Nagra PL–L Preamplifier

Owner's Instruction manual

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Congratulations

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You have just purchased one of the best audiophile preamplifiers ever made! The Nagra PL–L “Préamplificateur à Lampes – Ligne” (valve line preamplifier) is designed to provide the highest quality of audio performance in an ultra–high-resolution audio system.

The Nagra PL–L was created by an engineering team with over 50 years of experience designing world–class products for professional audio, national security and military businesses. Since its inception in 1951, Nagra products continue to earn a reputation for delivering the best possible sonic and mechanical performance under many very difficult operating conditions. Numerous awards have been bestowed upon Nagra for its technical innovation, excellence in design and flawless construction.

In building the PL–L preamplifier, significant effort has been focused on building a product that is robust, easy to use and with sonic properties that will delight even the most demanding and critical audiophile.

Thank you for being our customer and enjoy your new Nagra PL–L preamplifier!

Warranty

Warranty

NAGRAVISION SA KUDELSKI GROUP certifies that this instrument was thoroughly inspected and tested prior to leaving our factory and is in accordance with the data given in the accompanying test sheet.

We guarantee the products of our own manufacture against any defect arising from faulty manufacturing for a period of three years (tubes only six months) from the date of delivery.

This limited warranty covers the repair of confirmed defects or, if necessary, the replacement of the faulty parts, excluding all other indemnities.

All freight costs, as well as customs duty and other possible charges, are at the customer's expense.

Our warranty remains valid in the event of emergency repairs or modification being made by the user. However we reserve the right to invoice the customer for any damage caused by an unqualified person or a false maneuver by the operator.

We decline any responsibility for any and all damages resulting, directly or indirectly, from the use of our products.

Other products sold by NAGRAVISION SA KUDELSKI GROUP are covered by the warranty clauses of their respective manufacturers.

We decline any responsibility for damages resulting from the use of these products. We reserve the right to modify the product, and / or the specifications without notice.

About your PL-L

About your PL-L

You are about to experience music as never before with the Nagra PL–L preamplifier.

The PL–L is designed and hand–built entirely in Switzerland by Nagra engineers, using components of the highest quality from around the world.

- It uses 3 high–grade vacuum tubes and Nagra–made transformers to provide a variety of operating options.
- The power supply of the PL–L is designed to deliver quiet and stable performance suitable for the highest resolution audio system. It is completely isolated from AC line noises.
- The PL–L accepts up to 4 line–level input sources, such as tuners, compact disk players and video tape recorders. The 4 input sources are asymmetrical.
- A traditional Nagra high–precision modulometer provides the facility to accurately monitor, match and balance output levels.
- The outputs of the PL–L are directly coupled to the output vacuum tubes for the highest audio performance. There are two Asymmetrical sets of connectors to allow bi–amp setups and 1 optional symmetrical output.
- An optional remote control for selecting the different input sources, adjusting balance and output levels.
- The PL–L case is CNC–machined in hardened, anodized aluminum. It is designed to provide many years of durable service and to comply with all existing electrical safety and electromagnetic emissions standards.

This manual describes the proper setup and use of the PL–L. Please read through the manual carefully before attempting to set up and use the PL–L. Mishandling and abuse of the PL–L leading to faulty operation is not under warranty.

Basic Operations

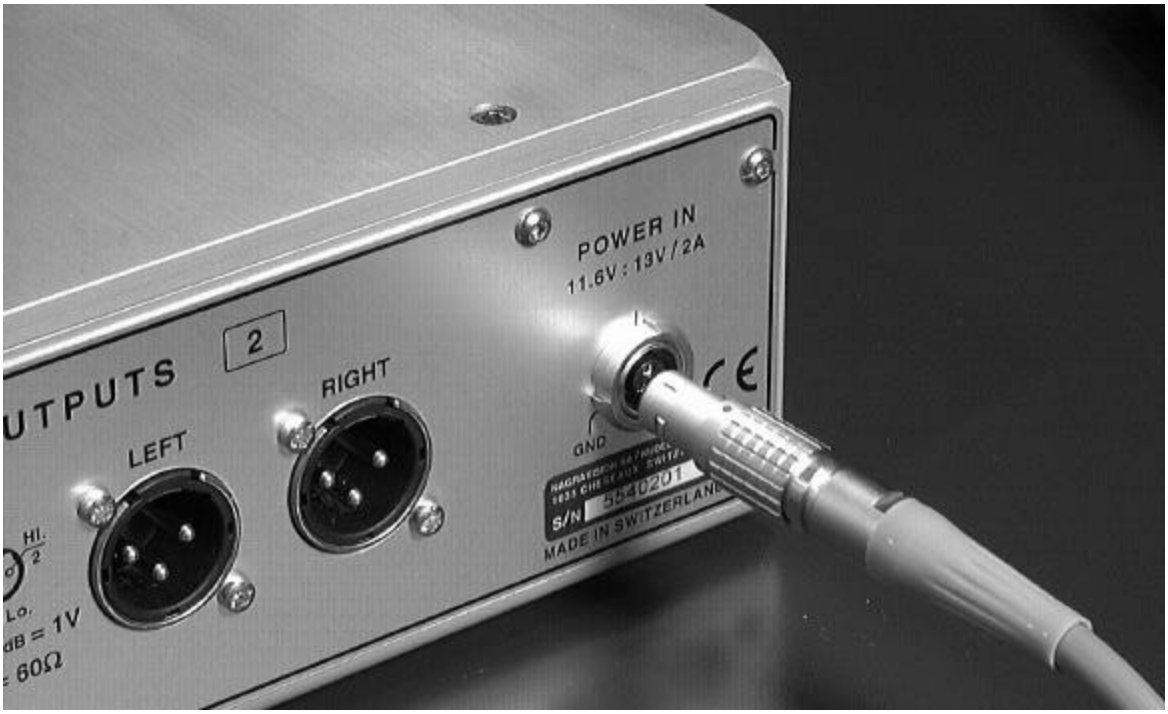
NAGRA PL–L and the ACPS power supply

Connecting the “ACPS” AC Power Supply

Verify that the main selector on the front panel of the PL-L is set to OFF. The male Lemo connector of the ACPS AC power supply unit can be connected to the female input socket, marked POWER IN, on the right side panel of the PL–L. The Lemo connector has a red dot that should be oriented face upwards when inserting into the socket. Fully seat the connector in the socket.

