

# Hifi Pig

Quarterly

JANUARY 2019

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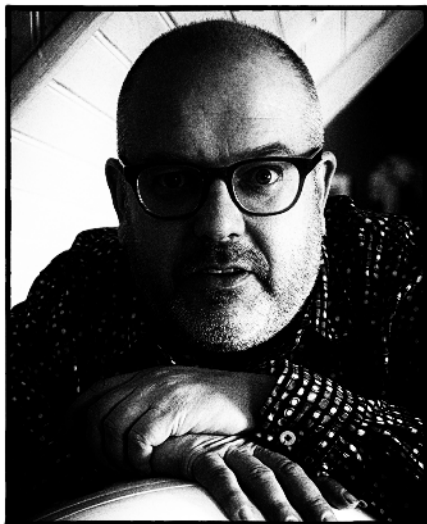
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# Hifi Pig

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into the DIY Hifi world and found that it's actually a vibrant and exciting community and we think that even though the vast majority of readers may never wield a soldering iron, they will find it interesting to read about others often innovative, creative and inspired creations. This quarter we focus on the DIY scene in Poland as well as some very interesting loudspeakers created by Hifi Pig reader James Meacham – you really must see what this guy has created.

We've also added bigger, and we feel better, articles from columnists, plus will be talking to industry experts helping you get the very best out of your system. To this end David Shevyn from GIK, who make room treatment products for recording studios, mastering studios and home systems opens up the discussion around how the room you listen has a major effect on the way your system sounds and performs – he'll be writing an informative and practical guide to common problems found in the home and how these can be combated.

When we spoke to readers we also discovered that lots of people were curious about what other readers' Hifi journeys had been like and so we are relaunching the our Readers' Lives series of articles where we'll talk to readers about their Hifi ups and downs and how they got to the point they are now with their systems.

Behind the scenes we've also made a few changes; we've taken on more freelance members of the review team and here at Hifi Pig Towers we've invested heavily on mid-priced and budget set-ups to use as references, allowing us to review more kit at lots of different price-points. Indeed, my article in this edition focuses on the need for reviewers to have a relevant and well-known system when comparing and contrasting products that come in for review.

And there you have it. We sincerely hope you enjoy the new look and feel of Hifi Pig Quarterly and we welcome your feedback – you can join the discussion on our [Facebook page](#) or [contact us by email](#).

**W**elcome to the new look and now quarterly Hifi Pig e-magazine.

Keen eyed readers will immediately notice that not only has the look of the magazine changed, but we've also changed the content and those changes have come about after consulting with readers about what it is they actually felt they wanted to read. To this end we've upped the number of interviews with industry figures and added a DIY section – we've also ditched the news!

There is an old adage that says "Yesterday's news is today's chip-paper" (perhaps that's a North of England saying, so apologies if that's meaningless), but essentially Hifi news, all news by definition, is only relevant and current for a couple of days maximum – silly then to have news that is potentially a couple or more months old on these virtual pages. In any case, Hifi Pig prides itself on having its finger on the pulse of what's new and news and we think the constantly updated news pages on the website are the perfect place to carry this content.

"Hold on a minute, did you just mention a DIY section?" I hear you ask. Yes, you did hear correctly! The DIY idea came out of a conversation with Russ Andrews of, well, Russ Andrews fame. We were discussing how the nature of Hifi as a hobby had changed over the decades and Russ made the comment along the lines that "Hifi used to be a hobby but it has changed. When Hifi first emerged, everyone was making their own amplifiers and speakers, but no one is doing that these days." And so we looked

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CYRUS ONE HD INTEGRATED AMP AND DAC

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# **INTERVIEW**

## **ABSOLUTE SOUNDS' RICARDO FRANASSOVICI**



**Hifi Pig chats with Ricardo Franassovici, the founder and managing director of UK high-end distributor Absolute Sounds about what inspired him to launch the company, what high-end means to him and where he sees the future of high-end audio going.**

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# ABSOLUTE SOUNDS' RICARDO FRANASSOVICI



## When was Absolute Sounds formed and what was the motivation for you?

I started the business in 1977. I had a successful career in the rock industry, working for record labels and promoting rock concerts, and this brought me to England. I was obsessed with good music – and also great sound. During my music industry career, I was known as 'the eccentric' because I'd never test white labels on 'ordinary' audio gear. I had a pretty esoteric system at the time... it just seemed natural that I'd move from the music industry into the 'high fidelity' scene.

I started Absolute Sounds with the aim of importing audio equipment that really needed to be experienced in the UK, but for insular and political reasons was not available in this country. The UK 'high-end' scene in the late 1970s was dominated by two well-known current brands. They had sewn up the UK market in such a way that it was widely believed that nothing beyond that type of performance existed. For me, that was baloney – the performance these products offered seemed rather one-dimensional compared to the high-end Hifi equipment I was used to.

## What were the first products you started importing into the UK?

The very first product was an exotic moving ribbon phono cartridge from Nagatron, which had a single ribbon acting as the coil. We sold about 50 units.

We then brought in a valve preamplifier from Californian company Precision Fidelity – extraordinarily good for the time – and the legendary Beveridge electrostatic loudspeakers.

Once I'd solidified my cashflow, I started approaching companies like Audio Research and Krell. We quickly gained a reputation for importing the finest audio esoterica from around the world.

## What do you think actually defines high-end audio?

A very good question... High-end audio is about removing the layers that the 'bad' electronic companies have put between the music signal and the speakers, so you get closer to the sound of a live musical performance. Without the electronic noise your brain relaxes, and the experience is instantly more pleasurable. The scale, the detail, the energy – high-end audio equipment is a conduit to bring you closer to the music in every possible way.

Of course, design and build quality come into it, too, as does aftermarket service and brand cachet – much like any other upscale product group, like watches or cars or haute couture. There's pleasure and pride in owning an exclusive brand, revelling in the craftsmanship and supreme, unerring quality apparent in every finely-honed detail. If you own, let's say, a Dan D'Agostino amplifier, you become part of an exclusive club, a select group defined by its appreciation for technology and engineering pushed to extremes in the pursuit of audio excellence.

Ultimately, the single most important factor that defines the absolute best audio components is their sound. For lovers of music, there's little to match the intense, emotional experience that high-end Hifi delivers, time and time again.

Listening to music should delight our senses and evoke a feeling of sublime pleasure, just like the experience derived from a fine bottle of wine, one's favourite piece of art and so on. A high-end audio system should seek to maximise the pleasure derived from music.

## Looking at this from a worldwide perspective, which person's designs have had the biggest impact on the high-end audio scene in the last 35 years, and why?

I can mention a few...

# ABSOLUTE SOUNDS' RICARDO FRANASSOVICI



Dan D'Agostino [founder of Krell] created the concept of big, muscular, musical sounding solid-state amplifiers. He was the first person to show that you could combine high-fidelity finesse and awesome musical power – the two weren't mutually exclusive, as others would have you believe.

The godfather of valves is Bill Johnson of Audio Research. He started by modifying Dynaco amps, then began creating his own amplifiers that were marketed as 'high-definition' long before the phrase became widely used. He created a genuine 'movement' and made people realise that valves could produce sonic power and precision, as well as sweetness and warmth.

I remember I spoke to Peter Walker [founder of Quad] in the 1970s and he said there was only one other electrostatic loudspeaker designer in the world that mattered – that was Harold Beveridge, with his big electrostatic panels that operated very differently from others. They were largely cylindrical and dispersed sound via an acoustic lens, conveying the natural space that surrounds musicians in a way that was seamless, grainless and utterly holographic.

The late Dave Wilson is truly the father of high-definition 'tower' loudspeakers. He developed his first speaker because he couldn't find a monitor to accurately reproduce the music he was recording at the time, including his wife's vocal performances. He mastered the 'time domain' like no other – critical for the accurate portrayal of a live music performance – and created high-fidelity music 'monitors' equally at home in music studios and dwellings. The quality of drive units, the innovative crossover networks, the use of inert composite cabinet materials – it all adds up to the musical realism for which Wilson Audio is famed.

Other important characters like Franco Serblin [founder of Sonus Faber] and Mark Levinson helped to define what the term 'high-end audio' really means: superbly conceived and beautifully built sonic

creations that deliver an astonishingly lifelike musical performance – way beyond the prevalent, mainstream audio components of the time.

**If you were to pick one product that you have imported over the decades, which would you say excited you the most when you first heard it and why?**

It's hard to pick one... I'll say Beveridge loudspeakers. I was astonished when I first heard them; "wow, this is a different level," I thought. They created a physical sensation similar to the best live music experiences – quite different to any other speakers I'd heard at the time. I'm not saying they're the best speakers ever made – certainly not – but they had a big impact on me, both in terms of sonic revelation and their importance to the early growth of Absolute Sounds.

I'd also have to include the original Wilson WAMM speakers. And Krell Class A amplifiers. And Audio Research valve amps. They all possessed a quality that nothing else delivered, in terms of digging right to the heart of the music and laying bare its emotional core.

**The last thirty years have seen huge changes in retailing with a massive move to online shopping, how has this affected Absolute Sounds and where do you see the future of high-end audio retailing?**

The idea of selling 'proper' high-end audio through the internet is a non-starter. Retailing high-end audio is not about search engines, cheap prices and impulse buys; it requires a physical experience that you can't get online.

If you wish to reward yourself with a good suit, you go to a tailor and get one fitted rather than buying a jacket online. If you want to discover high-quality wines, you go to a wine specialist. Nothing can



# ABSOLUTE SOUNDS' RICARDO FRANASSOVICI



# RICARDO FRANASSOVICI OF ABSOLUTE SOUNDS



replace the value of specialist knowledge to find the product – or combination of products – that perfectly fit each customer's requirements.

The same applies to high-end audio. You can't just buy some equipment on the internet just because it's had a good review; to build a system that truly satisfies, one must have it properly tailored to suit one's taste, room and so on. The advice that an experienced high-end audio retailer can provide when specifying the perfect system for a customer is hugely valuable, as is the ability to audition system combinations prior to purchase – it's an investment that requires proper consideration.

Simply selecting a system based upon that fact that individual components have received five-star reviews and assuming they'll work well together is often a recipe for disaster. There's a great need for consultants that have a high level of system-building experience. It's like cooking up high-quality cuisine – you can't just throw random ingredients together and expect to end up with a great dish!

Bricks and mortar stores can offer an experience you can't get online; it's the same in other high-end retail sectors. A customer can enjoy the shopping process, relax for an hour or two, receive great service. If high-end retailing is done well, it's more than a mere transaction; it's an experience in itself.

The very best high-end audio retailers deliver extraordinary sensory experiences for their customers – a bit like a luxurious audio spa!

**Music streaming is increasing in popularity within the wider audiophile community, what are your opinions on streaming as opposed to physical formats (which your portfolio of products still strongly supports)?**

Streaming is convenient but mostly isn't true high-end audio, although there are a few exceptions – dCS products are chief among them. The work dCS is doing to push the sonic envelope in terms of digital streaming is remarkable – we'd never have believed it could sound so good! Of course, you're massively dependant on the quality of the digital file you're streaming – is it compressed, or so-called CD-quality, or hi-res? Streaming services are mostly inherently compromised sonically, so there's a trade-off between convenience and ultimate sound quality. Most streaming platforms are developed for the mass market and the vast majority of online music remains heavily compressed.

That said, anything that keeps people listening to music has to be a good thing, and music streaming is certainly bringing young people back to recorded music – even if it's endangering the art of creating an album as a cohesive 'piece'.

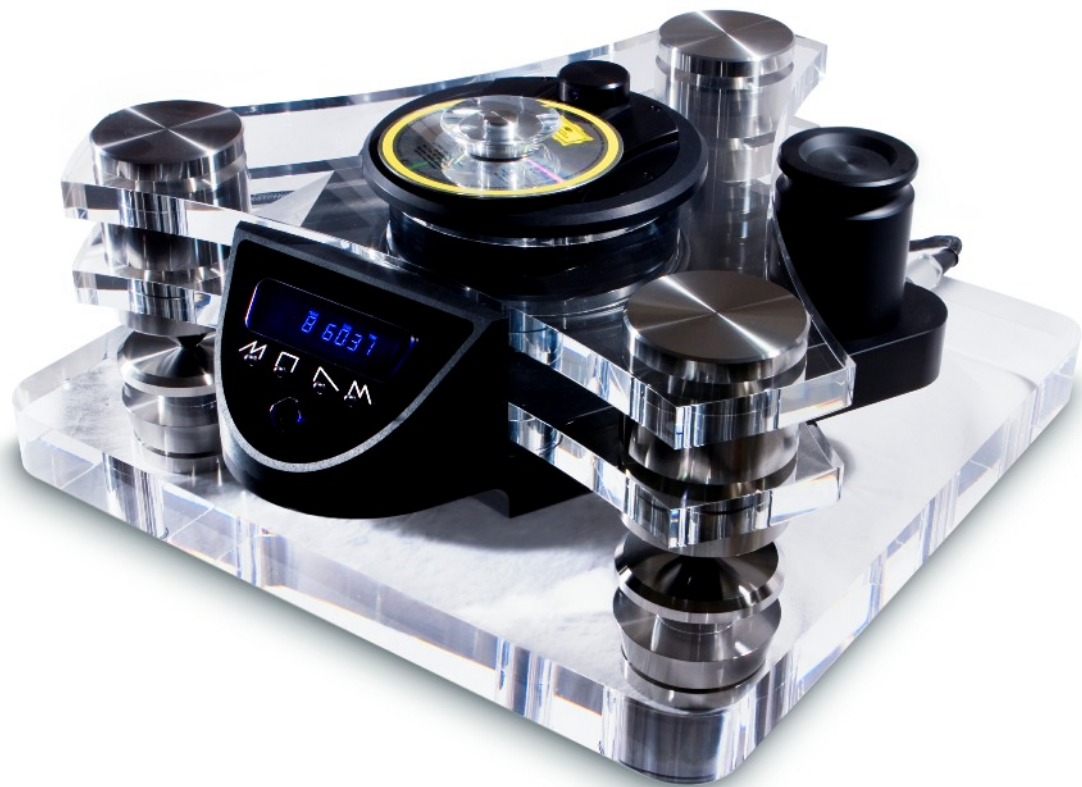
The physical music formats still have plenty of life left in them – after all, many of us have large CD and/or record collections. The recent vinyl revival proves that there's an enduring appeal in the tactile nature of physical formats and the idea owning a piece of music, rather than merely streaming it. Turntables and CD players have been perfected over decades, and the sound quality they can derive from these 'old' music formats is quite astounding – listen to, say, a TechDAS turntable or a Metronome Technologie CD player and prepare to be amazed!

Many of the systems we recommend incorporate the best of all worlds in terms of sources – there's no reason why streaming, CD and vinyl can't be encompassed within a single set-up. We embrace the various formats for their own distinct characteristics... Ultimately, we handpick the products we distribute based on strict sonic criteria; it's always about the sound, and if a streaming product doesn't measure up – no matter how clever it is on paper – it's simply not for us.





# ABSOLUTE SOUNDS' RICARDO FRANASSOVICI



## What system do you personally use at home?

That's tricky for me to answer – I'm like a master chef and I'm not going to have the same dish every night! I like to cook different sonic recipes, and I'm fortunate to have a wonderful menu to choose from!

At Absolute Sounds, we never reference one audio component against another; instead, we reference them against the experience of live music. How close they get to recreating that experience is core to the Absolute Sounds philosophy.

## What music inspires you?

I started my career in the rock industry – and I still love rock – but that doesn't mean I can't listen to Tchaikovsky or Shostakovich or Chopin, or a good jazz ensemble that gives me the same thrill. For me, it's not the type of music that's important; it's the feeling it gives me. I'm fortunate to have more than 6,000 LPs to choose from – and that's before we start talking about digital formats!

I strongly believe that listening to music is the best way to relax. It creates emotional vibrations like no other artform; it can even have medicinal effects. Absolute Sounds aims to give you more of the music... and an investment in a carefully curated high-end audio system will deliver hugely rewarding musical returns for many years to come.

