



## Nagra Jazz preamplifier Development review

## 1. GENERAL OVERVIEW

### 1.1 Incremental evolution

There have been some major technological developments in the area of hi-fi innovation over the years, such as the arrival of transistors or digital. But mainly, the industry evolves little by little as improvements to electronic components are successively introduced and as circuits and their implementation are constantly optimised.

It is in the extreme attention to detail and mastery of manufacturing techniques that current engineering often finds its biggest potential for improvement. In order for a new generation of machines to do better than its predecessor, existing boundaries have to be rolled back on every front and often in tiny proportions.

This incremental improvement is something that Nagra has always espoused from its very beginnings. It makes an essential contribution to the longevity of the brand's equipments, as it means that new products are launched with parsimony: a new model only replaces an existing one when it can bring an appreciable benefit to the user.

This is the path that has been followed by the new Nagra Jazz preamplifier, which continues in the footsteps of the Nagra PL-P and Nagra PL-L models. Launched in 1997 and 2001, these two valve preamplifiers became benchmarks for their time and are still highly rated in the world hierarchy of top hi-fi equipment. Having been revised from top to bottom, the Nagra Jazz is now up to the task of taking over the mantle from its prestigious predecessors and takes another step nearer towards total audio fidelity. Its name "Jazz" breaks with the Nagra tradition of calling its machines after acronyms (for example, the PL-P for *Préamplificateur à Lampes – Phono*, or in English, Valve Preamplifier – Phono) and pays respect to the legendary Montreux Jazz Festival where Nagra has been a partner for many years.

## 2. DEVELOPMENT OBJECTIVES

### 2.1 The Sound of Silence

The silence of an electronic circuit is one of the main criteria in a listener's evaluation of what he or she is hearing. The human ear calibrates itself, whether consciously or unconsciously, on the background noise generated by a machine in order to appreciate the dynamic range produced by the music. The lower the noise threshold, the greater the "space" in which this dynamic range can express itself which will correctly be perceived as open, clean and natural, increasing the impression of realistic sound.

A large part of the work carried out by the engineers in the development of the Nagra Jazz concentrated on this aspect. The two preamplifiers PL-P and PL-L already displayed excellent levels of signal to noise ratio, reaching 100 dB. But given current knowledge and state of the art technology, a noticeable gain in this area could still be expected. Taken together, the changes decided upon have borne fruit as the Nagra Jazz, which is also valve based, now offers a signal to noise ratio greater than 105 dB.

In this way, the machine is able to match the performance of the quietest digital sources currently available. Using it with these sources is ideal as no additional noise is generated by the preamplifier, which is all noise that would be amplified by the power amplifiers downstream.

## **2.2 Simplification and rationalisation wherever technology allows**

The progress achieved in electronics increases not only performance potential but also contributes to a general reduction in complexity and the size of the circuitry. The engineer makes the most of this to create solutions which are increasingly stripped down and simplified, in order to benefit from all the advantages that this implies, such as the reduction of the noise threshold, the heat generated, the power consumption and the risk of breakdowns.

The evolution in design which has directly benefitted the Nagra Jazz allows it, for example, to do away with the Nagra PL-P battery power supply that appeared at the time as the ultimate solution for achieving a very low noise threshold with valve circuitry. Better results are now obtainable with simplified designs.

The circuits have been designed with the shortest possible paths which bolsters their immunity to disturbances and radiation.

The increased compactness of the circuits has also allowed new features to be incorporated, such as the motorisation of the volume and balance potentiometers as well as the input selector which can now be controlled remotely. A symmetrical input and output via an XLR connection have also been added.

All the connectors are now mounted on the back plate rather than on the sides of the machine which was the tradition on the earlier models. The older location of the connectors, which was taken from the Nagra tape recorders, was particularly suitable for a professional usage where it is often necessary to access the connections. The new location is more in keeping with criteria which suit home use.

## **2.3 Suitability for multiple sources**

All sorts of sources, both digital and analogical, which are likely to be hooked up to a preamplifier these days, deliver a signal which may vary notably. Too weak a signal and the preamplifier will not allow to exploit all the power of the amplifier. Should the signal be too strong, the amplifier will be pushed into saturation before the volume even attains its maximum level.

