

THÖRESS

Full Function . Preamplifier

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"FFPre MKII"



INSTRUCTION MANUAL

Thank you for purchasing the THÖRESS Full Function Preamplifier (FFPre)!

You have acquired a versatile vacuum tube preamplifier incorporating a state-of-the-art line control amplifier (2x12J5GT tubes) and a ground-breaking tube phono equalizer (2x12JGT+2xPC86 tubes) in one chassis. The amplifier is built with meticulous hand construction using our proven point-to-point wiring techniques, whereas much care has been taken in arranging each aspect of the internal construction to ensure highest reliability, low noise performance and ease of service for many years to come. Please read the following explanations and instructions carefully to get the most out of your FFPre.

INPUTS

The FFPre is equipped with a MC gain phono section with excellent signal-to-noise performance implemented in purely active operation mode (no built-in step-up transformers!) and three on-the-fly selectable phono inputs P1, P2, P3 with equal gain status (65dB at 1kHz) yet different cartridge loading. Alternatively, the FFPre is available with MM gain phono section (45dB at 1kHz) on demand. The standard cartridge load pattern on the phono inputs of 3XMC and 3xMM units is

(P1, P2, P3)=(100, 200, 500) ohms and (P1, P2, P3)=(47, 47, 47)K

respectively.

The cartridge load values installed on the inputs of 3xMC units are printed on the rim of the rear panel (under the lid) !

The phono inputs are complemented by three-line inputs with different gain and input impedance characteristics as described below.

Normal Line Gain

The gain on input #6 is 26dB (20-times). This input presents a comparatively high input impedance of 80.000 ohm to the connected program source and is suitable for

classic line level program sources such as phono preamplifiers, tape machines and tuners.

Low Line Gain

Inputs #4 and #5 offer 18dB gain (8-times, 8dB lower gain compared to input #6) and are meant for modern high-output digital sources such as CD/DVD players, streamers or DAC-s. The input impedance on these inputs is 30.000 ohms.

Summarizing, the gain pattern on the inputs of the FFPre are

(MC, MC, MC; 18, 18; 26) dB and (MM, MM, MM; 18, 18; 26) dB

on 3xMC and 3xMM units respectively. Other gain patterns can be easily implemented on demand, for example,

(MC, MC, MC; 10, 10; 18) dB or (MM, MM, MM; 18; 26, 26) dB.

OUTPUTS

The output impedance of the line section is sufficiently low (around 300 ohms) to simultaneously drive long cable lines and power amplifiers with an input impedance as low as 10.000 ohms without compromising sound quality. The 3dB-down frequency under 10.000 ohm loading is still well below the audio band (lower than 5Hz, line output coupling capacitor 3.3MFD).

The output of the line section is lead out through 2x2 RCA jack's channel wise connected in parallel (twin output). Thanks to the twin output it is possible to simultaneously drive a power amplifier and an active sub-woofer without further adaptation in which case the effective load impedance (input loads of power amplifier and subwoofer driving module in parallel) should preferably not come significantly under 10.000 ohms. The twin output of the FFPre is also helpful for proper dual-channel mono installation with SINGLE-COIL cartridges as described in a dedicated paragraph of this manual.

Furthermore, the FFPre comprises a pass-through output (QUELLE) for the activated input. This design choice obviously allows to combine the internal phono section of the FFPre with an external line device.

The FFPre phono section can be tapped via the pass-through output!

In case of such an installation it is advisable to connect the pass-through output to a line input with high input impedance (equal or higher than 30.000 ohms) in order to ensure a sufficiently low 3dB-down frequency of the low end response. The phono output coupling capacitor (0.33MFD) has been chosen to give a 3dB-down frequency of 5Hz when no additional external loading is imposed on the phono circuit via the pass-through output. In cases where line inputs with sufficiently high impedance are

not at disposal it is advisable to install output coupling capacitors with higher capacitance values than 0.33MFD in the output of the phono circuit. For example, a critically low effective load value of 10.000 ohm would require a coupling capacitance of 3.3MFD in order to maintain the original no-load 5Hz 3-dB-down frequency, whereas 1MFD would give a still acceptable extension of the bass response down to 15Hz.