## What have been the greatest lessons you've learned about the hi-fi industry in your career?

It's sad to say, but too few audio engineers really care about music and understand its complexity. Hifi is a means to an end, and the science and engineering applied to acoustic design should always serve the music, rather than the other way around; but that is often forgotten, even in high-end Hifi. Absolute Sounds' job is to scour the world to locate components that are both scientifically 'correct' in the

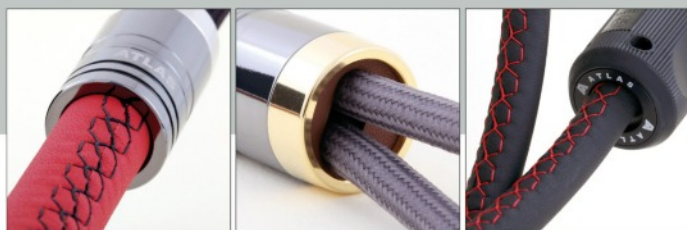
way they are designed and inherently 'musical' in the way they perform. With careful, knowledgeable component matching, a system built from equipment that fits these criteria will deliver a truly magical musical experience.



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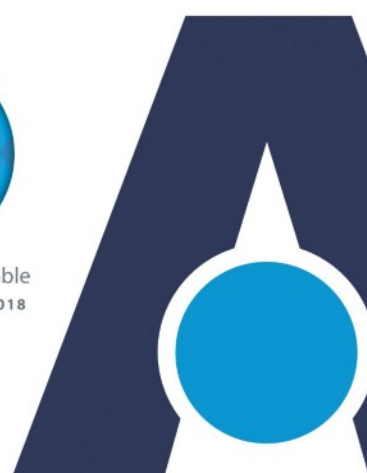
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# **INTERVIEW**

## **CARDAS AUDIO'S ANGELA CARDAS**



**Angela Cardas is Chief Awesome Officer (yep, you read that right) at Oregon (US) based Cardas Audio. Many will know the company for their cables but they also produce turntable accessories and much more besides. Hifi Pig has a chat with the awesome Angela about the company's history, what it's like to be a woman in the Hifi industry and much more.**

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# CARDAS AUDIO'S ANGELA CARDAS



**Cardas are a well established name in the Hifi industry, tell us a bit more about the history of the company and what led to it being founded by your father, George Cardas?**

As a kid, I remember my dad being really into his stereo. He was a line engineer for the telephone company, so he knew how cable affected audio quality. He started experimenting with speaker cable designs in the 1980s, in an effort to improve his own system.

My older sisters had already left the house, so I was drafted into cable caparison duty. He'd have me sit in his listening chair, play part of a song, switch cables, play the same part again, and ask me what I was hearing.

The cables he came up with were worthy of bringing to the market, so he did. And in a nutshell, that's how Cardas Audio started.

At first, his buddies would terminate cables in our garage while he went to work at the phone company. Eventually he took early retirement and put everything into the business.

**Tell us about the technology behind the products.**

We're very open about our product designs. We start with the purest virgin copper available, mined for us in New Mexico and drawn into Copper wire using a proprietary method George developed years ago. Only one facility can do it, and as such, our copper is in high demand all over the world, both in audio and scientific applications.

Our cables are assembled from multi-stranded Litz conductors - each individual Copper strand is insulated from the rest with an enamel coating. We start with the smallest strands at the centre of the conductor, with strand size increasing by a Golden Ratio step

(1:1.618) with every layer. This is a micro-resonance control technique that's the subject of one of George's first patents.

We use carefully calculated TPI (twists per inch) to ensure that every strand, from the centre to the outside, is the same length. Each layer is wound the opposite direction of the previous layer.

Each conductor is encased in high performance dielectrics. Multiple conductors are suspended in their geometries, often using air-tubes to minimize dielectric involvement.

Some of our conductor and cable designs have required the modification of antique braiding equipment to operate in ways their designers - over 100 years ago - never envisioned.

Terminating the cables - putting connectors on them - is critical. Our terminators are skilled craftsmen, using our own proprietary Quad Eutectic Solder and Rosin Solder Paste.

Our flagship speaker cables are terminated using a solder-less, compression die forging process that fuses the copper of the conductor to that of the connector.

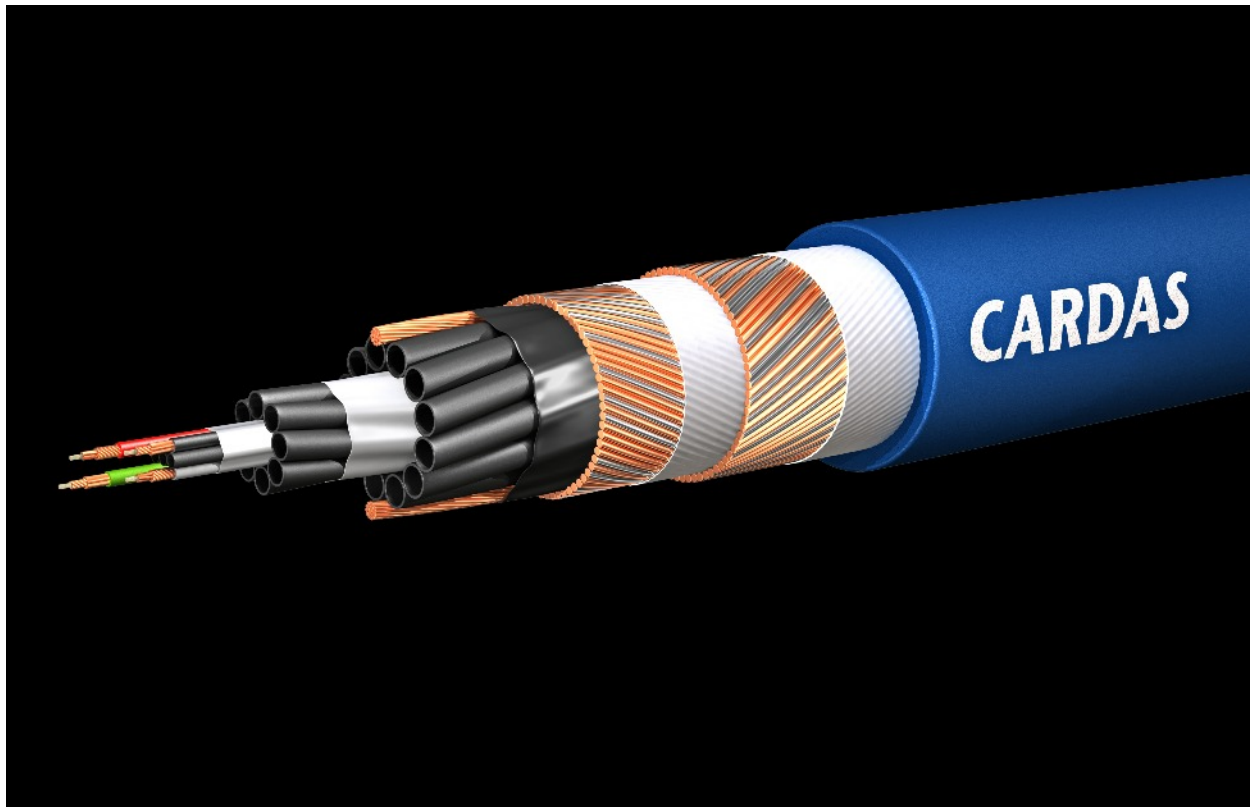
Cardas connectors are machined from billet copper or brass, and plated with a flash of rhodium over thick silver.

That's just a bit of what goes into a Cardas cable.

**Cables are perhaps one of the most controversial areas of Hifi and audio, how do you explain the role of cables to the sceptics?**

Thanks to my childhood role as dad's favourite cable tester, I was aware that cables made a difference long before I realized that there were people who thought they didn't matter. And I haven't come across many cable sceptics with an interest in high-end audio.

# CARDAS AUDIO'S ANGELA CARDAS



They're aware that some people have a passion for it, and that they're buying expensive cables. This bothers them.

Our customers have a passion for their systems, and they're tuned into the nuances that make HiFi so fascinating. They don't spend much time worrying that somebody behind a computer keyboard thinks they're not hearing what they know they're hearing.

We have cables that help tame the edge of a mid-level AV system. We have cables that provide warmth and musicality, much like tube gear. And we have cables in our flagship line that convey the utmost in clarity, allowing your zero-compromise components and speakers in your perfectly designed room to perform without a touch of coloration. I'd say the role of cables is to fine tune the system, but of course, that's the role of every component & accessory in a high-end audio system.

Instead of being sceptical that cables *might* make a difference, I suggest that it would be stranger if they didn't. I can't think of anything that isn't improved by employing the finest materials in a superior design. If the world's best copper wire combined with the highest performance dielectrics didn't result in a better performing cable, then *\*that\** would be newsworthy! We'd finally have found the *one* thing in the world that can't be made better by making it better.

**You seem to always be exhibiting at Hifi shows around the world, what are the important aspects of doing the shows yourself and how does this help the business?**

High end audio is almost as much about the community - both the manufactures and the consumers - as it is about the equipment. No offence to the engineers at Panasonic, but nobody wants to meet the team who designed the latest multi-channel AV receiver. People *do* want a connection with the personalities behind specialty equipment, however.

There's so much passion behind high-end audio that everything is basically a work of art - and consumers relate to their systems as both functional gear, and artwork. They want to interact with the manufacturers. And I'm a people person - I want to meet them too.

We love talking to Cardas users at shows - I'll admit it's an ego boost when somebody you've never met tells you how your product has transformed their experience. And we love to interact with our dealers, distributors, and other manufacturers - we're friendly people (I think!) and it's important to our business that the rest of the industry know that we're easy to deal with, and that we can help support them with product such as connectors and chassis wire.

Other exhibitors can also team up with us on showrooms, use our cables, and know that we won't be hanging around, taking up space or distracting visitors to the room, because we spend the entire show in the halls!

**Cardas is very much a family business with your sisters having also worked for the company, how important is 'keeping it in the family' and what does this add to your offering? Do you see this continuing with the next generation of the Cardas clan?**

I'd love to see Cardas Audio continue as a family run business forever. Our son is 8 years old, and he loves this company. He comes into the shop after school and chats with the guys. They even show him how to use heat-shrink and hot glue! He and his friends talk about working at Cardas Audio someday. One of my goals in running this business is to make that happen.

**When did you decide that you wanted to go into the family business? What was the main factor in this decision?**

It's kind of a funny story. About 10 years ago, my husband Josh was a freelance videographer, and George asked him to produce a video

# CARDAS AUDIO'S ANGELA CARDAS





# CARDAS AUDIO'S ANGELA CARDAS

for the Consumer Electronics Show. It turned out really well, and George decided he wanted Josh to come work for the company, doing marketing, multi-media stuff, etc.. So that got us to Bandon, where Cardas is located.

I was doing wedding and portrait photography, but being back home in Bandon with my husband working for my dad, I was gradually becoming more interested and involved in the family business. I found myself having pretty deep conversations with George about the future of Cardas Audio, one of which ended with him saying "Well I guess you need to start working here then." And suddenly I had a real job.

Josh often jokes that his job was just part of a trap, set by George, to get me involved.

**If you had not gone into Cardas Audio what do you think your career path would have been and where do think you would be now?**

I'd probably still be doing photography. Which I did enjoy, although wedding clients are SO much more difficult than stereo enthusiasts. People will call Cardas and say "I'm thinking about buying a Clear Beyond Speaker cable", and we'll say "Great, you'll love it" and... they buy it. Then they call us a month later to tell us how much they love it. But wedding clients... you've heard the term "bridezilla"? That's a real thing.

**What do you see as the importance of Cardas products being made in Bandon, Oregon, USA rather than being manufactured overseas?**

Making our products in the USA means something symbolically, but the primary, tangible thing it means to me is that we're providing good jobs in the USA. Both here at Cardas, and with the vendors we partner with in various parts of the country. It's nice to be able to print "Made In USA" on our products. And I'm glad that, even now, people around the world still desire American made products. But what it means to me is that the person who made that product can own a home, drive a reliable car, eat well, and enjoy a decent life.

**What has your experience been of being a woman in the Hifi industry? Has this changed throughout your career?**

I make no illusions about the fact that I was born into this, and groomed for the job since I was 10. There's no glass ceiling at Cardas, which is wonderful, but there is a touch of nepotism :). I have limitless respect for the powerful women in this industry who followed their passion and made a name for themselves in a male dominated field, without any help.

My experience as a woman in HiFi has been unfairly amazing. Most of the older generation have known me since I was a kid, and they treat me like family. People my own generation tend to be all about gender equality, so no problem there. And the younger people have grown up knowing my last name, so I get to feel like a minor celebrity :). I am fully aware of the challenges women face in the professional world, regardless of industry. I dealt with it in my previous careers. But it's not an issue for me in audio.

**Who do you admire in the Hifi industry and what wisdom and advice would you pass on to others who are starting out in the industry now?**

I definitely admire the people who got the modern era of high-end audio started. My dad, Jeff Rowland, Bill Lowe, Ray Kimber, Charlie Hansen to name a few.

Guys like Jeff Joseph of Joseph Audio and Alvin Lloyd of Grand Prix make amazing gear that I just love.

I'm also a big fan of the young people in our industry, with a passion for what they're doing. Jesse Luna of DCS. Will Kline at Sonus Fabre. Isaac Markowitz at AudioQuest. Alex Brinkman at Auralic. These are guys who started as enthusiasts, and found their way into the industry - which is humbling for me because I was born into it.

**How did music influence you growing up and how does that continue now?**

I have two *much* older sisters, so I was brought up on a combination of my parents' music, and my sisters'... From Willie Nelson to The Cure to Led Zeppelin. It's amazing I could relate to my own peers :)

I'd say music influences me more now, however, than it ever has. Josh and I travel all over the state and even across the country to attend concerts. I don't cut my hair or dress to emulate my favorite artists. But if you live in Bandon, Oregon, drive 5 hours to Portland, jump on a plane and fly to Austin to watch the Decemberists play at the University of Texas for 2 hours, I think you can say that you have been profoundly influenced.

And by the way, The Decemberists are based in Portland. But we'd already seen them in Oregon two times this year, so Texas just made sense :)

**What music do you enjoy listening to and what is your 'go to' format if you have one?**

I'm not good at identifying the genres of the musicians I enjoy. I can tell you some specific artists. The Decemberists. Portugal The Man. Neko Case. Nada Surf. Polyphonic Spree. Nightwish. In a general sense I call everything I like "rock & roll", but it's hard to call bands like The Decemberists & Polyphonic Spree rock & roll when the Rolling Stones exist. It renders the phrase nearly meaningless.

I will take this opportunity to express the opinion that there is a LOT of amazing new music out there. People my age and older (I'm 41) love talking about how music today just isn't like it used to be. I feel like music today is better than it was when I was a kid. I think it's better than when my parents were young (heresy, I know). The best music out there isn't being spoon fed to the consumers like in the heyday of top-40 radio, when nearly every young person listened to the same stuff. You have to seek it out. Which is ultimately more rewarding.

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# **INTERVIEW**

## **AUDIO CONCIERGE'S PHIL WANNELL**



**Phil Wannell has been in the industry for sometime and is a well known face at Hifi shows and events throughout the UK. Recently he has decided to take the leap into self-employment and has founded Audio Concierge, a bespoke service offering portable audio and headfi products to a discerning clientele.**

**Hifi Pig**  
**www.hifipig.com**

# AUDIO CONCIERGE'S PHIL WANNELL



## How did the idea for Audio Concierge come about?

Believe it or not the idea began to develop once I had left the industry after 16 years. I was informing a few people that I was leaving and a number of them effectively called me stupid. It got me thinking, and the market was already covered by a great number of high-quality stores offering similar products so it would have been a little tricky to do the same thing and follow the standard bricks & mortar retail model. I had to differ from that type of business.

