PhonoBlock refined

SUTHERLAND

*The performance of the **PhonoBlock** has been refined and improved. Its classic, understated design is still there — even more so.*

— RON SUTHERLAND

The **PhonoBlock** was introduced almost 10 years ago. It performs beautifully and continues to please music lovers all over the world.

Then came an opportunity to make it even better.

The circuit remains essentially the same. Improvements focused on providing a better environment to more fully realize its potential.

Each **PhonoBlock** chassis is a self-standing single channel phono preamp. Two are stacked to provide two channels for stereo.

In the left shielded compartment is one channel of phono preamp circuitry.

The front 2/3 is power supply filtering.

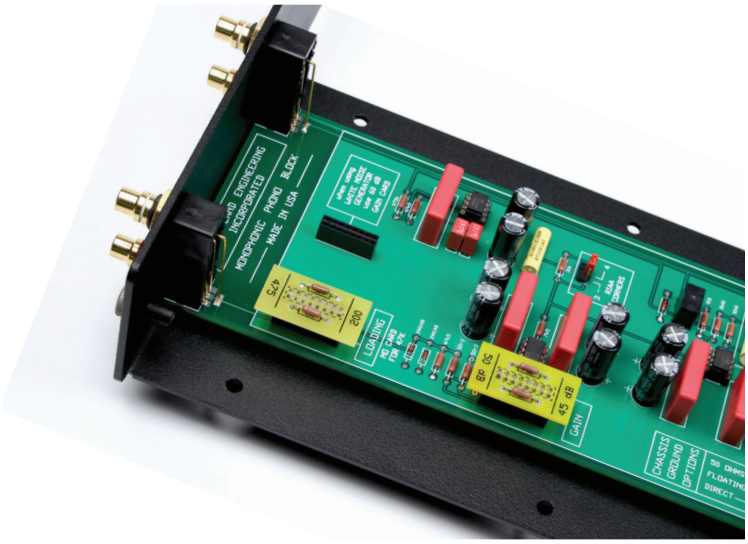
Audio circuitry is integrated tightly into the back third. Signal path is kept to an absolute minimum.

In the right shielded compartment is a well regulated and filtered DC power supply. There are two isolated power suppliers for the two gain stages.

— THE REFINEMENT —

The **PhonoBlock** refinements are derived from the **Argentum** design. The much more expensive **Argentum** is an all–out, hand-wired, silver–signal path version of the classic **PhonoBlock**. Turns out, the same extremely disciplined short signal path layout could be used to refine the classic **PhonoBlock** audio board.