Line amplification is performed by a unique single-stage, zero-feedback circuit employing one 12J5GT vacuum tube per channel (12SN7GT tubes in MKI units) operated at high idle current. As a result of this purist concept the output signal is phase-inverted (shifted by 180 degrees) relative to the line and phono input signal. Users who make a point of a formally correct over-all signal phase can apply a simple corrective (in case it is known that all other components of the system offer phase neutral operation).

To ensure a formally correct over-all phase of the signal in a setup including the FFPre the loudspeakers must be connected to the power amplifier with reversed polarity (red binding post of the amplifier connected to the black speaker terminal)!

PHONO EQUALIZATION

The gain of a phono pre-amplifier has to vary with frequency in order to restore the pre-emphasis introduced to the signal during the record cutting process. Therefore a phono pre-amplifier is sometimes called PHONO EQUALIZER (Phono Entzerrer). A pre/de-emphasis characteristic is completely and unambiguously determined by a set of edge frequencies (equivalent to so called time constants)

f1 > bass roll-off, f2 > bass turnover, f3 > treble roll-off.

The gain rises below f2 (bass boost) and falls off above f3 (treble attenuation/roll-off) with a slope approaching 6dB/octave. f2 determines the end point of the bass boost. The difference between the various pre/de-emphasis prescriptions established by prominent record companies in the inception of high-fidelity audio is rather small, often negligible, whereas in the most cases the crucial bass-turnover frequency f2 equals 500 Hz. A few examples of prominent de-emphasis prescriptions are given at the end of this manual.

The phono section of the FFPre performs highly accurate RIAA de-emphasis, (f1, f2, f3) = (50, 500, 2124) Hz!

This most widely used equalization characteristic is given by the NEW ORTHOPHONIC prescription established by RCA along with the microgroove vinyl disc in the late 1940s, which later was appointed as phono playback standard.

PHONO CARTRIDGES

Early microgroove records carry a monophonic signal written into a LATERALLY excited triangular spiral groove of constant depth. Such FIRST-GENERATION microgrooves were originally meant to get tracked by a spherical 25-micron stylus mounted to a MONO-FLEXIBLE cantilever (25-micron refers to the spike radius of the diamond/sapphire tip). A mono-flexible cantilever is one which does not comply in vertical direction.

By contrast, the groove of a stereophonic record carries two signals (more or less sharply separated from each other) coded LATERALLY AND VERTICALLY into the groove by also varying the depth of the groove relative to the record surface (concomitant with the lateral groove modulation). Consequently, stereophonic cartridges are obligatorily fitted with an OMNI-FLEXIBLE cantilever, that is one which complies in all degrees of freedom.

A phono cartridge with mono-flexible cantilever will seriously and irrecoverably damage the groove when it is (accidentally) used for tracking a stereophonic record!

A stereophonic cutting head produces a monophonic groove when it is fed with identical signals on both channels. A groove obtained in this manner is significantly narrower than a first-generation monophonic microgroove, due to the new groove standards introduced for stereophony, whereas a 17-micron stylus was specified for tracking such SECOND-GENERATION microgrooves. During the stereophonic era more sophisticated stylus profiles (Shibata, Micro Ridge, Paratrace, Gyger, van-den-Hull etc) have been developed from the humble spherical 17-micron stylus in order to reduce tracking distortion and to enhance tracking ability of phono cartridges. These modern stylus profiles provide the further advantage of reduced record and stylus wear on account of an increased contact area (line contact) between the stylus tip and the groove walls.

Phono cartridges with a sophisticated stylus profile tend to (drastically) outperform humble cartridges fitted with a simple spherical stylus!

A phono cartridge with omni-flexible cantilever and a spherical 25-micron stylus can faithfully track (NARROW) second-generation microgrooves, likely with reduced tracking ability, although this type of stylus was originally intended for tracking (WIDE) first-generation microgrooves!

Conversely, every phono cartridge with a spherical 17-micron stylus (or one of its modern derivatives) can faithfully track (WIDE) first-generation microgrooves although this type of stylus was originally intended for tracking (NARROW) second-generation microgrooves!

Stereophonic grooves are mono-compatible in a two-fold sense...

