

Sanders Sound Systems

Phono Preamplifier

OWNERS MANUAL

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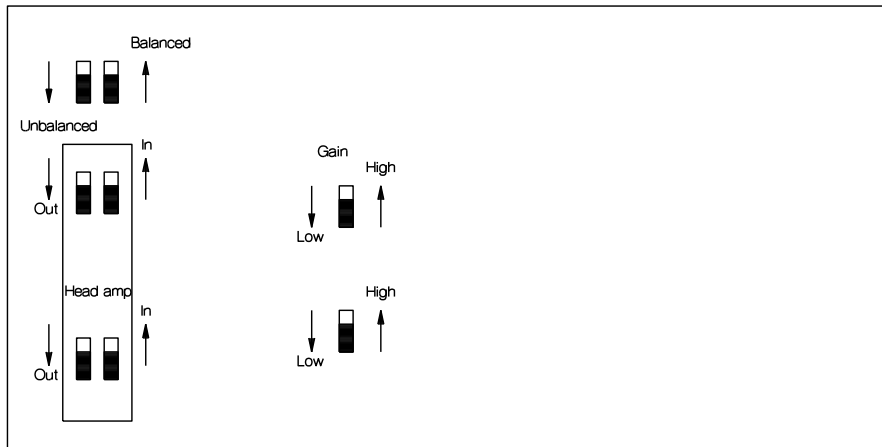
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INSTALLATION

SET UP

Prior to installing the unit, you may select balanced or unbalanced inputs as well as set gain and input loading (both resistance and capacitance) for each channel. The default input is “Unbalanced” and the default gain is “Low”, such as would be used with a high output, moving-coil or moving-magnet cartridge. The “high” setting will provide an additional 20 dB of gain, if necessary, for lower output, moving-coil cartridges. There is also a built-in “head amp” for use with ultra-low output, moving coil cartridges that can be switched in if even more gain is needed.

Settings are altered inside the unit. To do so, first unplug the unit and remove the cover using the supplied Allen key. Use care to avoid scratching the anodized finish. Inside you will see a large circuit board with several switches. A simplified view of the circuit board layout is shown below. There are a pair of grey/red slide switches near the RCA input connectors. Slide them as shown in the drawing to select balanced or unbalanced input. Similar switches near the middle of the board add 20 dB of gain for each channel. If more gain is needed, switch in the head amp by throwing all four switches on the head amp board as shown on the left of the drawing.

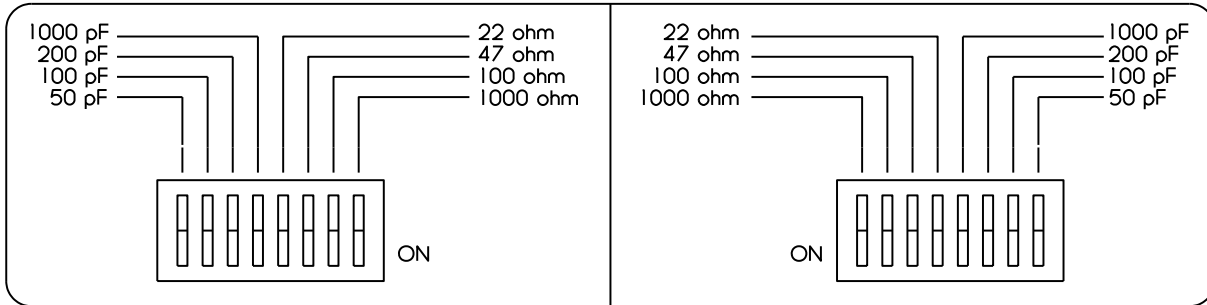


Front Edge of Circuit Board

! WARNING ! Never make any internal adjustments while this unit is selected as the input source on your line-level preamp.

