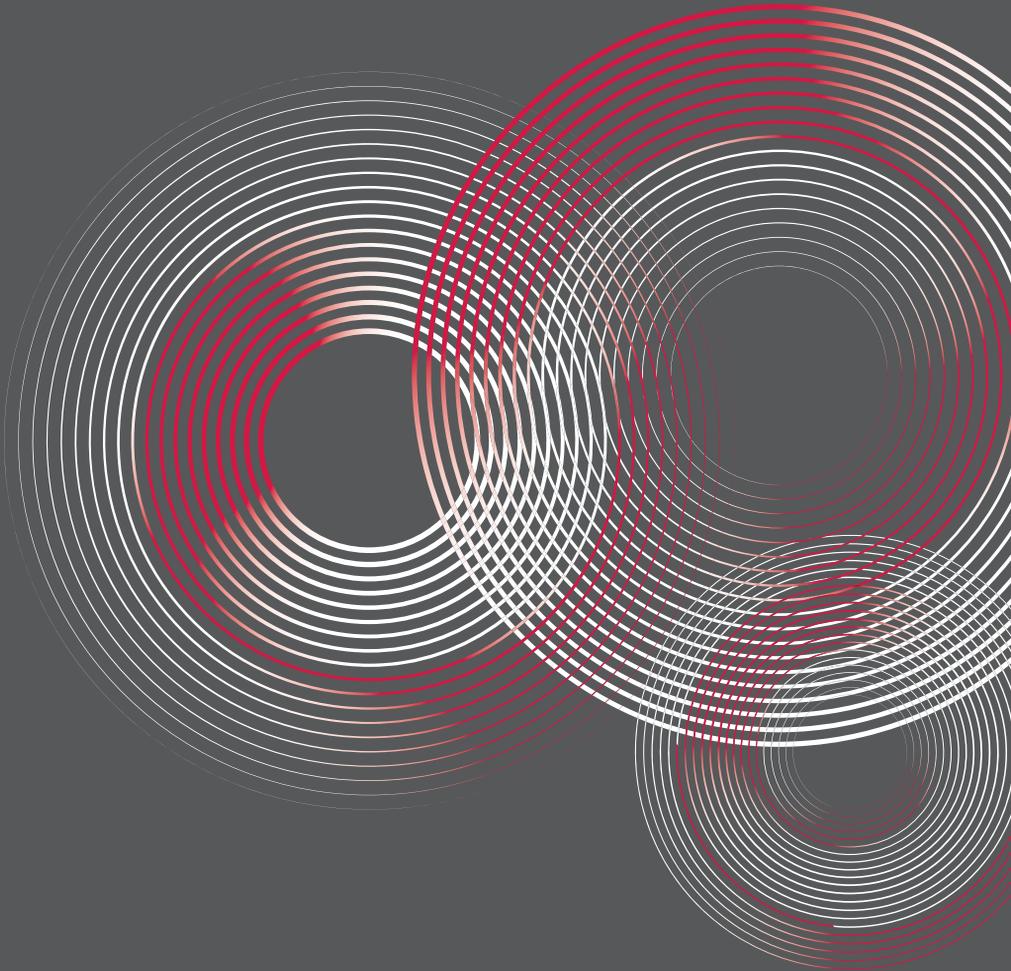




QUADRATIC

MC-2

Moving Coil Transformer



Quadratic Audio MC-2

The Quadratic Audio MC-2 is the product of the evolution of transformer based "Head-Units" for phono stages.

It takes the low-level signal from Moving Coil cartridges and passively increases the level to be compatible with standard phonograph pre-amplifiers.

Cartridges

The main two phonograph cartridge technologies that have withstood the test of time are Moving Magnet (MM) and Moving Coil (MC). MM cartridges are less expensive to manufacture than MC. The moving components have more mass than MC cartridges which limits their ability to accurately reproduce the sound imprinted in the groove which comprises the phonograph recording. MM cartridges have high impedance, high inductance and higher output voltage than MC cartridges. Because of these characteristics, cable length is a significant problem because of cable capacitance, which increases in direct proportion to length. This capacitive loading causes high frequency amplitude and phase response problems. Amplitude loss at high frequency is readily heard. Phase shift is very important for sound image "smear" which determines how well defined spatially the reproduced sound is reproduced. Bandwidth far beyond the range of human hearing is necessary to attain very good phase shift within the higher audible range.

