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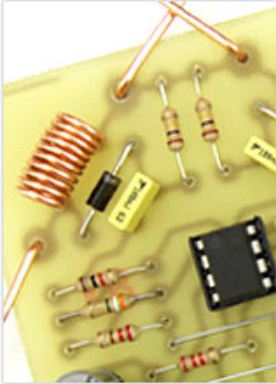
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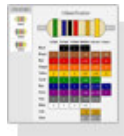
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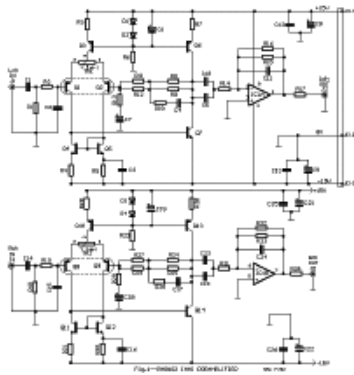
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Audio - Circuit Database

[RIAA Standard Hi-Fi Phono Preamplifier](#)



The circuit was designed to produce a hi-fi phono preamplifier circuit with RIAA equalization standard suitable for moving magnet cartridge that produces good sound.

- Recording Industry Association of America (RIAA) – the trade group that represents the recording industry in the United States
- Phono Preamplifier – an electronic circuit that equalizes and amplifies the analog output of the cartridge in a phonograph turntable where the output is increased to intensity equal to other audio sources like CDs and tapes and to restore the original signal, RIAA equalization is required
- TL072 – a low noise JFET input operational amplifier with features such as common-mode input voltage range, high slew rate, operation without latch up, compensated internal frequency, high input impedance at the JFET input stage, low noise, low total harmonic distortion, protected from output short circuit, low input bias and offset currents, wide common-mode and differential voltage ranges, and low power consumption
- BC212 – a PNP complementary Silicon planar epitaxial transistor used in AF small signal amplifiers and drivers, as well as in low power universal applications
- BC639 – an NPN medium power transistor used in driver stages of video or audio amplifiers due to its high current with 1 A maximum, low voltage with 80 V maximum, and enclosed in a TO-92 SOT54 plastic package
- BC183 – a complementary silicon planar epitaxial transistor used in AF small signal drivers and amplifiers as well as in low power universal applications due to its feature of good linearity of DC current gain

The main purpose of RIAA is to create, manufacture, and distribute around 85% of all legitimate sound recordings sold and produced in the United States, since its members consists of a large number of private corporate individuals and record companies like the record distributors and labels. They are involved in administering and creating technical standards of music reproduction and recording which includes magnetic tape, CDs, and digital technologies that are software-based. Their main purpose is to monitor and review relevant policies, regulations, and laws, to perform research about the music industry, and to protect the worldwide intellectual property rights and the first amendment rights of artists. They are also involved in the distribution, administration, and collection of music licenses and royalties, which makes them responsible for certifying gold, platinum, multi platinum, and diamond albums and singles in the United States.

The hi-fi phono preamp should have an accurate RIAA equalization, which is a technical standard of frequency response used on vinyl records during the playback and manufacturing. Once vinyl masters are cut, below 1 KHz frequencies are attenuated to prevent the stylus from crossing over into the groove. Higher frequencies are amplified in order to prevent noise from the disc surface. The RIAA equalization of phono preamps increases the lows and attenuates the highs so the original analog signal can be recreated.

The above circuit is based on the design of RIAA preamplifier with the first stage using visible components while the second stage contains an operational amplifier NE5532 or TL072. The standard imposed by RIAA filter is applied to the negative feedback. The use of capacitors C2 and C5 should be suitable with the moving magnet cartridge. The moving magnet refers to the process

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used to regenerate the music signal from the record grooves where a small and powerful magnet is attached to the cantilever with a diamond tip. This is used for tracing out the music signal from the record grooves. The movement of the cantilever is transmitted to the magnet that moves in a coil formed by very fine wires. The electrical signal is generated in the fixed coils due to the movement of the magnet. This signal will be input into a special phono circuit to amplify it to a level that is usable.

The transistors Q1 & Q2 have the same characteristics with Q8 & Q9 in that they have similar thermic behavior. This is essential especially in measuring with hfe meter. The input of differential amplifiers is regulated by the trimmer TR1 and TR2, to void the DC voltage in the output stage. The capacitors C4 & C17 is matched with C11 & C24 using a capacitance meter to avoid purchasing precise capacitors. The resistors are made of metal film. The supply of the circuit comes from the power supply which can be found in the amplifier or from external supply with 15 V and 100 mA. The circuit should be enclosed in a small external box to prevent noise from the environment.

R1-18=47Kohm	R15-16-32-33=150Kohm	C12-13-25-26=100nF 100V MKT
R2-19-13-29=270ohm	R17-34=100ohm	TR1-2=220ohm trimmer
R3-20=1Kohm	C1-14=1uF 100V MKT	D1-2-3-4=1N4148
R4-5-21-22=150ohm	C2-15=220pF *See text	Q1-2-8-9=BC214C [matched]
R6-23=2.2Kohm	C3-16=220pF	Q3-10=BC212
R7-30=82ohm	C4-17=47nF 100V [matched]	Q4-5-11-12=BC183
R8-24=68Kohm	C5-18=100nF 100V MKT	Q6-13=BC640
R9-25=1.5Mohm	C6-19=470uF 25V	Q7-14=BC639
R10-26=3.9Kohm	C7-20=100uF 16V	IC1=TL072 - NE5532
R11-27=2.7Kohm	C8-9-21-22=47uF 25V	J1-2-4-5=Female RCA cinch
R12-28=33Kohm	C10-23=2.2uF 100V MKT	J3=3pin connector 2.54mm step
R14-31=33Kohm	C11-24=1nF 100V [matched]	All Resistors are 1/4W 1% metal film

The phono preamplifier is normally built into an A/V or audio receiver and can also come as external devices for components without phono inputs in addition to the audiophiles that require the highest quality of restoration. For turntable to computer applications, external preamps are being used. A phonograph turntable is used for conversion of tracks on vinyl records into a digital format like the MP3 or CD audio. It converts the analog signal from the cartridge into digital PCM, since the turntable contains a built-in phono preamp that is required for equalization and amplification. The RIAA preamplifier is the best solution in getting a signal from an old turntable and into the mixing board, whether to obtain a pair of loops from a 70's LP record or just to archive the collection of record.

Source:users.otenet.gr/~athsam/phono_2.htm

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mehmed

Hi i am from arabia if anyone tried this circuit please tell me wheather it is working or not. thanks

mike arroyo

if the long playing album has been stored for several years, will it be restored fully by this circuit?

william

can be used in a sony pslx70 turntable?? thanks for u request

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