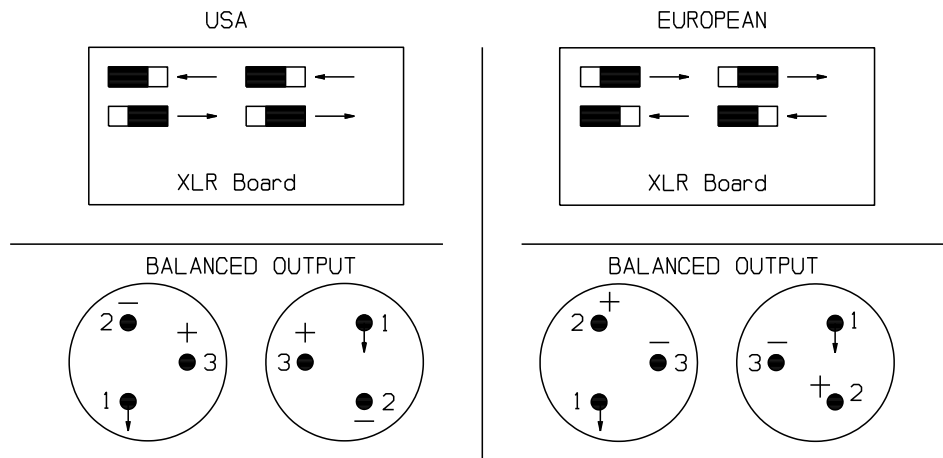
Throwing an internal switch while the unit is on will produce a loud transient that can damage a speaker. So be absolutely sure that the Phono Preamp is **not** selected on your main preamp when making any internal adjustments.

A switch block with eight miniature switches is used to set the input loading for each channel. Each switch connects a resistor or capacitor in parallel with the input and so adjusts the load value “seen” by the cartridge. The default values are 47KΩ and 50pF. Refer to the diagram below, which is repeated on a label inside the unit, to determine the values that need to be switched in for your cartridge.



The balanced outputs are equipped with switchable phasing due to differences in the USA/EUROPEAN standards. The default setting is EUROPEAN (which is used by most “audiophile” components) but may be switched according to the following diagram.

Note: These switches may also be used for selecting absolute phase.



The operating voltage of this unit is adjustable so that it may be used worldwide. Contact the factory for assistance if you need to change it.

LOCATION

Preamplifiers are normally set on a shelf in your equipment rack. But sometimes shelf space is not available, so the Sanders Phono Preamp was designed to be very thin to give you the option of setting it on top of another component — particularly the Sanders Preamplifier, after which it was styled. If you don't have an Sanders preamp, you may place it on top of any component except power amplifiers because they often have large magnetic fields that will induce hum in a preamp.

INPUT CONNECTIONS

Before making any connections, make sure all of the power switches on any associated components are turned off. If any of your other audio components do not have power switches, make sure they are unplugged from their AC power source.

The input and output connectors are clearly marked on the rear lip of the top cover. By way of review, connect the ground post to the ground wire from a turntable. Connect either the unbalanced or balanced inputs to the appropriate type of output of a turntable. Remember that if you use the balanced inputs, you must also switch to the balanced inputs internally as described on the previous page. *Do not use both balanced and unbalanced inputs at the same time.*

OUTPUT CONNECTIONS

Both balanced and single-ended output connections are available. You may use both outputs simultaneously to drive two different amplifiers or preamplifiers if you wish.

POWER CONNECTIONS

Be certain all associated equipment is turned off before plugging in the preamp. Insert the power cord into the AC LINE INPUT on the back panel and then connect it to an appropriate power source. You may then turn on your other components.

The preamp uses just a few watts of power and is designed to be left on continually so it will be fully warmed up, perform at its best, and be operational at all times. There is no need for a power switch, so none is supplied. All indicator lights are light emitting diodes (LEDs), so they will last an extremely long time.

