THEL Audio-World

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< to the home page

general overview
audio modules

Phono preamp Beautiful-Noise our second best

RIAA equalization basics

Neumann constant Truth or fairy tale?

Highly interesting links: 1. Hifi Museum 2. Vinyl knowledge

Were an order

Seismograph-2

< Our Equipment >

Drive: Seismograph 2 and 3 by Othmar Spitaler
Tonearms: SME Series V; Jelco SA 750 12"; Ortofon RS 309D
Pickup MC: Audiotechnica ART 7; Ortofon SPU 1S; Ortofon Cadenza Black; Koetsu Black/Gold; Sumiko Pearwood Celebration 2
Pickup MM: Audio-Technica 760 SLC, Shure V15V, one of the last originals
Pickup mono: Audiotechnica AT 33; Ortofon Cadenza Mono

Seismograph-3

More photos from the seismographs

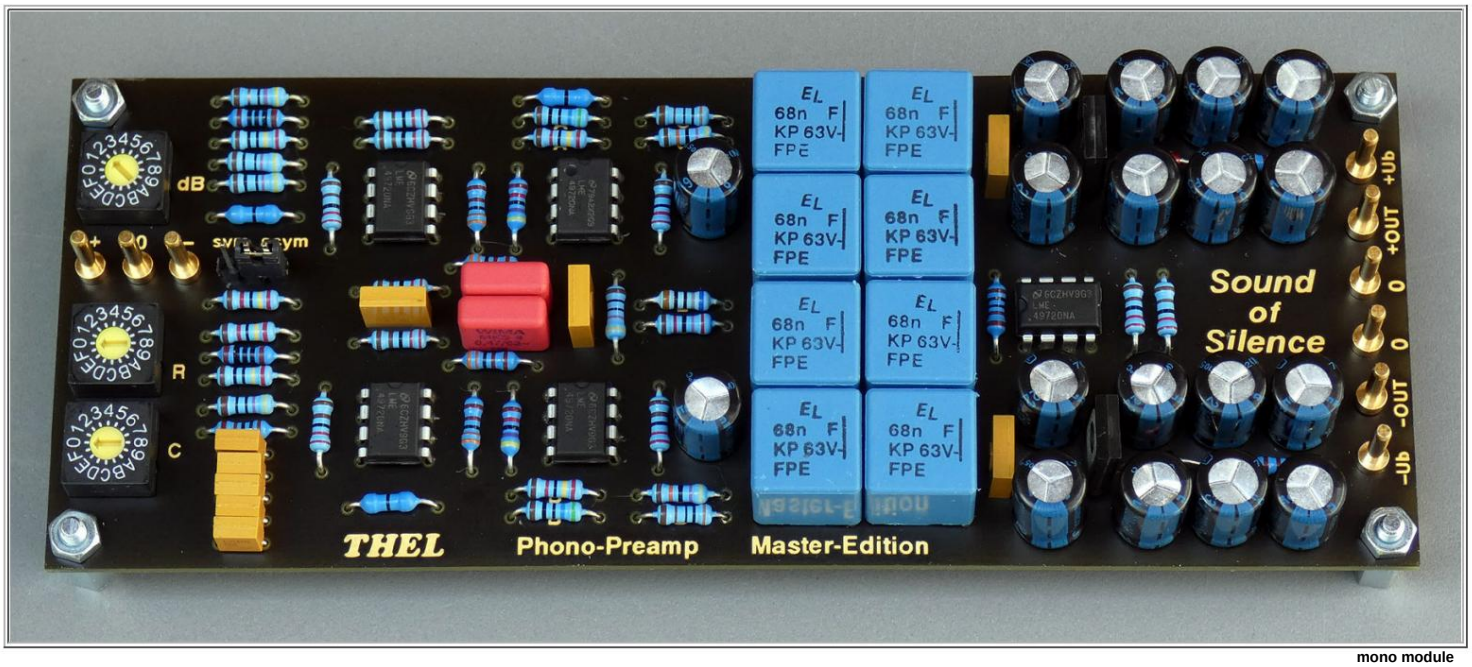
Seismograph-1 black

Seismograph-1 white

Seismograph-3

Sound of Silence This phono

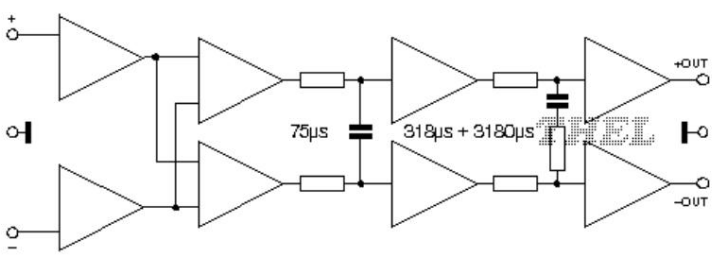
preamplifier will change the way music is perceived with completely esoteric electronics. There are no technical compromises to get any cult.



mono module

The first touch of the needle makes you sit up and take notice.

This is the rare case of experiencing something surprising.



2-stage passive RIAA filter; true symmetrical Once you have heard this circuit design, you will think differently about listening to music afterwards. Here the understanding of perfection in humans is addressed.

Hidden messages of masterfully constructed musical instruments and emotions of singers are so perceptible that it causes goosebumps.

Not just top drives like our seismograph go one step further, but all drives suddenly seem to go above and beyond to show what they can really do. Even old record collections are breathed new life again.

Technical precision isn't everything It's also achieved by many others - and has long been exhausted. Noise, distortion, RIAA accuracy - there is not much more.

This also includes our phono preamplifiers that have been released over the last 30 years. Basically, they were all similar, since the limit of circuit technology had already been almost reached in the 1980s. Measurements show that to this day.

Precise technology alone does not seem to be able to track down all the messages contained in the music signal and to discover the soul of the music. Only certain