Connecting the PL-L AC Power Supply

Correct way to connect the ACPS power supply



(Note the position of the red dot on the plug)

With the Lemo connector inserted, connect the IEC–specification power cord to the ACPS AC power supply unit and to an approved AC power outlet. A red LED on the ACPS shows that DC output voltage is available.

The proper operating range of the ACPS AC power supply unit is as follows:

- Input Voltage 90-132 and 180-264 Volts, AC
- Frequency 50-60 Hz

If the PL-L does not turn ON, this indicates that a faulty condition exists with the following possibilities:

The male Lemo connector of the ACPS is not properly connected and/or seated in the socket of the PL–L.

The internal fuse F1 on the motherboard of the PL-L has blown. (Please refer to an authorized NAGRA agency for the repair).

If the red LED on the ACPS is not lit, the following conditions may exist:

The power cord of the ACPS is not connected properly to the AC power outlet.
The internal fuse of the ACPS AC power supply unit is faulty or blown.

To restore proper operating conditions, examine each point above and correct if necessary. If the condition persists, please return the PL–L and the ACPS to an authorized Nagra service agency.

ACPS and the red LED.

Vacuum Tube Identification and Location

Each vacuum tube used in the PL–L has been burned–in for 12 hours, thoroughly tested with each tube being subjected to 400 measurements before final selection at the Nagra factory to ensure the highest level of performance. Two types of vacuum tubes are used:

- 12 AT 7 / ECC 81
- 12 AX 7 / ECC 83

Many variants of these vacuum tube types are available and may function in the PL–L. However, proper selection and use of vacuum tubes other than those supplied by Nagra is at the owner's responsibility. If the PL–L is damaged due to the use of non–factory selected vacuum tubes, the warranty will be rendered null and void.

The PL–L is shipped from the factory with vacuum tubes installed in their proper locations. Since the unit may have been subject to unexpected shock in transit, it is prudent to check that each vacuum tube is seated properly in its socket before operation, using a cotton glove.

To seat each vacuum tube properly, ensure that the PL–L is powered off. Disconnect the ACPS AC power supply unit and by using the screwdriver from the toolkit, remove the top plate. If the unit has just been powered off, please wait 5 minutes for the vacuum tubes to cool down before handling them. Wearing the glove, place two fingers around the cylindrical part of a vacuum tube to hold it firmly. Push the vacuum tube very gently in a downward, vertical motion until it is completely seated.

In the unlikely event that vacuum tubes became unseated in transit, please refer to the following diagram to identify the vacuum tube required at each socket position and place them in the manner described above.

The PL–L is also furnished with 1 vacuum tube usage timer. It is mounted internally on the printed circuit board as shown on page 12. When the power is turned on, this usage timer will time the usage of the vacuum tubes up to the maximum limit of 5,000 power–on hours (1division corresponds to 500 hours).

When the timer indicate close to the 5,000 hours maximum, vacuum tube replacement is recommended. We suggest that you use **the spare tube kit** available from your authorized dealer, which includes Nagra–tested vacuum tubes as well as one new usage timer.

Remote control

Buttons 1 to 6
This remote control can be used as a common control for different Nagra products. The buttons 1 to 6 permit to select up to 6 Nagra products equipped with the remote control receiver. Dedicating a selected product number to the PL-L is made by a jumper selection inside the machine.

Buttons A to D
Permit to select on the PL-L the different line inputs. Buttons E & F are not used for the PL-L.
The main selector of the PL-L must be in the fully clock wise position (Remote position), if not, the remote control is only enabled for Volume and Balance adjustments.

Mute
Pressing once on the mute button, the PL-L output is muted. Pressing once the line input (A to D) button, the outputs are enabled.

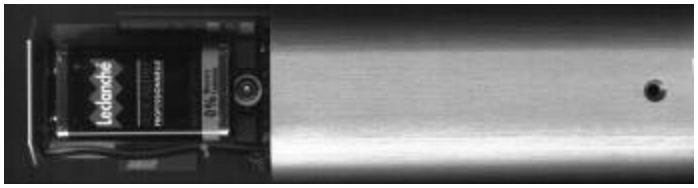
ON & OFF
When the OFF button is pressed, the PL-L switches to the standby position if the main selector is in the fully clock wise position (Remote position "**R**"). Only the power to the remote control receiver stays on.
When the ON button is pressed, the PL-L switches back ON if the main selector is in fully clockwise position.

Up & Down arrow keys
Adjusts the Volume potentiometer. When continuously pressing those buttons, the volume will increase or decrease over a 1/5 of the full range. To continue the adjustment, release and press again the same button.

Left & Right arrow keys
Adjust the Balance potentiometer.

Center button
Not used with the PL-L.

