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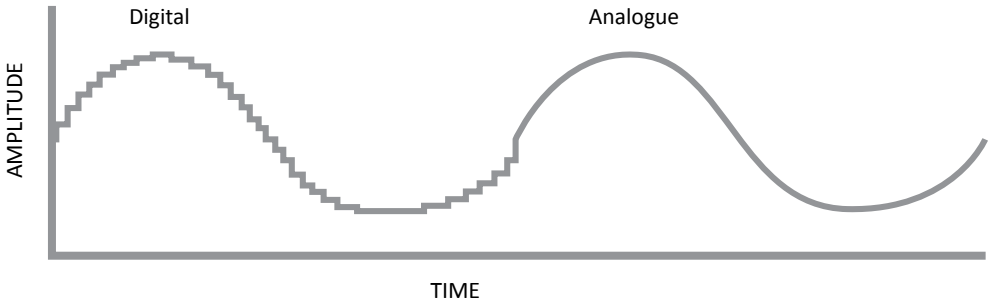
Phono Preamps

Discover true analog playback

Way back in 1982, Phillips and Sony got together and launched the venerable compact disc and the CD player. Gone forever were the days of scratchy 33 RPM records, records skipping and cleaning the dust off the collection. The new standard would promise less noise, greater headroom and amazing dynamic range. With the almost universal adoption of the CD, audio equipment manufacturers quickly eliminated the phono input stage on their receivers or preamps and instead opted for digital alternatives such as SP-DIF.



Today, there is a renewed interest in listening to music that has been mastered on lathes to produce 33 RPM records. For many audiophiles, the 'organic' sound and feel of a true analog playback chain extols a level of musicality that is lost when rendered digitally. Musical enjoyment is but one of the reasons that phonographs have resurged in interest. There is a crowd of users that enjoy converting their old album collections to a digital format so that these can be played back using more contemporary technology. Another area of interest comes from those that archive old recordings for conservation or simply to reuse the old recordings in a more editable format. Finally, some artists have found a niche whereby they can produce a lacquer master and limited runs of a session or live performance and sell these 33 RPM 'collectables' to their most avid fans as a prized memento.

No matter how you look at it... record players are really cool and the growing popularity seems to dictate that they may well be with us for years to come. This renewed interest has created a demand for phono preamps and Hafler has taken on the challenge by providing a number of devices to suit various budgets and user levels. The following pages describe the equipment in the audio chain and the Hafler products that best address a given need.

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Signal Path

A typical high fidelity system encompasses the following devices in the signal path:

Audio Source -10 dB **Preamplifier** -10 dB **Amplifier** 50 W **Speaker**

A CD player, video player or analog tape machine will generally produce a signal that is referred to as a -10 dB consumer level output. This stereo signal is typically an unbalanced source that employs a coaxial cable and a pair of RCA connectors at each end.

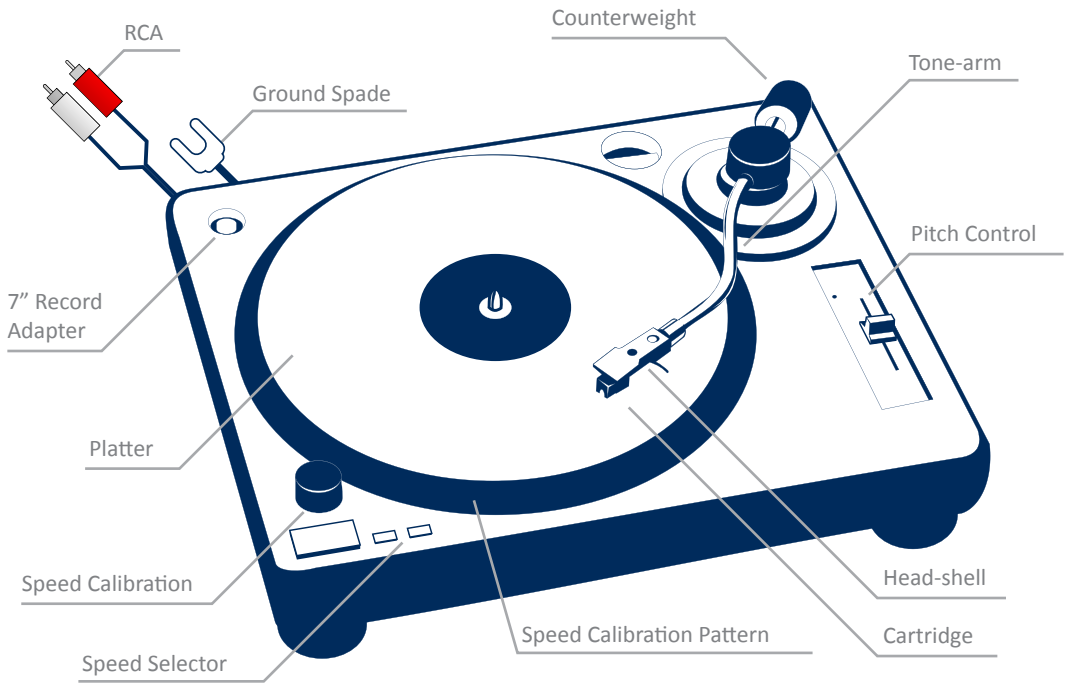
When a turntable is brought into the equation, due to the lower output that it produces (-50 dB to -30 dB) and extra gain stage is required called a phono preamp.

Turntable -30 dB **Phono Preamp** -10 dB **Preamplifier** -10 dB **Amplifier** 50 W **Speaker**

The phono preamp boosts the signal so that the preamplifier or receiver can manage the phono output stage in an effective manner.

