What's Up

Change is Good

By David Tovissi

Vice President and General Manager

HARMAN Luxury Audio

You might have noticed a change to the look of the newsletter this month. Now that Roon has joined the HARMAN Luxury Audio Group we wanted to add their logo to our HLAG website and newsletter, and while our creative team was busy making the update they decided to give the entire news campaign a refreshed, vertical-orientated make-over.

Our HLAG newsletter and website have consistently outperformed our expectations since we launched them back in June of 2019. We continue to more than double the industry average for engagement and want to not only maintain that performance but see if we can go even further in keeping our lines of communication open to our partners across the globe. Ergo – expect more change!

That's right – we've given our mail campaign a refresh and now we're gearing up to refresh some of the content as well. Look for a wider variety of stories with a fresh take on how we keep you updated about new product launches, trade shows and events we're engaged in throughout the year, and more specific messaging – from both technical as well as sales/marketing perspectives – to keep your team better informed and engaged across all of the brands in the Luxury Audio Group.

As I'm sure you are all aware, selling luxury products requires extensive product and brand knowledge and awareness because you aren't selling based on price. And it's vital that your suppliers of luxury audio and video products supply the knowledge base and training required of all sales team members. A few years ago when I joined HARMAN, I became aware that we weren't fulfilling our end of the bargain and I've been on a mission to improve our communication processes to position your sales teams to excel when engaging consumers on the incredible array of products the group delivers to market.

And I'm still on that mission. Please reach out to me if there is anything you'd like us to consider as we go about updating and invigorating the newsletter, social media, and other messaging our creatives deliver. Our commitment to you is to support your efforts as you market, sell and deliver the finest audio products in the industry. Our team keeps adapting, keeps changing in order to stay up to date and as relevant in the marketplace as possible. And will continue to do so. Change is good!

What's New

High End Munich 2024

By Jim Garrett
Senior Director, Product Strategy and Planning

High End Munich has become the largest 2-channel hi-fi show in the world with attendance this year of more than 22,000 people from across the globe. Over 550 exhibitors representing more than 1,000 brands all gathered at the M.O.C. convention center in Munich from 9-12 May for a celebration of all things relating to hi-fi audio systems. Our Luxury Audio team used this platform for the global debut of the second phase of our ARCAM Radia hi-fi components.

As our readers will recall, we first introduced the Radia Series last October with a dedicated launch event in London where the first five models were unveiled including the A25, A15, and A5 integrated amplifiers alongside the ST5 streamer and CD5 compact disc player. We found immediate success with these products led by their distinguished industrial design and their remarkable performance value. Two of the models – the A5 and CD5 – went on to win 2023 product of the year awards from *What Hi-Fi* in the UK.

Our room at High End Munich this year was dedicated to the ARCAM brand and to the announcement of three fantastic new Radia Series phase two products. We are excited to be able to share these with our customers and we are confident they will see the same success as the first models. The second phase is led by the flagship SA45 integrated amplifier, with the SA35 integrated amplifier and ST25 streamer joining the mix. All three include high-resolution streaming and large full-color graphical displays.

Attendees to our room were greeted with our Radia campaign and the invitation to "be the center of the music". As you entered our space, you found nine product display pedestals with each of the eight Radia models and one for the Roon Nucleus Titan music server that was being shown in a conceptual Radia finish. The three pedestals with the new SA45, SA35, and ST25 were the focal point and were up against a display wall that sectioned off the demonstration area behind it. The demo area featured two electronic systems – the SA35, and the A25/ST25 combo – alternately powering a pair of JBL S3900 floorstanding loudspeakers.

The new models drew serious attention due to the large full-color displays on their front panels – 6.5-inch on the ST25 and SA35 and 8.8-inch on the SA45. But while their looks drew rave reviews, it was ultimately their stellar audio quality that won over show-goers. The ST25 pairing with the A25 shows off the step-up in performance from the ST5 to the ST25 and really allows the A25 to sing! Moving to the SA35 with its integrated streaming capability demonstrated the power of its Class G amplifier and how effortlessly it can drive a large loudspeaker like the JBL S3900.

