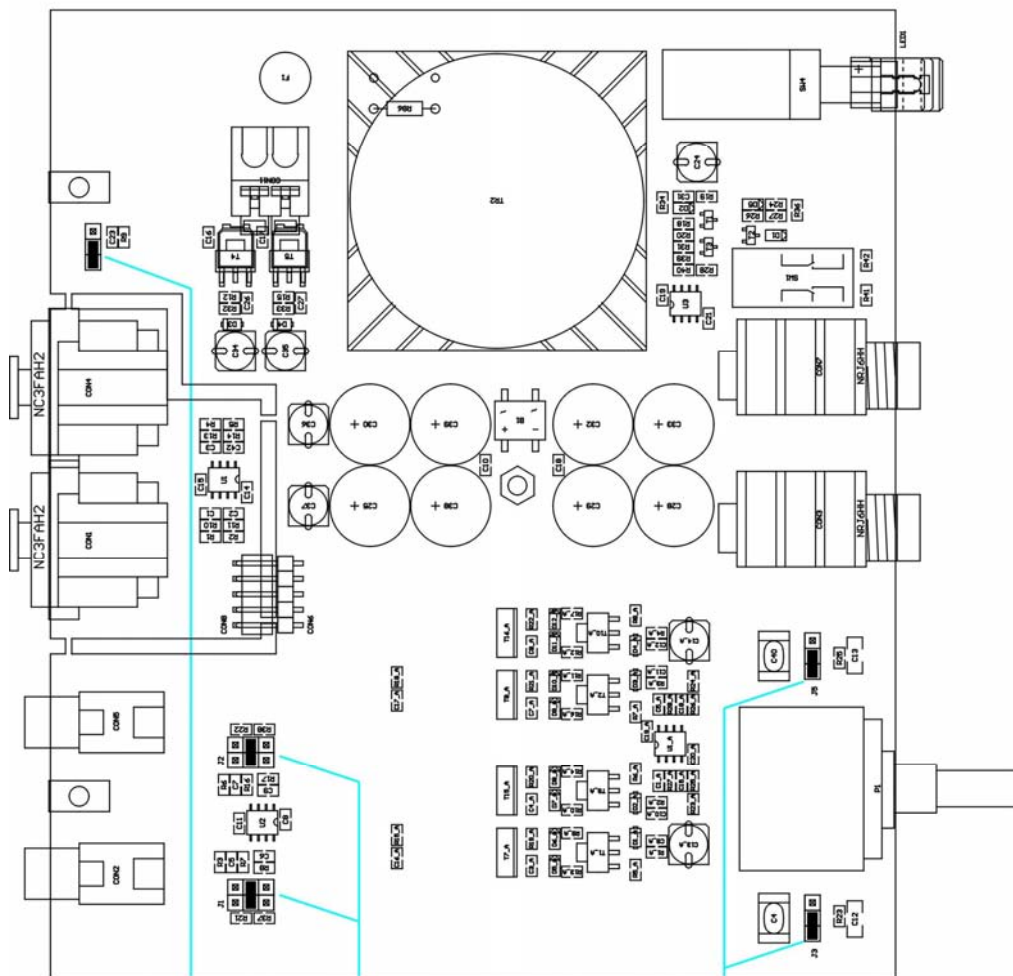
Inputs G109-A:	2 x RCA, unbalanced
Max. Input Voltage:	+ 21 dBu, Impedanz 10 kOhms
Input Impedance:	10 kohms
Nom. Input Sensitivity:	+6 dBu
Amplifier Gain:	+8 dB
Overall Gain with <b>PRE-GAIN</b> :	-4 / +8 / +14 dB
Frequency Range (-3 dB):	0 Hz ... 50 kHz (- 0,5 dB) $\delta$ 200 kHz
Slew Rate:	8 V / usec
Dynamic Range 2x 600 R:	> 125 dB / 129 dB (A-wtd)
Dynamic Range 2x 100 R:	> 122 dB / 126 dB (A-wtd)
Noise:	< -98 dBu / -101 dBu (A-wtd)
THD+N (1kHz / 2x10V / 100R = 1W)	< -100 dB / < 0.001 %
THD+N (1kHz / 2x18V / 600R = 0,5W)	< -102 dB / < 0.0008 %
Crosstalk:	< -110 dB (1 kHz) / -98 dB (15 kHz)
Output impedance:	< 0,2 Ohm

