



KLEI Harmony®Plug

A New Revolution By Keith Louis Eichmann (aka KL)

The Harmony®Plug is a new revolutionary approach to Keith Louis Eichmann's (aka KL) previous Bullet Plug design, which itself was a revolutionary approach to Phono/RCA connection. It represents a wholesale rethinking of something as basic as the venerable Phono/RCA plug; a connector designed over Sixty years ago by The Radio Corporation of America (RCA). It is KL's contention that the Phono/RCA plug in its current configuration is the standard connector in the audio/video industry not because it is the best possible choice for its intended use, but more by reason of default and its ultimate potential.

Realizing this to be the case KL decided to undertake a project of major significance: the wholesale redesign of this critically important but very compromised connector, with the objective being improved conductivity, enhanced signal integrity, higher resolution, and improved connection. Since the Phono/RCA plug is so widely used, connecting virtually every component in an audio/video chain, linking a multitude of components through a network of interfaces, any improvement in its performance in the critical areas of electron flow and signal integrity would be significant and particularly important in high resolution applications.

A first evaluation of the Phono/RCA plug pointed to obvious metallurgical shortcomings. Most connectors, even

those marketed as “deluxe” upmarket Phono/RCA plugs, are made from nickel and gold plated brass or phosphor bronze with a conductivity rating typically less than 28% IACS (International Annealed Copper Standard). As a comparison, the high purity copper used in the vast majority of interconnect cables has a conductivity rating of 100% IACS. Because of this low conductivity and the use of three disparate metals, it is KL’s contention that standard Phono/RCA plugs, even very expensive Phono/RCA plugs marketed as “High-End”, compromise electron flow and diminish the performance of the components they connect.

Nickel is added solely to provide the jewel like appearance that makes expensive connectors look expensive. While achieving the desired appearance, it comes at a cost, which is degraded sound or poorer picture quality, as electrons flow through three similar metals with differing electrical and conductive properties.

The conductive surfaces of the Harmony®Plug in contrast are formed from 99.999% pure copper (having over 101% IACS) with a dense proprietary high purity silver plating (>106% IACS) or formed from pure silver (having over >106% IACS), to ensure maximum conductivity. This provides >320% greater conductivity than the gold plated brass connectors used in the vast majority of deluxe Phono/RCA plugs. Proven metallurgical choices result in better signal transfer, and electron flow that is consistent with the highest quality interconnect cables.

Using a direct dense proprietary high purity hard silver plating on the conducting surfaces of the pure copper Harmony®Plug pins allows the elimination of the nickel/gold plating typically used as the third metals in a confusing composite on standard Phono/RCA plugs. The dense proprietary high purity hard silver plating (> 106% IACS) produces the performance/sound characteristics of 4-nines pure silver (>106% IACS) and no additional plating is required to preserve signal quality.

While the metallurgical understandings are significant, the second observation regarding the Phono/RCA plug turned out to be ground breaking. It related to a problem, overlooked for decades, that is intrinsic to the Phono/RCA plug’s design, and something as fundamental as the architecture of the RCA Socket itself. That is Phono/RCA ground collar, acting as a conductor that transfers electrons from multiple directions between the centre pin and its surface, are prone to electron turbulence called eddy currents. These turbulences are nothing less than electron chaos, exacerbated by the nonspecific point of ground in the Phono/RCA plug’s design, as an entire surface encircling the centre pin forms the electrical ground. Capacitive reactance and micro-arcing are additional artifacts of this architecture.

The Harmony®Plug addresses these issues and offers an elegant and arguably major solution to the Phono/RCA plug that is so fundamental and so extensive that we have been granted a patent. The solution being, rather than encircle the centre conductor pin with a formed metal collar as ground, KL opted for a single point ground contact similar to star earthing/ground in high-end electronics. KL’s Harmony design features a redesigned single point ground connection, which has an optimised shape, mass and thickness of the conductive elements, eliminates every vestige of eddy current turbulence, capacitive reactance, and micro-arcing.

KL believes he has, with this new Phono/RCA blueprint, solved a series of problems that collectively degrade audio/video performance and that do so in an additive manner. The importance of this innovation and redesign cannot be overstated. Its ramifications extend to every Phono/RCA interface in which high quality signal transfer is an issue. Extensive listening and critical comparisons played a major role in the evolution of the design, confirming at every juncture the audibility of properly applied science in even the area of Phono/RCA connection.

In summary the Harmony®Phono/RCA plug is a further innovation and totally new approach to Phono/RCA connection.

The Harmony®Phono/RCA plug innovations and refinements include:

- Signal/Ground pins are constructed of either a direct dense proprietary high purity hard 99.999% pure Silver plated Copper or 99.999% pure Silver as follows...
 - **KLEInnovations(KLEI) – Copper/Silver/Pure®Harmony** specifications/comparisons...