PhonoBlock *refined*



PhonoBlock

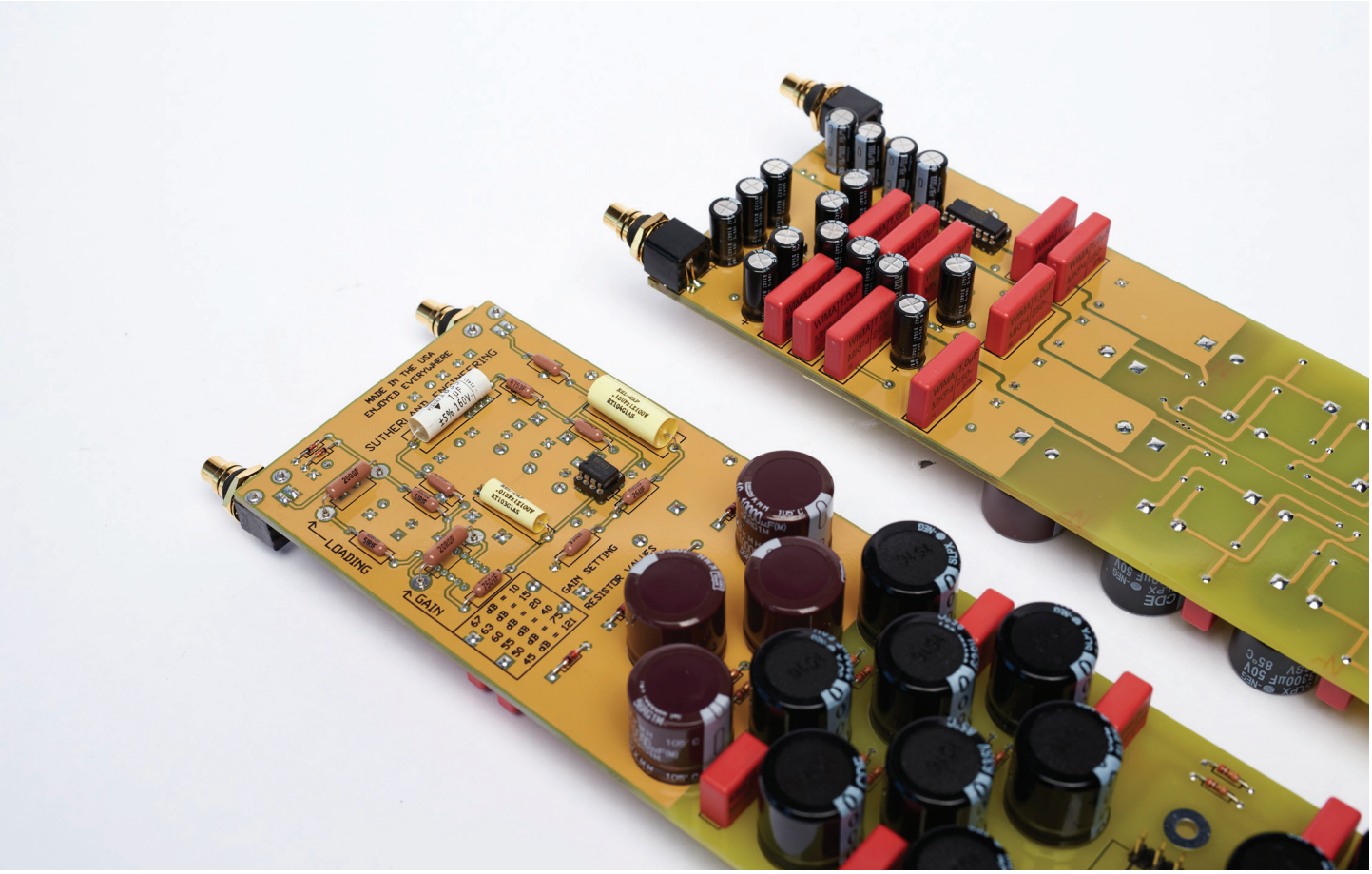
The best environment for delicate analog audio signals is LESS environment.

A compacted area for the circuit with minimal distance between components is a big advantage. The musical signal will have the tightest, shortest and purest connection from one component to the next.

Another performance necessity is a low impedance, low noise power source for the amplifiers. That would be a bank of multiple film and electrolytic capacitors.

Ideally, they would be paralleled with very wide copper traces and a very short distance from the amplifiers.

That's a challenge—how to have a compact layout for the signal path ***and*** a large area for multiple power supply capacitors ***and*** shortest distance.

