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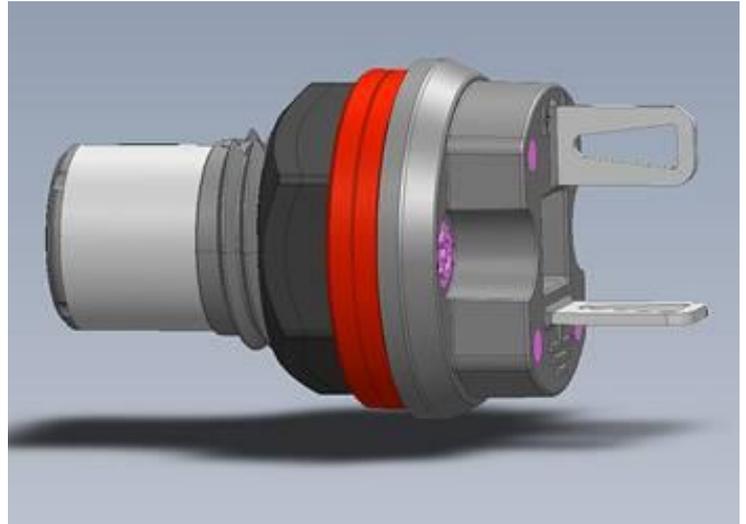
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## **KLEI™Harmony RCA Socket** TECHNICAL SUMMARY

**Advancing the art and science of the  
Eichmann Phono Pod**

**Keith Louis Eichmann (KL) proudly introduces the  
next generation Harmony RCA Socket design**

The KLEI Harmony RCA socket takes the highly acclaimed Eichmann Phono Pod to a new level of performance and sophistication. In 2008, the Eichmann Phono Pod set the industry on fire by offering radical improvements to the venerable RCA socket both in design and performance, and as a result the Eichmann Phono Pod received worldwide acclaim.



The Harmony RCA socket offers new materials and design enhancements, ie. new and superior technology and architecture, which can be considered the true and next generation Eichmann Phono Pod design, extends and builds on its superiority over the Eichmann Phono Pod (introduced in 2008), variations and enhancements of the Eichmann Phono Pod, and traditional RCA socket designs. It represents a wholesale rethinking of the RCA socket introduced over eighty years ago by The Radio Corporation of America (RCA).

### **History**

Looking to take his effort to the next level, Keith Louis formed KLEI (Keith Louis Eichmann Innovations) in 2013, and committed himself to improving the Eichmann Bullet plug design and for that matter, all connector designs. Since 2013 he has created the Harmony (Bullet) plug and Harmony Banana connectors with superior conductivity, enhanced signal integrity, and higher resolution.

Since the RCA socket is so widely used – connecting virtually every component in an audio/video/digital chain and linking entire systems through a network of interfaces – any improvement in its performance would be significant, especially over that of the Eichmann Phono Pod and its variants.

To recap – first evaluation of the traditional RCA socket showed obvious metallurgical shortcomings. Most RCA sockets, even those marketed as “deluxe” upmarket RCA sockets, are made from nickel and gold plated brass or doped copper variants with a conductivity rating typically less than 50% IACS (International Annealed Copper Standard) and often less than less than 28% IACS. 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 disparate metals, it is our contention that standard RCA jacks – even expensive, flashy ones – compromise electron/energy flow and diminish the performance of the components connections.

Nickel is added to the brass or doped copper variants substrate solely to provide the jewel-like appearance that makes expensive connectors look expensive. While achieving the desired appearance, this comes at a cost, *ie* degraded sound or poorer picture quality, as electrons/energy flow through dissimilar metals with differing electrical and conductive properties.

### **Conductivity**

Metal conductivity in IACS percentages, referenced to copper at 100%, are as follows

- Silver – >105%
- Copper – >100%
- Silver (Machinable) – 92.5% ~ 96%
- Tellurium Copper (Machinable) – 90% ~ 95%
- Gold – 65 ~ 75%
- Aluminium – 60 ~ 65%
- Bronze – 15 ~ 48%
- Beryllium (low/high copper content) – 17% ~ 43%
- Rhodium – 35% ~ 38%
- Brass (low/high copper content) – 25% ~ 37%
- Tungsten – 31%
- Nickel – 24%
- Palladium – 16%
- Platinum – 16%
- Tin – 15%

As with the Harmony (Bullet) plug, the Harmony RCA socket pins are formed using proprietary high conductivity metallurgical process, with the resulting conductivity being >101% IACS to even >106% IACS. This provides over 360% greater conductivity than the gold-plated brass connectors used in the vast majority of deluxe RCA sockets. Proven metallurgical choices at KLEI result in better signal transfer, and electron/energy flow, that is consistent with the highest quality interconnect cables.