As part of the announcement activities, we hosted German rock performer and producer Leslie Mandoki, who was also the celebrity ambassador for the 2024 High End show. Leslie and members of his band Mandoki Soulmates joined us for a press event to announce the release of his latest album *A Memory of Our Future*. We played tracks from the album on compact disc via the ARCAM CD5, from streaming via the ARCAM ST25, and from vinyl via the Mark Levinson № 5105MC turntable. Leslie and his bandmates were floored by the sound quality of the system feeling it conveyed the music as they had intended. Earlier in the day, musician Object Blue had joined us and listened to many of her own tracks streamed from Qobuz via Roon into our ARCAM rig with the same positive response. She even pointed out that she could tell the difference in who had produced her tracks due to the clarity of the sound she was hearing.

High End Munich remains the best place in the world to see and hear anything and everything related to high performance audio. Attendance was strong this year and this proved to be a great platform to share the new ARCAM Radia models with the world. More information on these products is available on the ARCAM website and we invite you to give them a preview. The SA45, SA35, and ST25 will be available in the fourth quarter this year at ARCAM retailers around the world.

Meet the HARMAN Luxury Audio Team

Name: **Noris Onea**
Position/Job Title: **Senior Coordinator, Customer Service**
With HARMAN Since November 2023

With Meet The HARMAN Luxury Team, *our goal is for you to get to know us better. In each edition we feature a different member of the team, and this month it's Noris Onea, Senior Coordinator, Customer Service for HARMAN Luxury Audio Group, HARMAN Professional Solutions and HARMAN Embedded Audio business units.*

ARCAM JBL SYNTHESIS lexicon mark levinson REVEL

How would you describe what you do in your current role?

I help field technical support questions and tickets from customers, dealers, distributors and coworkers. My day-to-day involves collaborating with the customer success team, QA, devs, product, partners and design, to ensure that issues and tickets are pushed through the process of escalation/response.

What did you study in school? Did you always imagine yourself doing something like what you're doing now or did the fates just take you in that direction?

I studied Computer Science at NYU, and I've always had a knack for computers since I was a little kid. I built my first desktop PC in middle school as part of the Dell Techknow program and things naturally grew from there. I had a feeling I would end up in the tech field, but I was unsure of where exactly. I explored software development in college, but ultimately I wanted something else, I just wasn't sure what yet.

How did your career path lead you to HARMAN?

My first serious job after college was working in audio/video, doing custom installs for affluential clients in the NY area – Hamptons, Manhattan, upstate, etc. While in the world of AV, I ended up taking courses for Home Automation programming (Crestron mostly), and started focusing on home audio/video solutions. In my Crestron training, I also ended up taking some classes studying Digital Signal Processing to better understand the input/output signals of audio automation programming, and this is where I picked up my initial audio knowledge.

What is the most important thing you have learned over your career?

You need to have some flexibility, priorities can shift (and sometimes quickly). Knowing you have a solid team backing you up alleviates a lot of the stress surrounding change. Every single one of my coworkers is a rockstar, and I rely daily on them, as they rely on me.

Any other advice you would share with people just starting out in this industry?

Curiosity is a good trait to have. Having a mindset of "how do things work" and "how can you tinker around with products and ideas to make it work the way you want" are questions that are helpful to keep in mind.

What are you most proud of in your life?

"Making it" in America. When I first came to the U.S. in 1999, my family and I were diving headfirst into a brand new life with nothing in our pockets and no English fluency. My family and I had to learn the language and the American way of life from the ground up.

When did you realize you had a passion for music or audio? Was there any one band, song, or movie that did it for you?

Absolutely. Music has always been with me throughout life, but one of my favorite musical experiences was seeing Roger Waters at Nassau Colosseum (now known as Nikon theater in Long Island / NY) with the water in the background. At one point the song the Great Gig in the Sky started to play and it was almost as if perfectly timed, it started pouring rain. Everyone in the audience was drenched, but it was a very unique and unforgettable experience.

What current technology impresses you the most?

OpenAI's Sora video generation technology feels like something that we've been progressing towards for a while, and it's finally here. The released previews seem already very promising and I was shocked at how far we've come in AI generative stuff since my college days.

Favorite music genre?

Progressive rock and Big room house (EDM).

The desert island question, of course. If you were marooned for eternity and could listen to only three albums, what would they be?