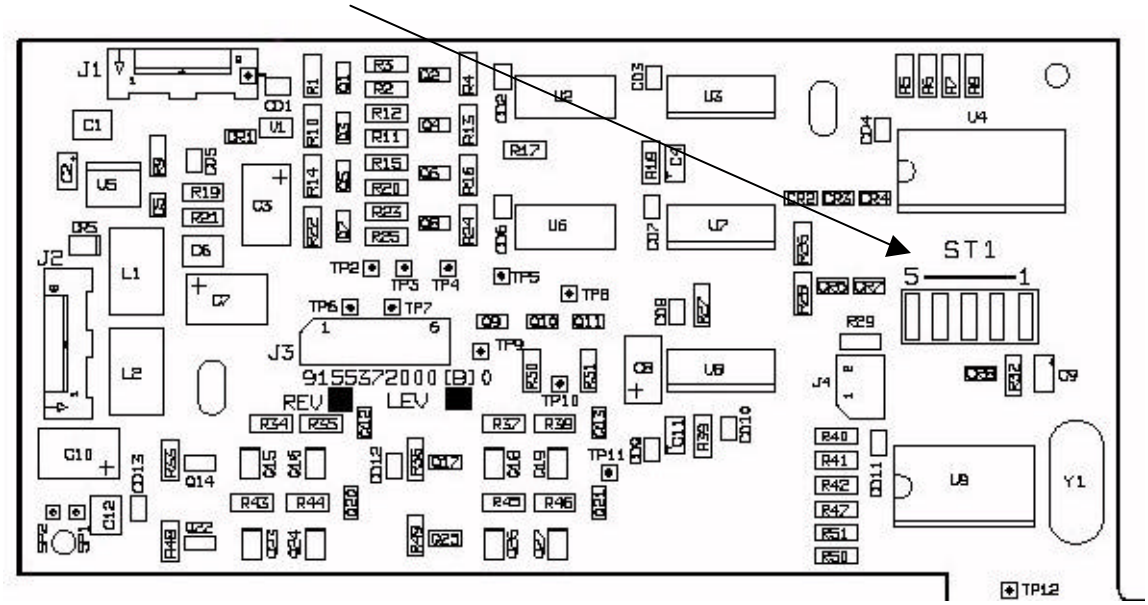
Battery installation



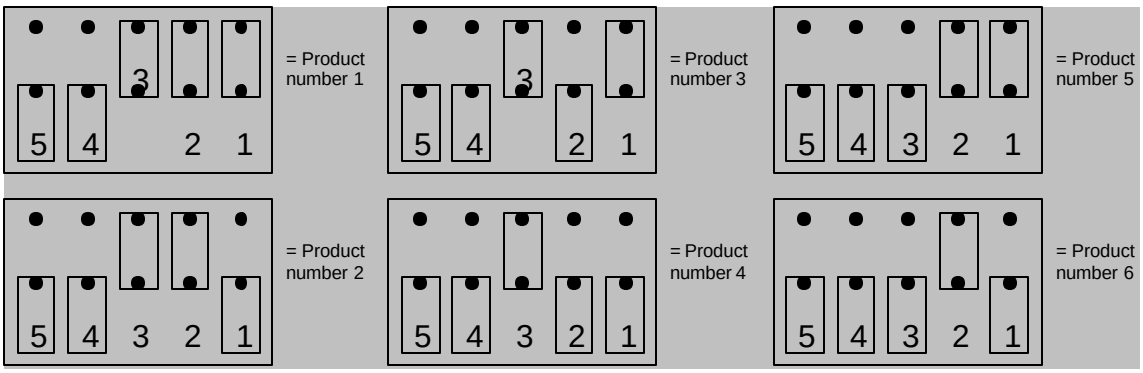
Turn over the remote control and remove the screw (screwdriver No 3).
Slide the housing from the front panel.
Install the 9V battery
Reinstall the housing and lock the screw.

Product number for the remote receiver

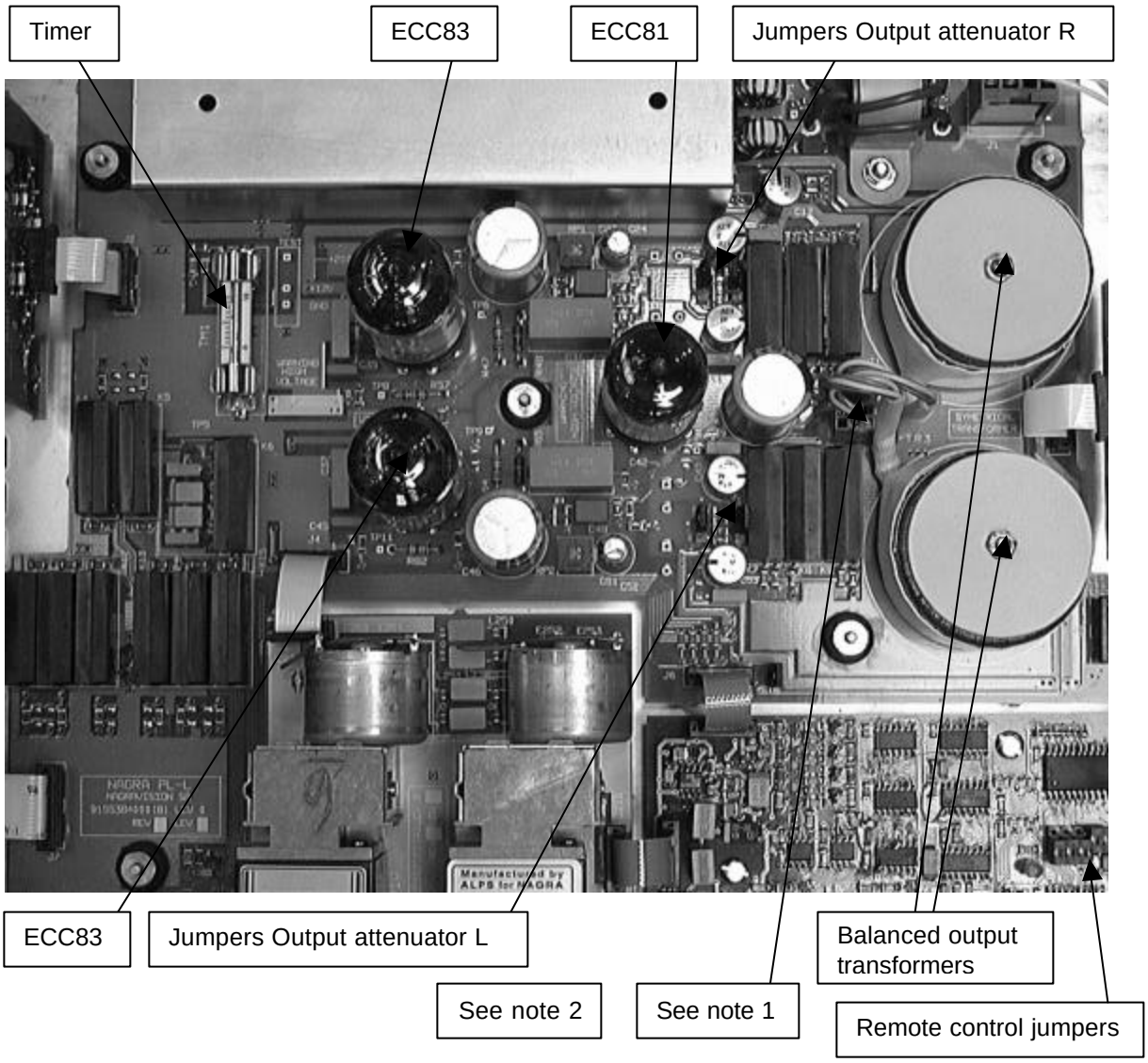
Remove the top panel from the PL-L following the instructions described under paragraph “Vacuum Tube Identification and Location”. Locate the Remote receiver board in the right corner towards the front panel. Locate the 5 jumpers “ST1”.