At first, every monophonic cartridge with omni-flexible cantilever (and a stylus profile suitable for microgroove reading) is able to faithfully track stereophonic

grooves whereas the fairly well separated R and L signals are converted back into a consistent mono signal. In this case the signal generator of the cartridge transforms only the lateral excitations into signal. While vertical stylus movements do not contribute to signal conversion. Thus, monophonic cartridges ignore vertical stylus movements even when they are fitted with an omni-flexible cantilever. Secondly, every stereophonic cartridge is able to read both, early and second-generation monophonic microgrooves faithfully, whereas identical signals are developed in the R and L channel generator coils. Hereby, the omni-flexible stylus, theoretically, is exposed to lateral excitation only. However, in reality vertical movements of the stylus due to groove imperfections (warp, dirt, scratches) are converted into signal and such add noise artifacts to the wanted cartridge output.

Every stereophonic cartridge is capable of faithfully tracking both early and second-generation monophonic microgrooves, yet it tends to produce more tracking noise than dedicated mono cartridges!

Stereophonic cartridges with a sophisticated stylus are not only suitable for faithfully tracking (early and second-generation) monophonic microgrooves but tend to (drastically) outperform dedicated mono cartridges fitted with a humble spherical stylus!

The majority of currently produced high-grade monophonic MC cartridges are derivatives of stereophonic models and as such employ a dual-coil signal generator (two separate generator coils terminating in 4=2x2 output terminals) with an omni-flexible stylus. The only difference to the corresponding stereophonic variants is that the generator coils are not arranged at a 45-degree angle to the tracking plane, as it is needed for stereophonic reading. Examples of omni-flexible dual-coil mono cartridges are the AUDIO TECHNICA AT33-Mono, the LYRA mono cartridges and the DYNAVECTOR DV-X1s-Mono.

Use a DYNAVECTOR DV-X1s-Mono for ultimate playback of mono records with microgroove coding!

Mono-flexible single-coil MC cartridges are currently produced by MIYAJIMA LAB in Japan, all of which models (unfortunately) come with simple spherical stylus profiles. The highly outstanding TEDESKA mono cartridges made in Berlin by Hyun Lee are other examples of mono-flexible single-coil MC cartridges from current production. Whereas the ORTOFON Mono CG-25 and the EMT OMD-25 are widely known classic single-coil MC cartridges (pick-up heads). These old-timers offer an astonishingly good sonic presentation even when judged by today's standards. However, they cause excessive record and stylus wear due to their spherical diamond profiles and tracking weights in excess of 4 grams, especially when combined with vintage tonearms without anti-skating facility. Their use is therefore questionable when maximum sound quality and preservation of valuable records is the main goal. Nevertheless, they will be an obvious choice when it is aimed to compose a setup for authentic monaural playback.

SINGLE-COIL MONO

A monophonic cartridge with DUAL-COIL generator outputs two copies of the monophonic signal and therefore allows for dual-channel mono playback within the regular stereophonic wiring scheme. However, if the 4 input terminals of a stereophonic phono preamplifier (hotL, groundL, hotR, groundR) with single-ended (non-balanced) circuit topology are wired to a SINGLE-COIL cartridge through a stereophonic tonearm cable, in an attempt to distribute the monophonic signal over the stereo channels for dual-channel mono playback, groundL and groundR will unavoidably meet at the cartridge terminals (2 contact pins) or within the cartridge body (2x2 contact pins pairwise connected in parallel inside the cartridge body). This unwanted conductive connection will evoke residual hum in the amplifier due to the so-called GROUND LOOP EFFECT. This is not a peculiarity of the FFPre but holds generally for phono amplifiers with single-ended (non-balanced) circuit topology.

Single-coil phono cartridges cause residual hum when they are wired to both inputs of a stereophonic phono preamplifier with non-balanced circuit topology!

The FFPre allows for hum-free dual-channel mono playback with single-coil cartridges on each individual phono input!

The key to hum-free dual-channel mono installation with single-coil cartridges in the context of phono equipment with single-ended (non-balanced) circuitry is to distribute the monophonic signal over the R+L channels at the OUTPUT of the phono preamplifier rather than at the cartridge terminals, in the manner described below.