## What is your past experience in the audio industry and in particular the mobile market?

I have always had a passion for music since listening to my Dads HiFi system as a young child. When I was 16 he managed to secure me a work experience place at a local, reputable HiFi store and I never left. I am now writing this at 33 and have thoroughly loved my time in the industry. In 2009 I immersed myself in everything e-commerce and began to run the company's website, slowly growing it over a number of years. 2009 was the same year that Sennheiser launched their now "legendary" HD800 headphones and it was when my love for HiFi shifted to portable audio. It felt like many retailers didn't really get the "high-end" headphone thing and I think many stores didn't see much potential in it. I had seen how huge portable audio had become in Japan etc and thought that this could reach the UK. There was then a decision made to become a headphone specialist and I began looking into more technology and products such as Audeze. As portable players had just started to arrive on these shores (like the Astell&Kern products) I had also found the super cool Colorfly C4 portable that we started to import into the UK for our client base. The C4 sold amazingly in the UK and from there we continued to grow and expand into our market as a headphone specialist. During that time I have been in the very privileged position to have supported HeadFi's CanJam shows on numerous occasions. I organised several dedicated headphone and portable audio shows at one of London's

leading mastering studios that then moved to a much larger venue. A highlight for me is being involved in a number of projects from some of the biggest brands in the industry. From the sound tuning, to the design and on through to the user experience, I have been lucky enough to be involved in it all in one way or another and it too is a great privilege.

## What do you feel sets Audio Concierge apart from other online retailers and how do you go about making the buying experience a positive one?

Being in retail for a number of years I feel that sometimes the love is lost for products and they are just a commodity. This frustrates me a little to be honest as the bare bones of this industry revolves around the love for music. These items are trying to improve on that musical experience and as such should be carefully matched to the user, the users listening preferences and their individual use case. I also carefully select a range of products that are exclusively available via Audio Concierge, products that I feel are exceptional in performance and can offer something no other product on the market can. I will discuss this in more detail a bit later. In terms of making the buying experience a positive one, there are a number of things I like to do but that would be telling..... ;- ) I guess if you look at my brand name my service is a little more personal than others.

## Did you have a particular customer type in mind when you created the Audio concierge concept, and if so what would a typical customer look like?

Yes, I did indeed; first and foremost I really enjoy helping the hobbyist and audiophile, however, they generally know what they want and are happy to take the plunge on items to match with their existing components without much, if any consultation. I also help clients whom perhaps have an existing HiFi system but want to venture into a portable solution, but perhaps they are not sure where to start. My



other clients are currently not audiophiles, nor do they have an existing HiFi, they simply want to have a problem solved, such as a lack of amazing quality music whilst travelling or commuting. These clients are where Audio Concierge can provide a solution that fits the clients use case. This requires a more hands on approach and guidance on the entire solution that is able to solve the issue they have.

**You mention on your website that every product you have in stock must have “something special”, how do you define that “something special” and how do you go about selecting products to carry?**

That's a tricky one to answer as to be honest it's based on my own personal preference. I don't stock products just because they have had an amazing review or won an award. Unfortunately, I also don't stock every brand that approaches me. Again the “something special” is personal preference and it has a number of factors I guess. Sound quality and performance is high on the agenda, with build quality and user experience also something that I take into account and takes quite a high priority. I guess I like to pick what I feel is best in class. Something for instance is the best closed back headphone at a specific price point, or best portable player in terms of sound quality at a specific price bracket that offers the best functionality. In regards to how I select what goes into the portfolio, I am exceptionally privileged to be able to hear many of the products before they are released to the public. This means that I can evaluate the product and see if it fits within the portfolio. I recently took on a brand called Lark Studios after being sent their LSX earphone to try. After listening to them, it was immediately clear that their sound, comfort and customisation options were something no other brand was capable of offering. I was subsequently proud to add them to the portfolio.

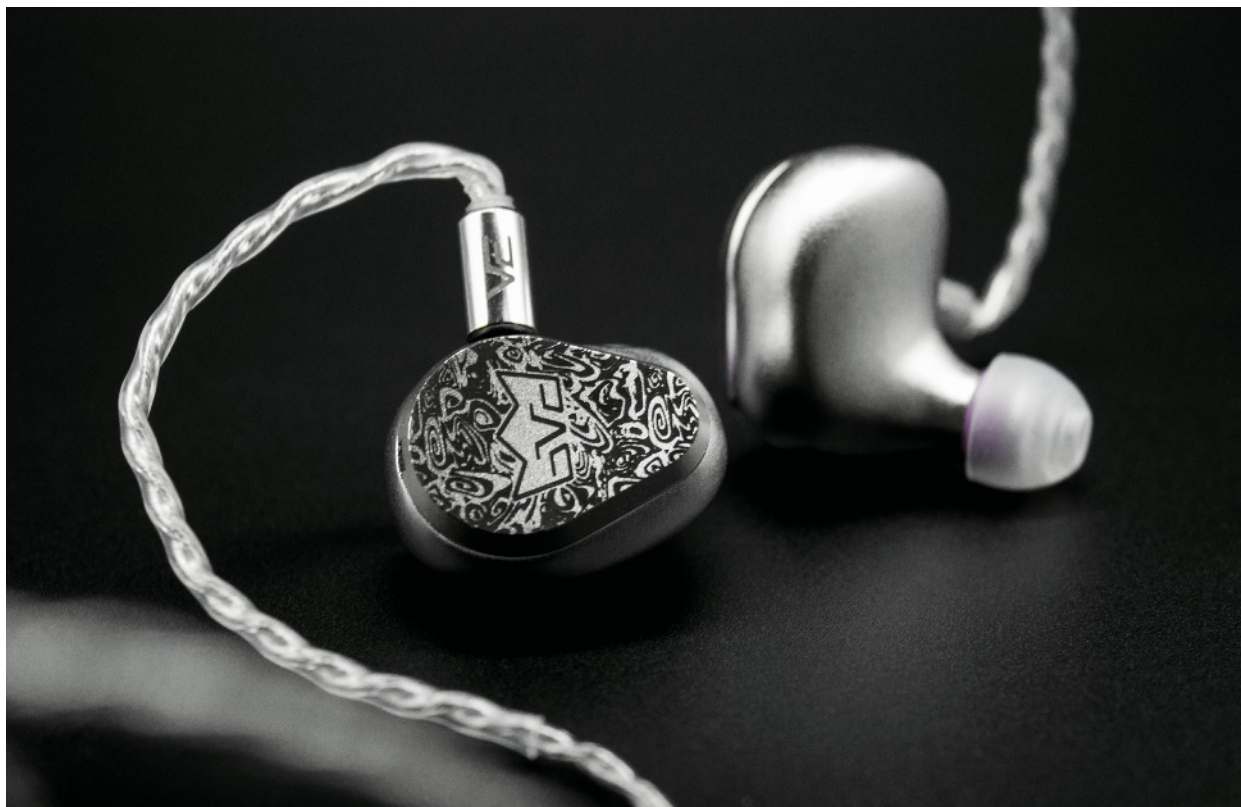
**The portable audio market has grown massively in recent years, what do you think the spark for that growth was, and where do you see the market going in coming years?**

Yes, the market has grown immensely over the last few years. The trouble is that the market is now flooded with different products, making it even harder for the consumer to choose what is best for them. I think the boom has been partly due to the rise in wireless technology to be honest, with a massive amount of sales going towards wireless companions for users' mobile phones, it has enabled many more brands greater exposure within the industry. I also think a lack of time and the lack of space a reason for the growth. People can't sit and dedicate time to listening to music these days, and they certainly don't have the space for a HiFi system in their London flat with people above and below them, along with their neighbours all around them. It just isn't convenient like a portable audio system. I believe that with the advent of CD quality streaming via 4G and 5G networks there will begin to be a shift back to wired earphones and headphones to get the best quality possible. There will be a number of people appreciating the different from their convenient wireless products to quality wired products for listening on-the-go.

**We speak with a lot of younger people who are happy with a pair of earbuds and their smart-phone, how do you think we as an industry can encourage these people to embrace high-end audio?**

Don't underestimate the value of a smartphone. This will continue to be the future for the convenient listen. It does everything that's required and more. The benefit is that you can simply add a higher quality pair of wired earphones to a smartphone and experience better quality audio. It's an incredible first step for younger people to start appreciating a higher quality of music reproduction. From there they can weigh up if a dedicated DAP will then be a worthwhile





purchase. Higher quality components, better battery life and massive storage are all positives of a dedicated portable player over a smartphone, however, I have heard “value” DAPs that sound very similar to a smartphone and offer nothing extra performance wise. We currently offer Astell&Kern as our preferred brand of portable players due to their performance and usability. For me personally, even their best value offering provides a greater experience than a mobile phone.

Android operating system is not best for audio playback. Android O is beginning to make moves towards a much cleaner signal path and I hope this development continues.

## **What was your personal product of the year for 2018 and why?**

My personal selection for this only just made it into 2018 and began getting to clients in late November early December. Due to its incredible ability to successfully demonstrate an amazing sound regardless of what it's attached to, I would have to say the Meze Audio Empyrean. The new flagship from Romania features unique technology, is super, super comfortable, comes with two different types of earpads and isn't fatiguing in any way. The best bit though is the sound. It is incredibly fun to listen to and enables you to immediately begin enjoying your music without really having to worry about what you are using to drive it. A few other headphones at this level only seem to sound incredible with specific hardware but that isn't the case with Empyrean. They are a great all-rounder and although they are not overly cheap they do provide an amazing amount of pride of ownership with their exquisite build quality.

## **What innovations do you personally see on the horizon for portable hi-resolution audio?**

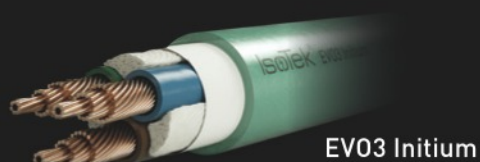
I see higher performance DACs such as ESS being used more in mobile phones and I hope to see the phone manufacturers spend more R&D on audio playback. To be honest smartphones are the future for the mass market of high resolution audio. They will close the gap on dedicated portable audio players and will provide amazing sound quality. At the moment however, this is a little way off as the

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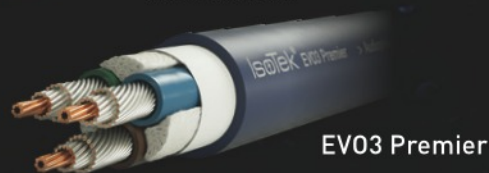
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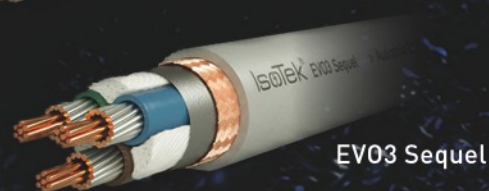
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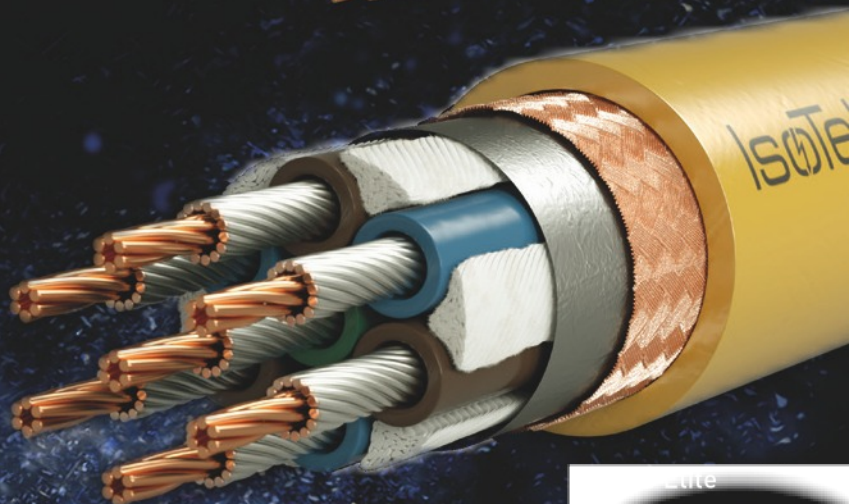
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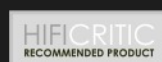
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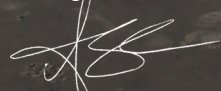


# Cardas Audio

## Bandon, Oregon

*Since 1987, Cardas Audio has manufactured premium audio cables and component parts. My father, George Cardas, founded the company to perfect audio cables using ultra-pure materials, innovative Golden Ratio resonance control techniques and uniquely insightful solutions to transmission line problems. The legendary craftsmanship at Cardas reflect his pursuit of perfection.*

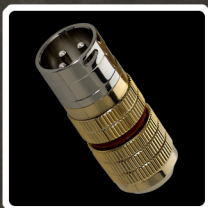
*All of us at Cardas are here to help. Whether you're a manufacturer in need of quality connectors & chassis wire, or a HiFi enthusiast looking for a cable to round out their system, please visit us online, call or email. We look forward to serving you.*



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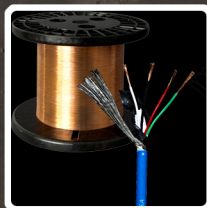
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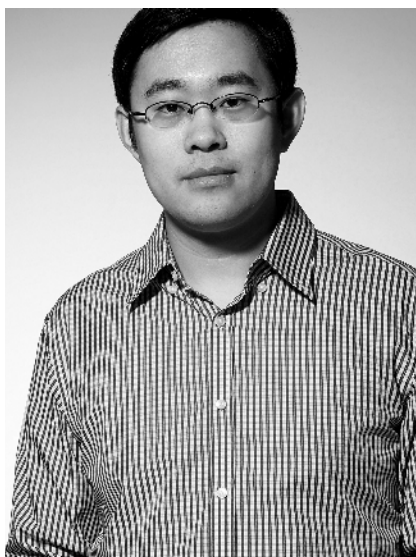
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# **INTERVIEW**

## **AURALIC'S XUANQIAN WANG**



**Xuanqian Wang, the President and CEO of Auralic speaks to Hifi Pig about the company's innovative products and what goes into them.**

**Hifi Pig**  
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**What was Auralic's first product and what in your opinion set it apart from the competition?**

Our original VEGA DAC very quickly established the Auralic brand as a market leader for digital source products. We released VEGA at the right time, at a very competitive price, and sonically, it did not disappoint. For the high-end audio marketplace, you couldn't ask for better positioning. VEGA offered several unique features that had never been included with a DAC before, technologies like the 82fs Femto Clock.

**ARIES G2 streamer is a significant jump in price from your original streamer, how does it differ in its architecture and how does this affect the final sound?**

Back in 2013 when we began developing the 1st generation of the ARIES wireless streaming node, its offerings were so unique that nothing else like it existed at the time. During development, our team had to focus its efforts on perfecting functionality rather than optimising sound quality. Over the last five years we have developed many software updates, and as a result, the product features, functionality, and sound quality are now far more sophisticated and reliable. Since the first generation was out for a while, we have received a considerable amount of customer feedback and experiences, all of which have helped in refining the design of this type of product. All of these valuable experiences help us to focus on improving the sound quality of the ARIES G2 during the development stage, especially in the area of hardware design.

**The Vega G2 streaming DAC offers on paper significant performance specs, how do you feel it performs against similarly priced competition and why?**

VEGA G2 is a revolutionary product; it has been designed based on our proprietary *Lightning DS* streaming platform rather than DAC structure. It is a virtual digital recorder, or digital audio station: all digital input signals are stored in our Tesla platform for processing and then sent to the DAC. When the data is recorded into the processor's

memory, the clock jitter from the input signal is completely eliminated. The DAC works in what we call *master mode*, as it generates a reference clock signal, which is then sent to the Tesla platform. For the first time, this is a DAC that does not need to lock to the input signal, making it completely independent, unaffected by source jitter. Utilising our proprietary noise reduction and precise clock technologies, the VEGA G2 simply sets a new benchmark for DAC performance. Almost all users report that the background is so quiet, so black, on VEGA G2, that they can hear far more detail from their recordings than they have ever heard before.