Pink Floyd – *Dark Side of the Moon*

Dream Theater – *Octavarium*

Robin Schulz - *Uncovered*

You have the floor. In closing, tell us anything else you want us to know about yourself.

Sure! I'm an avid SCUBA diver, one of my favorite dives was in Iceland at Silfra, and I touched two tectonic plates underwater at the same time! I have a 2nd degree blackbelt in Shotokan Karate, and have trained in Krav Maga for several years. I co-authored a paper in the field of Artificial Intelligence while in college. I'm originally from the Transylvania area of Romania, but no, I am not a vampire.

Dealer Profile

Gramophone

Gramophone is a legendary audio-video-integration company that started in 1976. They have a total of six stores in Timonium, Columbia and Gaithersburg, Maryland; our Experience Center, with superb electronics in a beautiful setting, in Timonium; the Kitchen Design Center in Hunt Valley; and our new partners, World Wide Stereo, just north of Philadelphia in Montgomeryville, Pennnsylvania.

Their founder, Brian Hudkins, an enterprising young salesperson with four years of working at House of Sound under his belt, graduated from Towson University in 1976 and decided to open his own shop – and the rest is history.

How many people are on the Gramophone and World Wide Stereo teams?

A total of close to 200 employees.

Thoughts on the importance of training?

Training is key for our growth, for the simple reason that the world of custom electronics is changing so rapidly. Many of our salespeople have been with us for decades, and we're always learning new things

What do you like most about HARMAN Luxury Audio products and which lines do you feature?

We sell ARCAM and JBL Synthesis, with a great sounding Synthesis system installed at our Gaithersburg store. We love the predictability and reliability of a calibrated JBL Synthesis system. We recently hosted a JBL Synthesis event in which we were able to show off that beautifully styled, and great sounding / looking, Gaithersburg system for a number of our customers. We took orders for several JBL Synthesis products that week, including an entire system.

How do you think the luxury audio industry is currently doing?

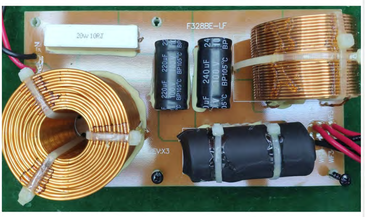
Business has been strong for us, and with all the interesting technical innovations that have happened lately, we're optimist about the future.

What is Gramophone's mission?

We love audio, video, automation and design, as well as the challenge of going above and beyond for our customers! We are especially proud of being able to handle the entire job in a customer's home. Our Design and Build / Electrical teams mean that we can handle all aspects of a custom installation job in-house, from bare walls to the completed system, without having to rely on outside contractors.

You have the floor. Anything else you want to share with us about Gramophone that you would like the world to know?

We are all about finding solutions that are the right ones for our customers. We listen to our customer's viewpoint, and then add our design expertise before the job begins. Listening and planning are vitally important in getting the best result – and big smiles from the customer – at the job's completion. Creative thinking and problem-solving is a core part of our daily to-do list.



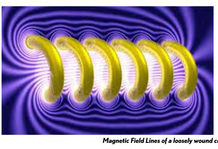
Tech Talk

Loudspeaker Crossover Air Core Inductors: A Look Inside

George E. Short III | Senior Principal Acoustic Engineer

Inductors are one of the three key elements in a loudspeaker passive crossover network (the others being the capacitor and the resistor). The function of an inductor is to pass low frequencies and attenuate high frequencies, exactly the opposite of the Capacitor, as discussed in Tech Talk November 2023. In almost all passive crossovers, at least one inductor can be found in series with the woofer.

Electrical current – which is simply electrons flowing through a wire – creates a magnetic field encircling the wire. A constant current will create a constant magnetic field. Rolling the wire into a coil concentrates the magnetic field in the central core of the coil through the principle of *superposition*. To make the magnetic field stronger, add more windings to the coil, more electrical current, or both.



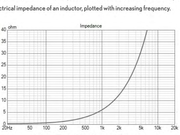
Magnetic Field Lines of a loosely wound coil
Image: The Mirror Universe

This is precisely how an electromagnet works, and they can be made incredibly strong. Here is an example of an electromagnet lifting a car:

Chris, you should have parked in the North Lot like the rest of us!