ELECTRICAL PROTECTION

Although not essential, it is a good idea to use a surge protector to prevent damage to your expensive equipment in the event of an electrical storm or other causes of abnormally high mains voltage. These are inexpensive and can be obtained from any hardware store. You do not need to use an expensive line conditioner, but if you do, these normally will have surge protection built in so you will not need additional surge protection.

CARE AND CLEANING

If you wish to clean your phono preamplifier, use a diluted, ammonia based cleaner. Window cleaners like "Windex" also work well. **Do not use any abrasive cleaners or chemical solvents like "Ajax", acetone, or paint thinners.**

Use particular care not to damage the aluminum face-plate. Aluminum is a medium hardness metal and although it is anodized, it can be easily scratched by the careless use of tools during installation. The unit may overheat and the finish may fade if exposed to direct, unfiltered sunlight or intense heat for prolonged periods.

Save your box and packing materials. They will be very helpful for moving or if you need to ship the unit for any reason.

DESIGN PHILOSOPHY

The circuitry used in your phono preamplifier is the result of an advanced and complete design process combining innovation and proven fundamentals. This process avoids both the limitations of total adherence to convention and the flaws resulting from inappropriate applications of clever circuit gimmicks.

Our approach demands painstaking consideration of every facet of each design choice, regardless of how small. Analytical, as well subjective techniques are all applied in an open-minded fashion with “no compromise” musical perfection as the goal. The resulting refinement of the product escapes simple explanation. With this in mind, we present here a few design highlights and concepts.

Primary voltage gain is derived from FETs (Field Effect Transistors). While careful design can yield good results from any device type, FETs consistently have the edge in voltage gain, low-noise, low interaction, and interface applications.

FETs are inherently transconductance devices, meaning that an input voltage controls an output current. Unlike conventional transistors, FETs have extremely high input impedance (typically about 10 meg Ω — like vacuum tubes). In other words, the FET “senses” the audio signal without drawing current from the source. This eliminates complex interactions with the source and allows maximum performance from each system element and greatly reduces the chance of cable characteristics altering the sound. The absence of input current in FETs also allows high bias currents for linearity and speed without sacrificing DC parameters.

While excellent capacitors for audio use exist, a signal-path free of coupling caps yields the best possible signal integrity. The DC stability of the circuit eliminates the need for any questionable DC servo circuits or input or output coupling capacitors. We make no AC compromises for DC performance. Our key design choices provide not only inherent DC stability, but also optimized AC performance throughout the audio region and well beyond.

These choices include the use of top quality dual FETs in differential configurations. Because the signal in these stages is handled in a balanced manner, rejection of unwanted noise and modulation from external sources is extremely high. This rejection extends even to noise which may originate with the circuit from support circuitry such as current sources. Also, stray RF signals are rejected.

Since phono preamplifiers require equalization, and equalization requires the use of capacitors, we use only high grade film types. These and other equalization components were carefully chosen to maintain response to within 0.2dB of RIAA standards. An additional subsonic rolloff at 14 Hz serves to reduce IM Distortion.

Noise is kept low by multiple paralleling of input devices, careful selection of circuit impedances, and pre-screening of devices. The Class A complimentary followers used to drive the preamp output are of such speed, linearity, and low output impedance that no feedback correction is required or used. The advantage of this is that the circuit's perfect stability and transient response are preserved into a wide range of difficult and unpredictable loads. Variation in sound, which could occur through interactions with interconnect cables and other system elements are thus avoided.

A simple, very high performance inverter, provides a fully balanced output, which allows the user to take advantage of the balanced inputs on many preamplifiers. The most commonly acknowledged advantage of this is rejection of stray noise pickup, but improvements in distortion and bandwidth may occur also.

The requirements of a power supply for flawless audio reproduction are straightforward but important. Our supplies take a very direct approach to high performance.