Both cartridge types put out a similar amount of electrical energy. Electrical energy is the product of voltage times current. Phonograph pre-amplifiers merely amplify voltage. They are designed to only work with MM cartridges with their higher voltage level. The voltage level of a MC cartridge is too low to go directly into a pre-amplifier. Attempts have been made to give them a higher voltage output, but those designs were few and have been abandoned because they could not deliver the performance demanded for critical listening.

The beauty of MC cartridges is that they produce the same power as MM cartridges while being capable of vastly superior performance when properly interfaced with a phono preamplifier.

MC Transformers

The engineering issue is: How can the very low voltage at a very low impedance MC cartridge be made compatible with a pre-amplifier?

The solution is the transformer. This is an electrical device that “transforms” one voltage to another in proportion to the turns ratio of the “primary” input side to the “secondary” output side. Not having active electronics to introduce electrical noise, it brings the signal amplitude up to a useful level without introducing objectionable noise.

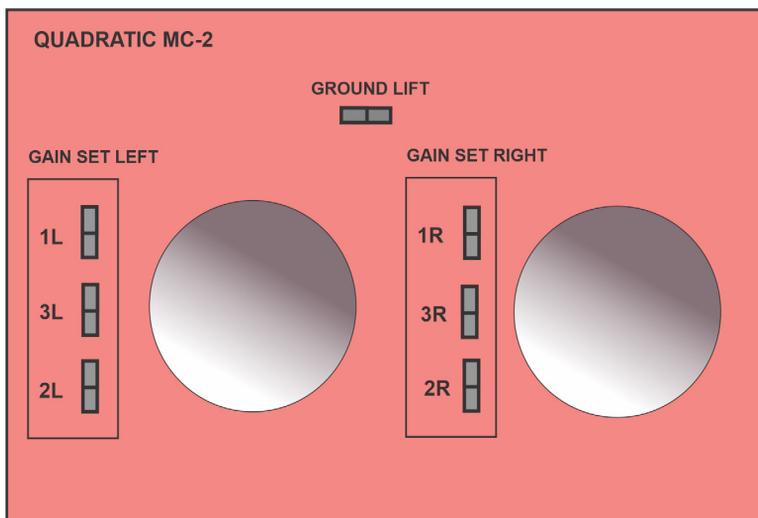
Just like the MC cartridge, the transformer must be carefully designed and manufactured. If the two are not well matched, superior results cannot be obtained.

MC-2 Initial Setup

Transformers “transform” the impedance presented on one side to the other as the square of the turns ratio. This works in both directions. The load impedance on the secondary is transformed and reflected back to the primary, just as the primary impedance is increased by the square of the turns ratio and presented to what it feeds. Each MC cartridge works best in its own limited range of loading impedances. The input impedance of a RIAA pre-amplifier has been standardized at 47,000 Ohms (47K). If the turns ratio of the transformer is 1:10 and it is an ideal transformer, the impedance that the cartridge will see is $47,000/100=470$ Ohms. (This ratio was used for this example for the ease of mental calculation only. Most MC transformers make available a higher turns ratio.)

Your MC-2 is a fully passive transformer matching system. It comes pre-set for high impedance ratio which works well for most modern MC cartridges. That said, there are internal jumpers that can be re-positioned to change the impedance ratio and grounding.

To change gain settings, remove case (4 screws that attach feet), slide chassis out and set the gain using included jumpers according to the diagram. It is important to disconnect the power to associated components while this is being done to avoid damage to your equipment.



Jumper Locations

The low gain setting of the transformer is 20dB.

For this setting, jumpers 3L / 3R are engaged and jumpers 1L and 2L / 1R and 2R are removed. (Do not put the jumpers in a drawer where they can get lost. Just lift them and rotate 90 degrees, re-setting them on one of the terminals where they cannot get lost.

High gain is established by engaging jumpers 1L and 2L / 1R and 2R and removing jumpers 3L / 3R. Instructions are also printed on the circuit board.

The MC-2 is designed to attain maximum separation between channels and the lowest noise pickup possible.

Note: The MC-2 leaves the factory at the high gain setting (26dB).

Your turntable phono cables should be connected to the inputs Left and Right and the turntable ground wire is attached to the Ground Post. It is important that the cables attached to the output (to your phono amplifier or integrated amplifier with a phono stage) are well shielded.