But a strange thing happens to coils of wire with **variable** current flowing through them in a circuit: changes in the current creates changes in the magnetic field, and the changing magnetic field induces an electromotive force on the electrons within the wire in the opposite direction of the current flow; that is, the coil pushes back against the electrons flowing within itself. Even more strangely, the push back strength is proportional to the rate of change of the magnetic field, which is precisely the frequency of the variable current flowing through the wire.

This *induced opposing force* impedes the free-flowing, variable electron current, which is why loudspeaker crossover coils are largely referred to as *inductors*, and their nature is to impede electron current flow as its variability rate (hence its frequency) increases. At right is the electrical impedance of an inductor, plotted with increasing frequency.



Inductor Electrical Impedance with Frequency

An inductor's inductance – that is, a measure of how hard it impedes current flow with increasing frequency – is mostly proportional to the square of the number of windings. All other things being equal, a coil with more turns has more inductance, so less high frequencies get through it. This is why in loudspeaker crossovers, one generally finds large inductors with lots of turns in series with the woofer, medium sized coils in series with the midrange, and no coils in series with the tweeter.

In a perfect world, that is all anyone would ever need to know about air core inductors……

<u>Digging Deeper</u>

…but of course, there's more…

Wire Gauge, Resistance and Skin Effect

Copper wire comes in many diameters, with thinner wire exhibiting much higher electrical resistance per unit length than thicker wire. Resistance converts electrical energy into heat, which is how toasters and electric space heaters work. At right is a toaster.

Resistance adds up proportionately with wire length, and resistance particularly in an inductor in series with a woofer is bad because it wastes amplifier energy (by converting it to heat) within the inductor wire, instead of converting it to cone motion through the woofer motor. A large woofer coil can require several hundred turns to induce a large enough back-electromotive-force to reach the required inductance for a low crossover frequency, therefore several hundred feet of wire.

For inductors wound with optimum geometry (see below), a thicker wire always results in a larger, heavier, costlier inductor but with a lower resistance, therefore less energy inefficiently wasted in the crossover and more being transformed into sound by the woofer. Simply put, larger gauges have cleaner bass.

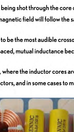
Then there is Skin Effect, a phenomenon where: as frequency increases, electrons are pushed to the outermost surface of the conductor. Essentially, because no current flows through the middle of the conductor, the wire effective cross sectional area decreases at higher frequencies withing the audio range. Thus, the conductor's resistance increases with increasing frequency. Solutions include making a woven "Litz" master wire from several thinner individually insulated wires, to maximize surface area for equivalent gauge, or to manufacture the inductor with copper foil and insulating film rather than insulated copper wire. While Skin Effect is easy to measure and fun to talk about, it is only a factor in very large gauge inductors and as these are used to cross out woofers at a low frequency. Even more strangely, subjective tests indicate skin effect when audible is actually considered *beneficial* in woofer crossover networks.

Current Density as a function of frequency

Engineering requires we seek a balance, and the general rule is that the inductor intrinsic resistance is 10% or less of the woofer's DC resistance, or less than 0.5dB of woofer output being lost.

Winding Geometry

Winding geometry – the number of coil turns per layer, the number of layers, and the dimension of the empty core at the coil center – can have a significant impact on the amount of wire required and therefore the inductors' intrinsic resistance and losses. Even though geometry can be easily optimized for minimum wire of each gauge to reach a target inductance, the space limitations inside a loudspeaker cabinet, the precise size of available wire widths, and in some cases for small volumes the manufacturer's reliance on existing core sizes, means that sometimes the "perfect" sized coil just can't be made or simply will not fit. In the old days, this forced designers to accept the second best solution, but today with computer optimization and Solid-Works wizardry, we are able to fine-tune the cabinet internals and winding geometry to reach both our resistance requirement and space restrictions pre-production and without accepting a geometric compromise.



Winding Stability

Electrons are trapped within the wire, so the forces they experience get transferred to the wire. In the case of loosely wound inductors (called "scramble-wound"), if the windings are not rigidly bonded they can actually vibrate, once again dissipating electrical energy as heat with no benefit to the sound. That said, scramble-wound inductors actually exhibit lower self-capacitance than hee-laid inductors, which some people feel is beneficial.