Circuit designs can detect and reveal hidden messages in the signal, so they no longer need to remain hidden.
Since the beginning we work with the knowledge of physics , we have long since abandoned this approach and are looking for the details in a circuit to which the hidden signal information reacts particularly sensitively. Experience and emotional flair have to be incorporated. You can't set any limits.

A phono stage that has to handle signals in the micro- and even nano-volt range and on top of that has to straighten the frequency response is significantly more sensitive than any other linear amplifier circuit with a higher level.
Dealing with such a **complex interaction** also requires interdisciplinary knowledge. Every compromise in detail, every preference for a preference inevitably affects the perfect interaction of the whole. Only when you "see" and "feel" a circuit's properties during development do you achieve results that cannot be explained with measured values.

Thus, the **Sound of Silence** is not only packed with noble components in an audiophile circuit design, but also with dedication, experience and emotions from over 40 years of experience.

The three most important sound-influencing factors 1. The choice of
operational amplifiers We use the **LME-49720 .** Over the years, it has
proven to be an audiophile benchmark for us, whose sonic properties are particularly evident in optimal circuit design and has changed the way we think about discrete circuits.

Special technical features: Lowest distortion factor with high amplification up to 20kHz. The low THD of many other OPs will skyrocket if the gain ramps up too much above 1kHz.

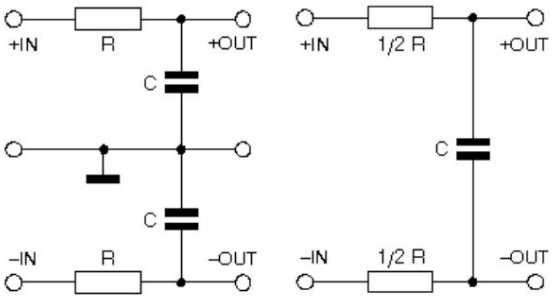
The high requirements for low noise (2nV) are also met. Often the super low-noise are not the most audiophile. Noise is already heavily influenced by the source resistance of the signal source (resistance noise) and by the wiring of the input stage.
Compare data from LME49720, OPA 2134, OPA 627, AD797, LT1124, etc.

2. Strictly symmetrical signal processing Not just a double
structure in which each half of the signal refers to ground, but the consistently genuinely symmetrical structure of the entire circuit with no reference to ground. Even when feeding an unbalanced signal, true symmetry is created.