The Nagra Jazz brings a solution to this problem by offering two distinct gain levels which can be switched via a selector. In the "0 dB" position, the machine adds no gain at all and acts like almost a passive preamplifier. In the "12 dB" position, maximum gain is provided, which is suitable for low level source inputs.

## **2.4 Upgradeability**

The Nagra Jazz has been designed to be adaptable to various different uses. The "A" input via XLR balanced connectors can thus be optionally equipped with a circuit which in the same way as the machine's symmetrical output, uses high performance transformers which have been wound by Nagra. The symmetrical input is especially recommended when the cable between the source and the preamplifier is particularly long. The circuit can be factory supplied or fitted subsequently, which means that the machine can be upgraded at any time.

The preamplifier's power supply is mounted in a separate external case. The first advantage of this layout is to avoid bringing mains alternating current into the interior of the preamplifier, which would introduce a potential source of disturbance to the circuits. But there is an additional advantage: it means that the power supply may be upgraded in the future to any new power supplies that Nagra may develop. This is a valuable plus as the company is constantly innovating in this area.

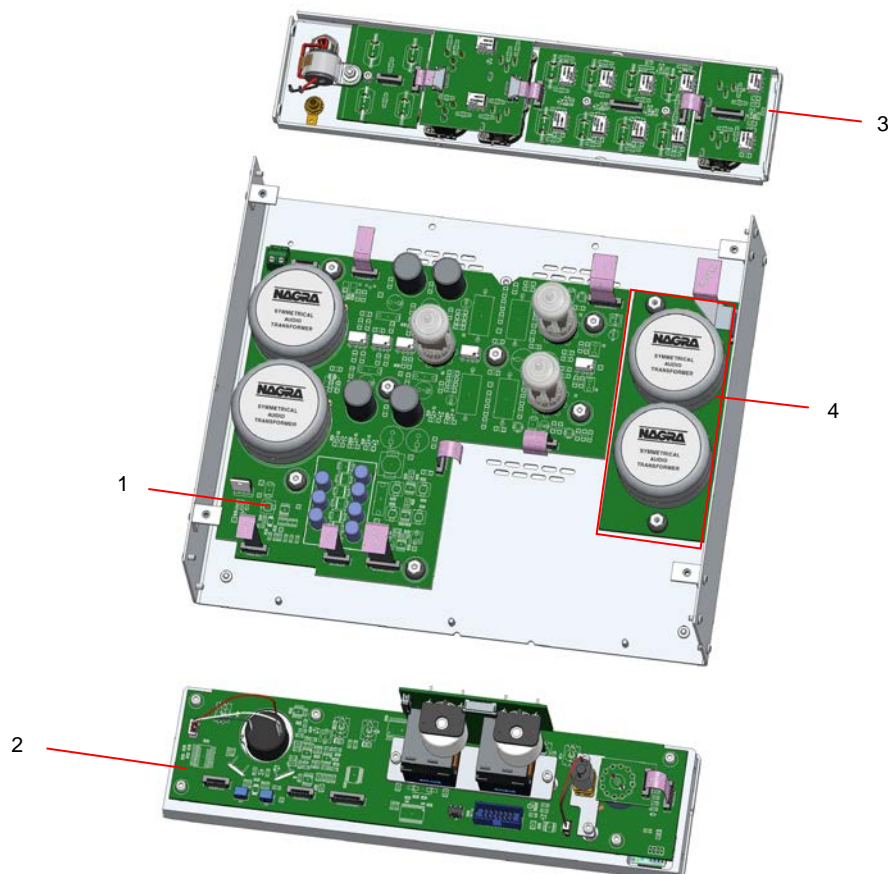
### 2.5 Taking its place in the range

Nagra Jazz preamplifiers respect the aesthetics of the brand in terms of format, ergonomics and finish. They are designed by the same engineers and made by the same team as the professional recorders, according to the same peerless standards.

## 3. DESCRIPTION OF THE ELECTRONICS

The Nagra Jazz preamplifier is built around three groups of printed circuits, as well as a fourth one for the optional symmetrical input circuit with Nagra transformers.

These four-layered, gold-plated, epoxy glass circuits are of military grade. They form the basis for the machine's components which have been chosen according to the most rigorous criteria in terms of tolerances, durability and listening performance. It includes a ground layer which screens out disturbances and radiation and stops static loops which might give rise to hum. They are linked together with ribbon cables which ensure that the paths between them are as short as possible. The motherboard is mounted on elastomer silent blocks which filter out vibrations.