Likewise, there is a lot of energy trapped inside a loudspeaker cabinet, and anything that can buzz will. Inductor windings that are not stabilized will join the party.

The solutions lie in the manufacturing processes: wet-winding, where a very thin bonding layer is applied to the coil continuously as it is wound, and/or vacuum-dipping the inductor into bonding fluid after it is wound, so any trapped air percolates out and is replaced with bonding fluid, permanently stabilizing the windings.

Eddy Currents

Oh, all these terrible things that happen to inductors never seem to end! And now, its Eddy Currents!

Eddy currents are induced by the coils' magnetic field into any conductor the field can reach. This means that for an inductor mounted on a PC Board, if mounted near the solid electrically conducting ground plane, localized currents are induced and swirl within the plane. This affects the inductors' magnetic field and represents another form of energy loss, and additionally the eddy currents can energize other elements on the PCB.

An inductors' magnetic field is concentrated through the core, weakening with the square of the distance from the egresses, so inductors mounted flat on PCBs will usually have a blanked area aligned below their cores. Alternatively, they will be mounted on "golf tee" standoffs elevating the inductor away from the board.

Lastly, they can be mounted on edge, so only a section of the weakest part of the magnetic field interacts with the PCB.

Induced Eddy Currents in Ground Plane
Image by BrainCart

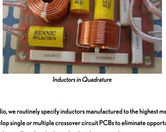
Mutual Inductance

Mutual Inductance occurs when the magnetic field created by one inductor interacts with the windings of another. Because Back Electromotive Force experienced by electrons can be caused from any magnetic field, current flowing in one inductor can induce current flow in another. This effect is actually the fundamental operating principal of electrical transformers, but in crossover world it is a liability.

To visualize mutual inductance, envision an arrow being shot through the core of one inductor, following a circular path and flying through the core of a second inductor. The magnetic field will follow the same path as the arrow.

Mutual inductance – induced distortion turns out to be the most audible crossover component artifact distortion. In complex crossovers where several inductors are closely spaced, mutual inductance becomes a serious problem.

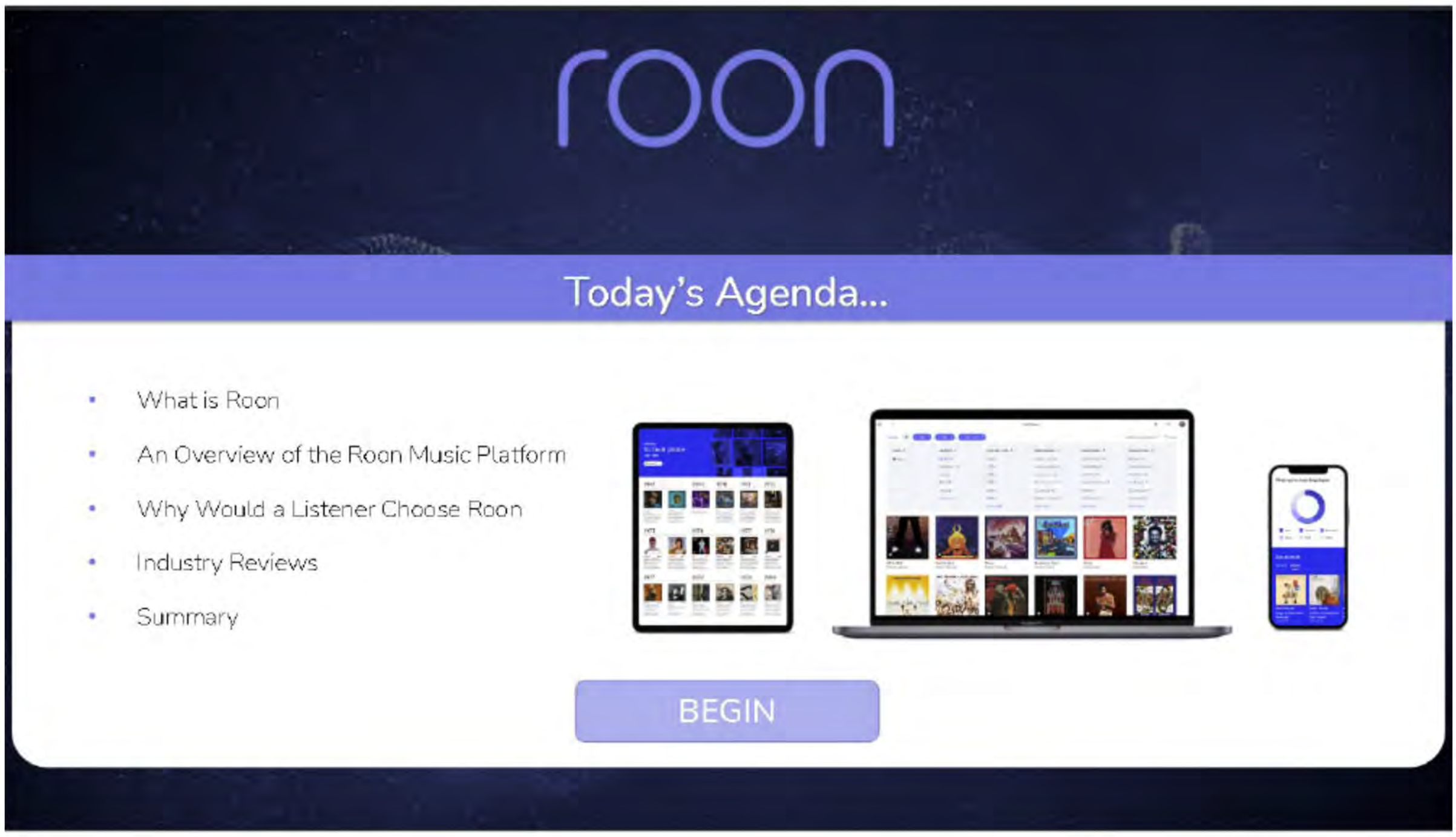
The solution is to align the inductors in quadrature, where the inductor cores are mounted perpendicular to each other, and maximizing the physical separation between inductors, and in some cases to magnetically shield one inductor from another.