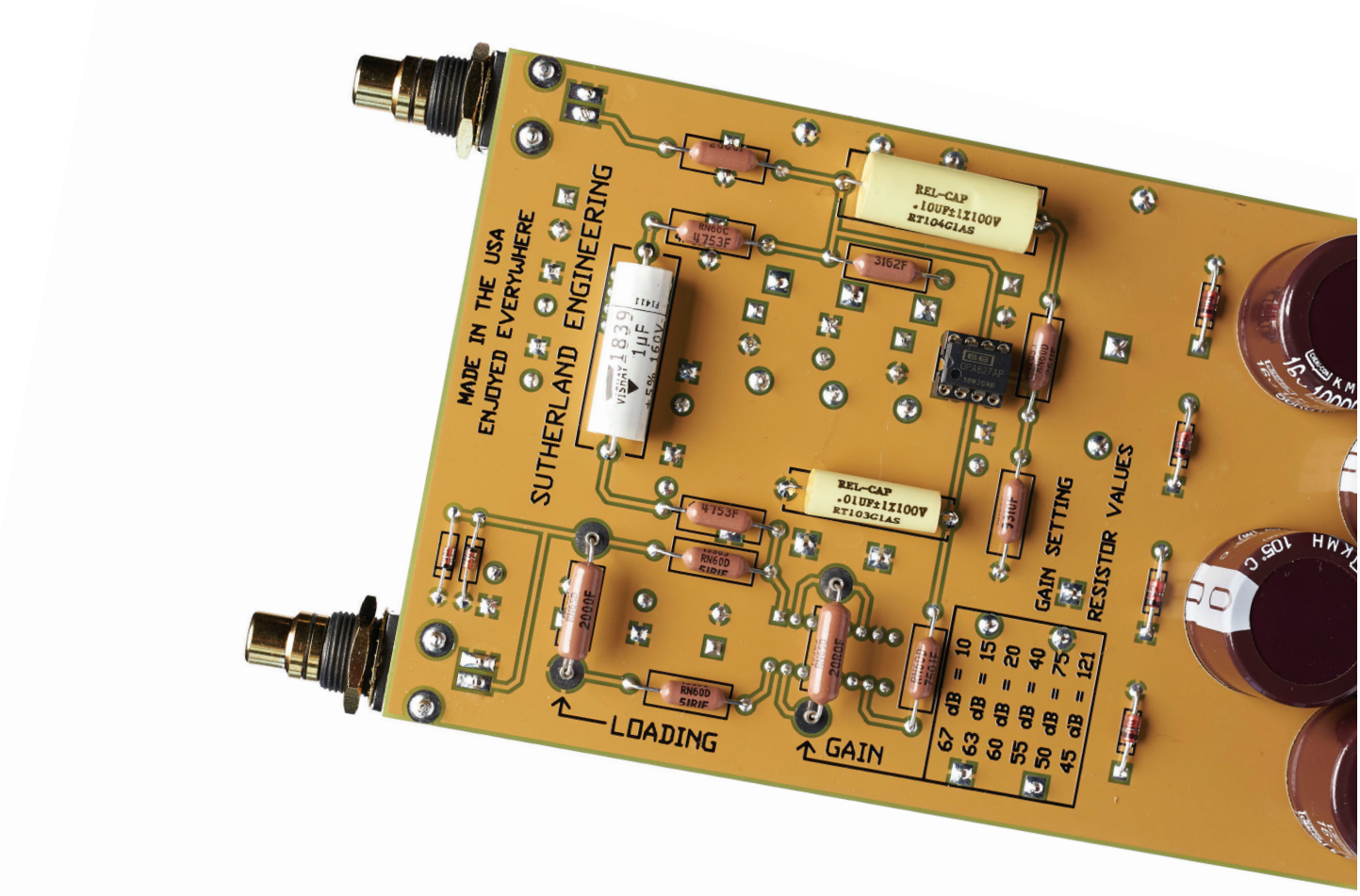


Fortunately, there is an alternative to compromise. ONLY signal path components are placed on the top side of the circuit board. With no power supply capacitors on the top side, and a disciplined layout strategy, the signal path is optimally short and direct. A large bank of power supply capacitors is located on the bottom of the circuit board.

All of the copper area on the bottom side is dedicated to forming a robust power plane that is located right under the amplifiers.

The tighter signal path gives uncluttered purity and the robust availability to power gives effortless ease to dynamic expression. These improvements bring the listener even closer to the music.

The original **PhonoBlock** used small plug–in circuit boards for setting gain and loading options. They were compact, and provided a short signal path from the plug–in resistor board to the amplifier circuit.



The refinement provides an even shorter, simpler pathway. The individual resistors plug directly into the audio circuit board. Sockets are located even closer and take up even less board area. The signal path is now even shorter and more direct.

Add flexibility is another advantage. The most popular gain and loading values are included. However, the user is free to explore those values. Some will want to experiment with different resistor types and/or manufacturers.

For those using outboard moving-coil step up transformers, you will have the means of choosing loading resistor values that appropriately reflect through the transformer to the cartridge.

— LINKING INTO YOUR SYSTEM —

Grounding Options

Sometimes ground loops can cause hum in a phono system. Breaking ground loops can be easy or it can be a nightmarish frustration. In the difficult situations, grounding options can save the day.

For product safety and electrostatic shielding purposes, the metal casework of the **PhonoBlock** is electrically connected to the ground lead in the IEC power cord.

There are, however, options on the audio circuit's ground reference. Each mono chassis has three grounding options. They are selectable by moving a gold-plated shunt.