1. Motherboard
2. User-controlled circuits on the front panel
3. Input/output connector circuits
4. Optional symmetrical input circuit with Nagra transformers

### **3.1 Input/output selector circuits**

The circuits mounted on the back panel, to which the connectors are directly soldered so as to avoid any wiring, carry the input and output selector switches. They are made up of four boards, two for XLR input/outputs and a further two for Cinch input/outputs.

The Nagra Jazz has five inputs, one for XLR connectors (A) and four for Cinch connectors (B, C, D and E). All the inputs use the floating system which allows the signal to be managed pseudo-symmetrically until it reaches the amplification circuit. Each is filtered to eliminate radio-magnetic interference (RMI) by a combination of selfs/condensers. The input switching is handled by tandems of high-quality relays. Only the earth of the active input is connected, all the others being removed from the circuit so that no static loops are created with and between the inactive sources. A sixth XLR input connection is destined for a bypass mode which allows the connected source to be diverted directly to the XLR output when the machine is not working and even if it is disconnected.

The machine has two outputs which are relay-switchable. One of these is balanced via XLR connectors and the other is unbalanced via two pairs of Cinch connectors allowing bi-amplification for instance.

### **3.2 Switch circuits**

The main switch circuit is mounted behind the front panel which also carries two sub-circuits which control the motorised volume, balance and input selection.

The main circuit includes a microprocessor which controls all the management functions. It is responsible for input selection, the remote-controlled functions, the muting of the amplification stages and the display of the output signal level via a modulometer. It also enables the machine to soft start by delaying the application of high-voltage current to the valves for 20 seconds in order to protect them from premature wear which can occur when they are started from cold.

The motorised Blue Velvet volume and balance potentiometers are manufactured by Alps. These components are renowned for their precision in pairing tracks and their reliability over time.

### **3.3 Motherboard**

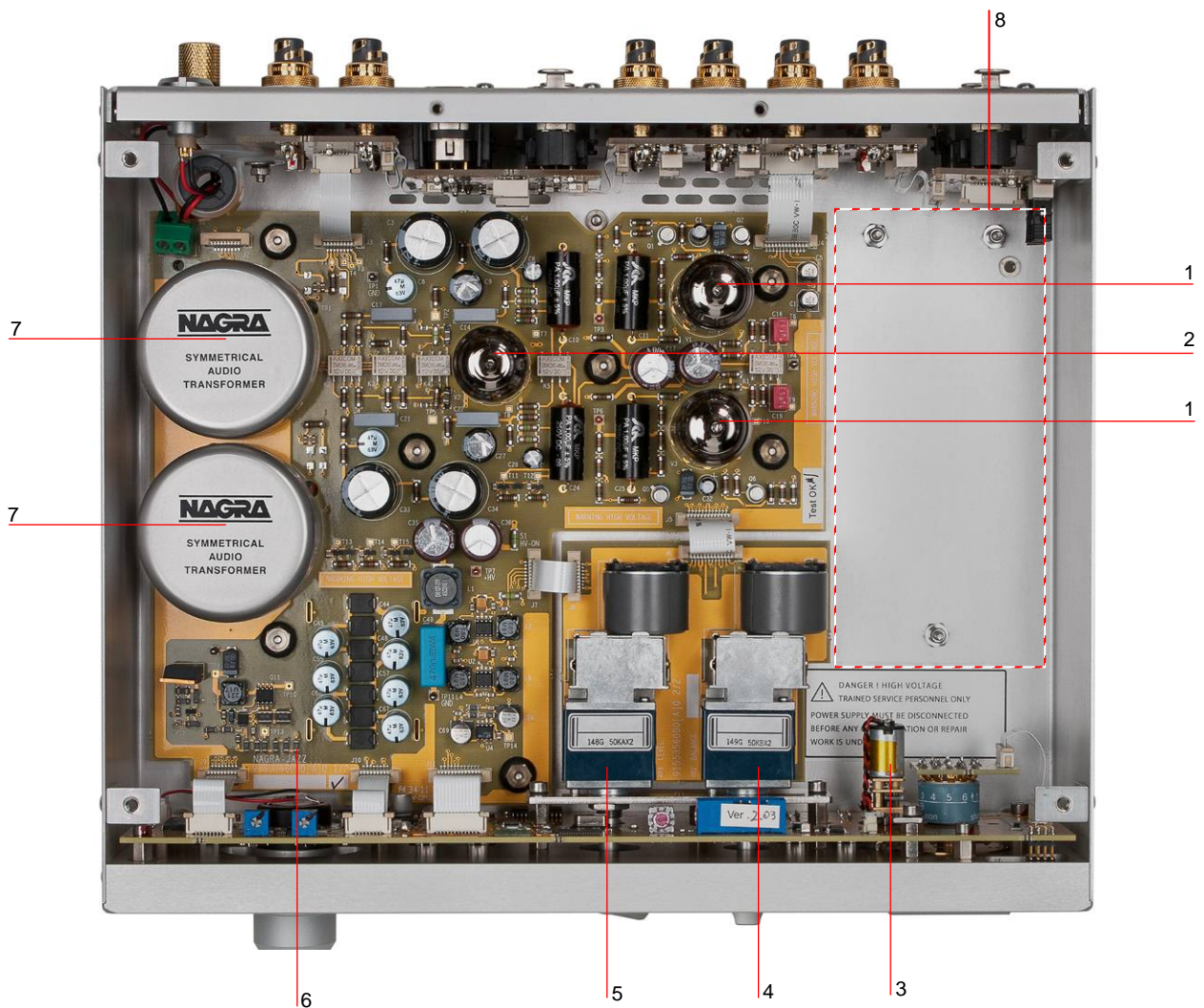
The large board located on the bottom of the machine houses the amplification electronics and a voltage multiplier which enables a high voltage (200 V) to be applied to the valve anodes from the initial 12 V which is provided by the external power supply.