Because the input to the transformer is low impedance, cable quality and length are not critical. (Of course, it is always best to keep cable length to the minimum necessary and that they are very good quality.) As previously explained, the secondary impedance is very high, being 47,000 Ohms. High quality cables from the MIC-2 output to the preamplifier are required for best high frequency characteristics. All cables have capacitance which increases directly in proportion to length. When selecting these cables, pay attention to their published capacitance. Keep those cables short.

MC-2 Gain Evaluation

Quadratic Audio suggests that you pick a variety of recordings that you know well to audition your MC-2 and the gain setting you select. It also is useful to listen to recordings that have passages that are difficult to reproduce well. Select the gain setting that gives you the best results.

If you have any questions about which setting works best with your cartridge, please consult with your dealer. They will be able to guide you or to ask us at Quadratic Audio and pass that information along to you.

Hum and Noise Rejection

MC cartridges put out very low voltages. The MC-2 step-up transformers are specifically designed to operate optimally in that environment.

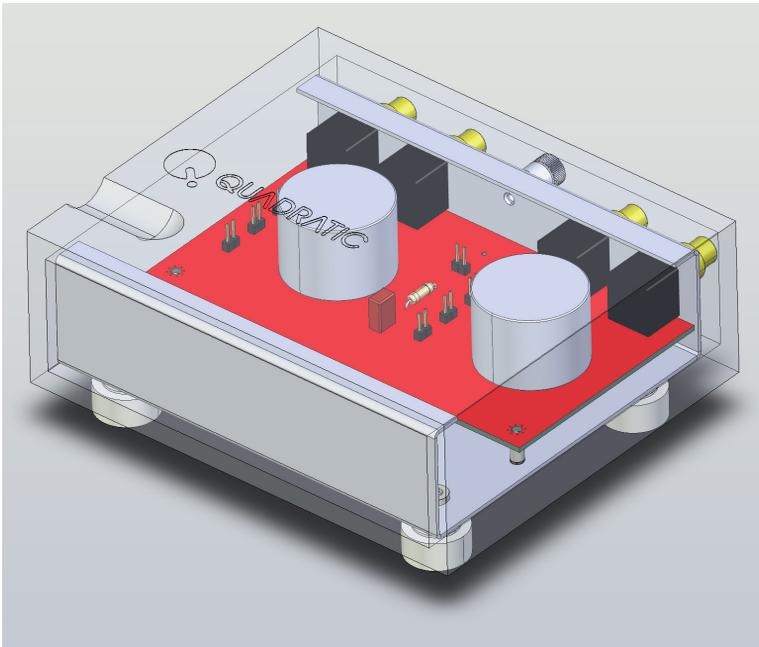
Stray magnetic fields can cause problems, as most experienced audiophiles working with phono cartridges know. The MC-2 transformers are encased in mu-metal cans which block out a lot of stray magnetic interference (greater than -30dB isolation). Additionally, they are manufactured using a hum-bucking technique which greatly increases the ability of the transformers to reject induced magnetic field pickup typically coming from nearby power transformers and motors.

The ability of the transformer to reject hum induced into the transformer itself is only part of the hum rejection equation because hum can be induced in the cables and wiring of the overall system leading up to the transformer primary. Hum bucking transformers inherently have superior common mode rejection ratios (CMRR) which helps mitigate this problem.

Finally, the MC-2 features a Ground Lift option. Engage or disengage if needed for best hum rejection.

External Adjustments

Some systems have the ability to add capacitance across the input jack of the pre-amplifier. If you feel that your cartridge is too bright, you may want to experiment with this. However, keep in mind that the MC-1 has extended bandwidth and you may not be used to hearing this. Remember comparable live performances of similar music that you heard in the past. The objective is to give you the best and most real listening experience.



Warranty

The unit is covered by a limited warranty for a period of three (3) years when purchased from an authorized dealer in the United States. Subjecting this product to voltages above that which can be generated by a phonograph cartridge or a properly working RIAA phonograph preamplifier input shall void this warranty.

Non-United States warranties will be provided by the distributor in the country of sale and may vary as the distributor determines in accordance with local applicable laws.

Repairs, alterations or modifications not performed by Quadratic Audio, an authorized dealer or an authorized technician shall void all warranties, express or implied.

Removal or defacing of the serial number shall void all warranties.

Specifications

Gain Setting High: +26 dB (Gain of 20)

Gain Setting Low: +20 dB (Gain of 10)

Frequency Response: 10Hz - 100Khz

Recommended Load: 47k

Dimensions: W 6.0" (152mm) D 5.5"(138mm) H2.4"(61mm)

Weight: 3.0 lbs. (1.4 kg.)



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