**Tesla G2 is the hardware platform behind the new series of components, tell readers about the thinking and engineering behind this platform.**

Tesla G2 is an upgrade version of Tesla G2, which was used on the original ARIES. This platform uses a generic computing processor which is powerful and flexible. Comparing to DSP or FPGA based platform, our software engineers can develop new software features easily and provide these a customer's product via OTA update. For example, it is hard to add new features to DSP or FPGA based platforms, but very easy for our platform. DSP or FPGA based platform software upgrades are mostly for product optimisation only.

**Leo GX is a mastering clock, of which there are many on the market, how does Leo GX differ in its approach to master clocking?**

LEO GX is a very unique product designed to work exclusively with the partnering VEGA G2. All existing master clocks on the market either generate a 10M reference clock or word clock. DAC's using master clock signals still need to lock onto the input signal which means the sound quality is affected by the input signal's jitter. Since VEGA G2 doesn't need to lock onto the input signal, LEO GX uses two atomic clock's to generate two working frequency feeds directly into the VEGA G2 and replaces the existing clock on the VEGA G2 - the result is a very obvious sound quality improvement when



# AURALIC'S XUANQIAN WANG





compared to existing master clock product technology. We have more detailed information on our website of course.

**Auralic don't offer a standalone DAC into which users can add a computer or their own streamer, instead favouring to offer the Vega G2 streaming DAC discussed above, are there plans to offer a standalone DAC and if not why not?**

We believe the "computer as source" (CAS) for high-end audio enthusiasts is only a temporary solution for the playback of high-resolution music. Dedicated music streamers will replace CAS sooner rather than later. That's why we designed ARIES back in 2013: to remove the computer from the HiFi system completely. Although there are no plans at present, we may still introduce a stand-alone DAC at some point in the future.

**In my opinion, many products fall down with the quality of the apps they make. Lightning DS is your iOS app, what makes it better than the competition and why no Android version?**

The Android OS has many different versions, including those manufactured and customised exclusively for their hardware. It's hard for software to maintain a uniform user experience on an Android system. To reach the same quality standard as we experience with the iOS ecosystem, more engineering resources would be needed to develop and maintain an Android platform. We have made our choice to focus on doing what we can do the best, and that's iOS.

**You haven't made an amplifier since the Merak, which is now sold out, do you have any plans to introduce a new power amplifier to enable users to have Auralic electronics end to end?**

We have several monoblock and stereo prototype designs already in-house, but have not yet decided if we should make those products available.

**We are seeing many companies introduce all in one systems that offer, Streaming, DAC and amplification in one convenient unit, are there any plans for Auralic to follow suit and create such a**

**product?**

We actually produce the acclaimed POLARIS, which is an all in one solution that we released to the market in 2016. This powerful product incorporates analogue and digital inputs, a moving magnet phono stage, optional internal storage, and a powerful 120w + 120w amplifier in a compact chassis. So our answer is that we already have!

**None of your products support MQA, why is this?**

Whilst we respect MQA, we feel the technology is not relevant to our current needs. The concept is to compress high-resolution audio into a lower sampling rate and save bandwidth for the streaming service provider, and it is not lossless. The next generation streaming service providers like Qobuz now offer a real high-resolution streaming service in FLAC format. I don't see any reason to incorporate such technology due to the fact that MQA applies so many restrictions to hardware manufacturers.



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# **INTERVIEW**

## **GRYPHON'S RUNE SKOV**



**Rune Skov is the sales director at legendary Danish high-end manufacturer Gryphon Audio Designs, here Hifi Pig talks to Rune about the company's history and the design philosophy behind their iconic products.**

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# GRYPHON'S RUNE SKOV



**Flemming E. Rasmussen (pictured later), the founder of Gryphon Audio Designs is by his university training a painter and graphic artist and after graduating taught photography and painting, how did he come to launch an audio company?**

First of all, FER was running a distribution and marketing company in Denmark before Gryphon was founded. He was among other brands distributing Infinity, Krell, Martin Logan, VPI, Classé, Kiseki and some other High-End related brands and at the same token, he was desperately in need of a very nice Head Amp (for his own use) for being able to listen to the differences between the many cartridges he was having in his possession. At the same time Flemming was designing connectors and cables and that was actually the first products under his name and not at least the Gryphon name. But it was the Head Amp which started the adventure and legacy of The Gryphon. The little shiny Head Amp in a true dual mono Class A design was designed and manufactured back in 1985 and since that day the company became a reality.

**The first product designed by Flemming and using the Gryphon name was a headphone amplifier, how did this project come to be and how did it become a commercial project?**

Well, as mentioned earlier this amplifier was something Flemming wanted for his own use as there was no proper Head Amp out there in the market and definitely not with a true balanced Class A design which Flemming was a huge believer in and something our company has been using as our trade mark ever since. The Head Amp was designed by Flemming and with the help from a good friend of his the amplifier topology was designed and it went from being an idea to reality. It was when Flemming brought this little amp with him to Asia that the Gryphon got wings due to the massive interest in this unique product. And that was basically how it all started.

A little quote from one of our book "Gryphon Unplugged" which was launched at our 25th Anniversary:

The Gryphon recipe was pretty much all there right from the start: extreme dual mono configuration with wholly independent left and right channels on

two separate chassis connected by a bracer and sharing a common faceplate, isolated outboard power supplies for each channel, pure Class A operation, zero negative feedback, discrete components throughout, no coupling capacitors in the signal path, ultra-flat frequency response from DC to beyond 3.5 MHz - and most crucial for an MC preamp, a record-breaking low noise floor.

Honoured as "Best Product" by Stereo Sound, Japan, "Product of the Year" by Hi-Fi & Elektronik, Denmark, winner of the EIA Innovations Design and Engineering Award 1990, USA, and declared "State of the Art" by L'Audiophile, France, the Headamp placed the Gryphon name firmly in the exclusive circle of highly respected audiophile brands and set the benchmark for all Gryphon products to follow.

**Where does the name Gryphon come from and what does it represent?**

Well, Gryphon is a company that designs and manufactures huge, black, massive and extremely strong Class A amplifiers. A true Gryphon Amplifier is always an amplifier ready to deliver an enormous amount of current and always ready to strike when needed. This is the thing we have always been doing and most likely the type of amplifier topology that we will continue doing for many years to come. It is a part of our legacy and how our brand is presented to the public. Big, black and bold with unlimited power. It was Flemming's idea and intention to find a name and a logo which was able to represent this image of unlimited power, while at the same time conveying graceful ease, and a name that would stand for that power and grace. Funny enough "Power and Grace" is the title of the phenomenal CD that was produced a little bit over a year ago by our Hong Kong/Chinese distributor Radar Audio Ltd.



# GRYPHON'S RUNE SKOV



The logo, is inspired by the fabulous creature of Greek mythology with the head and wings of an eagle and the body of a lion. A creature and a logo that symbolize power of the Lion and the grace of the eagle. It is actually the first sentence you see when you click on to our website - "...perfect union of the power of the lion with the grace of the eagle". And I think that this logo is so strong that it can stand all by itself and you will clearly know what this creature and logo stands for. The logo and brand are definitely some of the strongest assets at Gryphon Audio Designs...and of course together with our Class A topology. Something that I sincerely hope will live on forever.

**The current make-up of the Gryphon design team is a mix of electronic engineers and more traditional audiophiles, why do you have this mix of people and who in the team has the final say on a project's tweaks, merits or otherwise?**

This mix of people has been something that has always been related to Gryphon - actually from the very first head amp which was a collaboration between FER and Kim Rishøj (Founder of TC Electronics). It is important to gather as many strong minds as possible and let them collaborate in a very structured team where no one is in any doubt as to what he or she should bring to the table. It might be the great design of all the exteriors of Gryphon products (the visual presentation of the product) which has always have been done by Flemming, but most of the people within the design team have been working at Gryphon for +20 years and they have all been a part of this process. There is most likely no one on earth who is the best product designer in terms of the visuals and also being the best designer for the mechanical parts and for the electronic parts too. The way that Gryphon has been working from day one is to find the best possible designers and engineers and make them work in a symbiotic team atmosphere. That's how we achieve our goals and that's maybe one of the reasons why Gryphon has managed to keep its strong position in the industry for high-end luxury audio components. But for all the lines and designs it has been Flemming who has been setting

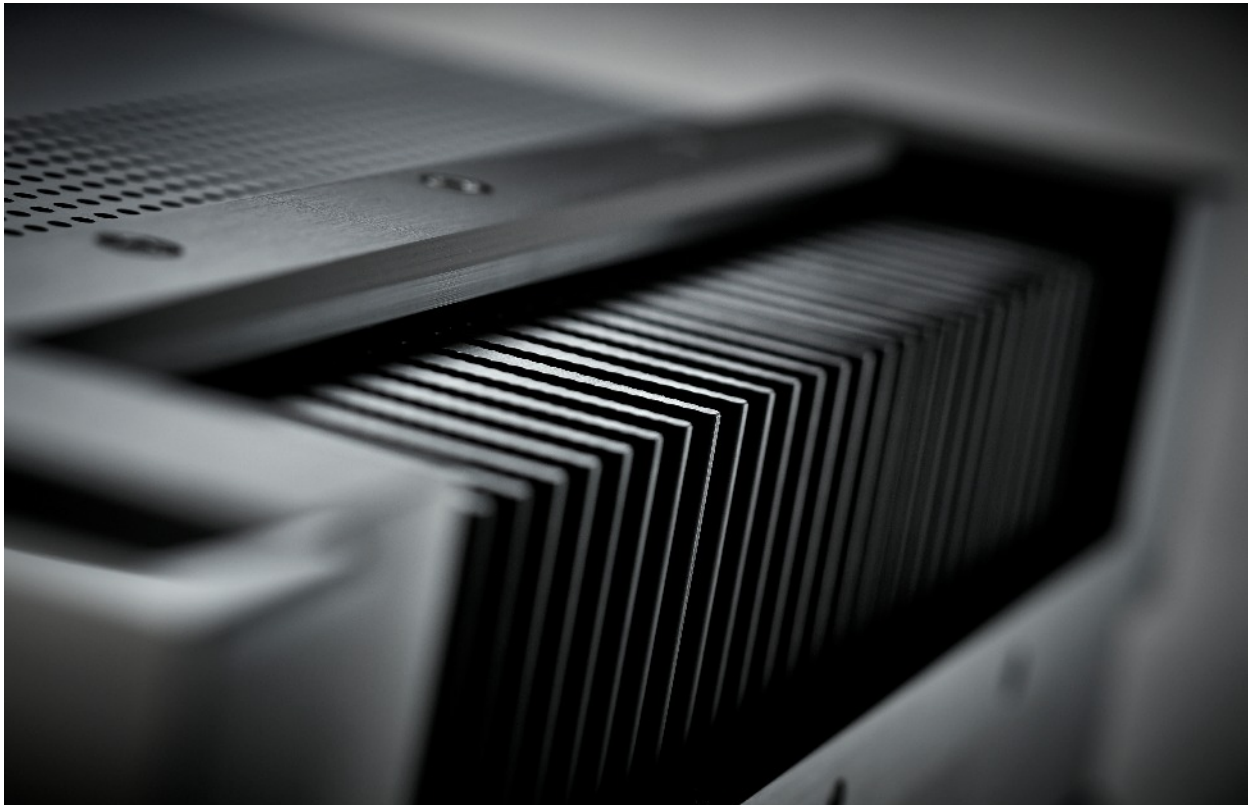
the direction and he will continue being a part of the design team, even though he decided to retire earlier this year. Flemming will still make drawings for Gryphon Audio Designs as he has been doing since the very beginning in 1985.

For years it has always been Flemming's final decision as to how the product should look and sound, but it has always been in a close collaboration with the rest of the design team. Something that we will continue doing. Gryphon Audio Designs is not a one-man-band, but it is a strong team effort and close collaboration between all the involved persons in a design project that leads to the final product.

**We met once with Flemming at Munich High-End and he made a comment along the lines of "Synergy is a myth, a good product should work well with whatever other products it is partnered with", tell readers what this means and why Gryphon adhere to this philosophy. Do you feel that there is a "house sound" to Gryphon products?**

It is true that we do not operate with things like "Synergy". We do believe that any Gryphon product should be able to play well along with other products from other manufacturers. We are fully aware of, despite the fact that most Gryphon owners (over the years) will become true Gryphon Ambassadors or fans and in many cases will end up with a complete Gryphon setup (cables, electronics and speakers), that most owners might have a preferable brand when it comes to, for example, speakers or digital sources and we do not want to leave that client in the dark and not having the possibility of buying a Gryphon amplifier or phono stage. We do not aim for a particular House Sound, but we are striving to make the products as neutral as possible and if we should have a House Sound I guess it can be explained as "power and grace". But in general, we are aiming towards neutrality just like most other manufactures will claim. But it is the best answer that I can give to your question. And it is probably the reason why almost all Gryphon products have the same tonality and character. But with bigger power supplies and having

# GRYPHON'S RUNE SKOV



more current available in a Solo version of a (for example) Mephisto, there will be small differences in the sound, headroom, etc. But the overall character of any Gryphon is almost the same.

**Most manufacturers will make the claim that they and their products are looking to get as close to the “live” sound as possible, what is the Gryphon take on this and how do you go about achieving your sonic goals?**

I think some of my answers above very much explains how we try to achieve our goals as getting as close as possible to the “live” sound that anyone in high-end audio is aiming for. We are building our products with the belief that all our products must have this topology of fully discrete dual mono designs (balanced) and with enormous trafos and power supplies which always give us the advantage of having an huge amount of current available. We do strongly believe in our Class A designs as something we have done since the very early days of Gryphon. It is a topology which we think is capable of delivering the most true/realistic/natural sound. It is this special character and trade mark of Gryphon.

**What musical sources do you use as your references when testing/developing a new product and why these specific references?**

We are using several different sources in our development of new products. It is not all CD, but we are trying to use different source components in our R&D and also depending on which products we are designing.