The PL-L is factory set to work as product number “1”
The following positions can be set:



Tube, Jumpers and timer positions



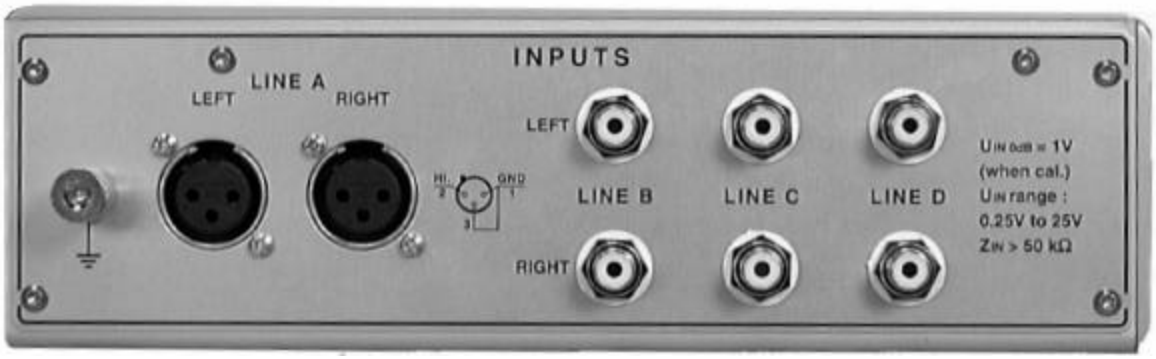
Note 1: If the balanced option is installed, the transformer wires are connected. If no option is installed, 3 jumpers per channel are plugged.

Note 2: Jumper ST6, do not remove in any case.

Burn–in Period

With the NAGRA PL–L a period of about 250 ~ 300 hours of use will allow all components within the circuits to reach a level of operating equilibrium. At the end of this period, the mechanical and sonic performance of the PL–L will have had an opportunity to reach its full performance potential. Serious audition and permanent installation options should only be evaluated after a complete burn–in has occurred.

Left Panel / Input Layout



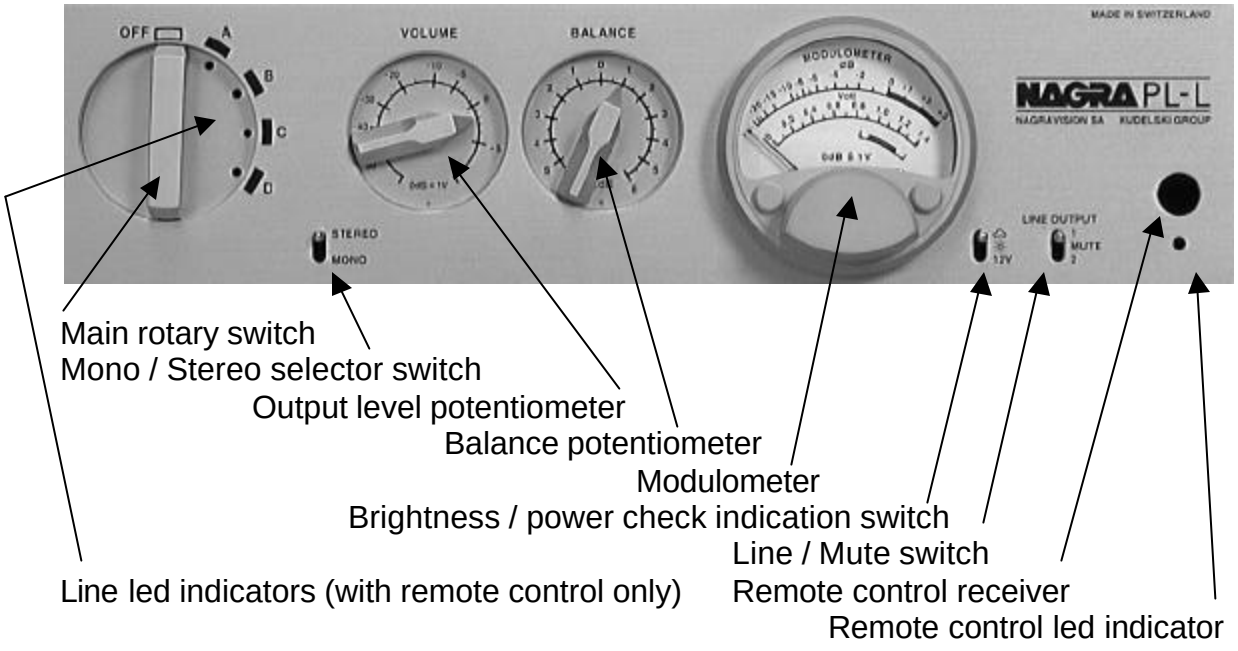
The left panel consists of four sets of stereo input connectors:

- One set of XLR input connectors for asymmetrical line-level.
- Three sets of RCA input connectors for line–level connections are configurable to accept source inputs such as tuners, compact disk players or video tape recorders.