Traditional connectors impose a serious compromise to conductivity at the transfer point, component to component. KLEI's proprietary high conductivity forming processes eliminate the nickel/gold plating typically used as the third metal in a confusing composite in these standard RCA sockets.

The company's processes are controlled and supported via proprietary mathematical modelling, which creates an architectural and metallurgical relationship between the ground and signal pins. This provides a noticeable *sonic* improvement, when compared to other RCA sockets, and from Harmony socket model to Harmony socket model. The metal complement, mass, and other critical parameters, are derived via KL's signal to ground mathematical formulae.

Extrapolation, testing, and modeling indicate that our IACS percentages are equivalent, and even superior, to pure (solid) annealed copper (>=100% IACS), even pure (solid) annealed silver (>=105% IACS). They are noticeably superior to KL's previous copper and silver Eichmann Phono Pods. While the metallurgical understandings are significant, paramount, and crucial, the second observation regarding the traditional RCA socket turned out to be ground-breaking. It related to a problem, overlooked for decades, that is intrinsic to the RCA sockets design – something as fundamental as the architecture of the socket itself.

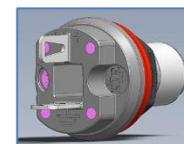
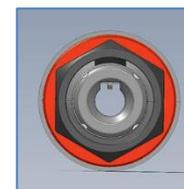
## Architecture

The RCA Socket ground collar/body, which in traditional designs encircles the Signal pin, acts as a conductor that transfers electrons/energy from multiple directions along its surfaces and surrounding the Signal Pin. It is prone to small out-of-control turbulences called eddy currents. These turbulences are nothing less than chaos, exacerbated by the non specific point of ground in the RCA sockets design, especially since an entire surface encircling the centre pin forms the electrical ground. Capacitive reactance and micro-arcing are additional artifacts of this architecture.



The Harmony RCA socket design addresses these issues and offers an elegant – and arguably major – redesign of the RCA socket, and in itself is fundamental but extensive. Rather than encircle the Signal pin with a Ground metal collar/body, we have opted for...

- The Signal pin that utilises a single point contact/connection, similar to star earthing/grounding as utilised in high-end electronics. Further, after Signal connection the Signal pin acts like, or is similar to, the Ground electron/energy channel as utilised in the Eichmann Phono Pod.
- Although the Ground pin utilises a traditional collar, which ensures compatibility with all RCA plugs, it is split formed to act like, or is similar to, the Ground electron/energy channel as utilised in the Eichmann Phono Pod. Further, after Ground connection the Ground pin acts like, or is similar to, the electron/energy channel as utilised in the Eichmann Phono Pod.
- The Signal pin is positioned perpendicular to the Ground pin to ensure that EMF and Inductive effects are minimal, ultra-low, and even be regarded as negligible. Further, the Signal and Ground pins are arranged and positioned to maintain and ensure a consistent maximum distance from each other which further improves capacitive and inductive reactance effects, and minimizes cross-talk EMF effects that occur in all other RCA sockets. This allows for significantly higher characteristic impedance, than conventional RCA sockets, and makes the Harmony RCA socket ideal for digital Interconnection requiring RCA connectivity in 50, 75, or 110 ohm impedances and for ultra-low jitter.
- A closer inspection shows that the Harmony RCA socket design is the compliment, or mirror image, of the Harmony (Bullet) plug design. Further, the Harmony RCA socket and Harmony (Bullet) plug connection is designed to make ground before signal but it is always recommended that you turn off all components before plugging or unplugging any electrical connection.



Our Harmony RCA socket design, features single point Signal connection, optimised ground connection, optimised Ground/Signal pin arrangement/positioning, optimised pin shape, optimised mass and thickness of the conductive elements, and eliminates and controls eddy current turbulence, micro-arcing, and capacitive/inductive reactances.