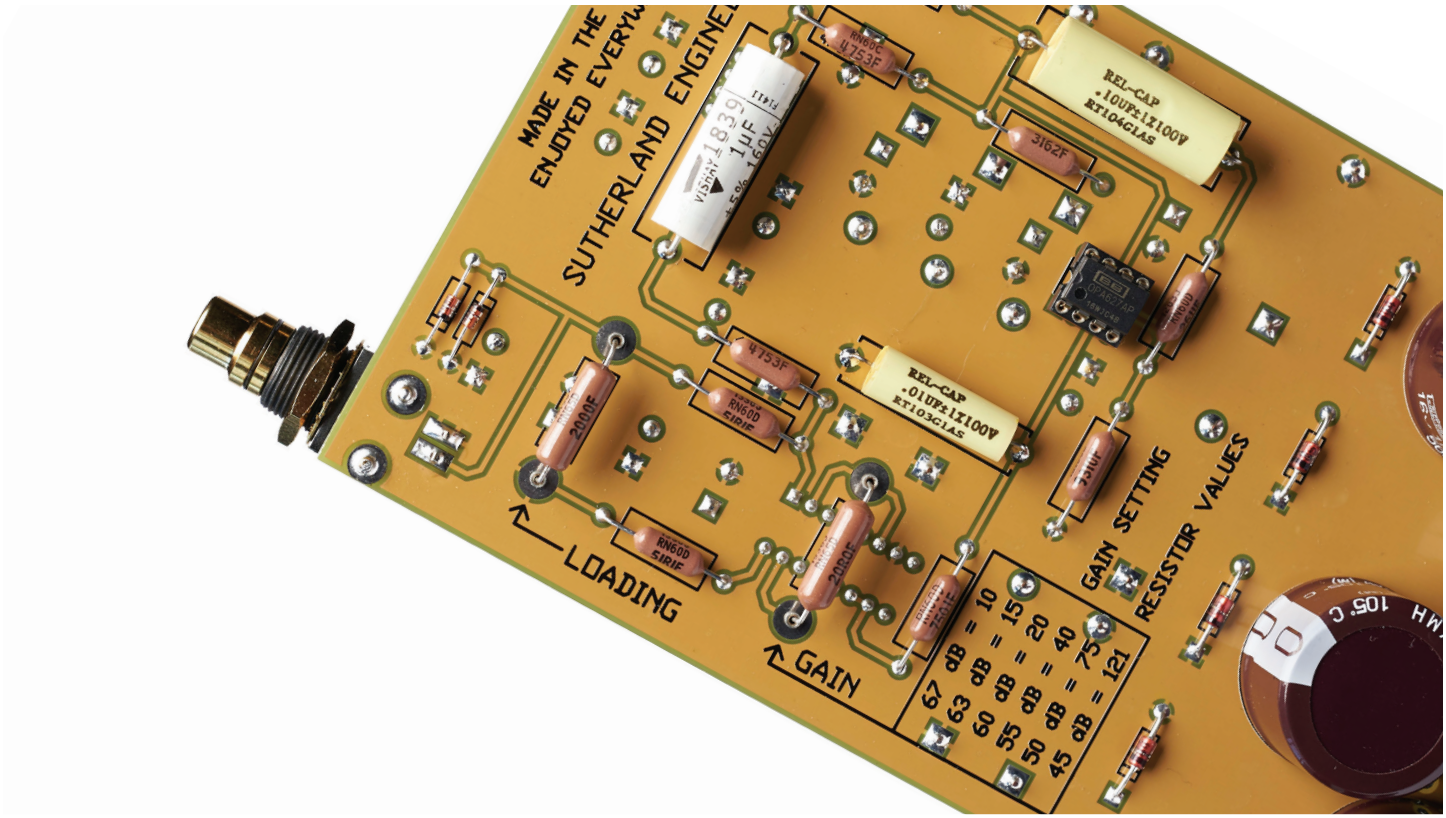
- Audio ground can float with respect to the chassis
- Audio ground can tie directly to the chassis
- Audio ground 'softly' connected to the chassis through a 50 Ohm resistor

The **PhonoBlock** is shipped configured for a gain of 60 dB and a loading of 200 Ohms. This will be a good starting point for most systems. If you have different preferences, please refer to the GAIN and LOADING pages.

The two **PhonoBlocks** are designed to be stacked on top of each other. Plug your turn-table into the IN jacks. The interconnecting cables to your preamp go into the OUT jacks. Ground wires go to the knurled screw.

The **PhonoBlock** is designed to be powered on 24/7. The supplied AC power cords are just to get you started. Later you will probably want to experiment and invest in power cord upgrades.

BE ABSOLUTELY, 100% CERTAIN THAT YOUR **PHONOBLOCK** IS CONFIGURED TO YOUR COUNTRY'S PROPER VOLTAGE.