**Gryphon claim to be the first company to introduce a true dual mono topology, where did this idea come from and what do you see as being the benefits?**

Well, it cannot be explained in one word sentences and certainly not in short, as it is something we think is the right way to build electronic products for audio purpose. As Flemming has quoted in the past

*"Strict dual mono construction is an essential trait in the Gryphon genome, because stereo is based on two channels and any interaction between these two channels must be in the original recording and nowhere else.*

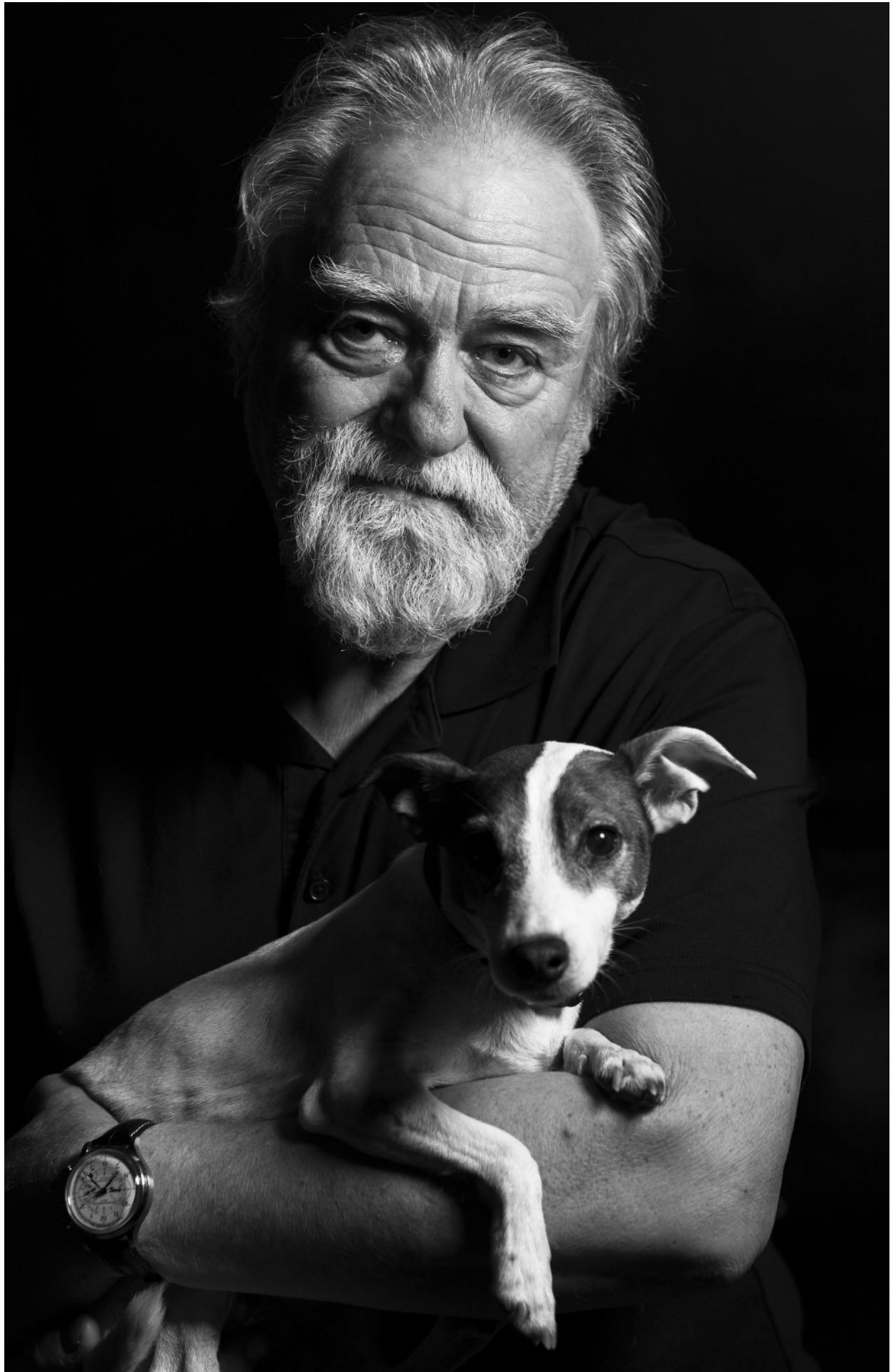
*With a true, uncompromising dual mono topology, there is no crosstalk (interchannel distortion). Two entirely separate power supplies ensure that even the most dynamic passages – requiring instant fuel from the power supply – will be handled without any adverse impact on soundstaging. A single power supply may run out of steam, resulting in shifting instrumental focus and placement as draining power reserves are allocated unevenly between the two channels."* You can read more about the thoughts of Flemming on our topology and credo with regards design in Gryphon Unplugged.

**We are seeing more and more audiophiles focusing on the AC supply, indeed the Hifi Pig reference system uses outboard filters and balanced mains and the benefits are (to us) clear, how important do you feel the mains supply is and what has Gryphon done to ensure a good AC supply?**

It really depends on which products we are designing as each individual product requires different power supply topologies and components. You can't use the same topology on a Class A power amplifier as the one we are using in our pre-amplifiers, for example. But there is one common thing and that is that we are aiming to use extremely low noise design topologies in all our products. But overall the power supplies are something we are very focused on and there is no doubt that having a state-of-the-art power supply can make the difference between an extreme performance and a very poor performance.

**How important is the distinctive look of Gryphon products and who is responsible for this?**

It is very important. Until today the look of a Gryphon has been designed by Flemming. It is a trade mark of ours. I think it goes very well in hand with “The Grace and Glory” thing and that a Gryphon is





# GRYPHON'S RUNE SKOV



having a destructive appearance in terms of having this “bad-ass-attitude”. A Gryphon must never be mistaken for a different product or brand-name. A Gryphon has its own very unique and personal visual appearance and something that any Gryphon client can relate to. We do not design anonymous products as we do think they should make a difference and have an artistic visual appearance. Especially having in mind, that Flemming holds a degree in painting and graphic arts from the Art Academy in Aarhus, Denmark. Why not benefit from having such a unique background and with the eye for all aesthetic details when it comes to the designs of a Gryphon product?

## **Gryphon products come with a test certificate, what is this and what is the test procedure?**

When a Gryphon product is being manufactured it will undergo a long test procedure of the individual steps in the manufacturing. The product will run on a test bench for about 48 hours (depending on the product) to ensure that the power supply lives up to our very strict quality control, but also making sure that there will be no variations between the different units. Unit number 100 should sound and perform the same way as number 500, or number one for that matter. We are working with extremely fine tolerances and only the best is good enough when building a Gryphon. Throughout the manufacturing, for example when doing the PCB-boards and doing the mounting of components, each individual board is inspected and controlled. It is the same thing in all the stages in the manufacturing process. And finally, when the unit is 100 percent assembled and almost ready to be packed the product will undergo one final test to ensure that it is 100 percent perfect and ready to ship. That's how the procedure of testing is and something that relates to every single Gryphon product.

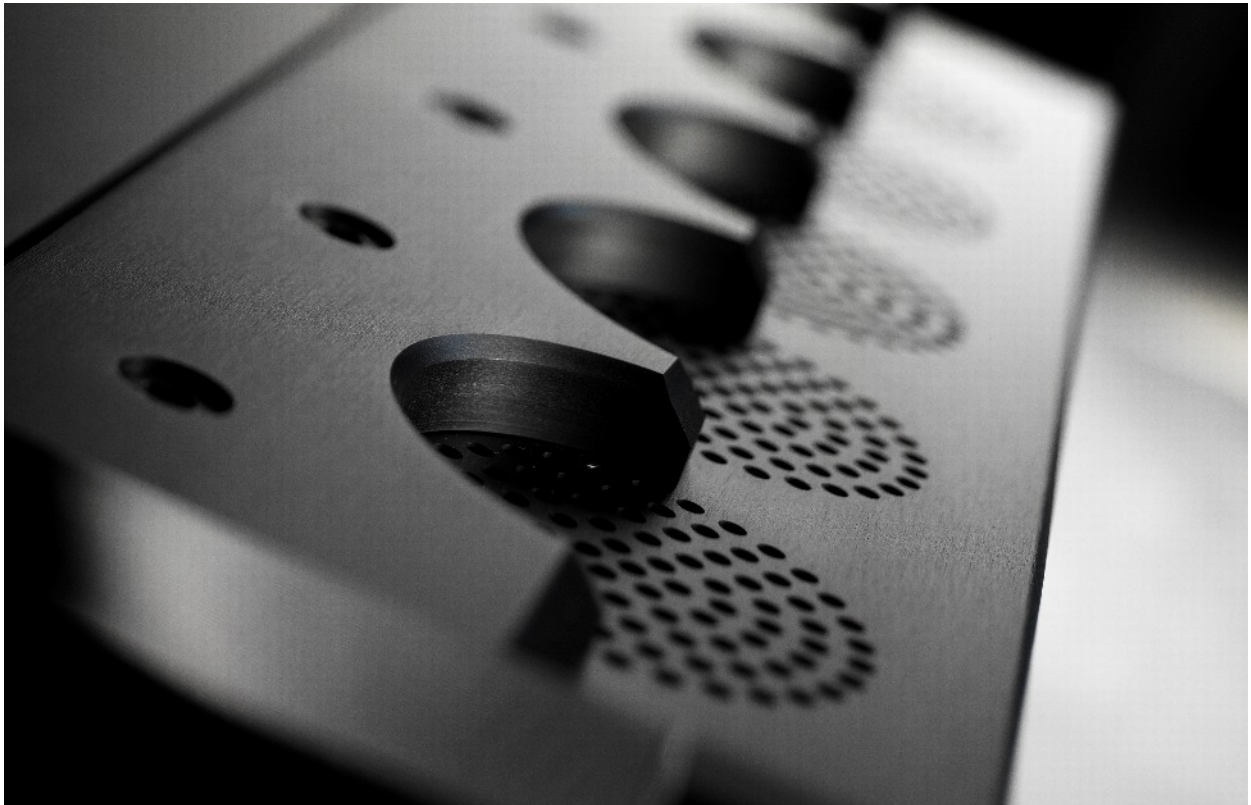
## **If there was/is one product that is quintessentially “Gryphon” what is it and why?**

I would definitely say the Antileon EVO Class A amplifier. Today we have the 3rd generation of the Antileon. The first Antileon was released back in 1995 and later replaced with the Antileon Signature in late 2000. The Antileon Signature stayed in production for the next 15 years and was replaced by the latest member of the Antileon family, the Antileon EVO in 2015. I guess that's a product which has really defined what Gryphon is all about. It's a pure Class A dual mono amplifier with this distinctive “Bad-Ass-Attitude” but with such a refined and delicate sound. That's a product which lives up to our saying: “Grace and Glory”. All the Antileon “brother/sisters” share the same amplifier topology and are based on all the original design ideas by Flemming. I think the Antileon will always stand out as something special in the high-end audio industry and will always be considered as a legendary product, no matter if it is the original Antileon, the Signature or the EVO. They all share the same sound character and design philosophy. You can easily tell that they come from the same family and that they share a common DNA.

## **Vinyl is gaining traction more and more, are there any plans for Gryphon to jump on the vinyl bandwagon and produce a turntable?**

No plans so far to enter the manufacturing and designing of turntables...but you should never say never. One day we might find the “excuse” to jump on the vinyl bandwagon but also seen in the perspective that we are manufacturing some of what we think are the finest phono-stages and so why not take it all the way...perhaps. It is something that we are very often confronted with from distributors, dealers and not least from the consumers. If we should make products every time we are having a “request” we would have to release a new product every 3 month and as you know, Gryphon is not a company like that. Things take time and especially if you want to make extremely well performing and distinctive looking products it is a long design and manufacturing process. From making the first drawings to the final product might take more than one year before

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we are ready to launch or at least being able to push the manufacturing button.

But at this moment we are not planning to do something like a TT. But you'll never know what will happen and especially not when working with such a creative design-crew as we are so fortunate to have engaged here at Gryphon Audio Designs.

## **What next?**

No comments dear Stuart... Unfortunately, I can't reveal what's in the pipeline. It is something that we always keep very close to ourselves right up to the actual release date. But the Gryphon never sleeps and we are always looking into different design ideas and hopefully we will be able show some interesting designs and products to the public in the years to come.



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# **INTERVIEW**

## **JERN AUDIO'S OLE LUND CHRISTENSEN**



**Ole Lund Christensen is the man behind the Jern loudspeakers reviewed in this issue of Hifi Pig Quarterly, we caught up with him to ask him a few questions about the design of his speakers.**

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# JERN AUDIO'S OLE LUND CHRISTENSEN



**Your loudspeakers are very unusual in that you are using cast iron for the enclosures, what do you feel are the benefits of this material?**

The ideal loudspeaker enclosure should be silent. Firstly, the density of iron is 10 times more than wood, so iron does stop vibrations 10 times better. Secondly, grey cast iron dampens resonances 100 times faster than Aluminium. Thirdly, grey cast Iron is 2,5 times stiffer than aluminium and about 20 times stiffer than plywood, so the loudspeaker walls bend much less.

**What technical difficulties have you encountered working with cast iron?**

Making the tools for a prototype enclosure takes many months and is very expensive. The high temperature (1450 C) is also a problem. A wooden prototype can be done in a day.

**The speakers are an unusual shape, why is this and what sonic benefits does the shape make?**

The classic reference book is Elements of Acoustical Engineering by Harry F. Olson Ph.D. Many years ago, Olson tested different loudspeaker cabinet shapes and found that the sphere is the best cabinet shape. The round shape has less edge diffraction, and therefore a smoother frequency response. The reduced diffraction also benefits the soundstage clarity and depth. Therefore, we combine 2 spheres to make the JERN 14 cabinet.

**These speakers only go down to 90Hz, necessitating the use of a subwoofer and this is certainly an unusual concept, why did you go down this route?**

Large full range loudspeakers have two fundamental problems:

A: The woofer shakes the enclosure, the midrange and the tweeter is therefore also shaken, and this reduces sound quality. By using a separate enclosure for the woofer, this problem is solved.

B: The best location in the room for midrange and tweeter with reference to stereo imaging is rarely also the best place to reduce room bass resonances. With a separate woofer enclosure, the woofer can be moved on a circle with the listener as the centre. This keeps the woofer distance to the listener unchanged, but changes the room bass resonances.

Enclosure volume, efficiency and the lowest frequency are linked by physics so that you can only optimize 2 of the 3. So by not demanding deep bass from the JERN 14, we could get both a small enclosure and a sensitive and easy to drive true 8 Ohm load.

**Do you plan to design and build your own Jern subwoofer and if so when can readers expect to see this in production?**

We have cast the 402 mm enclosure for the spherical 1000W active JERN subwoofer and we are now developing the electronics. Production is expected in 2019. This enclosure is extremely strong due to its pure spherical shape. The earth is round because it the strongest shape in nature. We expect this to be the world's best sounding subwoofer. It will have a display and a remote control with memories.

**The tweeter you use is something quite unusual in that it is not an off the peg number employed by so many other manufacturers. Can you tell Hifi Pig readers about the design of the tweeter, the man behind it and why you prefer this specific tweeter?**

This tweeter is made especially for JERN by Oskar Wrønding, founder of Hiquphon and former technical manager at Scanspeak. He



# JERN AUDIO'S OLE LUND CHRISTENSEN





# JERN AUDIO'S OLE LUND CHRISTENSEN



develops, builds and test each tweeter himself. It is a soft dome, but 2 of the 5 layers of coating contains very small metal particles. The result is a unique combination of metal and soft dome qualities. It disappears better than other dome tweeters.

**When we reviewed the speakers the first thing we noted was the exceptional imaging properties they have, what do you feel are the most important features of a loudspeaker and why?**

The goal of HiFi is the transfer of emotions from the artists to the listener. This requires a reduction of all kinds of loudspeaker errors to almost zero, and this is almost impossible.

Errors in frequency response are clearly heard, however the brain can learn to compensate for them, and also for some 2nd harmonic distortion.

The worst errors are therefore time delay errors, because they are clearly heard in the interval between notes.

If the loudspeaker makes a delayed error sound, this can hide the weaker delayed sounds from the music instrument body, the recording room wall, ceiling and floor. Then stereo imaging suffers.

**Why is the tweeter placed further back compared to the woofer?**

When you have solved all the normal errors like frequency response, harmonic distortion, and diffraction caused by the enclosure's shape, some other small errors becomes more noticeable.

The perfect loudspeaker is also phase linear. To do that in a passive loudspeaker, the fast tweeter must be located behind the slower woofer, and we use a 6 dB per octave crossover because it is a phase linear. This crossover demands an extended bandwidth, even frequency response woofer and a tweeter with a large excursion.

**What are your plans for the future with regards speaker design? Do you plan full range floor-standing models for example?**

Yes, we work on full range floorstanding loudspeakers. They will be heavy and compete with the state of the art.



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## Experience**680**

**Reference Audio Cable**

The **Experience680** from Wire on Wire is a reference-level audio cable. With its REDpurl™ variable geometry (UK patent pending), it uniquely permits the user to alter its wire spacing, allowing the character of the interconnect to be tuned.

### Experience**680**

The Experience**680** uses carefully chosen PTFE-insulated silver-plated copper conductors. Different diameter multi-stranded conductors add dynamic weight and timbre throughout the frequency range, whilst capacitance is kept low, thanks to our REDpurl™ geometry.

Of course, there is no need to do anything with our cable; it performs beautifully straight out of the box. However, if you think you would like to make changes, the REDpurl™ geometry allows you to alter the wire alignments, changing capacitance and inductance at individual nodes along the cable. It is up to the listener to say which they prefer, but being able to make a difference can be profoundly important when it comes to creating an involving personal experience.