The Basic Turntable

The following image shows the various parts and components that make up a turntable. Although all parts are important, those most relative to reproducing sound include the stability of the platter, the quality and balance of the tone arm, the solidity of the head-shell and the all important cartridge. It is the cartridge and needle assembly that picks up the vibrations from the record and converts them into an electrical (audio) signal.



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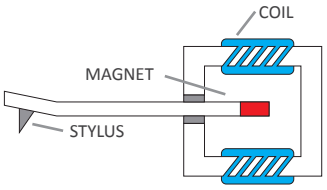
Types of Cartridges

There are two basic types of cartridges used on turntables: moving magnet (dynamic) and moving coil. Dynamic cartridges are by far the most common. They have a higher output and only require about 20 dB of gain to produce the desired signal level. This makes them easier to manage as they are less prone to noise.

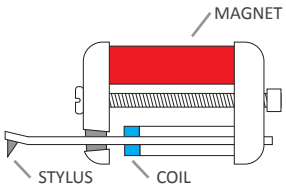
Moving Magnet Cartridge



The Hafler PH50 is specifically designed for moving magnet (dynamic) cartridges. You merely connect the output of the turntable using the stereo RCA cable and the ground that is usually hard wired to the turn table to the PH50 and then connected a second stereo RCA cable from the PH50 to your receiver. It will boost the signal to produce a -10 dB output. Some of the available -10 dB inputs on a receiver include the AUX input, TAPE input, MON input or the CD input.

Moving Magnet | PH50 | Receiver Amp

Moving Coil Cartridge



Moving coil cartridges produce a much lower output than a moving magnet. In order to bring their gain up to a usable level, between 60 and 70 dB of gain is required. This in fact is extremely difficult to do without introducing noise or artefact. This is why moving coil preamps are more expensive.

There are two ways of boosting the signal of a moving coil. It can be done electronically by combining an active booster amp in front of the phono preamp (also known as a pre-preamp) or by introducing a passive step-up transformer (SUT) in between the phono output and the RIAA preamp.

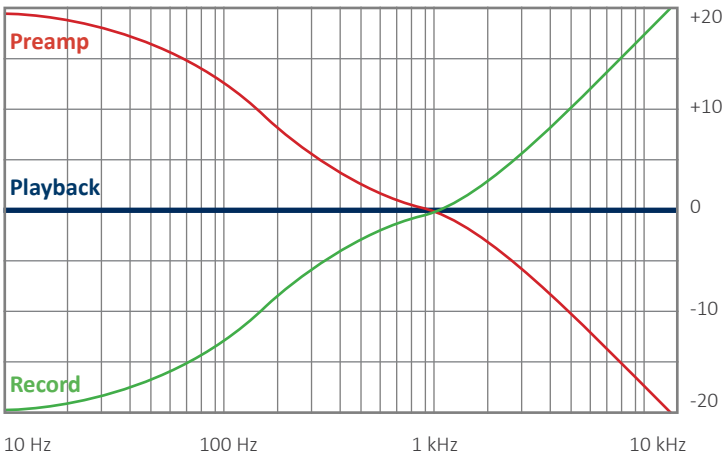
The Hafler PH60 is a combination pre-preamp and RIAA preamp that both increases the level to accommodate the moving coil, adds in the RIAA equalization curve and then boosts the signal so that it can be used by a typical high fidelity receiver.

Moving Coil | PH60 | Receiver Amp

RIAA Preamp

When a recording is being transferred to a lacquer master, the signal passes through what is known as an RIAA equalization curve. The Recording Institute Association of America (RIAA) figured out that in order to reproduce the recording effectively - with less noise and greater dynamics - the high frequencies have to be exaggerated. Upon playback, the reverse filter must then be applied – resulting in a flat or natural sound. All phono preamps are equipped with an RIAA equalization curve as part of the signal chain.

RIAA Equalization Curve



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SUTs (step up transformers)

As previously mentioned, due to the exceedingly low level produced by a moving coil cartridge special care is needed to boost the signal to a usable level. The problem with doing this actively with an amplifier is that any background noise that may be present will also be amplified. Further, the amplifier and required power supply can introduce noise. For the audiophile keeping noise to the absolute lowest level possible is the ultimate goal.

To this end, special high performance transformers called SUTs are available that can be used to boost the signal without the use of an amplifier or power source. For 40 years, Jensen has led the world in audio transformer technology and is considered to be the foremost producer of SUTs. By carefully arranging the primary coil with the secondary using a proprietary nickel-alloy laminated core, the signal is boosted by as much as 31 dB. To keep magnetically induced noise from power supplies, dimmers, transformer and electrical cables at bay, Jensen SUTs incorporate a series of Faraday shields and double layer protective mu-metal can. This results in the most accurate signal transfer with the lowest possible noise.

The Hafler PH34 and PH44 SUTs incorporate Jensen transformers to boost the signal from the low-level moving coil cartridge so that it is loud enough for the RIAA amplifier to work.

Moving Coil | PH34 | PH50 | Receiver Amp

Unbalanced line level inputs

Once the signal has been boosted by the RIAA preamp, the output can then connect to any line input on a receiver. This input is typically a -10 dB input for CD players, video players or even sometimes identified as the AUX input. Note that hi-fi systems have traditionally been constructed using unbalanced signals with standard RCA and coaxial cable.

Balanced line level inputs

There is a shift these days to balanced alternatives. These employ 3 pin XLR connectors and twisted pair cables to deliver the signal. Balanced systems are 'standard' in broadcast, recording and professional live sound and produce a +4 dB signal level. Twisted pair cable has been in use since the dawn of the telephone and is the basis for high speed Ethernet cable (cat-5, cat-6). The twisted pair configuration benefits with less noise from external fields and is most enjoyed when using cables that extend beyond a couple of meters. Hafler SUTs are available in a balanced format.