True Balanced Connection for Phono: A deeper technical insight

Pro-Ject
AUDIO SYSTEMS

TRUE BALANCED CONNECTION

Present day problems

Nowadays, many electromagnetic fields interfere with turntables. The causes are wireless networks and numerous electronic devices in the modern home. The RCA cable between your turntable and your amplifier is prone to picking up noise on the way. This so-called “electrosmog“ can interfere with the tiny phono signal and add noise to your music.

The Solution

Balanced audio connections are standard among professional musicians, recording studios, and for live concerts. It is essential to have a stable & interference-free connection as these signals, especially microphone signals, will be highly amplified.

The same applies to the connection from your turntable to the phono preamplifier. The significant advantage of a balanced connection is its ability to suppress picked up noise and interferences.

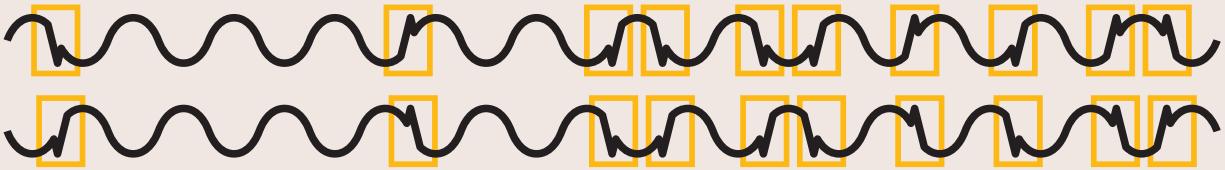
The works:

The problem of an unbalanced RCA connection:

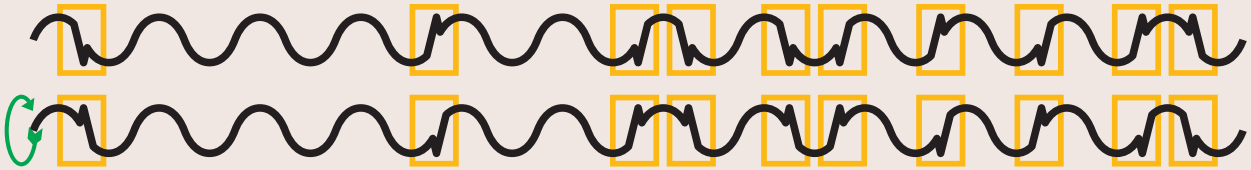
Unshielded interconnects can pick up noise and interferences. (yellow boxes)

1

How the balanced connection works:



Balanced connections double the wires carrying the musical signal – with one side inverted. Noise gets picked up by both wires.



When the source signal reaches the receiver, one of the signals is inverted so both signals are now identical, but the noise spikes look now in the opposite direction.