3. The RIAA filter
The filter is also really symmetrical and even divided into two stages.

Examples 1 and 2 on the right each show a low pass >

High component quality only adds the I-Punk to the more important basic concept



1. Classic symmetry with reference to ground

2. True symmetry with no ground reference.

The sound of the "Sound of Silence"

There is no doubt that the RIAA filter, in terms of its design and the choice of components, particularly influences the sound of a phono stage. If you look at the two-stage, truly balanced **passive filter design** for a while, you might be able to understand how all signals are treated in a completely natural way and how life is preserved in them. There is probably a connection in the naturalness of the signal processing. Because after a passive filter, a natural sine wave always retains its exactly natural shape. It is not changed by negative feedback in a signal loop caused by settling times, rise times, etc.

A sound description is always a bit more difficult than the pure representation of measured values - they are fixed and fact. Sound has to be put into words. Words to describe the feeling and sensations. Everyone does that differently.
Here it can definitely be said that the emotions are particularly strongly addressed. The emotions of the singers and the secrets of masterfully crafted musical instruments are truly "felt". This is reproduced so clearly, as if the **"Sound of Silence"** knew what was being sung or played. This is immediately noticeable when you first hear it and sometimes gives you goosebumps.

It's almost as if you've only ever heard with one ear all your life. Even the entire playback chain appears in a new quality because it now reveals much more of itself and suddenly reveals many more details. Because the newly discovered messages in the tiny signal world are now recognized much better by the rest of the audio chain.

From now on you will think differently about listening to music

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technical description

Input parameters
Operation is possible with all pick-up systems. **Three 16-stage rotary switches** enable a wide adjustment range of capacitance, resistance and amplification. This also ensures very high channel equality between the modules.

Input / Output = Balanced / Unbalanced Really balanced
input stage with precision instrument amplifier, built with audio-grade OP amps. This allows you to optimize for maximum low-noise and linearity, as well as the lowest distortion factor.

For an **asymmetrical input (cinch) ,** only the "plus" and "zero" connections are used and a jumper is repositioned. Since the first stage always works as a symmetrical device, an asymmetrical signal is also processed in all further stages in a really symmetrical way. As a result, a cinch signal also benefits from the genuinely symmetrical 2-stage passive RIAA filter. This basically means that a really symmetrical signal is available at the output, which does not have to be symmetrical there first.

It's not a typical balanced signal routing that simply uses two separate paths for the positive and negative signal and each branch is referenced to ground. A so-called floating ground circuit is used here, in which the signals correspond to one another and not to ground. Therefore, the negative feedback resistors of the op-amp stages have no connection to ground (function similar to a transformer coupling).
However, if only an unbalanced output is required, use only one output (e.g. +Out). This contains all the information of the opposing signal. In this case, the signal ground current flows via the power supply cable and not within the module.

Passive RIAA filter Unassailable for many audiophiles See also the basics of RIAA equalization The fantastically
low and inaudible deviation here is only 0.05dB typ (0.08dBmax) 50Hz-20kHz. This level of accuracy is fundamental. It results from components whose values are precisely calculated and have narrow tolerances. No adjustment is necessary.
In addition, KP capacitors are used with a particularly even capacitance curve of 20Hz-20kHz (important). There are only significant deviations from about 100kHz (+0.3%).

An RIAA deviation of <0.1 dB is not necessary at all, but our values are lower. The passive filters are not part of a negative feedback. There are purely linear amplifier stages before and after the filters, which means that the signal is completely error-free from negative feedback distortion and shows the best transient response. Very low impedance filter network with film foil capacitors.

The individual stages
In order for the circuit to retain all the emotions of the music signal, the balance between the stages must be right.
These include:
1. Careful dimensioning of the successive amplifier stages.
2. The optimal order of the two passive filters in terms of noise and clipping limit.
3. Noise behavior of the individual stages and their different influence.
4. Optimum choice of components and their values, matched to the properties of the individual stages (source resistances, etc.).

No capacitor in the signal path
Although there is **pure DC coupling** from start to finish , there is no annoying offset at the output, but still a smooth capacitorless **subsonic filter,** with a -3dB point at around 10Hz (-0.6dB at around 20Hz) so that the lowest frequencies in the range of mechanical turntable noise (rumble) experience a minimum attenuation without the slightest influence on large bass foundations.

No unnecessary buffer stage in the output
The OPs we use are particularly audiophile (LME49720). The distortion factor of a single OP with a 600 ohm load and 3V RMS signal voltage is only 0.00003% at 1kHz and 0.00006% at 20kHz (see here).