Connect the L-plug of the (stereophonic) tonearm cable with the L-jack of the chosen phono input, while the R-plug is left to hang freely, thus avoiding a critical conductive connection between groundL and groundR. Isolate the armature of the R-plug with the aid of a small glass test tube (or similar accessory) in order to prevent unwanted contacts. This installation permits hum-free amplification of the monophonic signal in the L-section of the FFPre, while the R-section of the amplifier runs at idle (is not fed with signal). Connect the ground wire of the tonearm cable to the ground terminal of the chassis in the usual manner! Connect both plugs of the interconnect cable (L+R power amplifier > FFPre) into the L-channel output jacks of the FFPre (possible in view of the twin output terminals of the FFPre). Now both power amplifiers are driven by the L-output signal of the FFPre (Y-connection). The system is now ready for replaying mono records with single-coil cartridge in dual-channel mono playback mode. Do not forget to restore the regular stereophonic wiring scheme when the single-coil listening session is over!

The system replays the L-signal on both loudspeakers (rather than a consistent stereophonic signal) when the system is fed with a stereophonic signal (from a stereophonic cartridge or line level program source) while the system is wired for dual-

channel mono playback in the above manner!

Some phono devices with non-balanced circuit topology feature a so called MONO SWITCH. Here the monophonic signal is distributed over the channels at the input (hence ground loop noise is induced), processed in the initial L and R amplifier stages (distorted in each branch!), mixed together somewhere in the middle of the circuit and then re-distributed over both channels of the following circuitry, whereas the ground loop noise introduced to the wanted signal in the initial amplifier stages cancels away during the mixing process. Obviously a clumsy and sound destructive concept!

Mono switches are sound destructive and go along with clumsy circuitry and are therefore not helpful when ultimate sound quality is the aim!

SUBSONIC ARTIFACTS

Coupling capacitor values in the phono section of the FFPre have been carefully chosen to ensure a low 3db down edge frequency at the low end while providing a certain amount of attenuation of subsonic frequencies. However, notably the phono section of the FFPre does not incorporate dedicated subsonic filtering! The amplifier will therefore pitilessly reveal subsonic artifacts which may have crept in the signal due to improper phono installation (turntable poorly isolated against structure borne noise, too low resonant frequency of the tonearm-cartridge combination, or comparable shortcomings).

The FFPre does not employ high-slope subsonic filters!

High-slope subsonic filters do not solve but mask phono installation problems while seriously compromising sound quality!

NOISE PERFORMANCE

Much care has been taken in arranging each aspect of the internal construction of the FFPre so as to achieve an extraordinary signal-to-noise performance even though the phono amplifier operates in purely active manner (without the aid of step-up transformers!). However, electromagnetic stray fields emitted by mains transformers or switching mode power supplies of other electronic devices positioned near the FFPre may, under unfortunate circumstances induce hum in the amplifier via electromagnetic interference. The phono section of the FFPre is particularly susceptible to this kind of noise induction for obvious reasons.

The FFPre requires considered placement for optimal signal-to-noise performance!

Place the FFPre on the right hand side of the rack in order to avoid/minimize electromagnetic interference with other components of the setup!

Idle noise emitted by the FFPre line section may become audible in the system when the gain of the power amplifier is rather high and not adjustable (as it is sometimes the case with solid state devices) or the loudspeaker is exceptionally efficient (horn system), whereas a worst-case mismatch scenario will obviously arise when both conditions meet. In order to avoid idle noise issues and to ensure conveniently fine volume adjustment, the gain of the power amplifier needs to be properly matched to the line gain of the FFPre with respect to the efficiency of the loudspeaker. Proper matching can be easily achieved in case the power amplifier allows for gain adjustment. In a matched scenario the volume controls rest near the middle position for a saturated listening loudness (assuming that the program sources are connected to line inputs with suitable gain figures).

Idle noise may become audible in the system when the gain of the power amplifier is not properly matched to the gain of the FFpre line section with respect to the efficiency of the loudspeaker!