In addition, a technical ground post is provided for the connection of a ground source to eliminate possible ground loops, which can lead to hum.

To connect input sources ensure that the PL–L is powered off or muted and insert the corresponding connector into the line connectors.

Front Panel/Control Layout



The front panel consists of a variety of controls and a modulometer. Starting at the left of the front panel, they are:

- **The Main Rotary Switch**

Powering the PL–L and input selection is provided through the main rotary switch on the left–hand side of the front panel. This 6–position rotary switch turns the PL–L on and off as well as facilitates selection of all input sources. The positions of this main rotary switch corresponds with the following labels, clockwise from top to bottom:

"**OFF**" – No power is supplied to any audio stages. A red stripe is printed on the backing plate in the space occupied by the switch handle to alert the user of having switched the unit from the "OFF" position.

"**LINE A**" – Line A input is selected. Power is supplied to all active electronic stages. A 15–second mute function engages when the main rotary switch is activated to this position to eliminate clicks and pops and surge voltages at the output stage. This stays identical if from power off line B, C or D was selected.

"**LINE B**" – Line B input is selected. Power is supplied to all active electronic stages.

"**LINE C**" – Line C input is selected. Power is supplied to all active electronic stages.

"**LINE D**" – Line D input is selected. Power is supplied to all active electronic stages.

"**FULL CLOCK WISE POSITION**" **"R"** This is the position for the remote control. In this position by remote control, the different line inputs as well as power ON or OFF can be selected.

- **Mono/Stereo switch**

A toggle switch to the right of the main rotary switch on the front panel allows the selection of mono or stereo operation.

- **Volume and Balance Potentiometers**

Output level gain for both channels can be controlled via the volume potentiometer. The balance potentiometer on the front panel permits to balance the right and left channel in a range of +/- 6 dB. The scale of the volume potentiometer is calibrated in a logarithmic–scale and represent the amplification of the input amplifier, before the modulometer, for both channels.

o **Modulometer**

A highly precise, Nagra–made modulometer identical to the legendary NAGRA IV, provides a multitude of indications through 2 coaxial, internal pointers representing the left and right channels. The black indicator pointer represents the left channel and red is for the right channel.

Suggested uses of this instrument are covered in the Advanced Operations portion (page 17) of this manual, under “Using the Modulometer” section.

o **Modulometer lamp/Power Check switch**

This is a 3–position switch. The functions are as follows:

In the upper position, it turns on the modulometer lamp.
In the middle position, it turns off the modulometer lamp.

In the momentary lower position, the needle indicates the correct DC input voltage (green area). Factory adjusted for 12V green area center position.

o **Line/Mute switch**

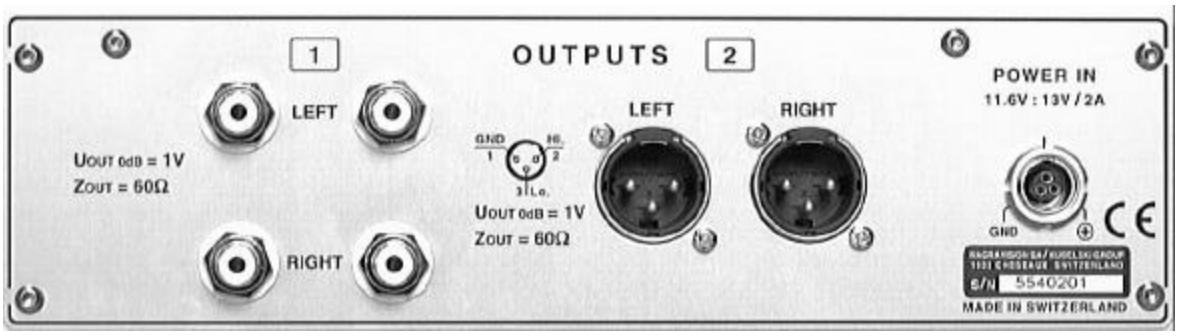
This is a 3–position switch. The functions are as follows:

In the upper position, output is directed to the “Line output 1” RCA connectors on the right side panel

In the middle position, output is muted.

In the lower position, output is directed to the “Line output 2” XLR connectors on the right side panel.

Right Panel/Output Layout



The right panel consists of two sets of RCA stereo output connectors and one set of XLR connectors as well as the external DC power input connector:

Two sets of RCA output connectors are available to feed power amplifiers for bi–amping applications.

One set of XLR output connectors is provided for symmetrical and floating (option with very high quality transformers) or asymmetrical connection to an amplifier.

The level of the output connectors can be modified (internally) to match the level for the amplifier. See advanced operations.

Before connecting to the power amplifier, ensure that the PL–L and the power amplifier are powered off. Insert the corresponding connectors into either one or both sets of the output connectors.

Adjusting the internal jumpers for output level is covered in Configuration guidance “Output Customization”.
To gain access to the inside of the PL–L case, ensure that the PL–L is powered off, disconnect the ACPS power supply unit and remove the top plate by removing the four hex screws using the supplied ISO/Allen 2.5 mm key. Lift the top plate off the PL–L case carefully. If the unit has just been powered off, please wait 5 minutes for the vacuum tubes to cool down before handling any item inside the PL–L case to avoid potential burns or injury.

Advanced Operations

Using the modulometer

Description

The PL–L is equipped with a highly precise multiple purpose Nagra modulometer. It has two coaxial pointers, the black representing the Left Channel and the red representing the Right Channel. The face of the instrument is graduated with 3 scales and can be illuminated by two internal LEDs.