**Conductors:** Silver plated copper

**Insulation:** PTFE

**Capacitance:** 69pF/m variable

**Connectors:** WBT 0114 phono plugs

**Geometry:** REDpurl™

For further information contact:

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# **INTERVIEW**

## **LINN PRODUCTS' GILAD TIEFENBRUN**



**Linn will be a name that is familiar to all audiophiles as their Linn Sondek turntable was, and indeed still is, one of the most iconic pieces of Hifi ever produced. Hifi Pig takes time to have a chat with Gilad Tiefenbrun, Managing Director at Linn Products based in Scotland.**

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**Linn Launched in 1973 with your Father Ivor at the helm, and the iconic Linn Sondek LP12 was born. What was the inspiration and philosophy around the LP12?**

It's a well-known tale – my father had bought what he believed to be the ultimate hifi system at the time but found it lacking. At the time the prevailing wisdom was that speakers were the only things that mattered in a hi-fi because that's where the sound comes out. He experimented with the speakers but nothing improved the sound until he moved the turntable into another room, running the cables from it underneath the closed door. The music was clearer, more accurate, more involving, better, so he concluded that the speakers' output was being fed back through the turntable and was damaging the source signal.

He realised that any musical information that's lost is gone forever, no matter how good the rest of the system. This informed one of Linn's founding philosophies: the more musical information you retrieve from the source, the better the sound, giving rise to the 'Source First' principle.

And this became the inspiration for Ivor to create a new turntable – the Sondek LP12 – which was isolated from this acoustic feedback.

The other guiding principle of the Sondek LP12 is its modularity – it was created with a modular, upgradeable and expandable design. The idea was that it could be built-upon and upgraded over time in order to continually meet the needs of its owner and as further advancements became possible. A deck bought back in the 70s can even today be upgraded to current spec.

**The LP12 has had many upgrades and improvements made over the years, what in your opinion has made the most significant improvement in sound quality?**

Following 'Source First', we recommend upgrading an LP12 from the central bearing outwards – making the platter spin as accurately as possible is fundamental to retrieving the most information from the groove of the record – and so the upgrade that has made the most significant improvement would be the Cirkus bearing (1993).

Of course there have been many notable LP12 upgrades since then: the Radikal power supply (2009) and the new Lingo and Urika II (2018), which incorporate the most recent Linn innovations of their time.

**Linn have long been advocates of active (Aktiv) loudspeakers, right back to '74 and the Isobariks, what do you see as being the benefits of active speakers as opposed to passive designs?**

There are huge performance benefits in going active, it is one of the greatest enhancements you can make to your system, whether that's analogue or digitally active.

Inside most loudspeakers is a passive crossover which splits the signal into the portions intended for the various drive units. Passive crossovers cause unavoidable distortion, allowing treble to bleed into bass and vice versa. To mitigate the losses caused by a passive crossover, Linn introduced Aktiv systems which eliminate this inter-band interference and match the signal more precisely to the drive unit. By providing a dedicated power amplifier to drive each drive unit, our Aktiv systems ensured far greater efficiency and suffered less loss than passive crossovers.

Building on the Aktiv principle, we launched Exakt technology in 2013 which implements the Aktiv crossover digitally. This removes the sources of noise, distortion and interference created by the traditional analogue processes. This far outperforms the capabilities of an analogue Aktiv system, as well as delivering many other benefits.

# LINN PRODUCTS' GILAD TIEFENBRUN



## **When did Linn start manufacturing electronic components like amplifiers and what prompted this move?**

It was the early 80s, we were making turntables and speakers and providing electronics would fulfil my father's vision of Linn becoming a full system manufacturer.

The move to our purpose-built facility in Waterfoot allowed us to make this happen and gave Linn a unique capability in the industry to monitor and control signal quality throughout the whole audio reproduction chain

We produced the LK1 pre-amp – the first micro-processor controlled pre-amp – alongside LK2, our first power amplifier.

## **You no longer produce a CD player, production stopping shortly after you became Managing Director in 2009, why is this?**

Linn introduced Klimax DS in 2007; it was the first high resolution streamer on the market and we soon realised that all the benefits it provided meant that it was the superior product to our best CD player.

We decided to send a message to our customers that streaming was the future. We were way ahead of the game, but it came from a conviction and belief that CD players were no longer the best way to get the maximum performance from a CD collection; ripping them and playing the files through solid state delivers superior sound. And then there's the benefits of being able to stream 24-bit Studio Master files.

**Multi-room audio is huge and Linn were one of the pioneering companies to identify the market for this kind of thing, how did that come about and what were the landmark products for the company?**

Linn's original multiroom system – Knekt – arose from the simple desire to be able to share music around the home. What's most interesting about Knekt is that it was launched back in 1994, way before the home network existed, so it was an extremely advanced multiroom audio system for its time and also the first to allow multi-user operation.

Today, Linn's range of DSM players connect over a standard home network for the best multiroom experience.

## **Music streaming has taken the audiophile and music loving world by storm, what do you see as being the advantages of streaming audio?**

If you are listening to digital music, you can't beat the convenience of having millions of tracks and radio stations at your fingertips and now there are lossless streaming services like Tidal and Qobuz, you don't need to compromise on quality.

## **Tell Hifi Pig about your "Space Optimisation" technology and what you feel its benefits are.**

When a Linn Specialist installs the Linn DSM in a customer's home an acoustic model of the room is built based on the speaker model, their position and the characteristics of the listening environment. This model is used to optimise the performance by removing the unwanted distorting effects and revealing the true sound of the music. The major advantage is that you can choose whichever speakers you like, place them exactly where you want them and still enjoy the best performance possible.

**Where do you see the future of music reproduction in the home and where do you see the mass market going? And where do you see Linn's position in this market, if at all?**





When we launched Klimax DS, networked audio was in its infancy but now, over 10 years later it's becoming the norm. More products are becoming available, internet bandwidth is increasing and consumers are realising the opportunities and convenience of networked devices. They are demanding higher quality; high quality music in every room and the convenience of playing it over the network is where the mass market will go.

**Are we moving into more so called "lifestyle" products, but at the high-end, or are Linn just producing what they believe are great products that also fit in with the public's demand for products that fit in with their home environment?**

No matter what, the products we create must fit into the homes and lifestyles of our customers.

We've long focused on creating products that integrate technologies to deliver better sound from a smaller package; it's now possible to have a beautiful aesthetic, the convenience of a one-box solution as well as incredible performance. Selekt DSM, our latest product launch, delivers all of these and more.

**You have invested heavily in your Glasgow factory, how important is it that your products are manufactured in Scotland?**

Linn is uniquely able within the industry to take a holistic view to product development. This is closely linked to the symbiotic relationship between our R&D and Manufacturing departments which is made possible by them being located so physically close to each other.

We are determined to own and control all of the processes in the manufacture of our products and this is just not possible if you manufacture elsewhere. Outsourcing manufacture to another country

would be as disastrous for Linn as it has been for so many other manufacturers.

**Anyone famous you are allowed to mention that owns Linn hifi?**

There are always rumours but I couldn't possibly speculate! Lou Reed had an LP12 and I bumped into him one day in his hotel near Glasgow. I knew he had the turntable so I asked him if he wanted to visit the factory. Despite his reputation, he was lovely – I gave him a tour and we sat in Linn Home listening to music – the Velvet Underground, I think!

**You and Linn were recently featured on The Apprentice, how was the experience for you?**

It was a great experience, good fun and absolutely priceless exposure for Linn.

**Any new products on the near horizon that you can tell Hifi Pig readers about?**

You'll have to wait and see...

**And so, what for the future for Linn, where do you see the company in five, ten and twenty years?**

We've made significant investment into our manufacturing capabilities over the past couple of years. Upgrading machinery across the entire production process and bringing as many processes in house as possible has given us even greater control and ensures we can continue to create exciting, innovative products into the future. Linn will remain a proudly independent business focusing on delivering life-enriching sound to music lovers across the world.





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# Are you serious about vinyl?



Having collaborated with such guest artists as The King's Singers, Judy Collins, Art Garfunkel, Mel Tormé, Ray Charles, Chet Atkins, Crystal Gayle, Lou Rawls and Roger Miller to name a few, Kory Katseane, Director of Orchestras in the BYU School of Music, knows how music is intended to sound and had this to say about the Graham Slee Accession phonostage -

"I hadn't noticed at first that the Accession was reproducing those acoustic environments more faithfully but gradually became more aware that in addition to it sounding more like real instruments, it was also sounding more like I was in great halls as well."



# **INTERVIEW**

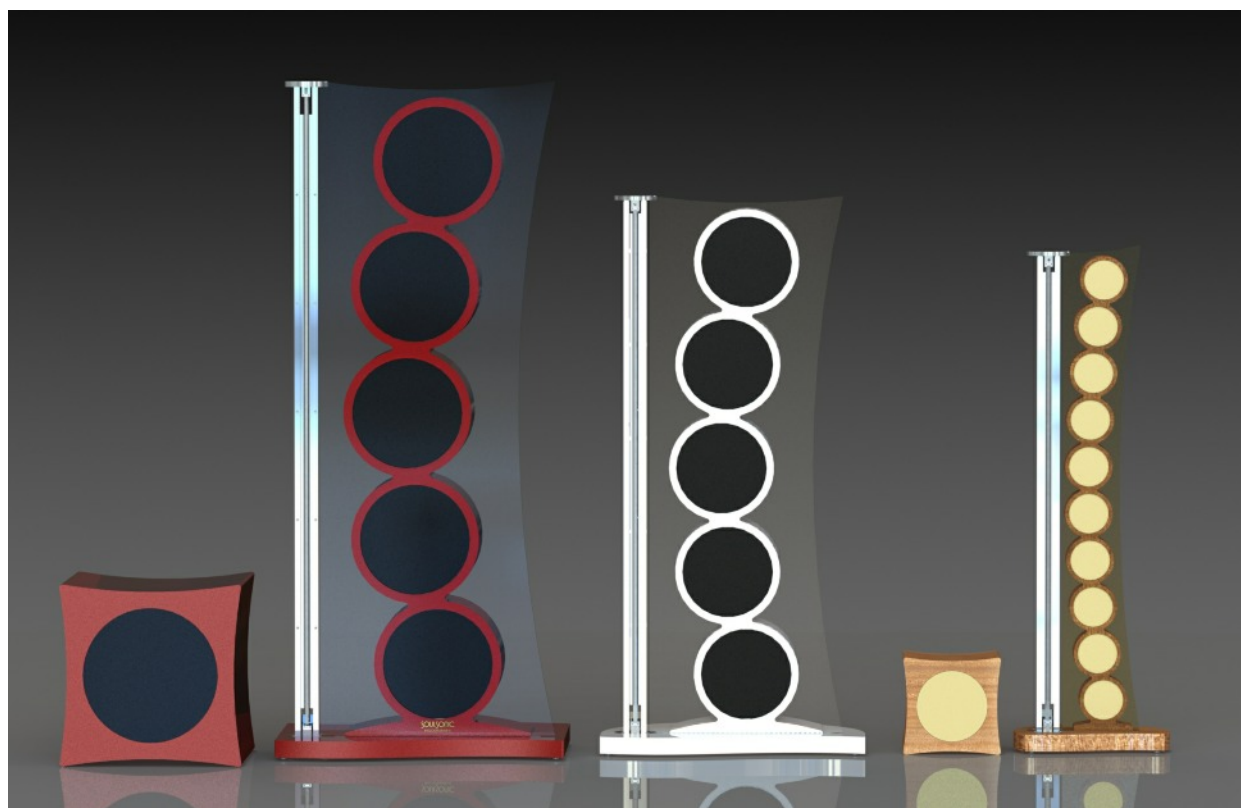
## **SOULSONIC SPEAKERS' MIRO KRAJNC**



**Hailing from Slovenia, Miro Krajnc is a loudspeaker designer for his own company Soulsonic Speakers and also Natural Sound. He is also an audio designer at Ubiq Audio. Hifi Pig talks to him about how he came to be working in the industry and about his innovative designs.**

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# SOULSONIC SPEAKERS' MIRO KRAJNC



Hifi Pig first met Slovenian, Miro at the Audio Video Show, Warsaw a couple of years ago and we were captivated by his unusual and distinctly high-end loudspeaker designs. We recently caught up for him for a chat and to find more about the man and his designs.

## **What is your working background and when did you begin exploring loudspeaker designs?**

I was simply drawn into the music since my early childhood. My father was an amateur musician and he had many acoustic instruments at home which he used for his own pleasure but he also sang in a choir. The love for music only become stronger as I grew. During my elementary school days I fell in love with various types of acoustic stringed instruments' music like Bluegrass and various Folk music traditions. At one point I got myself a five string banjo and a guitar and started torturing them :- ) I got tablature sheets for some of my favourite music and it kept me quite busy for a few years.

My musical preference goes mostly toward acoustic instruments used in variety of styles, but my favourite ones are still contemporary Bluegrass, modern and traditional Tango, Bossa Nova, Fado, and of course Jazz and Classical. I do listen to some electric and electronic musical genres if the mood is right.

On the other hand there is a mass of music production out there that can make me nervous; in these cases I prefer silence or the sounds of nature. I do have to admit that if it weren't for all these great music works, I wouldn't get involved with speaker design.

During my high school days I become more and more intrigued by the mechanisms of great sound reproduction. I started to read reviews of audio components, bought some that I could afford and soon the journey begun. Although I have used many different components along the years, some that remained in my memory were the first Kuzma Stabi/Stogi turntable system (equipped with Ortofon OM 40

cartridge), Sony APM 22 Esprit loudspeakers and later, the Musical Fidelity B200 integrated amplifier.

At some point when I was in my twenties, I started to look for ways to improve the sound of my speakers. I was just about to modify some parts inside my beloved Sony APM 22 Esprits when I came across the German Klang&Ton magazine. This really caught my attention as it got me interested in building speakers from scratch. I got a ton of DIY magazines, ordered all of the past issues of Speaker Builder, Klang&Ton, Hobby Hifi, bought books like Vance Dickason's Loudspeaker Design Cookbook, Martin Colomms' High Performance Loudspeakers and many more.

I also bought some early loudspeaker CAD software like the Australian CALSOD, German Audio Cad Pro, even a program that was written for Quatro Pro (don't remember the name), Lasip, early SoundEasy, etc, etc.

I have read everything on loudspeakers I could get my hands on: books, magazines, studied world famous speaker designs, started going to audio shows, auditioned private setups, performed first simulations on computers, etc but the turning point came in 1993 when Liberty Instruments' IMP hardware measurement system came out, which I bought immediately. The accompanying software was written for MSDOS, now an ancient operating system. With it it also came a measurement microphone, calibrated by Kim Girardin and...that's when the real fun begun. Much of the guesswork was out because I could "see" the problems I have heard, so to speak.

Of course, theory found in books, magazine articles, augmented by CAD simulations and measurements can only provide the fundamentals - the basis for experimentation, the final proof is in the listening but...ears only detect the problem, they are incapable to point to exact frequency.



# SOULSONIC SPEAKERS' MIRO KRAJNC

I have spent three decades experimenting constantly like mad. I wanted to know what's behind every speaker principle, box loading technique, single driver, multi driver, steep crossovers, shallow crossovers (parallel and serial), horn/wave loading, dispersion characteristic (omni, dipole, cardioid, etc), boxless operation, transducer types (dynamic, electrostatic, plasma, etc), diaphragm material (paper, aluminum, Rohacell, carbon, magnesium, ceramics, etc), point source, line source plane source...you name it, I wanted to discover as much as possible but it never ends - which is great in my view. The more I discover, the more questions appear and this keeps me intrigued and fascinated all the time.

Of course, out of all these numerous experiments and custom builds, a number of preferences emerged, but these cannot be simplified, or shall I say, considered as simple recipes. It all depends on many criteria like: available room size, desired speaker size, available distances to the side walls, available amplifier power, etc. I believe that great sound could be achieved by many means but realistic sound demands something that clashes against the domestic environment norms - large size of the speaker or better said: large active and passive loudspeaker surface - among other things (large room included). Of course, small speakers can sound fantastic and musically satisfying, no doubt about it but how about realistic? Much less, I would say...