- **KLEInnovations(KLEI)/Copper®Harmony... GROUND and SIGNAL pins have a Silver plating over PURE COPPER base material, in accordance with KL's Copper Signal/Ground formula...**
 - The Silver plating **protects** the **Copper pins** from **oxidization** and improves **conductivity** to **>101% IACS**
 - Signal/Ground pins are **pure Copper and >101% IACS** (not Tellurium Copper (95% IACS) or Brass (28% IACS)).
 - Signal/Ground pin optimization to enhance electron flow, in accordance with **KL's Copper Signal/Ground formula**.



- **KLEInnovations(KLEI)/Silver®Harmony (short for Silver Hybrid Harmony Phono/RCA Plug)... GROUND pin is PURE SILVER and the SIGNAL pin has a thick/dense Silver plating over a pure copper base but due to Skin Effect the thick/dense Silver plating acts like it is solid Pure Silver, in accordance with KL's Silver Signal/Ground formula...**
 - Our testing shows that the Silver®Harmony when compared to the Copper®Harmony has noticeably better PRAT, Decay, Timbre and Texture, Edge Control and Extension, Resolution, and Stage.
 - The **GROUND pins conductivity** is **>106% IACS** and the **Signal pins thick/dense Silver plating** improves **conductivity** to **>106% IACS**
 - Signal/Ground pins are **pure Copper/Silver** and **>106% IACS**.
 - Signal/Ground pin optimization to enhance electron flow, in accordance with **KL's Silver Signal/Ground formula**.



- **KLEInnovations(KLEI)/Pure®Harmony (short for Pure Silver Harmony Phono/RCA Plug)... GROUND and SIGNAL pins are PURE SILVER, in accordance with KL's Pure Silver Signal/Ground formula...**
 - Our testing shows that the Pure®Harmony when compared to the Silver®Harmony is Simply... Faster, Quieter/Noiseless/Blacker Background, and more transparent, and has noticeably better PRAT, Decay, Timbre and Texture, Edge Control and Extension, Resolution, and Stage.
 - The **GROUND/SIGNAL pins conductivity** are **>106% IACS**.
 - Signal/Ground pins are **pure Silver** and **>106% IACS**.
 - Signal/Ground pin optimization to enhance electron flow, in accordance with **KL's Pure Silver Signal/Ground formula**.

- Further optimization of mass and thickness of the Signal/Ground pins, in accordance to KL's Copper, Silver, and PureSilver Signal/Ground formulas, to enhance electron flow.
 - Although the **Copper®Harmony** is capable of transferring extremely detailed Musical information with very high Resolution, further analysis of Electron Transmission theories (eg. skin effect, to name one of many aspects) revealed that the Copper Ground pin was a limitation and **even better performance could be attained by replacing the Copper Ground pin with a Silver Ground pin** as in the **Silver®Harmony**.
 - The Signal and Ground must be in harmony with each other, hence the name (Harmony), and this is why **KL's Signal/Ground formula** is very important, re each Harmony model.
- Further rejection of the idea of using a formed metal collar Ground to encircle the centre Signal pin, which KL has replaced with a new Ground pin.
- The Ground pin creates single point star earthing/grounding which eliminates eddy current distortions, capacitive and inductive reactance, and micro-arcing.
- The Ground pin includes thread teeth which ensures that a Harmony®Plug metal Housing is grounded.
- The Signal/Ground pins are now much stronger and now shaped like tags, which makes soldering small/large/multiple conductor wires to them... very easy.
- A Signal/Ground Anti-Short shield has been added between the Signal/Ground pins.
- The Signal/Ground pins are now arranged to maintain a consistent maximum distance from each other, using foil technology, which further improves capacitive and inductive reactance effects and minimizes the cross-talk EMF effects that occurs in all other Phono/RCA plugs.
- The Head Assembly jaw structure has been redesigned, and mechanically improved, to allow an easy snap-like connection to a Phono/RCA socket, ensuring an ultimate connection without damage to the Phono/RCA socket.
- The Housing now uses 2 screws to secure the cable sheath to the Harmony®Plug housing.
- Extremely high temperature melting point thermoplastic polymer is used, with excellent electrical and mechanical characteristics, which easily adjusts to your Phono/RCA socket to provide a secure snap-like fit that is easy to disconnect.
- Having a significantly higher impedance than conventional RCA plugs makes the Harmony®Plug an ideal connector for Digital Interconnects requiring RCA connectivity in either 50, 75 or 110 ohm applications. Due to the high conductivity rating of the materials used for the conductors in the Copper Harmony, JITTER will be significantly reduced.