Max. Output Level:  
(1kHz / < 0.1% THD+N)

$R_L (x 2)$	$U_a$ (dBu)	$U_a$ (V)	$P_a$ (mW)
600	27,8	18,9	595
300	27,3	17,8	1056
240	26,5	16,3	1107
100	24,6	13,2	1742
60	23,1	11,1	2053
40	20,5	8,5	1806
32	18,7	6,7	1402
16	13,1	3,5	765

Mains Supply Voltage:	230 V AC / 115 VAC max. 8 VA
Case, Front, Back:	black anodized aluminium
Dimensions:	168 x 49 x 145 mm (W x H x D)

# PHONE-AMP G109 JUMPER SETTINGS



### GROUND LIFT JUMPER

Ground Lift  
 Ground Lift

**Lift-Operation**  
The internal ground is low impedance for high frequencies (ex Works setting)

**Normal-Operation**  
The int. Ground is connected to earth potential

### PRE-GAIN JUMPERS

Gain is set to -12 dB relative or -4 dB absolute  
 Gain is set to 0 dB relative or +8 dB absolute (ex Works setting)  
 Gain is set to +6 dB relative or +14 dB absolute

### LO-CUT-JUMPERS

Lo-Cut is set to 4 Hz (-3dB corner) ex Works setting  
 Lo-Cut is not engaged, DC operation

# KONFORMITÄTSERKLÄRUNG

## CONFORMITY STATEMENT

Wir bestätigen hiermit, dass das folgende  
Gerät:

We herewith declare that the following unit:

Bezeichnung: **PHONE-AMP G109**

Name : **PHONE-AMP G109**

Serien Nr. : -alle -

Serial No: - all -

mit folgenden EU-Richtlinien bzw. Normen  
übereinstimmt:

is in conformity with the following EC  
directives:

### **93/68/EWG, Niederspannungsrichtlinie**

Angewandte harmonisierte Norm:

**EN 60065 : 2002**

### **93/68/EEC, Low voltage directive**

Applied harmonized Standard:

**EN 60065 : 2002**

### **2001/95/EG, Produktsicherheitsrichtlinie**

### **2001/95/EC, Gen. Product Safety Directive**

### **2014/30/EU, EMV Richtlinie**

Zur Beurteilung des Erzeugnisses hinsichtlich  
seiner elektromagnetischen Verträglichkeit wurden  
folgende, harmonisierten Vorschriften angewendet:

**EN 61000-6-3 : 2007**

Fachgrundnorm Störaussendung

**EN 61000-6-1 : 2007**

Fachgrundnorm Störfestigkeit

### **2014/30/EC, EMC directive**

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

**EN 61000-6-3 : 2007**

Generic emission standard

**EN 61000-6-1 : 2007**

Generic immunity standard

Produktfamilienorm für Audio- Video- und audio-  
visuelle Einrichtungen sowie für Studio-Lichtsteuer-  
einrichtungen für professionellen Einsatz:

**EN 55103-1 / 2005** Teil 1: Störaussendung

**EN 55103-2 / 2005** Teil 2: Störfestigkeit

Product family standard for audio, video,  
audio-visual and entertainment lightning  
control apparatus for professional use:

**EN 55103-1 / 2005** Part 1: Emission

**EN 55103-2 / 2005** Part 2: Immunity

### **2011/65/EU, RoHS Richtlinie**

### **2011/65/EU; RoHS directive**

### **2012/19/EU, WEEE Richtlinie**

(Mitgliedsnummer DE 26076388)

### **2012/19/EU, WEEE directive**

Member No.: DE 26076388

**Lake People electronic GmbH**  
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Konstanz 14.09.2015, Fried Reim, Geschäftsführer / CEO