The modulometer is a precision instrument with very special pointer ballistics. A modulometer is different from a VU or a PPM meter. They share a common purpose of indication, and a brief description of each follows:

o Modulometer

The modulometer measures the peak value of the signal, irrespective of the form or the level, and takes into consideration the strongest positive or negative value. It is equipped with a memory, so that with very brief signals, the pointer advances and stays for a sufficient time in order for a reading to be taken. The modulometer measures signals that can affect systems prone to overloading such as amplifiers and radio transmitters. It shows signal peaks that would saturate – an average value of the signal is of little value in preventing system overload. In particular, while monitoring spikes, indications from the modulometer are always exact, no matter how long the duration of the spike may be.

o VU Meter

On the contrary versus the modulometer, the VU meter has the same rise and fall time. It indicates the accurate physiological sound level with a good balance between speech and music. It is used a lot in sound post-production houses. It's not at all adapted for the PL-L
.

Modulometer calibration and its use

There are 3 scales and 1 legend printed on the face of the instrument:

- Logarithmic–scale markings in relative dB from –? to +3 dB indicating the output level.
- Linear–scale markings in absolute voltage from 0 to 1.4 Volts corresponding to the –? to +3 dB scale referenced to 1.0 Volt at the output connectors.
- Green areas indicating the limits for the power supply.
- A written legend, “0 dB = 1.0 V”, printed on the lower center portion of the dial on the instrument, reminds the user that all markings are referenced to 0 dB = 1.0 Volt on the output connectors.

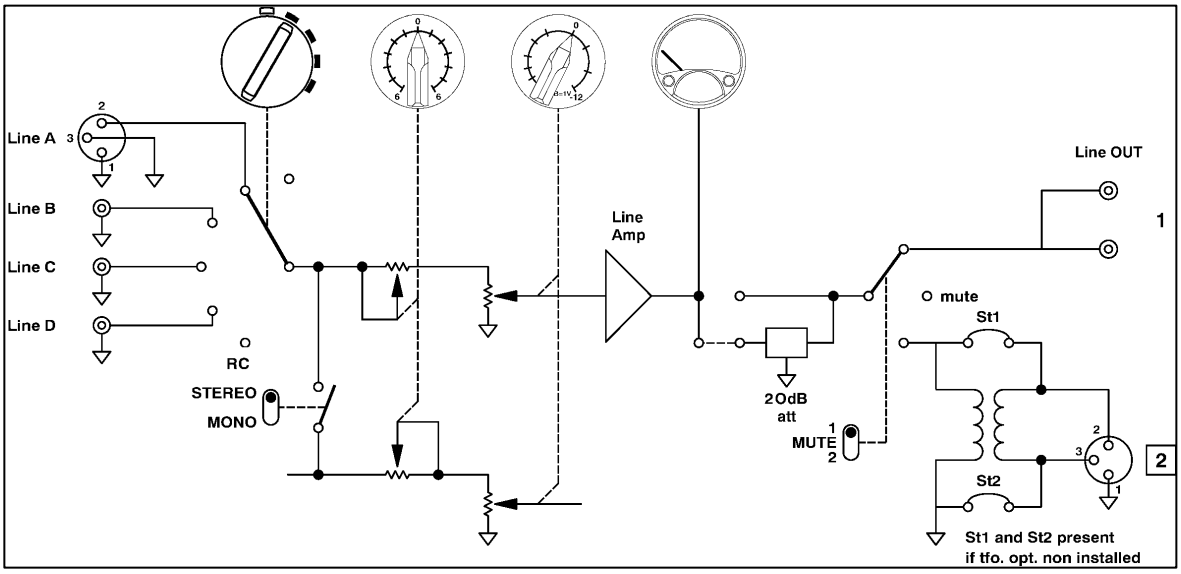
The modulometer can be used to adjust the volume and balance potentiometers for reaching:

- A proper balance between left and right channels,
- Recorded level differences between various recordings.
- With the correct adjustment of the power amplifier input, it can be used to measure the output level of the amplifier as well as a very precise indication in the event of saturation.

o Checking the external DC input level that should be inside the green area (11.6 V to 13 V).

Note: With both volume and balance potentiometers set at “0” on their respective scales, a 1.0 V input signal at Line A, Line B, Line C or Line D input connectors will register 0 dB on the modulometer scale and produce a 1.0 V output signal at the output connectors (factory adjusted).

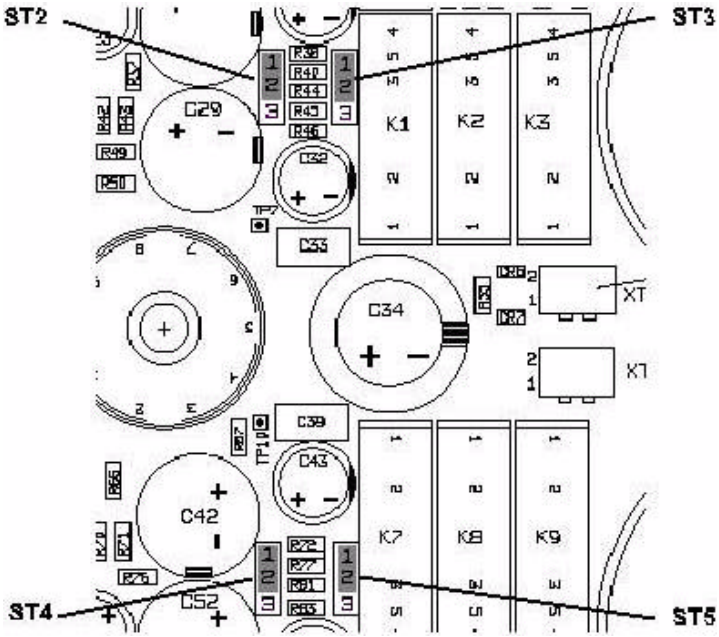
Block diagram



Output level attenuation

The PL-L is factory set to 0 dB output level (position 2-3).

If the output level is too high, it can be attenuated by 20 dB by moving the 4 jumpers to the position 1-2 (See figure).



Hum

The exceptional audio performances of your PL–L will give you hours of listening pleasure. However, you can only benefit from the total quality of your PL–L if it has been correctly installed.