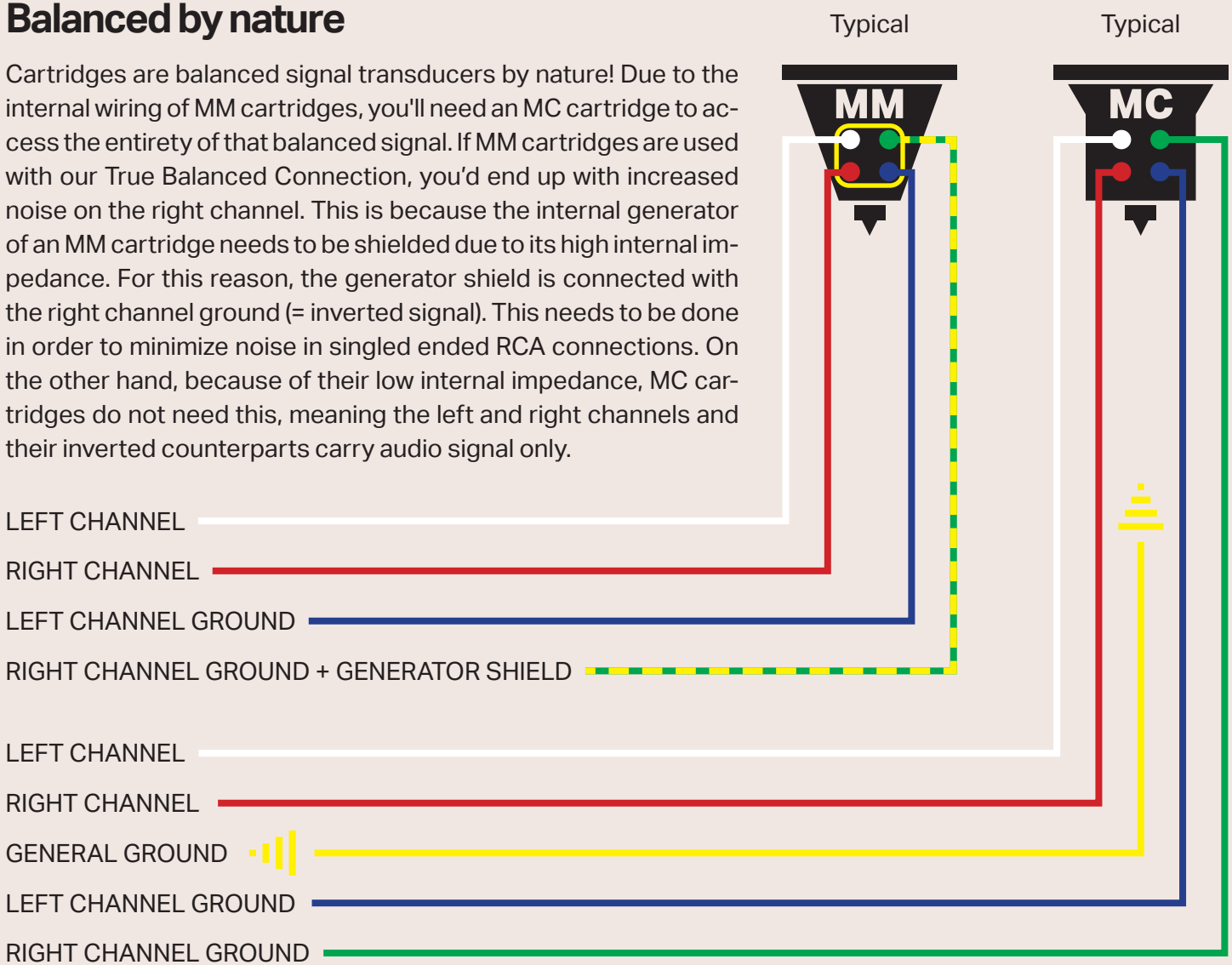
2

The result

When both waves are combined in the phono stage, the final musical signal has now doubled its level and the noise has been cancelled out.

Balanced by nature

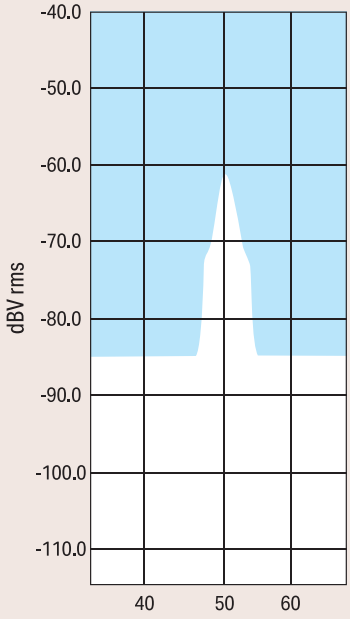
Cartridges are balanced signal transducers by nature! Due to the internal wiring of MM cartridges, you'll need an MC cartridge to access the entirety of that balanced signal. If MM cartridges are used with our True Balanced Connection, you'd end up with increased noise on the right channel. This is because the internal generator of an MM cartridge needs to be shielded due to its high internal impedance. For this reason, the generator shield is connected with the right channel ground (= inverted signal). This needs to be done in order to minimize noise in singled ended RCA connections. On the other hand, because of their low internal impedance, MC cartridges do not need this, meaning the left and right channels and their inverted counterparts carry audio signal only.