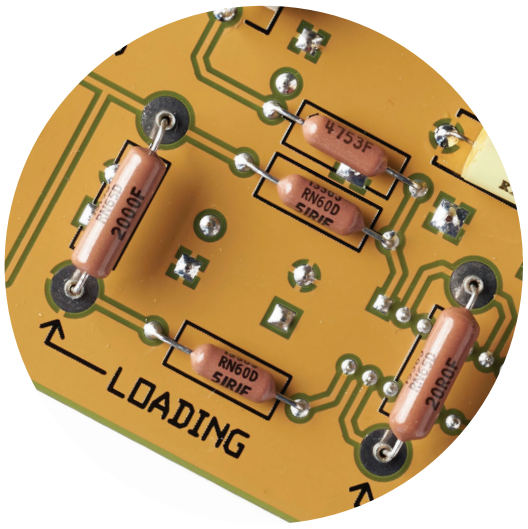
Load Settings

Cartridge loading is determined by the resistor value installed in the LOADING resistor socket.

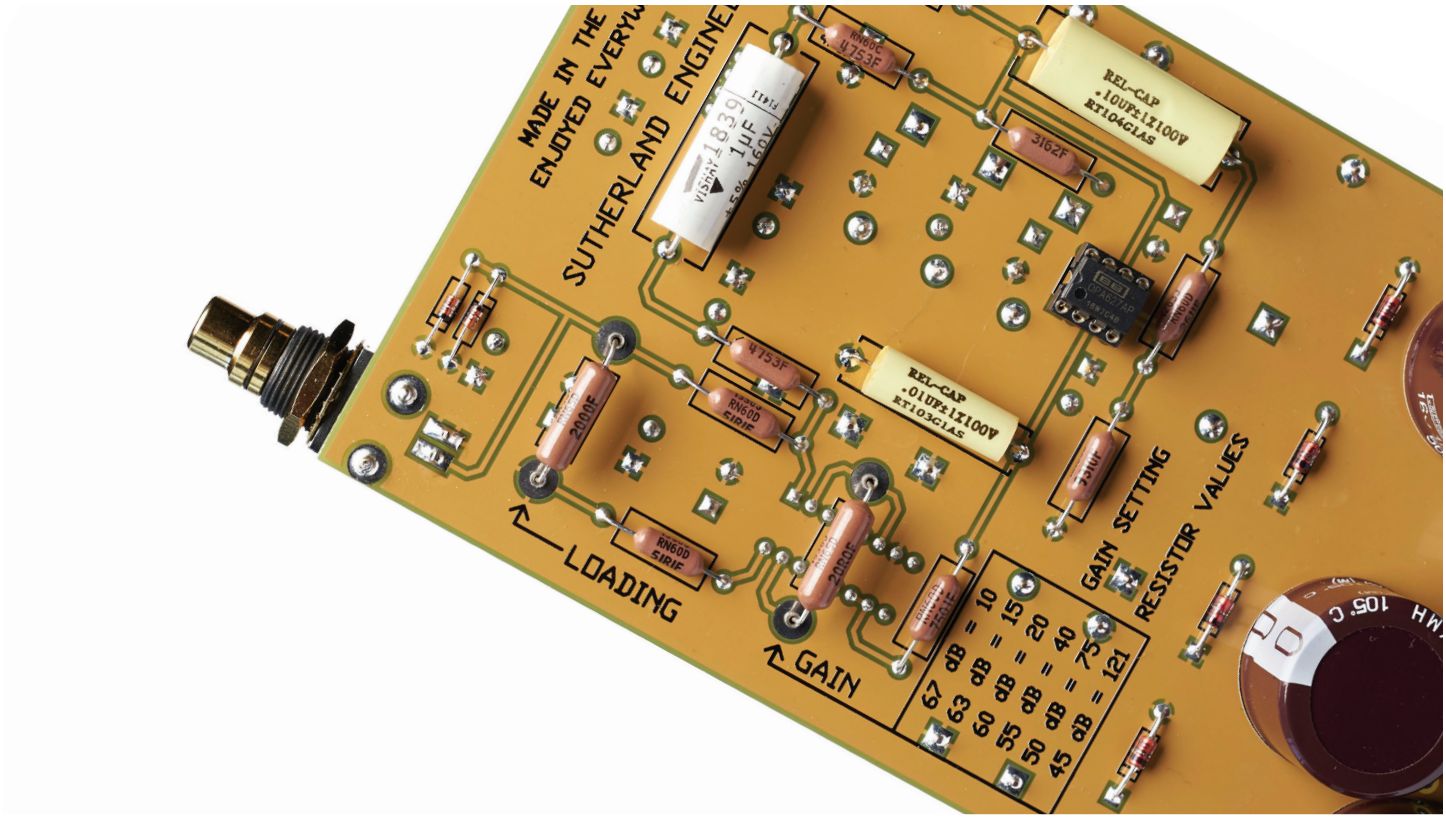
Dale/Vishay RN65-style resistors are included with the following values.