First, a top quality, shielded, toriod transformer with plenty of reserve current capability is used. The shielding eliminates strong magnetic fields which could induce hum into sensitive circuitry. About 25,000 μ F of capacitance with very low ESR and inductance provides good passive filtering. A reference voltage is developed by delivering a constant current to zener diodes. The resulting voltage is heavily filtered and delivered to each stage through independent, Class A followers, which completely decouple the stages. The resulting non-reactive, low-impedance over an extremely wide bandwidth, yields a perfect power source for the individual circuits. The simplicity and absolute stability of our power supplies removes the chance of unpredictable interactions that may occur with the more elaborate, high-feedback circuitry often used by other manufacturers.

Most companies in the upper end of the audio industry use either a sheet metal or formed aluminum chassis. By contrast, the FET Phono Preamplifier's chassis is all anodized, machined aluminum. The advantage of this over a conventional chassis is that a machined chassis is more precise, which makes it possible to work at tighter tolerances and use PC mounted parts more easily. Moreover, such a design allows easier servicing either for repair or for future upgrading. From the standpoint of appearance, a machined surface can be contoured in a much more precise manner and gives the final product a more seamless appearance.

PARTS QUALITY

FINISHES — All exterior and interior metal parts are anodized. While paint may be more impact-resistant, the anodized surface is more resistant to solvents and prevents corrosion. And our anodized parts are enhanced by either graining or bead-blasting the surface.

CIRCUIT BOARDS — Circuit boards are fiberglass epoxy with gold plating over a tin/nickel barrier. This gold layer will not corrode, while the barrier plate prevents the gold from migrating to the lower copper layer and detracting from its appearance.

RESISTORS — All are high reliability, flame-proof, metal film, 1% tolerance.

CAPACITORS — All capacitors have been eliminated where possible on the basis that “no cap is better than the best cap.” Where they are used in the active part of the circuitry, they are high quality, film caps. The only electrolytics used are in the power supply where large numbers provide enormous filtering capacitance for the supply.

SEMICONDUCTORS — Very high quality dual FETs are used for voltage gain and were selected for their superb noise performance and precision matching. The remaining semiconductors are also of very high quality, each possessing parameters ideally suited for the specific application.

CONNECTORS — RCA connectors are CNC machined brass, gold plated, and insulated with Teflon®. The balanced XLR connectors are Neutriks from Switzerland. These are black chrome finished with gold contacts.

WIRE — All signal wire has been eliminated wherever possible. Where wire is used, it is silver plated copper, 141 strand, 18 gauge with silicone insulation.

SPECIFICATIONS

CIRCUIT SPECIFICATIONS

FREQUENCY RESPONSE: ± 0.2 dB of RIAA with subsonic roll-off @ 14 Hz

DISTORTION: < 0.001% from 20 Hz to 20 KHz @ 3 volts peak into 600 Ω or higher, shunted by 1000 pF or less.

GAIN: Unbalanced in and unbalanced out; 37 dB @ 1 kHz
Balanced in and unbalanced out; 37 dB @ 1 kHz
Unbalanced in and balanced out; 46 dB @ 1 kHz
Balanced in and balanced out; 46 dB @ 1 kHz
Note: Internal switches can increase gain by 20 dB. An additional 20 dB of gain is available in the switchable head amp.

MAXIMUM OUTPUT: 12 volts peak

NOISE: <87 dB referenced to 1 volt output

INPUT CAPACITANCE 50 pF to 1000 pF, user selectable

INPUT IMPEDANCE: 22 Ω to 47k Ω , user selectable

OUTPUT IMPEDANCE: 75 Ω non-reactive unbalanced
150 ohms non-reactive balanced

CROSSTALK: 70 dB @ 20 kHz

POWER SUPPLY

Independently regulated with shielded toroidal transformer and 25,000 μ F capacitance

POWER CONSUMPTION: 10 watts

DIMENSIONS

HEIGHT: 1 $\frac{3}{4}$ " (4.5 cm)

WIDTH: 17" (44 cm)

DEPTH: 9 $\frac{3}{4}$ " (25 cm)

WEIGHT: 6 pounds (2.8 kG)