The input selector of the FFPre produces moderate switching noise when it is moved in between the phono positions (P1, P2, P3) or from posP3 to pos4 or backwards, particularly on (3xMC) units. This effect is not a peculiarity of our preamplifier and would arise in the same manner with any kind of phono amplifier with on-the-fly selectable inputs due to the extreme input sensitivity of such devices. The magnitude of the noise emission is dependent on the gradation of the effective impedances (internal impedance of the cartridge in parallel with the associated load resistor) presented to the phono circuit on adjoining phono inputs. The noise disturbances will obviously remain inaudible and without impact when the volume control is set to a low angle of rotation before moving the input selector.

Always turn the volume controls to zero or at least to a very low angle of rotation before moving the input selector!

The FFPre outputs hiss when an open input (no cartridge connected) is switched active, because in this case the thermal noise produced by the cartridge load resistor R_{mc} is not shunted with the low impedance generator coils of a cartridge. The magnitude of the hiss noise is proportional to the resistance value of R_{mc} .

The FFPre is grounded in the sense that there is a conductive connection between the central zero point of the circuit and the ground terminal of the power inlet module (and thus a conductive connection between circuit zero potential and earth/ground by means of the respective lead of the power chord). On rare occasions, residual hum may arise in a setup with the FFPre due to the so called ground loop effect, which typically comes into play when more than one component of a system is grounded in the above sense.

Multiple grounding in a system can be resolved by interrupting abundant earth connections either by adjusting ground lift switches or, in case ground lift switches are not in place, by substituting 3-core power chords by 2-core parts!

The FFPre is equipped with six tubes (4x12J5GT+2xPC86 on MKII units and 4x12SN7GT+1xPCC88 on MKI units respectively). These tubes are unarguably among the most linear amplification devices ever developed in the history of electronic technology. The amplifier comes with a set of new-old-stock tubes which have been hand-picked to meet tight specifications.

The use of tubes with questionable characteristics may lead to degraded noise and sonic performance of the amplifier. Even serious damage may occur in worst case scenarios!

Never switch on the amplifier unless ALL tubes have been installed!

Never pull a tube out of the socket while the amplifier is powered on!

Always deinstall the tubes and wrap them up in the original protection case before transporting or shipping the amplifier!

SETUP

To setup the FFPre power off all devices of the system and proceed as follows.

0. Do not connect the amplifier to the mains until steps 1 to 8 have been taken.

1. Make sure that the frontal power switch (NETZ) rests in OFF (AUS) position.

2. Bring the master power switch on the power inlet module into the ON position.

Switch off the amplifier at the power inlet when the unit will not be used for a longer period of time!

3. Ascertain that both volume control knobs rest in zero position or at least at a very low angle of rotation.

4. Remove the top lid of the amplifier (eight metric 2.5 Allen-screws to release) and install the tubes carefully. Ascertain that the guide pin of the octal base tubes is properly aligned with the socket opening! Tighten the screws properly when reinstalling the lid so as to ensure a proper conductive connection between the lid and the chassis. Take care to place the lid on the chassis with correct orientation (5 slot stars head-on, 4 stars on the rear side).

Never power on the FFPre unless ALL tubes have been installed!

Never pull a tube out of the socket while the amplifier is powered on!

Always deinstall the tubes and wrap them up in the original protection case before transporting or shipping the amplifier!

Keep the original crate (including the four soft foam inlays and the tube protection case) for later use. It has been specifically designed for safe transport under rough conditions!

5. Bring the FFPre into its final position. Observe the remarks made on optimal positioning in the paragraph NOISE PERFORMANCE.

The FFPre requires considered placement for noise-free operation!

Place the FFPre on the RIGHT side of the rack to avoid/minimize electromagnetic interference with other components of the system!

6. Connect phono cartridges to suitable phono inputs (P1, P2 or P3). Do not forget to connect the ground wire of the tonearm cables to the ground terminal adjacent to the phono inputs. If one or more single-coil cartridges is to be used in dual-channel mono playback mode, follow the instructions given in the respective section of this manual to ensure a proper installation. Note that the amplifier is internally grounded in the sense that there is a conductive connection between the central zero point of the circuit and the ground terminal of the power inlet module (and thus a conductive connection between circuit zero and earth/ground by means of the respective lead of the power chord).