The main problem (in technical terms) is the high surface loudness produced by small speakers; musical instruments are huge in comparison and for a realistic sound reproduction demand that the speaker produces low surface loudness over its diaphragms - in order to be perceived as realistic. There is a big difference between the sounds coming out of a small active surface area and the sound coming out of big active (and passive) area (low intensity per unit area of radiating surface). Small speakers can use long excursion capable drivers but the sound will be simply more relaxed if the active surface area is large and the excursion is small.

The "objective" versus "subjective" dilemma?

Without digging too deep into these issues let me just say that I cannot imagine myself working only one way or another; voicing the speaker either only by measurements or only by ear. I always start with measurements and continue with listening, in between these two processes constantly interchange.

## What do you use as your reference when voicing the speakers?

Some people say that maintaining the sound of acoustic instruments and voices as an absolute reference for judging music reproduction systems is pointless because there are too many variables and problems that currently cannot be avoided or overcome. The impossible task of replicating the acoustics of the original event, the distortions of the recording chain, the limited resolution of the medium, etc, all contribute to reproduction artefacts, no doubt about it, but should we set our goals too low? By omitting any relation to the live event, what choices are left? Should audio be divided into "high fidelity" and "fun fidelity" categories where the later category allows for unlimited freedom in "creative sound design" and the former helplessly tries to catch that ever elusive live feeling but fails to? Well, there is enough space for all approaches and considering that the high end audio police still hasn't been formed, we can choose our path to follow. I for one, will work towards making the final sound as realistic as possible and everyone knows what that means: I want the reproduced sound to remind me of the live acoustic event (even if only remotely) and I want the whole reproduction chain to be

optimized with this in mind. Listening only to hifi systems doesn't help here but going to those, perhaps rare acoustic events does. Can we come reasonably close to the sound of the live event? I dare to say yes or at least in many parameters but I must admit it's anything but easy. Does this mean just throwing together all the "best buys" or just simply the most expensive components? Sadly - no, the darn thing is just too complicated to follow a simple scheme. I for one am struggling to get there as well but as the years pass by, experience grows. What are the requirements? Too numerous to name but the appropriate room is the absolutely the first thing on the list, next comes system component matching but I believe these issues are beyond the scope of this interview.

**SoulSonic is your own brand of loudspeakers and they certainly look like a no-compromise design, can you tell readers about the origins of these speakers, the unusual array of drivers and that massive ribbon tweeter.**

I've never had any intentions to start my own loudspeaker company; years ago I was just pursuing the path to the "sonic bliss" - whatever that means. I just wanted to find out which loudspeaker principle would satisfy me the most in its reproduction qualities and so the IMPULSE was born. This speaker was meant to be built for my own listening pleasure, at the beginning but as more and more people heard it the more that thought it would be a great idea to produce it commercially.

After a decade or so of experimenting with conventional, boxed speakers I stumbled upon Apogee Diva, a brainchild of the late extraordinary speaker designer Leo Spiegel assisted by Tony Schuman. When I heard the Divas, I was shocked; I felt like I have wasted years for nothing. These speakers sounded so much more realistic than even the best boxed speakers from that time, that it was pointless to discuss. They had one big drawback though: a real world sensitivity of around 80 dB or even less. So I had to go in different direction in order to make my Impulse more amplifier friendly and therefore I have opted for the excellent Acoustic Elegance 12" woofers which were optimised for a dipole use. With them I could easily achieve a 6 to 7 dB higher efficiency while providing a truly superior dynamic span. Also, unlike the original Apogee, I was able to use those small neodymium magnets and hence was able to design a shallow, low diffraction ribbon structure with wider dispersion characteristic.

Beside the late Apogee designer I also admire the work of Stanley Marquiss who opened my eyes to many possibilities in planar, ribbon based speaker designs. His ideas still give me food for thought, for future designs and I hope some day we will collaborate on a joint project (actually, one is already long overdue). Adam Hulsebus is another friend with whom I have exchanged some ideas and his speaker designs are also extremely well thought out.

It's been around ten years since the Impulse was born and recently I have decided to upgrade it acoustically and visually but it still remains a pure, 3 way open baffle, dipole loudspeaker system with a tall, true ribbon line source tweeter - a speaker of enormous capabilities that even today, I continue to discover.

The Hologramm-X, which I believe is the biggest passive loudspeaker and also uses the tallest single piece, true ribbon, came as a request from Adam Krauze, my current Polish dealer and the owner of the Natural Sound company from Warsaw, Poland, for whom I have also developed the Samurai speaker model. Three years ago Natural Sound participated at the Munich Hifi Deluxe exhibition in Marriot

# SOULSONIC SPEAKERS' MIRO KRAJNC





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hotel where we have represented the two way field coil loudspeaker that I have developed for Natural Sound and after the show Adam asked me: "Miro can you make a dipole speaker that could be driven with low powered Audio Tekne tube amps?" And I started to think and think...

I knew that I would need a substantially bigger active and surface area than in the Impulse model but I had no idea the final speaker will be so big. I took this offer as a great opportunity to build an extraordinary dipole speaker that could really be driven by low powered amps, regardless of topology, with genuine high sensitivity - not only on paper. BTW, my sensitivity ratings may seem conservative but I never use those "marketing sensitivity ratings" with added 6dB for better sales effect. This can easily lead to self delusion which I try to avoid.

So, I knew I will need bigger drivers than in Impulse, a cardioid enclosure instead of a pure dipole - all with the aim to achieve some substantial increase in sensitivity and my predictions were spot on. The Hologramm-X has a benign impedance characteristic with an average 6 ohm resistance across the majority of spectrum and can be driven even with 8 watts of tube power.

The shape of the Hologramm-X is based on certain acoustic demands: the midrange in the centre is offset mounted, close to the ribbon (as it should be) and the woofers are located further away from the ribbon, to not cause any potential air wave pressure on the ribbon foil. The stained glass acts as an acoustic baffle, preventing the early dipole cancellation and raising the sensitivity of the whole speaker. Dipole speakers are notorious for having low efficiency because there is no box loading to help them in this regard. The sound in the front is out of phase with the sound from the back of the speaker and hence a dipole cancellation effect occurs - below the front baffle's acoustic wavelength. Some open baffle dipole speakers are reasonably efficient but the bass extension is less deep. There is always a

compromise between the efficiency and bass extension, regardless of speaker working principle.

After all this was set, I had to "make up" a visual story around the speaker and the resultant shape is what I came up with. I am really fed up with conventional square designs and so I seek to implement something that works well in the acoustic sense and looks elegant but of course, you can never satisfy all tastes. In order to make the speakers look less dominating due to already imposing size, I have decided to make the acoustic baffle visually transparent and it worked, my speakers do not visually dominate the domestic environments or, if they do perhaps only in a positive way. The overall size of the speaker realistically portrays bigger instruments and bigger venues which is impossible with smaller conventional speakers.

The Hologramm-X ribbon was also difficult to materialize. Basically, dipole ribbons have much lower sensitivity ratings due to their open back magnetic structures, compared to sealed ribbons but with a massive ribbon metal pole plates and huge, custom made magnets, I have succeeded in bringing their sensitivity up on par with the rest of the speaker. I also personally wound all of my ribbon transformers by hand and use high tech transformer core materials. The winding technique is a direct result of countless trial and error procedures and resulted in extreme bandwidths and low distortions. The Impulse model which was used for T.H.E. S.H.O.W. in Las Vegas in 2011, used a laminated ribbon sans transformer but my current ribbons are capable of higher SPLs with lower distortions than the laminated ones and they also sound much better because they are lighter.

The Hologramm-X ribbon has an effective area of an 8" midrange but is extremely light in comparison.

Some of my other SoulSonic speaker designs like the Beat and the Impact LE, explored the idea of waveguide loading for the ribbon and

# SOULSONIC SPEAKERS' MIRO KRAJNC



this quite successfully. Both of them were developed with the aim of making something unique and great sounding.

## **What do you see as the benefits of an open baffle design?**

The benefits are no air pressure on the cone (and hence lack of box colorations), cleaner output and better dynamic reproduction of big instruments like various drums. The bass of a well designed open baffle speaker can be spectacular and very lifelike but without the box induced colorations and related listening fatigue.

The drawback is, as already mentioned, poorer efficiency, but I think the sound quality they produce is more than compensated for.

If I may, I should mention that I have also developed the acoustic part for one very interesting and capable boxed speaker, the Ubiq Audio Model One. This is a relatively compact three way sealed boxed design of enormous dynamic capabilities. It is my statement "conventional" speaker and was chosen a "loudspeaker of the year 2016" in Poland, by High Fidelity Poland, a web based magazine but it also got rave reviews in USA and UK.

Tell readers about the Natural Sound Samurai loudspeaker that you were involved in designing; their conception, design and build.

The Natural Sound Samurai speaker was a direct result of my proposal to Adam Krauze, to develop a reference type of the speaker of original design and of elevated efficiency, with wide frequency spectrum (25Hz to over 20kHz, in case of Samurai) but of medium size. Adam is an avid music lover with exceptional taste in music genres (very knowledgeable), an incredibly experienced audiophile and a great person with an uncanny sense of humor. He has helped me really a lot and probably most of any other person, recently. He has an open ear and mind for my speaker designing fantasies and always encourages me to pursue new paths.

The Samurai speaker took two years to develop and it consists of an 18" long excursion woofer (paper cone), a 12" midrange (very light paper cone) and a 10" air motion tweeter used in a proprietary horn. This horn gives all the benefits of horn loading like higher efficiency, lower distortion, better in room power response, etc, without the typical horn colorations.

The box shape helps spreading out resonances because of its non paralleled design and the back sloped front baffle ensures better time coherence of the signals coming from three drivers.

All I can say is that I am extremely satisfied with the end result and so is Adam.

## **You use ribbon tweeters and, unusually, a "horn" on the Samurai, what do you think the benefits of this design are?**

I prefer the sound produced by ribbons (as in SoulSonic) and air motion transformers (as in the Samurai) because they have much bigger diaphragms than conventional dome tweeters while being uniformly driven across the entire membrane and due to their line source characteristic they also avoid floor and ceiling reflections. To me personally, they produce a much more realistic portrayal of the upper spectrum. The horn in the case of Samurai and waveguides in the case of some SoulSonic models, ensure a better room power response, elevated efficiency (and thus lower distortion) plus a better dynamic response.

## **Are there any plans to produce a more mass-market loudspeaker or are you solely focused on the high-end market?**

Yes, right now I am working on two smaller SoulSonic models, one 110cm tall floorstander and one bookshelf model. Both should utilize some special ribbon transducers that I am working on and both will have a recognizable "SoulSonic shape". Of course the prices should be much more affordable as well.



# SOULSONIC SPEAKERS' MIRO KRAJNC



I will probably develop a smaller, two way version of Samuari too, in the near future.

## **Where do you see the high-end audio market going in the coming years?**

Frankly speaking, I have no idea but I believe everyone will have to adopt to whatever situation comes out. I also believe the two channel systems will still thrive for many years to come.

## **Moving away from your designs, what do you do to relax?**

You wouldn't believe but many times I just listen to my favorite music at ear blasting levels - without chasing the deficiencies in the reproduction chain or in the speakers, haha.

Of course, then there are our kids, our son Timi (a classical guitar player), our daughter Nuša and some other kids like Zorro (the Pitbull) and Lisa, our three legged cat. We spend much time together joking and poking fun at each other. Me and my wife Jasna (who helps me at shows in many ways and also helps assembling the speakers) usually say that we have four kids (including the animals) and the fun just never stops. Zorro is the most spoiled dog in the world and Lisa always comes running if you call her by her name. They both like to cuddle like there is no tomorrow.

Timi plays in two bands, one is Piazzolleky (obviously a Tango band) and the other is Mascara (a Fado band) and I am a fan of these two bands - naturally.

I also love to explore the nature in our surroundings, long walks in the forests and...observing the stars. We live among beautiful hills of central Pohorje ridge, in the tiny country of Slovenia.

When I am not obsessing about speakers, I read articles about discoveries in space exploration and try to help those that cannot speak for themselves - the animals. This is also an area where my wife Jasna is most active (animal shelter volunteer).



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# **INTERVIEW**

## **ULTIMATE STREAM'S STEVE HELLIKER**



**Keeping up with the fast-moving business of high-resolution audio streaming, we checked in with AV industry veteran and recent winner of the Best Live Event of the Year category at the AV awards Steve Helliker from Ultimate Stream to learn about his take on the way streaming is changing the way we listen to our music.**

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# ULTIMATE STREAM'S STEVE HELLIKER



## **What's your history with audio and in the world of Hifi?**

My interest in Hifi started whilst at senior school. I worked part time in a Radio & TV shop in Bournemouth. This enabled me to buy a Goldring Lenco turntable, Sony integrated amplifier and stereo cassette deck. Needless to say, many hi-fi systems have been auditioned and purchased since then! Back in the early 1990's I started an events business where I became very much involved in the world of professional audio. Sound quality at our events whether from live bands or the videos we produced was always a top priority to me. More recently because of my passion for music and hi-fi I decided to start the hi-fi dealership Ultimate Stream.

## **When you launched Ultimate Stream you made the decision to concentrate on streaming and associated products, why was this?**

It was an easy decision. Having digitised my entire CD collection (which took up a lot of shelf space!) I started playing these albums with a music server, so I was already taking advantage of the convenience offered by this method of music replay. I had also become an early adopter of Roon and was using some of the music streaming services. The streaming market was starting to take off and gave me the opportunity to become part of a fast-developing industry where I could specialise and help to educate people about the benefits of high-quality music streaming.

## **For readers that are not aware, and in simple terms can you explain what streaming actually is and the different ways of accessing music, both online and via ripping etc.**

I consider there to be two types of music streaming. The first where you stream from an internet music provider giving you instant access to millions of tracks in high quality usually with a paid subscription.

The second is where you store your own digital music files locally to replay through your hi-fi system.

## **What do you see as being the advantages of streaming over and above more conventional ways of playing music?**

Firstly convenience. It's the ability to be able to play albums or tracks when and where you want to in single or multiple locations around the home instantly. More recently by streaming with companies like Qobuz, Tidal and Hi-Res Audio, the audio quality far exceeds other streaming companies such as Spotify, & Apple Music who offer lower resolution streams. With the continuing development of high-speed broadband, higher resolution audio is becoming easier and more reliable to stream and much more readily available. When you browse for an album or track other titles/artists are suggested thereby broadening your choice of music selection. It also gives you the opportunity to try before you buy, make your own playlists, hear playlists shared by the streaming provider or other users. Often these playlists will contain music similar to your own taste but from artists you might not have previously listened to.

## **Storage of files and back up. What do you consider the best way to store ripped or downloaded files? There are dedicated units such as the Innuos that claim to offer superior performance to NAS drives etc, but what are your thoughts on this?**

I have a pretty large music library with a collection of both CD and high-resolution music in various formats from CD quality up to DSD. Typically, a 2TB drive will be plenty for most people as this will store up to 3000 albums at CD quality. It's important to take a backup of your library. I'd recommend keeping a backup at home on a portable drive and a further back up away from home, so you're always doubly covered if you experience any problems. For a much larger collection a RAIDED NAS drive is a perfect solution as this offers its own back up in the case of a drive failing. I'd still recommend keeping a backup

# ULTIMATE STREAM'S STEVE HELLIKER



away from home as well. A dedicated unit like the Innuos will stream from a NAS drive or its own internal drive via USB or ethernet. But it goes further than that by improving the sound quality as it's designed specifically for audio replay.