However, a phono preamp is usually only followed by the high-impedance input of a line preamp, without 100m of cable capacity in between. You also don't operate headphones with it, or similar, which you would have to control in terms of volume - with a correspondingly low-impedance adjusted potentiometer.
Each additional low-impedance output buffer amplifier would thus unnecessarily increase this extremely low distortion factor.
Example: The THD of the 50 Ohm "Superbuffer" OPA 633 from Burr-Brown is 0.02-0.005%. Some act as if you can simply ignore such a component at the end of a much higher quality chain. Therefore, we no longer find any argument for an additional, sound-influencing, low-impedance buffer stage.

Operating voltage - buffering The
operating voltage is +/-5V to +/-25V (optimal +/-18 to +/-21V). On board is a gyrator-like voltage smoothing that works as a regulator above 18V. It is buffered with six LOW-ESR electrolytic capacitors connected in parallel with a total of 2x1,300µF. This means that the output stage in particular has a very large amount of buffering available directly at its connection pins. In the further course of the conductor tracks, various symmetrically attached HF capacitors ensure noise reduction of the operating voltage.

Gold-plated **conductors** The
conductors of this exceptional module are made of gold- **plated 70µm copper,** and the lettering on the black surface is gold-plated as well.

See topic noise here

Extensive range of high-end power supplies

The sound signal of an audio circuit cannot be better than the power supply. That's why we offer different analog power supplies for every requirement, especially the battery -like Class A Overkill.

Addendum
The inspiration for this super phono stage came from the **super drive Seismograph,** developed by our long-standing partner **Othmar Spitaler (formerly Fa. Artkustik).** Some test organs say that the 100% mark has to be redefined because of the **seismograph .** A turntable that belongs to those that surpass everything calls for a preamplifier of equal stature.

Where there is a niche, you will find extremes. "Sound of Silence" and "Seismograph" seem to have found the perfect symbiosis to this extreme. Of course, such a drive is not affordable for everyone, but the "Sound of Silence" shows how other drives can surpass themselves.

Technical data

symmetrical operating voltage: Ub +/-18 to +/-21V optimally symmetrical
operating voltage: Ub +/-5V to +/-25V limit values
Own power consumption: approx.
+/-60mA Output voltage max at 1kOhm load: approx. 2V under 1xUb, max 14Vs (unbalanced)
Output voltage max at 2kOhm load: approx. 4V under 2xUb, max 28Vs (symmetrical)
Output Offset: <1mV
Output current max: approx. 20mA/750 Ohm (unbalanced)
Output current max: approx. 20mA/1500 Ohm (balanced)
Input: sym. or asym.
Input resistance: 47k or 60R to 1k0
Input capacity: 47p - 880p
Gain (G) at 1kHz: 38.6dB - 64.4dB adjustable in 16 steps* overload resistance
1kHz; G=38.6dB: input 120mVs; output 13Vs* Overload resistance 1kHz; G=64.5dB: input
7.0mVs; Output 13Vp* Channel equality between modules: < 0.04dB

Noise: here
RIAA accuracy: 0.05 dB typ; 0.08dB max (40Hz: -0.15dB) 35°ambient
THEL test generator: <0.002dB
smooth subsonic: -0.6dB 20Hz; -3dB 10Hz; -10dB 5Hz
Dimensions: 155 x 60 x 15mm
(Height from lower edge of circuit board)
*The stated amplification factors and output voltages refer to an asymmetrical output. Balanced = +6dB (x2)

Info

Phono Manual.pdf

Turntable conversion to symmetrical

The RIAA curve
Function during recording and playback.
IEC
standard Neumann
constant etc

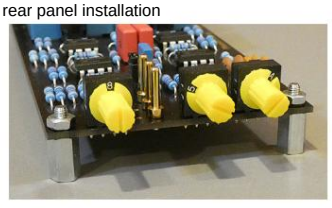
Conversion to other equalization curves

equalization curves

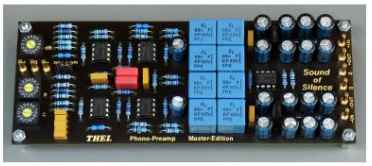
Two versions of the input selector switches are available (for the parameters gain, input resistance, input capacitance)
Switch horizontal, for housing installation. Switch not accessible from the outside
Switch standing, accessible from the outside with rear panel installation