We believe this approach solves a series of problems that collectively degrade audio/video performance and does so in an additive manner. The importance of this innovation and redesign cannot be overstated. Its ramifications extend to every 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, even in the area of RCA connection.

The Harmony RCA socket, the next generation Eichmann Phono Pod design, is the sonic culmination of KL's proprietary signal to ground formulae as applied to the architectural and metallurgical relationship between the signal and ground conductors.

In summary, KLEI's Harmony RCA Socket represents a further innovation and a totally refined approach to RCA connection and a closer inspection shows that is the compliment, or mirror image, of the Harmony (Bullet) plug design.

The KLEI™ Harmony RCA Socket's innovations and refinements include:

1. The Ground/Signal pins incorporate highly conductive materials, such as ultra-high purity copper and silver.
2. KL's proprietary mathematical modelling optimises mass, thickness, and composition of the Ground/Signal pins, resulting in enhanced electron/energy flow.
3. A closer inspection shows that the Harmony RCA socket design is complimentary to, or mirror image of, the Harmony (Bullet) plug design.

4. The Harmony RCA Socket and Harmony (Bullet) plug connection is designed to make ground before signal but it is always recommended that you turn off all components before plugging or unplugging any electrical connection.
5. The Signal pin utilises a single point contact/connection to control and eliminate eddy current distortions, capacitive and inductive reactance effects, and micro-arcing.
6. The Signal pin structure/architecture has been redesigned and improved to allow an easy snap-like connection with and RCA plug, while still ensuring an ultimate connection.
7. Further rejection of the idea of using a metal Ground body to encircle the Signal pin which eliminates co-axial inductive reactances.
8. The Ground/Signal pins are arranged to maintain a consistent maximum distance from each other and positioned perpendicular to each other, which further improves capacitive and inductive reactance effects and minimizes cross-talk EMF effects that occur in all other RCA sockets. This allows for significantly higher characteristic impedance, than conventional RCA sockets, and makes the Harmony socket ideal for digital Interconnection requiring RCA connectivity in 50, 75, or 110 ohm impedances and low jitter.
9. The Ground/Signal pins are strong and allow for small and large conductor wires to be soldered to them.
10. The Harmony RCA Socket utilises a standard M10 Panel hole, M10 Nut (Slim), and M10 Washer, and an extremely high temperature melting point polymer, with excellent electrical and mechanical characteristics where the Socket Body and Nut thread/washer insulate the Ground and Signal pins from the Panel hole.
11. The Mounting Panel maximum width/thickness can be upto 4.5 (w/- Washer) or upto 6.0mm (w/o Washer).
12. The Harmony RCA Socket can be produced to comply with IP65 and/or IP67.

Standard RCA Sockets	KLEI™Harmony RCA Sockets
Gold plated brass or phosphor bronze with a conductivity rating of often less than 28% IACS (International Annealed Copper Standard).	Contact pins formed using proprietary high conductivity metallurgical processes, provides ultra-high conductivity (>101% IACS and even >106% IACS).  Provides over 360% greater conductivity than gold plated brass binding posts.
Solid signal pin. Metal body/collar completely encircling signal pin. Total thickness and mass not optimised for signal integrity. Sound quality and electron flow compromised.	Single point Signal pin with easy connection, ideal shape, thickness, and mass  Controls and eliminates eddy-current turbulences, co-axial inductive reactance, capacitive reactance, and micro-arcing. Provides a superior electron/energy movement/current flow, and minimises skin effect issues.  The result is a cleaner, more open sound, with even further detail.
Heavy plating of gold over a nickel substrate. This is often a cause of poor sound quality as electrons flow through 3 dissimilar metals with differing electrical and conductive properties.	Metallurgy process minimizes oxidation.
Ground collar surrounding centre pin has co-axial inductive reactance effects, which have detrimental effect on electron flow. Eddy current turbulences created as a result of non specific ground contact. Loss of signal integrity due to capacitive and inductive reactances and micro-arcing.  Provides a plug with poor and reduced signal transfer resolution.	Compatibility with all RCA plugs and with easy connection  Controls and eliminates eddy-current turbulences, co-axial inductive reactance, capacitive reactance, and micro-arcing. Provides a superior electron/energy movement/current flow, and minimises skin effect issues.  Provides a socket that is linear to over 150KHz, which allows excellent sound and video signal quality, signal integrity, electron flow, and extremely high signal transfer resolution.



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