Any error in the connection of the system is likely to create hum caused by AC ground loops. The first step is to be sure that all the various units in the system (DVD, PL–L, amplifier, CD–player, etc...) are powered correctly.

As a preamble, we will explain the hurdle. Any wire has an electrical resistance, and all currents passing through a resistance create a drop in voltage. Depending upon where the voltage drop occurs, you will be confronted with more or less AC hum.

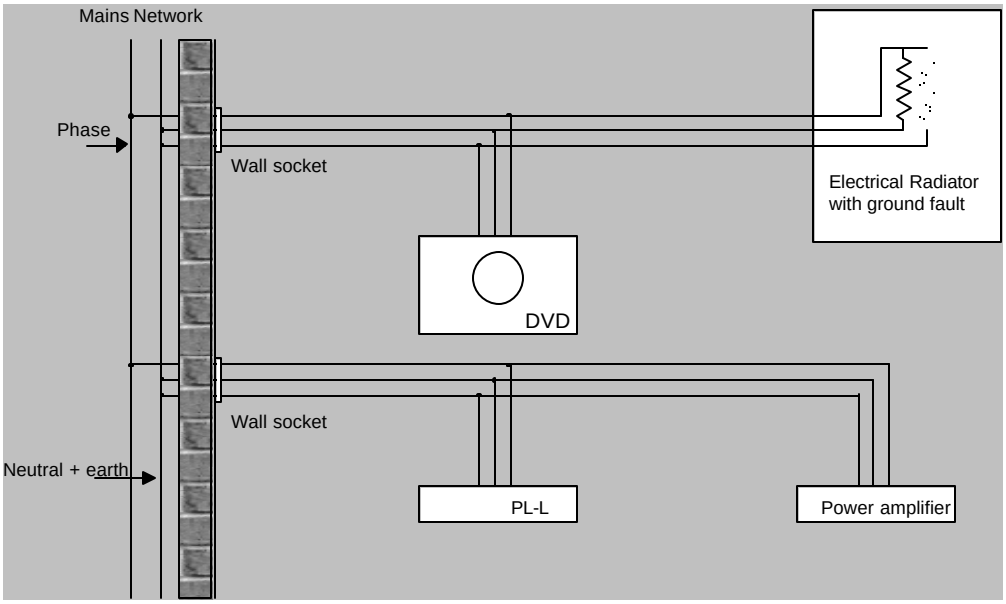
Normally, the AC network that powers your equipment is made up of three separate conductors, these being the ground/earth, the neutral and the phase, the latter two allow the passage of energy to the device being powered. The latter two wires are not floating; the phase wire, which should not be touched for risk of electric shocks, carries a high alternating potential (110V or 220V), whereas the neutral wire is very close to the ground/earth and can normally be touched (in principle!) without any risk. Normally these two wires carry an identical current, one being the return of the other.

The third wire, the ground/earth, allows all the chassis' of all the equipment in the installation to be linked together. It constitutes a security in the event that one of the pieces of equipment has a break in the isolation of the phase.

In principle, this wire carries no current, and therefore according to the theory above, there should not be any difference in potential between different points along its length. Unfortunately, this is not always the case.
In fact, the demands of modern regulatory standards regarding high frequency protection create a significant circulating current along the length of this wire.
In addition, it is possible that various pieces of equipment connected to your AC network, without being defective, present an earth problem, which in itself causes a loop current within this precious earth wire. Finally there is the most frequent case, where the neutral and the earth wires are one, and cause these currents to be carried throughout your installation, causing in most cases terrible AC hum.

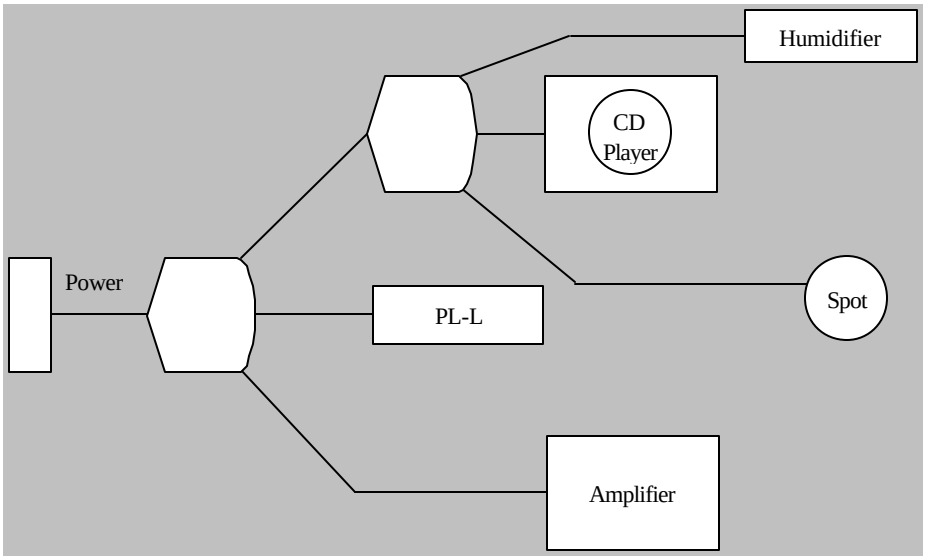
If you find yourself confronted with a situation similar to that shown below, you have every chance that you will be listening to the mains hum rather than your favorite piece of music!

INCORRECT: (presence of a faulty radiator, with the DVD and audio installation connected on two different plugs).