7. Connect line level program sources to suitable line level inputs (4/5/6).

8. Connect the FFPre to the power amplifier (active loudspeaker, subwoofer). Choose a reasonably low gain on the power amplifier in case this device allows for gain adjustment. If our EHT mono block is used for power amplification, set the gain selector to position 1 (lowest possible gain). Re-consider/adjust the gain setting on the power amplifier after the setup has been completed until optimal gain matching between the FFPre and the power amplifier is attained with respect to the efficiency of the loudspeaker. This is the case when the volume controls of the FFPre rest close to the middle position for convenient listening loudness.

9. Connect the FFPre to the mains with a 3-core power chord.

10. Power on the program sources.

11. Select the desired program source with the input selector.

12. Power on the program sources (while the FFPre is still powered off).

13. Switch on the FFPre while the power amplifier remains powered off. Wait for at least 1 minute until the warm-up process on the amplifier has come to an end.

When powering on the system, always switch on the program sources and the FFPre before the power amplifier, observing a delay of at least 1 minute!

14. Complete the setup procedure by switching on the power amplifiers (active speakers, subwoofer).

Never switch the FFPre on or off while the power amplifier is on!

When powering off the system, always switch the FFPre and the program sources AFTER the power amplifier, observing a delay of at least 30 seconds!

FUSE

The FFPre draws a current of 0.3A/0.6A from the 230Vac/115Vac mains corresponding to a power consumption of 70 watts. It is protected with a

1A slow-blow 5x25mm fuse

in the power inlet module. On rare occasions, the fuse may blow at the switching-on moment due to the current spike drawn by the mains transformer in this instant. Should this condition arise more regularly it is advisable to use a fuse with slightly higher current rating.

ULTRASONIC RECORD CLEANING

Record cleaning is a crucial activity for all vinyl lovers who wish to fully exploit the sonic capabilities of the FFPRe!

Step 1

Roughly clean a lot of records with a microfiber cleaning fabric.

Step 2

Let the records rotate in the bath of an industrial grade (6 liter) ultrasonic cleaning machine (USCM) for at least half an hour with the aid of the KUZMA rotator kit or similar device. Use demineralized water and a few drops of dish cleaning concentrate as cleaning fluid heated up to about 45deg Celsius. Use a EMAG 60HC (Made in Germany) USCM for optimal cleaning results.

Step 3

Take the records out of the bath one after another and vacuumize them on a conventional record cleaning machine such as the Nitty Gritty (platter with LP label size) or Okki Nokki (rubber coated full size platter!) while they are still wet. Notably, in case of the Okki Nokki the platter needs to get dried up before the record can be flipped. The vacuuming procedure is obligatory and must not be omitted. Air-drying or blow-drying of the records after the ultrasonic cleaning treatment is highly counterproductive.

Step 4

Let the record air-dry for a little while and put it in a pristine sleeve.

FEATURE OVERVIEW

- Reference grade vacuum tube line control amplifier and state-of-the-art vacuum tube phono equalizer within one chassis.
- Purely active MC gain phono section (70dB@1KHz) with excellent signal-to-noise performance (no built-in step-up transformers). Alternatively, MM gain (45dB@1KHz) can be installed in the phono section on request.
- Highly accurate RIAA equalization (passive de-emphasis implementation).
- Minimalist single-ended zero-feedback schematics throughout.
- Six inputs (3 phono + 3 line) with gain pattern (MC, MC, MC; 18, 18; 26) dB.
- Channel-separate manual volume control via high-grade continuously-variable rotary potentiometers with low angle sensitivity (conveniently fine volume adjustment).

- 2x line outputs with low output impedance.
- Pass-through output for the active input.
- Ultra low noise and leakage mains transformer produced in-house for 230Vac (115Vac via jumper setting), 100Vac (Japan), 120Vac (USA, Canada), 220Vac (South Korea, China, Thailand, Indonesia), 240Vac (UK) or 245 Vac (Australia).
- Full hand c
- onstruction, point-to-point wiring throughout.
- Nonmagnetic aluminum casework, anodized printing on front and rear panel, powder-coated lids.
- Dimensions: 434x434x154 mm, 154=134+20 (feet).
- Dimensions of the shipping box: 650x650x350 mm, weight 11.5 Kg.

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THÖRESS...

**A Tribute to Professional Audio Components
from the Golden Age of the Electronic Tube !**

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