Inductors in Quadrature

What we do

Here at HARMAN Luxury Audio, we routinely specify inductors manufactured to the highest mechanical standards and optimized dimensions and develop single or multiple crossover circuit PCBs to eliminate opportunity for secondary distortions. Paying attention to the smallest details always leads to better results.



Roon Tips

Roon Overview - Free trial reminder

By Kevin Kent
Senior Global Product Line Manager

With the announcement of the ultimate Roon server, the Nucleus Titan, at HARMAN ExPLORE this year we wanted to remind you of the free trial of Roon software with the completion of the Roon Overview training.

If you have not had a chance to experience Roon, this is a great opportunity to experience the seamless software interoperability with our Roon Ready products. We share a common goal, to help people have an easier time enjoying their music. The HARMAN Luxury product portfolio boasts dozens of Roon Ready devices, with some of the latest notable products being the JBL 4329P powered loudspeaker, and the ARCAM Radia ST5 streamer.

Roon Ready is reliable and simple like Airplay or Google Cast but boasts an elevated music listening and software experience with features like bit perfect playback to deliver fantastic sound.

The Roon Overview training looks at the system anatomy and details what makes the Roon system special, including the ways it enhances the music listening experience, as well as the quality of sale for our dealers.

We look forward to the forthcoming release of the Nucleus Titan to accommodate the largest music libraries, multi-room streaming demands, and DSP functions, making it the first choice for those seeking the best possible server option for Roon.

From The Audio Files

Sound Advice JBL L42ms Product Review

Sound Advice's Rahiel Nasir had a lot of great things to say about the JBL L42ms. Here are some of the highlights from the product review:

'This is a simple system to live with. Measuring just 162x617x234 (HxWxD, mm) and weighing 8.5kg, you can easily move it to wherever your party is at. It doesn't require a great deal of set-up - the JBL Premium Audio app (Android or iOS) can be used to connect it to your Wi-Fi network and then access streaming services, podcasts, radio, etc.'

'JBL has come up with a real party animal with the L42ms. It plumbs the depths when it comes to bass and excels at beat-driven dance tracks and their ilk. This is one for those who like to move to their music as opposed to those who like their music moody, as the midrange tends to sound congested with less frenetic tracks. It's certainly a solid bit of kit, both in terms of acoustics as well as build, although beauty is in the eye of the beholder...'

Full Review