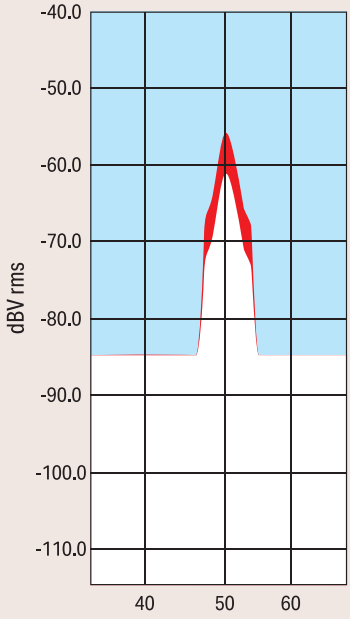
True Balanced Connection with MC cartridges

Balanced operation with MC cartridges leads to perfect suppression of outer influences. Together with our new True Balanced Connection cables we are taking full advantage of this fact and allowing you to access high-end features that were previously only available on the most expensive of phono stages. And the best of all: any Pro-Ject turntable with RCA, miniXLR or 5P outputs can do it!

MM Cartridge

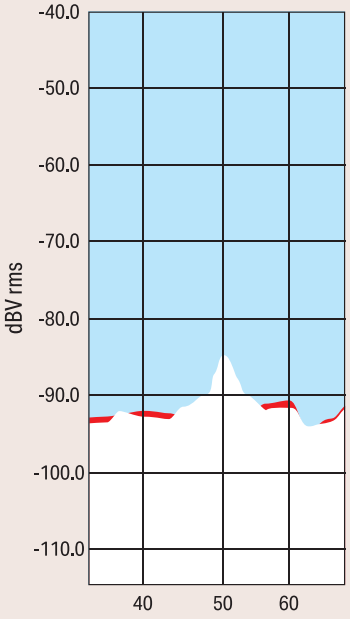


Shield connected, RCA connection, RCA out: Hum identical on both channels, good

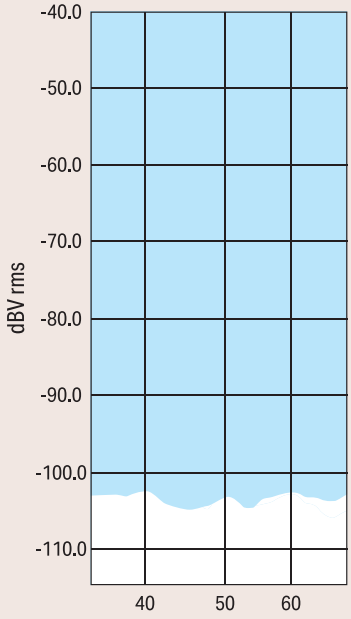


Shield connected, balanced connection Mini XLR, XLR out: Increased hum on right channel visible (-55dB vs 61dB on left channel)

MC Cartridge



RCA connection, RCA out: Still quieter than MM, but massively worse than balanced connection.



Balanced connection, Mini XLR, XLR out: No hum whatsoever, very good!

True- vs Pseudo-Balanced

Careful! Not everything that looks balanced is balanced on the inside. The following examples explain how different the internal wiring can be.

Pro-Ject tonearms which are wired to jacks on the rear are balanced and offer the full benefit for using balanced components in your hi-fi chain.

True Balanced Connection

Pro-Ject devices carrying the True Balanced Connection logo have balanced in and outputs and have fully balanced internals! The amplifications stage in our balanced phono stages are not cutting any corners and the positive and inverted signals are treated individually. And our True Balanced Connection phono cables ensure, nothing is lost on the way from turntable to phono preamp.