47.5k	**Ohms**	**(4752)**
1000	**Ohms**	**(1001)**
475	**Ohms**	**(4750)**
200	**Ohms**	**(2000)**
100	**Ohms**	**(1000)**
49.9	**Ohms**	**(49R9)**

Your **PhonoBlock** is shipped with loading set to 200 Ohms.



NOTE: If you are using a moving coil, step-up transformer, check its owner's manual to determine correct loading resistor value.



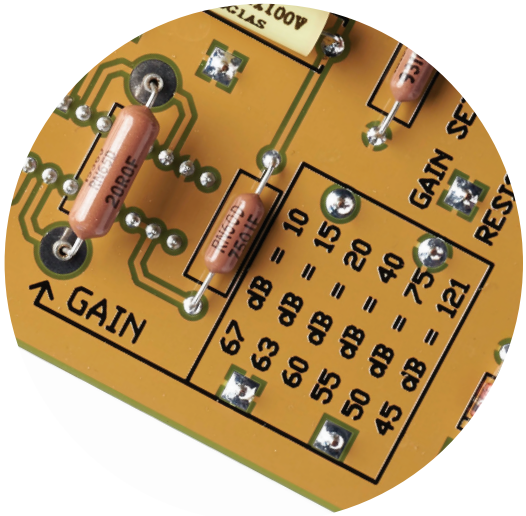
Gain Settings

Gain is determined by the resistor value installed in the GAIN resistor socket.

Dale/Vishay RN65-style resistors are included with the following values.

121	**Ohms for 45 dB gain**	**(1210)**
75	**Ohms for 50 dB gain**	**(75R0)**
40.2	**Ohms for 55 dB gain**	**(40R2)**
20	**Ohms for 60 dB gain**	**(20R0)**
15	**Ohms for 63 dB gain**	**(15R0)**
10	**Ohms for 67 dB gain**	**(10R0)**

Your **PhonoBlock** is shipped with gain set to 60 dB.



Size

17” wide
17” deep
3.25” high

Weight

Net 21lbs each
Shipping 26lbs each

Shipping Box

24” wide
24” deep
11” high

Power Requirements

110–120 VAC, 10 Watts — each
or
220–240 VAC, 10 Watts — each

Contact Info

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Design Detail Reprinted from the Original PhonoBlock Owner's Manual

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DESIGN PHILOSOPHY

Another path to the same destination.

Almost always, upscale designs are laden with features. More features are touted to represent advancement, product differentiation AND a rational for the upscale price. The PhonoBlocks don't play that game. Their elevated performance is achieved by NOT cluttering the signal path with deleterious features. Complexity is not the path to purity. Elegant refinement is.

PURE MONO, the path to PURE STEREO

Why do stereo phono preamps prevail in the market? Even the most expensive ones on the planet still merge the two channels into one box. Obviously, there must be some advantages in stereo construction. But are the advantages worth compromises in performance?

The advantages of a stereo phono preamp:

Conformity: A single chassis stereo phono preamp is the accepted standard. With the introduction of stereo records, came stereo preamplifiers. That initial decision has rarely been questioned.

Convenience in configuration settings: It is more convenient to go to one place to set configurations for both channels. The most convenient way is having control knobs (or remote controls) that change both channels simultaneously.

Simplified installation: Only one box to install. Only one power cable to purchase and accommodate.

Less expensive to implement: Sharing the same enclosure and power supply is cheaper than each channel having its own enclosure and power supply.

Other simplifications: Only one box to build, test, warehouse, inventory and ship.

Less expensive, convenient, simplified, conformity. While these points may all be valid, they hardly scream "best practice" when it comes to making the best sounding phono preamplifier.

The advantages of stereo packaging come at a cost. Start at the back panel; that is where the first compromise appears. On most phono preamps you will conveniently find both input jacks grouped at one end and both output jacks grouped together at the other end. That concession to convenience has deleterious consequences. Both channels are now intertwined as the circuit layout progresses from the pair of input jacks to the pair of output jacks. There is going to be cross coupling of the two channels. Signals from one channel will spill into the other channel. Channel separation and the spatial/dimensional clues will be blurred.

DESIGN PHILOSOPHY

There is another signal degrading consequence of conventional stereo packaging. The two channels are subjected to different signal paths. Even though the circuits are identical, the layouts of individual electronic components are not. To convey all the subtle stereo information, each channel must be absolutely identical – to the most minute detail.