The first stage of the circuit is built around a 12AX7 (ECC83) double triode configured in differential topology and polarised by transistors. This configuration ensures that the valves perform in a highly stable manner. The second stage, which is responsible for most of the gain, is also entrusted to a type 12AT7 (ECC81) triode. This is the valve which does the job of receiving the variable gain from the switch: as the corresponding knob on the front panel is turned, a relay switches in a series of resistors which varies the gain from 0 to 12 dB.

The components installed in the signal path have been carefully selected based on their sonic qualities. High-end polypropylene capacitors are mostly used. As far as the valves are concerned, they are subject to the most rigorous testing. They are burn-in for 48 hours and then individually measured and sorted in accordance with multiple criteria: gain, hum and sensitivity to vibrations (microphonics effect). At the end of the test, 60% of them are rejected and the remaining valves are paired up.

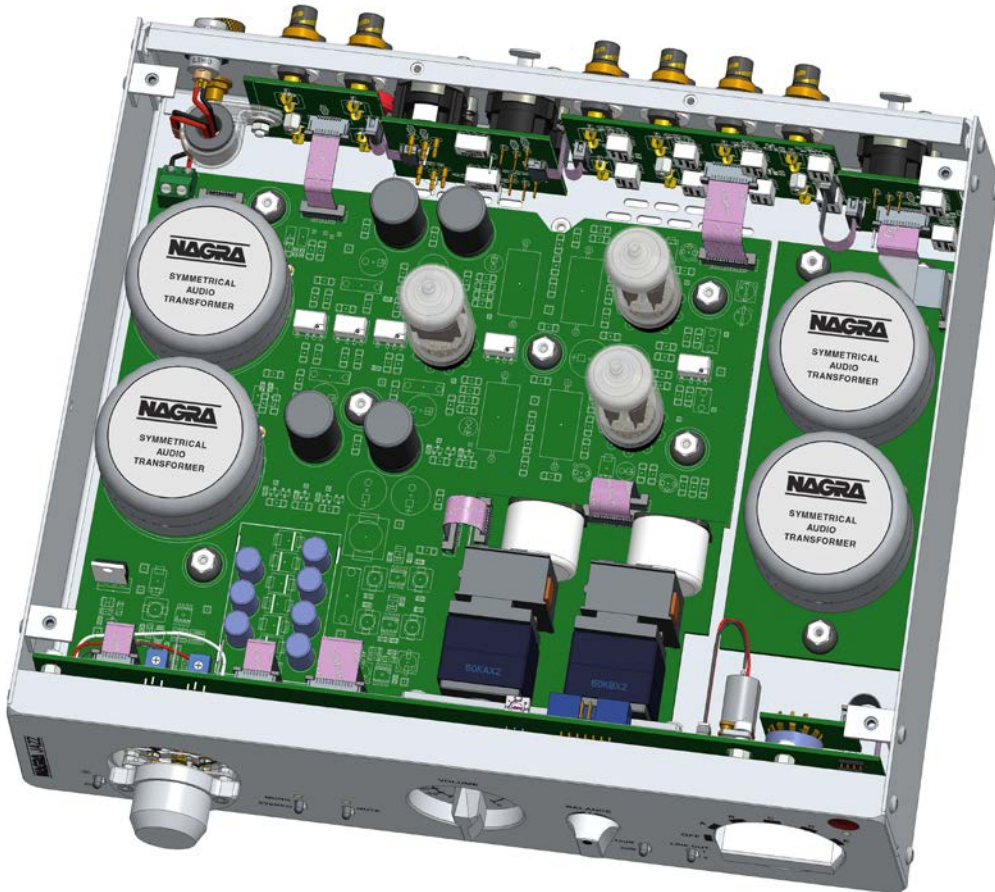
A switching system directs the signal to the type of output that has been selected: balanced for the XLR connectors, or unbalanced for the Cinch connectors. The symmetrisation for the XLR is achieved by a very high quality transformer which is wound by Nagra. This is mounted underneath an annealed mu-metal shield which protects it from any static interferences.

Inside view of the Nagra Jazz preamplifier



1. Left and right channel first stage 12AX7 (ECC83) valves
2. Second stage 12AT7 (ECC81) valve
3. Motor and input selector
4. Motorised balance potentiometer
5. Motorised volume potentiometer
6. High-voltage 200 V power supply
7. Balancing output transformers for XLR connectors (one per channel)
8. Space for the optional XLR symmetrical input circuit with Nagra transformers