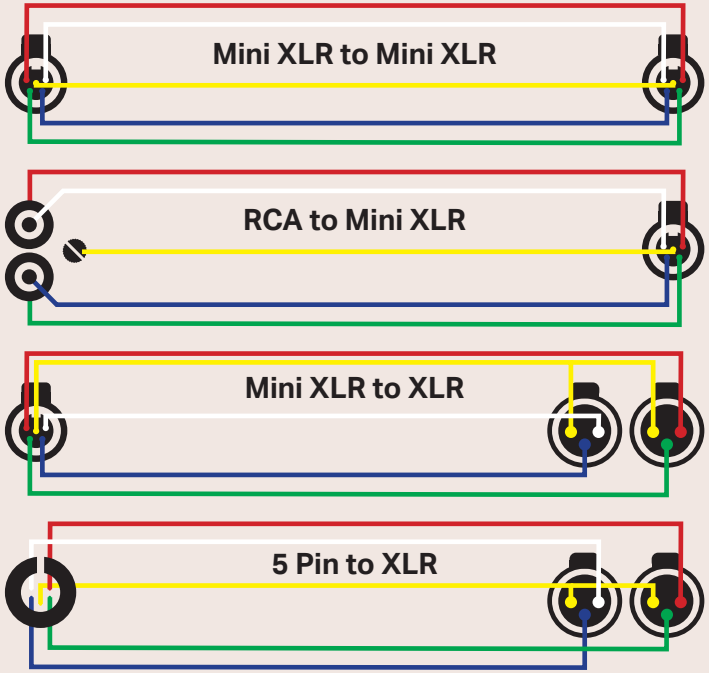
RIGHT CHANNEL

LEFT CHANNEL

GENERAL GROUND

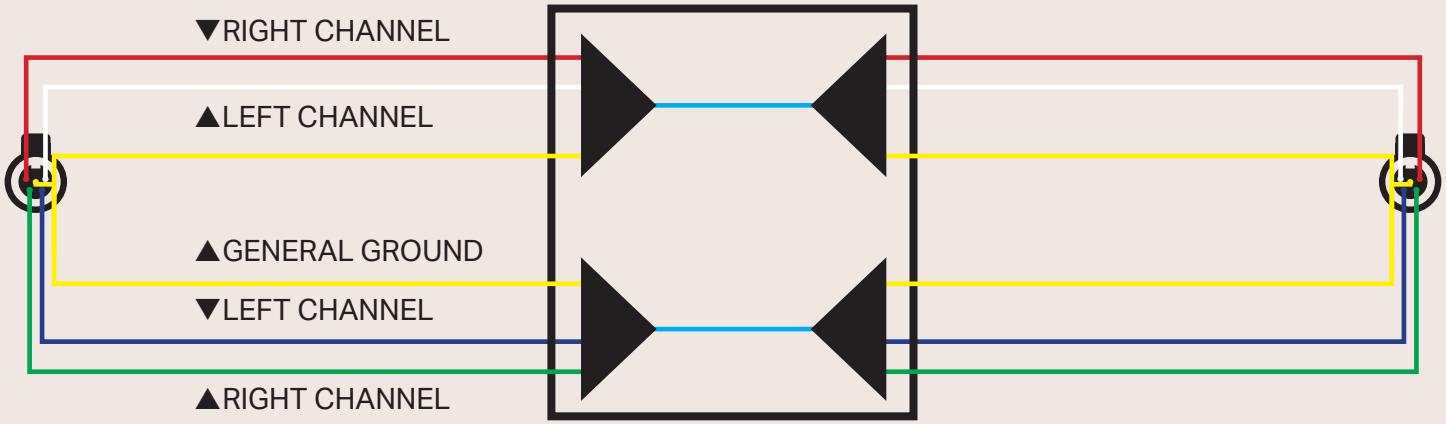
RIGHT CHANNEL

LEFT CHANNEL



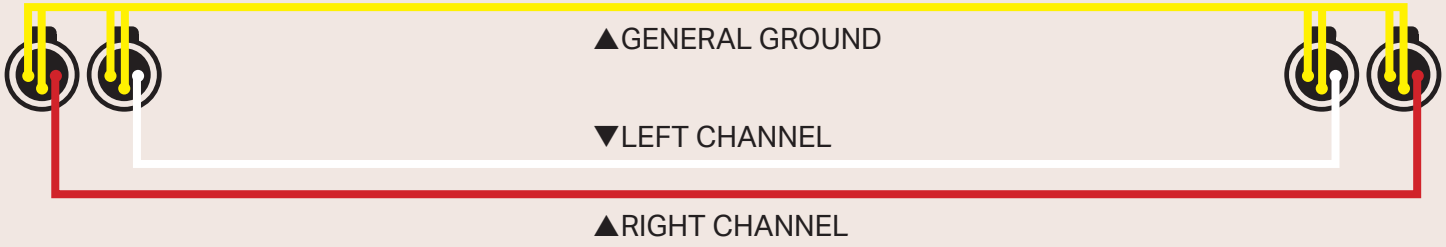
In/Out Balanced

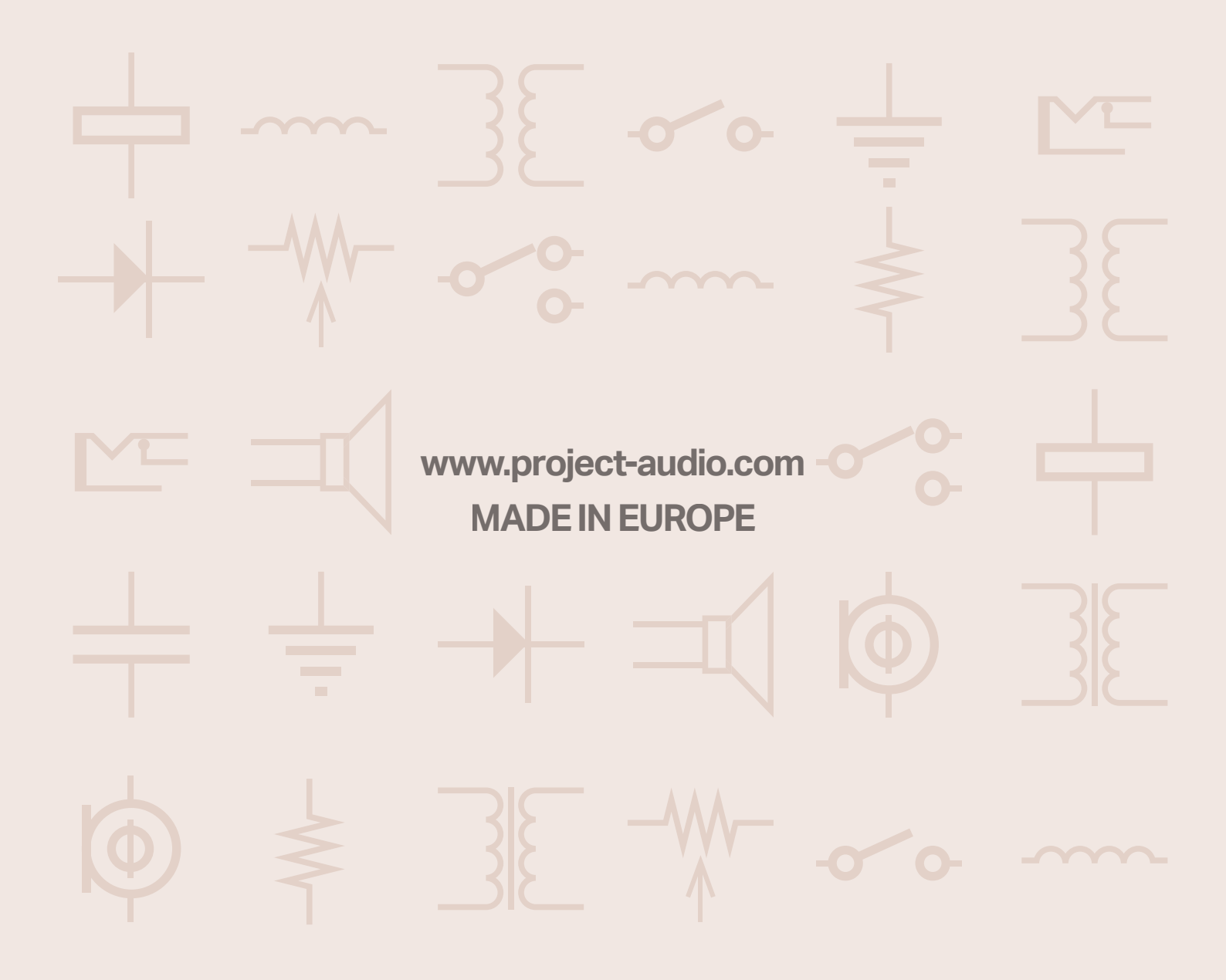
This means that the device has balanced XLR connections for input and output, but the amplifier stage on the inside on works in single ended operation. A fully balanced amplifier needs independent amplification stages for the positive and the inverted signals. These are then treated seperately, which leads to the most desirable results. This leads to increased cost, increased space on the internal PCB's, and twice as much cost of materials.



Fake balanced

Fake balanced connections utilize fancy XLR outlets on the components but are wired like RCA- connectors on the inside. This offers no sonic advantage. The user is just stuck spending more for cables.

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