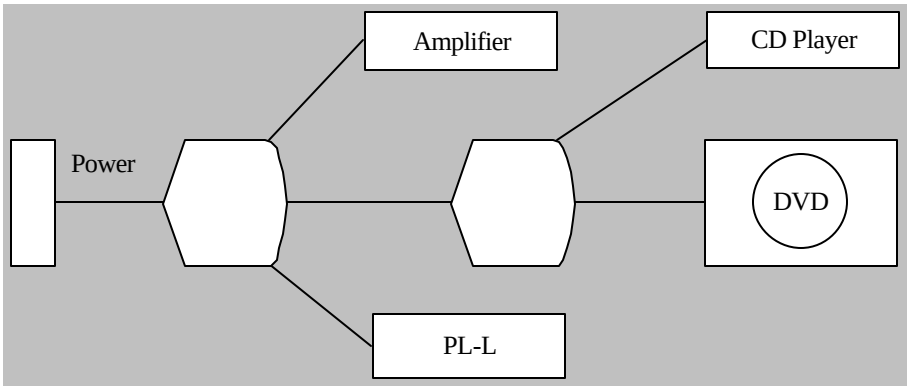
Once the theory above is understood, the recommendations, which are to follow, may seem somewhat evident. For those who have not followed to this point, simply pay careful attention to the following elementary rules.

- Power your entire installation from one single wall socket, and avoid connecting any equipment that is not linked to the installation to this power source (i.e. spotlights etc).

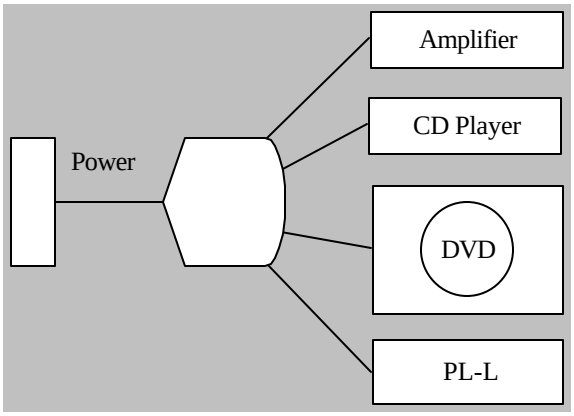


In this example both the humidifier and the spotlight should not be connected to the same plug. From your single power socket, try as much as possible to use “single point” connection rather than multi point (see below).

INCORRECT – Multi point

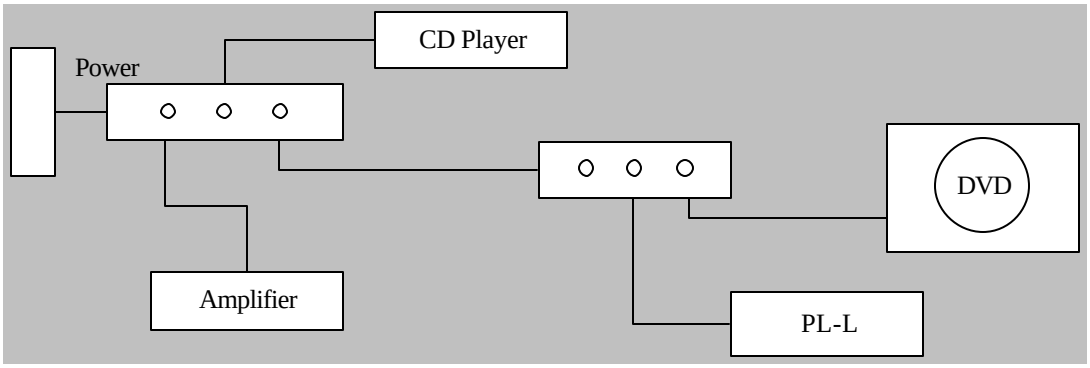


CORRECT – Single point



A third solution, which is equally viable, is to connect the individual units to the wall connector starting with the highest power consumers and finishing with the lowest power consumer. Equally the units using high level audio signals together and those with lower levels together, as indicated in the diagram below.

CORRECT connection diagram.



These few basic indications allow you to start in the correct direction for obtaining the best from your system with your PL–L.

Specifications

Specifications

Electrical		
Input impedance	> 110k Ohm	
Output impedance	60 Ohm	

S/N ratio / Ref 1V	> 88 dB	A-weighted

Min Vin for 0 dB out	0.25 Vrms	
Max Vin for 0 dB out	25 Vrms	

Dynamic range	100 dB	+12 dB output

Bandwidth	20 Hz – 100 kHz	+ 0 / - 1 dB

Distortion	< 0.02 %	1 V out, no load at 1 kHz
	< 0.10 %	2 V out, 600 Ohm load

Physical		
Vacuum tubes	2	12AX7 / ECC83
	1	12AT7 / ECC81
	1	5,000-hour usage timer

Power consumption	12 V	900 mA

Dimensions	Width	12.2"	310 mm
	Depth	10.0"	254 mm
	Height	3.0"	76 mm

Weight	7 lbs.	3.20 kg

DECLARATION DE CONFORMITE
DECLARATION OF CONFORMITY

CE

FABRICANT: NAGRA - KUDELSKI, 1033 Cheseaux SUISSE
MANUFACTURER: *NAGRA-KUDELSKI, 1033 CHESEAUX, SWITZERLAND*

APPAREIL : PL-L & ACPS & RCU
MODEL: *PL-L & ACPS & RCU*

NORMES GENERIQUES APPLICABLES :
APPLICABLE GENERIC NORMS:

EN 55022 Cl. B	Champ électromagnétique rayonné
EN 55022 Cl. B	*Radiated electromagnetic field*
EN 55022 Cl. B	Perturbations conduites sur secteur
EN 55022 Cl. B	*Disturbance voltage on mains terminal*
EN 61000-4-3	Immunité aux champs électromagnétique
EN 61000-4-3	*Immunity to electromagnetic fields*
EN 61000-4-2	Immunité aux décharges électrostatiques
EN 61000-4-2	*Immunity to electrostatic discharges*

Par la présente nous déclarons l'équipement conforme aux exigences de protection de la Directive européenne 89/336/CEE relative à la compatibilité électromagnétique pour environnement commercial et l'industrie légère.

We hereby declare that the equipment conforms to the requirements of the European guidelines 89/336/CEE referring to the electromagnetic compatibility for commerce and light industry.

Cheseaux 3ème trimestre 2001
Cheseaux 3rd quarter 2001

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