Interior design with optional symmetrical input circuit



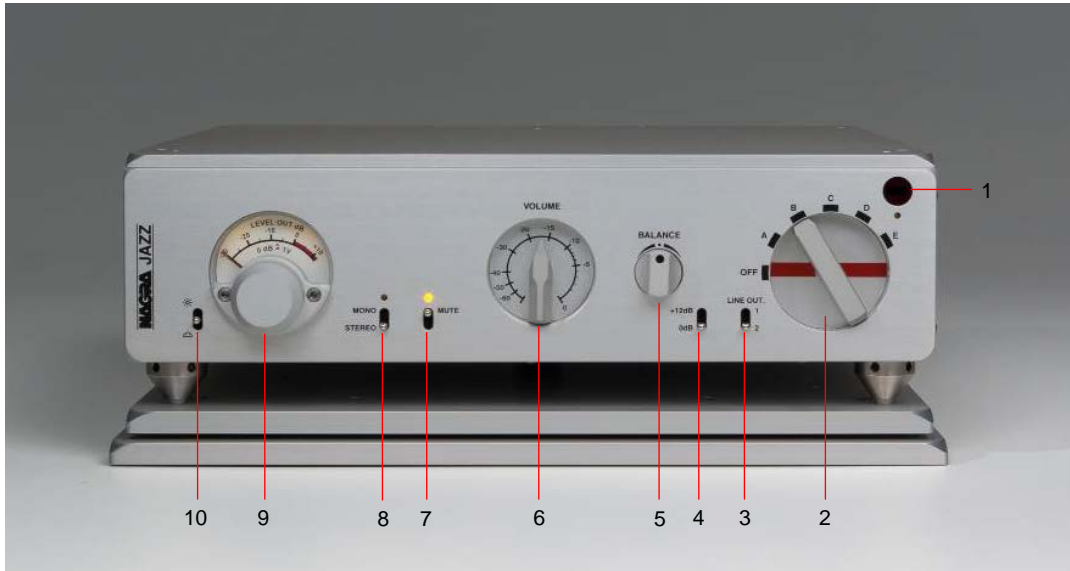
## 4. DESCRIPTION OF THE MECHANICS

### 4.1 Case

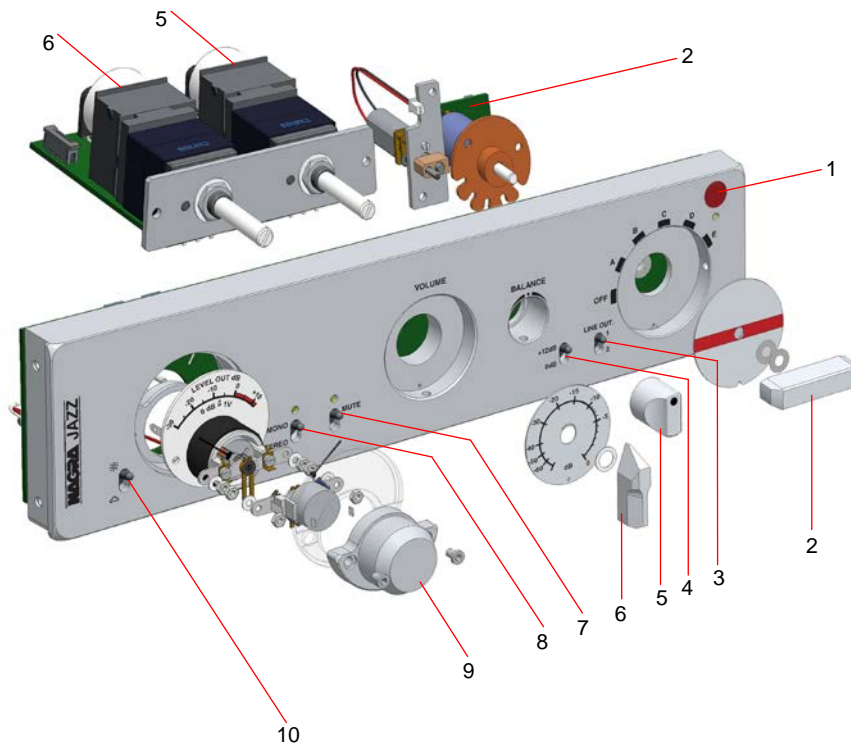
Entirely constructed in finely brushed, anodised aluminium, the Nagra Jazz preamplifier's case is faithful to the look and ergonomic criteria which characterise the brand. The case base adopts the same dimensions as the other Nagra products, such as the Nagra CD players. The width and depth are exactly the same (W x D: 275 x 230 mm excluding connectors).

The 14 mm thick front plate is machined out of solid billet, as well as the top. The back and the chassis are constructed out of folded sheet aluminium.