Then there is the issue of sharing the same power supply with both channels. Obviously another opportunity for cross coupling and channel interactions.

THE SIMPLE SOLUTION – Science Serving Art…

After such a lengthy disparagement of stereo phono preamps, let's get positive and look at an alternative. The limitations of stereo phono preamps are easily fixed.

Each PhonoBlock is purely and simply a self-contained monophonic phono preamp. Each chassis has its own power supply in the right shielded compartment. In the left shielded compartment is one channel of audio circuitry.

Stack up two PhonoBlocks and you have the ultimate instrument for enjoying stereophonic records.

SO….?

OK, this is all well and good but what if I'm not an audio engineer and simply want the best reproduction possible of my precious vinyl collection? Great question and one with a pretty simple answer. The PhonoBlocks are not just an exercise in engineering, although they are superbly designed and executed.

All of the design principles described above, along with using world class circuit components, are utilized to provide the music lover with an exquisite combination of accuracy and musicality. The ultimate compliment one can pay to any audio component is that it simply gets out of the way of music. Or, to put it another way, the technology serves the music. All of the desirable attributes on the audiophile checklist are here; accurate frequency response, superb imaging, an extremely realistic soundstage, dynamics and, perhaps most importantly, the ability to let the music "breathe" in the same way that live music does.

Unlike some designs which purport to be accurate but present music in a sterile and analytical way, the PhonoBlocks are both accurate and intensely musical. You are not forced to choose between a euphonic but colored presentation and one that is technically highly accurate but no fun. The Sutherland PhonoBlocks are a classic example of science serving art.

THE PURE AND SIMPLE SOLUTION

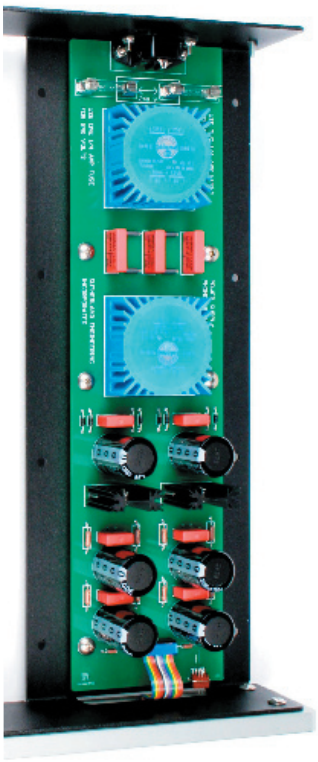
POWER SUPPLY:

Much of the PhonoBlock's effortless musicality can be attributed to power supply capability. The power supply is not 'sized' for the gain stage's load. On the contrary, gain stage power requirements place an insignificant load on the power supply's capacity. The power available to the amplifier section is a bedrock solid foundation. Precisely defined by fixed current regulators, shunt voltage regulators right at the load and over 100,000 microfarads (per mono chassis) for energy storage. It takes nearly 20 seconds for this huge reservoir to fill up when AC power is applied.

For a design guided by simplicity, the PhonoBlock's power supply may, at first, appear plenty complicated. Admittedly, it is both simple AND complex. It is a long chain of individually simple elements. Each element has a function of either filtering or regulation (also doing a filtering function). Each element inserts a level of isolation. The accumulated isolation is unprecedented.

The chain looks like this:

- AC power entry connector
- AC fuses
- First torroidal transformer
- Dual pi ferrite bead / film capacitor filter
- Second torroidal transformer



From here, there are two parallel power paths. One for the first gain stage and another one for the final gain stage. EACH of the two separate paths has these elements.

- Slow recovery, discrete diode, full-wave bridge rectifier
- Initial filter capacitors
- Constant current regulator
- First RC pi filter
- Second RC pi filter
- Shielded ribbon cable between shielded compartments
- Cross over from the right compartment to the left compartment
- Third RC pi filter

PURPOSEFUL TWIST

Power Path Continued

- Forth RC pi filter
- Fifth RC pi filter
- Constant voltage shunt regulator
- Electrolytic and film capacitor bypass at the active devices

You can clearly see that each element adds ‘distance’ from the incoming AC power source. This is also apparent when you look at the physical layout of components. Each element adds a physical distance from the AC power connector. All listed items before the ribbon cable are in the right shielded enclosure. They are in linear order from back to front. The ribbon cable goes from right to left, taking power to the front of the audio board. Power filtering elements then go in linear order from front to back on the audio board. Finally, you will see the electrolytic and film capacitors very closely clustered right at the chips they are powering.