Switch horizontal (L)


Switch standing (S)


Switch standing (S)

Sound of Silence L



Price (incl. VAT)

Mono module - 2 pieces are required for stereo operation

module	Switch	EUR/ piece
Sound of Silence **L**	lying	~~245.00~~
Sound of Silence **S**	standing	~~245.00~~

No longer available as a finished module
Still available as a kit from phelektronik

Tips for free sound improvement from modules that are operated with a very low signal level: If possible, **switch** off all devices that have a switched-mode power supply .
Even the more distant ones!
Devices such as televisions, etc. that run in "standby mode" (electromagnetic transmitters)

A common power supply unit for left/right is sufficient for optimal setup. **>** If the entire system (preamp/power amp) is set up with separate power supplies for left/right, the phono preamp should also be set up with two power supplies.
Otherwise, two separate power supplies offer an advantage, especially for the simpler, hum-free setup.

Recommended power supplies:
NT10HQ-18 or NT25HQ-18

BLP10-22, or
BLP25-22 (Ultimate)

Important

The Sound of Silence phono module is not an independent device and requires the connection of additional components or Modules, such as transformer, rectifier, filter, sockets for inputs and outputs, mains switch, etc. to get a functional device.
Below are a few suggestions that are optimally coordinated.
But they can also serve as a basis for the procurement of other additional parts or for your own ideas.

Accessory Links

Plugs for the 2mm gold-plated connection pins Some find it a pity to solder the gold-plated solder pins on the circuit board. That's why we offer these gold-plated connectors that ensure a solid connection.

Plug-socket set for the phono ground wire Connection set for a proper connection of the ground wire.
Consists of a 2mm insulated socket and a 2mm gold-plated bunched plug from MC.

Suggestion for amplifier wiring on our cable page
OFC stranded wire 1.5mm2,
84x0.15mm 99.99% pure copper

Solder **cinch cables yourself** with our THEL Bluecord Silver

78rpm shellac equalization curves

All our phono modules can be converted to any desired treble and bass equalization curve for 78rpm.
Only other capacitor values have to be soldered in. When ordering, please ask for the 78rpm chart with the conversion instructions. If you are clever, you can make these additional equalization curves switchable.
We ask for your understanding that we do not offer any further support on this topic that goes beyond these conversion instructions. We just offer a good tool. Anyone who is interested in this certainly has a large field of experimentation in front of them.
Examples:
https://wiki.audacityteam.org/wiki/De/78rpm_playback_curves https://sound-au.com/project91.htm

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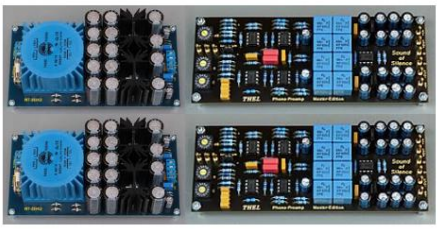
Combination examples The suggested combinations are optimally put together and also serve as templates for your own ideas.

Combination SX-20 Stereo,
with dual power supply. An already very high quality combination

Prices (incl. VAT)

	Single EUR	Total EUR
Type 2 x Sound of Silence (L or S)	245.00	490.00
2 x NT-25HQ-18 (set approx. 2x 18V)	128.00	256.00
Total SX-10		**746.00**

SX-20



2xNT10HQ-18; 2xSound of Silence, or NT25HQ-18 for oversizing

Combination SX-50 Stereo,
with the exceptional Black-Pulsar power supply, whose voltage quality with left/right channel separation corresponds to the level of a battery supply.

Prices (incl. VAT)

	Single EUR	Total EUR
Type 2 x Sound of Silence (L or S)	245.00	490.00
2 x power supply Black-Pulsar 10-22 (set approx. 2x 18-21V)	138.00	276.00
Total SX-50		**766.00**

SX-50

2xBlack Pulsar 10-22; 2x Sound of Silence

Complete assembly - example The photos on the right show a suggestion of how the phono stage (Sound of Silence L) can be assembled.
Not all accessories are in our range of components.

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Equipment parts checklist

What is required for
a finished device?