**4.2 Front panel**

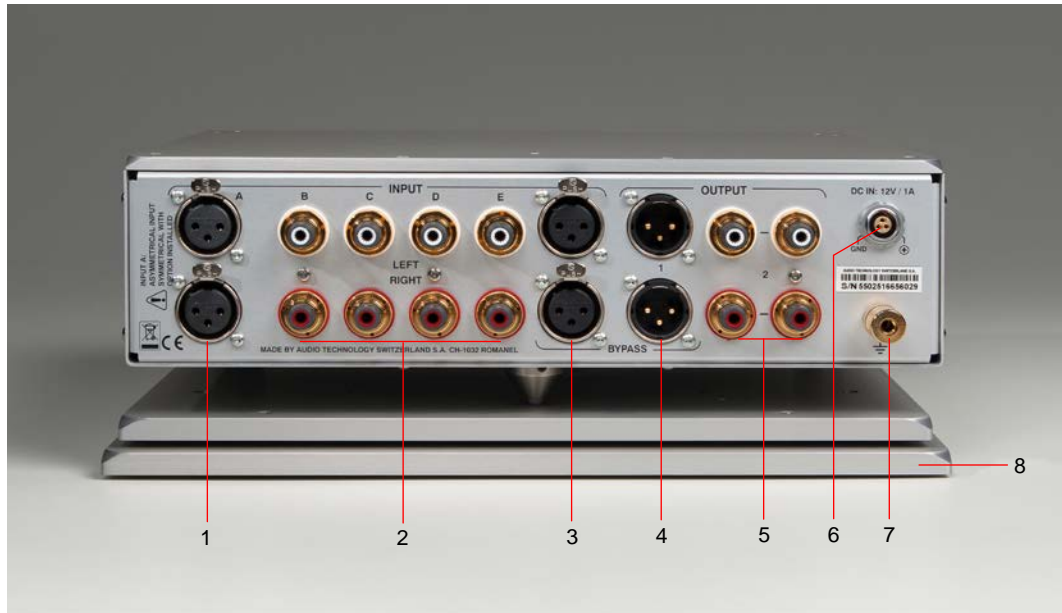


1. Window for receiving the infrared signal from the remote control with a yellow LED indicator light below
2. Motorised on/off and input selector
3. Output selector for balanced XLR or unbalanced Cinch connectors
4. Selector for "0 dB" or "+12 dB" gain levels
5. Motorised balance potentiometer
6. Motorised volume potentiometer
7. Mute selector with yellow LED light (which when flashing indicates the soft start phase)
8. Mono/stereo selector
9. Modulometer indicating the output signal level
10. Dimming switch to adjust modulometer lighting level





### 4.3 Back panel

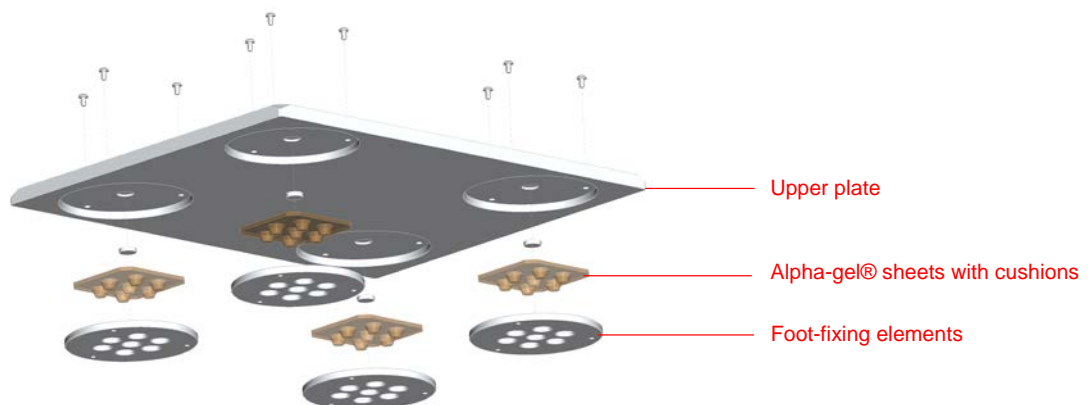


1. XLR input
2. Cinch inputs
3. "Bypass" input with bridge to the XLR output
4. Balanced XLR output
5. Double asymmetrical Cinch outputs
6. Connector for external Nagra power supply
7. Gold-plated ground connector
8. Shock-absorbing Nagra VFS double-plate support (option)

### 4.4 Shock-absorbing VFS support (optional)

The Nagra Jazz preamplifier can be delivered with an optional shock-absorbing Nagra VFS double-plate support. This solid aluminium support equipped with special Alpha-gel® feet is designed to isolate the machines from vibratory disturbances efficiently. It is especially appropriate for valve-based equipment which is more sensitive to this sort of vibration.

The shock absorber is finished off with three little conical feet which are screwed into the case of the preamplifier itself. These feet are made out of Arcap with points in Delrin® resin which locate precisely in little holes that are machined into the upper plate.





## 5. TECHNICAL SPECIFICATIONS

Input impedance	>75k Ohms
Output impedance	50 Ohms
Frequency response	10 Hz to 50 kHz, +0/0.5 dB
Signal to noise ratio	Typically 105 dB (ASA-A weighting, ref. 1 V)
Dynamic range	>112 dB, gain at +12 dB
Minimum input level to achieve 0 dB	0.25 V rms, gain at +12 dB
Maximum input level to achieve 0 dB	>0.25 V rms, gain at 0 dB
Total harmonic distortion (THD)	>0.02% @ 1 kHz, 1 V rms without load
Crosstalk	>78 dB
Power supply	115 or 230 V via external Nagra ACPS II supply
Dimensions (excluding connectors)	310 x 254 x 76 mm (12.2 x 10.0 x 3.0 inches)
Weight	3.3 kg (7.27 lbs)

Specifications may change without notice