Simple, logical, straightforward, reliable AND effective.

CASE / CONSTRUCTION:

Once a circuit topology is optimized for sound quality, it is critical that the surrounding physical environment is supportive of that achievement.

Like so many other aspects of the PhonoBlock design, the case is unassuming, classic --------- but with a unique, purposeful twist. There are two shielded enclosures behind the machined front panel. The right side contains the AC power supply and left side contains the analog audio circuitry. We get the performance advantages of shielded isolation and the tidiness of unification.

And yet there is another concealed advantage. Usually the cable interconnecting audio and power supply sections is hanging out in space, exposed to radiated interference and other environmental uncertainties. The PhonoBlock interconnection is hidden away, protected and totally shielded. You don’t even see that cable. It is securely tucked into a machined channel in the aluminum front panel.

NOVEL, YET ELEGANT

There are other details making the PhonoBlocks special.

Some are small. For instance, if the front panel logo were simply silk-screened ink, sitting on the surface of the panel it would, over the years, rub off. It is actually a black dye anodized INTO the aluminum. You can see and even feel the difference.

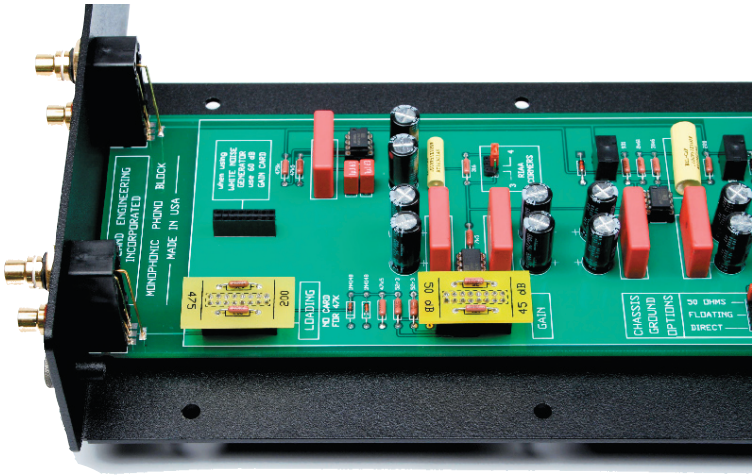
Some are big. The base of the PhonoBlock is laser machined 12 gage cold rolled steel. That's about 1/8" thick. That substantial platform is protected with baked on epoxy power coat.

Feet are custom machined from Delrin with rubberized cork inserts.

The theme of robust construction is also evident in the circuit boards. Fiberglass FR-4 is a well established, top quality choice for circuit board material. However, what you will see in the PhonoBlock is over the top. At 1/8" thickness, PhonoBlock circuit boards are twice as thick as normally seen. Individual parts are anchored from any mechanical movement.

PRINTED CIRCUIT DIELECTRIC:

Anytime two conductors are at a different voltage potential, there is an electric field generated between them. The dielectric (the insulation between conductors) within that field become involved in charge storage. If not carefully considered, that extra charge storage can time smear details of a musical signal. Circuit board material is a dielectric. With normal double-sided construction, there are copper conductors on each side of the board. Unintentionally, a new capacitor is introduced into the circuit, formed by top surface copper, bottom surface copper and the circuit board dielectric sandwiched between the two. It is NOT the quality of capacitor we want to have in a high-end signal path. Some manufactures make the situation even worse by going to multi-layer boards in the analog audio sections. Instead of two layers of copper, there are four or more layers of copper. Even worse than that, the dielectric between layers is much thinner and the undesired capacitive effect is inversely proportional to thickness. At best, some manufactures make small, incremental improvements by using exotic board material.



The PhonoBlocks addresses the issue of circuit board dielectric in a novel – yet elegantly simple way. All signal carrying conductors are on the top plane of the circuit board. There are no copper conductors on the bottom plane, opposite signal carrying regions. Thus there are no electric fields generated between top and bottom layers. The circuit board dielectric is not exposed to electric fields and there is no undesired storage in circuit board material. The circuit board dielectric is not improved ---------- it is removed. It is as if a window were behind you, instead of in front of you. It is still there, but not in the way of clarity.

Size

17” wide
17” deep
3.25” high

Weight

Net 21lbs each
Shipping 26lbs each

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Power Requirements

110–120 VAC, 10 Watts — each
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