**We read a lot about products being “Roon Ready”, but I’m sure many readers may not actually be aware of what Roon is and what it does, will you explain?**

During the past few years the list of Roon Ready network players has grown at a rate of knots and so has the number of Roon subscribers. Roon provides an exciting way to engage with your music. Once you've downloaded the Roon software, it will identify the music files on your hard drive and enhance them by adding all the latest metadata. Roon detects the audio devices on your network and will stream to them in the highest audio quality. So, you could have a streaming DAC in your living room, streaming loudspeakers in your snug, airplay speakers in your kitchen and your children's iPads – Roon will detect them all and let you stream your music direct to them giving control over volume and playback. It also lets you group zones, so you can listen to the same music in say your living room and dining room at the same time. It goes beyond just cataloguing and controlling playback though – it examines your music, finds photos, reviews, bios, lyrics and concert dates. It provides a new resource by making connections between composers, performers, and producers. It integrates with Tidal and allows you to build your own playlists combining your own library music with music you can stream from Tidal. For advanced applications it offers a full range of digital sound processing including room correction. Most of my customers have tried Roon and then gone on to take up the one year or lifetime membership.

**Given that laptops are so powerful these days is there any need for separate streaming boxes, or will a computer offer, with the right software, offer a performance that is on a par?**

Noisy power supplies effect the quality of the sound and there are vast improvements to be had by using products with linear power supplies. Companies like Innuos strive to reduce electromagnetic interference (EMI) and reduce the unwanted sound degradation of computer audio. Quite simply, these devices are tuned for audio replay whereas a PC is well, a PC!

I also think having a dedicated music server gets over the inconvenience of having to keep your computer switched on, using processing power and doing system updates when you want to listen to your music!

**Many enthusiasts are looking to the Raspberry Pi to perform streaming duties and claim they are getting superb performance with very modest outlay, have you experienced what the Pi is capable of and what are your overall thoughts if so?**

You only have to look at the forums to see how people are storing, playing and listening to their music. Everyone has a different budget they want to work to. As with many products there is a law of diminishing returns as you invest more in the device you choose. I think that Raspberry Pi devices have their place in the home perhaps where you don't need the best quality, perhaps in a multiroom installation or where you don't require specific features like MQA or DSD playback. A well-designed dedicated streamer/endpoint will sound better but then you'll be investing more to improve on the sound.

**There are myriad number of file types available from MQA to DSD et al, which many find confusing and unnecessary, what are your thoughts on the different file types.**

MP3 and AAC audio files have huge compression compared to FLAC files and other file types required to play up to DSD. Admittedly they take up less storage space but at the cost of degradation in the replay



# ULTIMATE STREAM'S STEVE HELLIKER



quality. My personal recommendation would always be to use find the highest quality file type for the music you want to listen to provided you have the required bandwidth to stream or the device to decode the file. I use flac files for everything up to PCM 192/24 and dsf files for DSD 64, 128 and 256.

I always recommend that you listen to the different file types to make your own personal choice. There is a good selection of MQA music available the beauty of which is that it can be streamed at the same file size as CD. I usually prefer 192/24 or DSD recordings but I do have a selection of MQA music in my library.

**We've seen some of the online streaming services struggle and face accusations of not paying high enough, or simply not paying, royalties to artists, what are your thoughts on this?**

I think that revenues to artists could always be improved. Online data shows that artists get around £5.35 for 1000 plays. Or course, the more people use streaming services, the more the artists will receive. We should also consider that the artist gets a much broader access to their product through online recommendations/playlists or perhaps through apps like Shazam which people use to identify their music and then go on to stream.

**Do you think streaming signals the death knell for analogue playback?**

History has shown us that when something new comes along what's already there doesn't just stop! Vinyl albums are selling at their highest rates for years. Analogue suits us, it connects with us. It's not always about the last word in resolution but we like the way it sounds. Choice is a good thing! What has happened though is that manufacturers of digital Hifi products are striving to get digital files to have an analogue sound. With higher resolution files we are now

getting so close to the original recordings without the pops and crackles!

**Attending shows and speaking to non-fanatical music lovers, there seems to be a shift towards more one box systems where streamer, DAC, amp, possibly a phono stage, etc are all combined in one unit and all the consumer need s to do is add speakers. Can these units truly represent high-fidelity music playback or are they simply more convenient "lifestyle" kind of products?**

In a word yes, although the people who buy them might not be the hi-fi dealers' best friends! Think of the lost sales of interconnects and speaker cable upgrades! Seriously though, the loudspeaker solutions with built in DACs and amplification from manufacturers like Kii Audio and Dutch & Dutch (soon to be Roon endpoints) negate the need for a rack full of components. They have built in room correction and do offer high fidelity music playback.

**One of the questions that is always hot on the lips of anyone involved in the hi-fi industry is how we engage younger people. Do you consider streaming and the use of more "techy" technology one of the routes we can engage these people, or do you think we have lost the younger generations to smart phones and earbuds.**

I genuinely believe that as people mature they grow into hi-fi and the way music sounds. My teenage daughters both have iphones with earbuds, use Spotify and stream with the many playlists they have compiled. It's what their friends do and what they've grown up with. Spotify and Apple have around 70% market share with Tidal at less than 2%. Iphones have Apple Music and Samsung have just announced a significant long-term partnership with Spotify. Most people enjoy listening to music and it's great this is from an early age but, the younger persons Hifi is for those who have a passion for

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# ULTIMATE STREAM'S STEVE HELLIKER



music, listening to the sound of the performers, instruments and compositions and some money to invest in improving on the basic products available.

**You are clearly an evangelical devotee of all things streaming, but can you give readers an idea of the system (s) you currently run at home?**

I suppose I'm lucky because doing what I do, I get to audition many products at home. So, DAC/Streamers/Amplification would come from T+A, Auralic, Innuos, CAAS Audio & Hegel. I use Amphion Krypton 3 loudspeakers. However, I grew up with vinyl and reel to reel with a large collection of music in these formats. I own a Marantz TT1000 turntable from 1979 now fitted with a Graham arm and Transfiguration cartridge and an Otari MX5050 reel to reel from the late 1980's. I think it would be fair to say that 90% of my listening today is digital purely down to the mix of convenience and quality but I love to pull a vinyl album or three from my shelves on a Friday night or put on a 15ips tape compilation for a dinner party!

**Music. You have to choose three albums and you can only listen to these three albums for the rest of your life, what are they and why?**

Stuart, that's an impossible question to ask a streaming enthusiast so, why don't we change the question to what would be on your playlist?  
[So here it is with apologies for the guilty pleasures!](#)

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# **FACTORY VISIT**

## **ACOUSTIC SIGNATURE, GERMANY**



**Acoustic Signature are a German manufacturer whose company slogan is “Teutonic Engineering”, Hifi Pig’s Linette and Stuart fly over with Audio Emotion’s Gary Cargill to meet the team, take a look at the company’s turntables and tonearms, and the engineering skills that go into making them.**

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# ACOUSTIC SIGNATURE FACTORY VISIT



When we were invited by Audio Emotion to fly out to Germany and visit turntable manufacturer Acoustic Signature, we naturally jumped at the opportunity. I've long admired the company's offerings when I've seen and heard them at shows and so getting to see how they are put together really appealed. The thing is, Acoustic Signature turntables aren't just "put together" in the sense that many turntables are an amalgamation of many bought in parts that are then assembled in-house, at Acoustic Signature pretty much for every part of the turntable a solid block of Aluminium comes into the factory, is machined and then is finally brought together to make the finished product. The company use the slogan Teutonic engineering and as we progress on our tour it becomes self-evident why this slogan has been chosen.

Asking Gunther Frohnhoefer (pictured) what he feels are Acoustic Signature's unique selling points he comes back with a self-assured air that has one feeling confident that he is in control of every aspect of the design and manufacturing process, telling us that they concentrate primarily on their own products (15% of the business is OEM), everything from 3D design to CNC machining and CAM programming is done in-house and that the highest priority is controlling quality by using machines that are so precise that they simply do not make mistakes with the right, and well trained, people behind the machines. This last point is interesting with Gunther telling us it takes six months to train a CNC operator.

Of course, some parts are bought in and here Gunther is keen to point out that the location of the Acoustic Signature premises is no accident. Süßen (or Süssen), where the Acoustic Signature HQ is located, is a town in the district of Göppingen in Baden-Württemberg in southern Germany. It is located on the river Fils 8 km east of Göppingen, near Stuttgart with the region being a centre for engineering excellence meaning that high quality products and services are only a stone's throw away allowing for "just in time" delivery of those items that are being bought in from outside

suppliers. Look at some of the household names and their reputations for solid engineering and you will get an idea; Porsche, Mercedes and Bosch to name but a few.

On the day we arrived a small but hefty delivery of "raw" platters for the £109,000 Invictus turntable had arrived in the loading bay. These, like 90% of what is bought in, came from the area and the whole Made in Germany being a big thing with Gunther saying "Made in Germany is a high standard, Made in Swabia is an even higher standard". So, bigger bought in parts arrive "just in time" whilst the raw materials (aluminium and brass) for smaller parts are bought in in long bars. There are two grades of aluminium used with the black variety being used for parts that do not need anodizing and the more expensive blue aluminium being used for platter, knobs etc that all do need anodizing.

Gunther is keen to point out Acoustic Signature's green credentials stating that ALL waste metal is recycled and that the factory only runs on renewable energy adding that the company recognise that their turntables are a luxury product and that adding a few euros to the overall costs to enable this greener approach is nothing in the grand scheme of things.

Gunther's enthusiasm for his craft, he is an engineer through and through, shines out and he's keen to show us the Boehringer lathe made in 1957 that he learned his trade on and which he later bought.

## CAD ROOM

Needless to say, this is where all the programming of the CNC machines takes place and whilst we were in there the designer was working on the armboard for the Invictus Junior. Each armboard takes two hours to produce and there are four armboards on the Invictus – so just for the armboards we are looking at eight hours of machining. Gunther is keen to tell us that everything is machined to very low tolerances and the systems and machines that are in place are there

# ACOUSTIC SIGNATURE FACTORY VISIT



to errors are not made - for example when metal is turned it naturally gets hot, expands and if these systems were not in place parts would be produced that were not uniform. For reference the machine that is used for making the armboards costs in the region of €175 000 and they have a new machine arriving for Christmas that will allow for production of three Ascona plinths at once. For a non-engineer type this is all quite fascinating stuff with Gunther explaining that the machine uses forty different tools depending on which part of the process is being carried out and all is done automatically.

You certainly get the impression that this whole process is seriously monitored and governed from start to finish and that once you see this process in action it certainly inspires an innate respect for the finished product.

I mentioned the arrival of the raw materials for the Invictus platters earlier and now we were to see them being milled and lathed on the €300K DMG Mori machine. At this point I spy a micrometer lying on a work bench and is hammers home that what we are seeing here is precision engineering being carried out to the highest of standards.

The next machine the Mori Seiki was making feet for the XX turntable with Gunther pointing out that all the tools here are made from diamond to give a finer finish.

## EMPLOYEES

One thing that says a lot about a company is the way that employees are treated on a day to day basis and what I liked here was that everyone was keen to talk and share their experiences with there being a clear pride in the work that they were doing. In a mass-produced age of throwaway this and that this attitude and pride was a great thing to see. Of course, looking after your work force is vital in ensuring the finished product is the best it can be and at Acoustic Signature they seem to have taken this onboard with free soft drinks,

tea and coffee being available to all employees and at noon everyone downs tools and goes for lunch together in the well-appointed and spotless dining room/kitchen. This may seem like a small thing but a real break with your cohorts in nice surroundings goes a long way to creating an atmosphere that people are happy to work in. Likewise, bathroom facilities are clean and really rather nice.

## TONEARMS AND CARTRIDGES

We sit and have a coffee in the dining room and chat about the company a little with us asking about the tonearm part of the business which now makes up 35% of the company's turnover since their introduction in 2014, with Asia being the biggest market. Acoustic Signature employ goldsmiths and watchmakers in the manufacture of tonearms with Gunther pointing out that these skilled craftspeople are used to working with smaller parts and tight tolerances. Later in the tour we are shown the inner structure of one of the tonearm wands by way of a cutaway and told that the internal structure is 3D printed. All the tonearms and all the parts for tonearms are made in-house with all finished tonearms being tested on the test-deck where they are listened to.

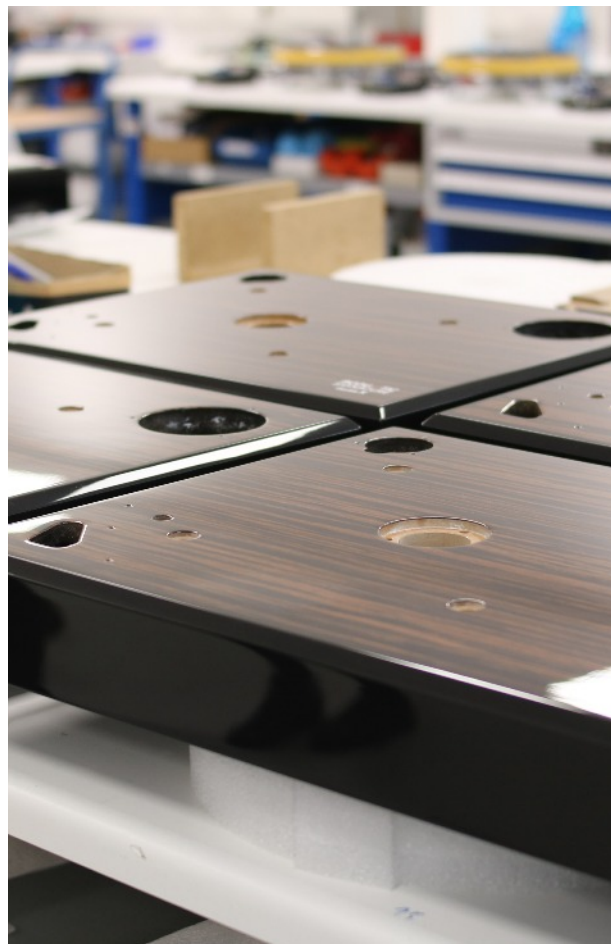
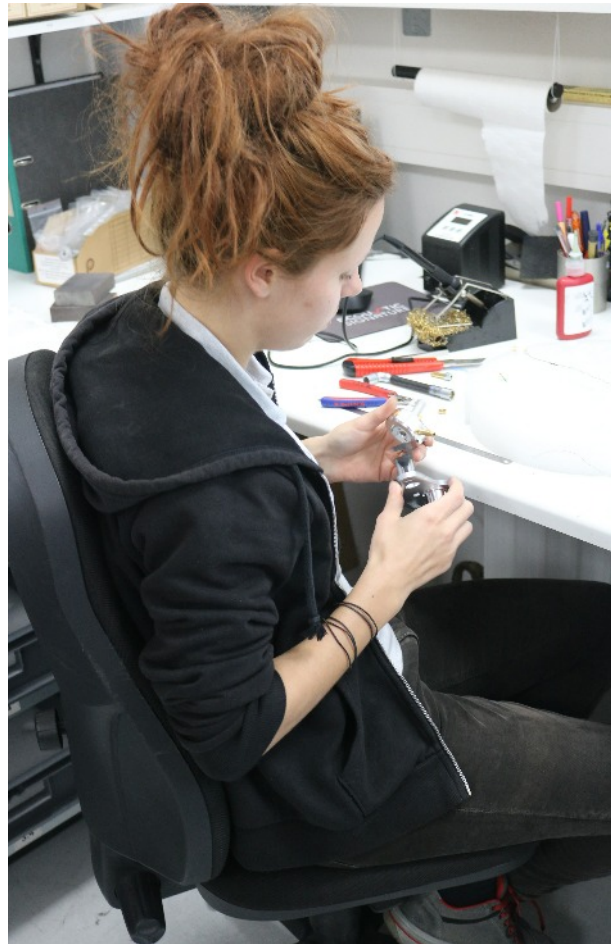
He also at this point mentions cartridges which have their housings made in-house but the inner workings being manufactured by external suppliers with Gunther keen to add that he is aware that the skill set of Acoustic Signature is on the machining side of things rather than making cartridges from scratch and so why would they get involved in something that they are not masters of their craft with.

## ATTENTION TO DETAIL

As we walk into the assembly room, it's nothing like I was expecting, we are greeted by a whole host of the rather lovely looking Double X turntables (£3399) with their seven layers of piano lacquer ensuring that the locally sourced Palisander and Macassar really shines – it

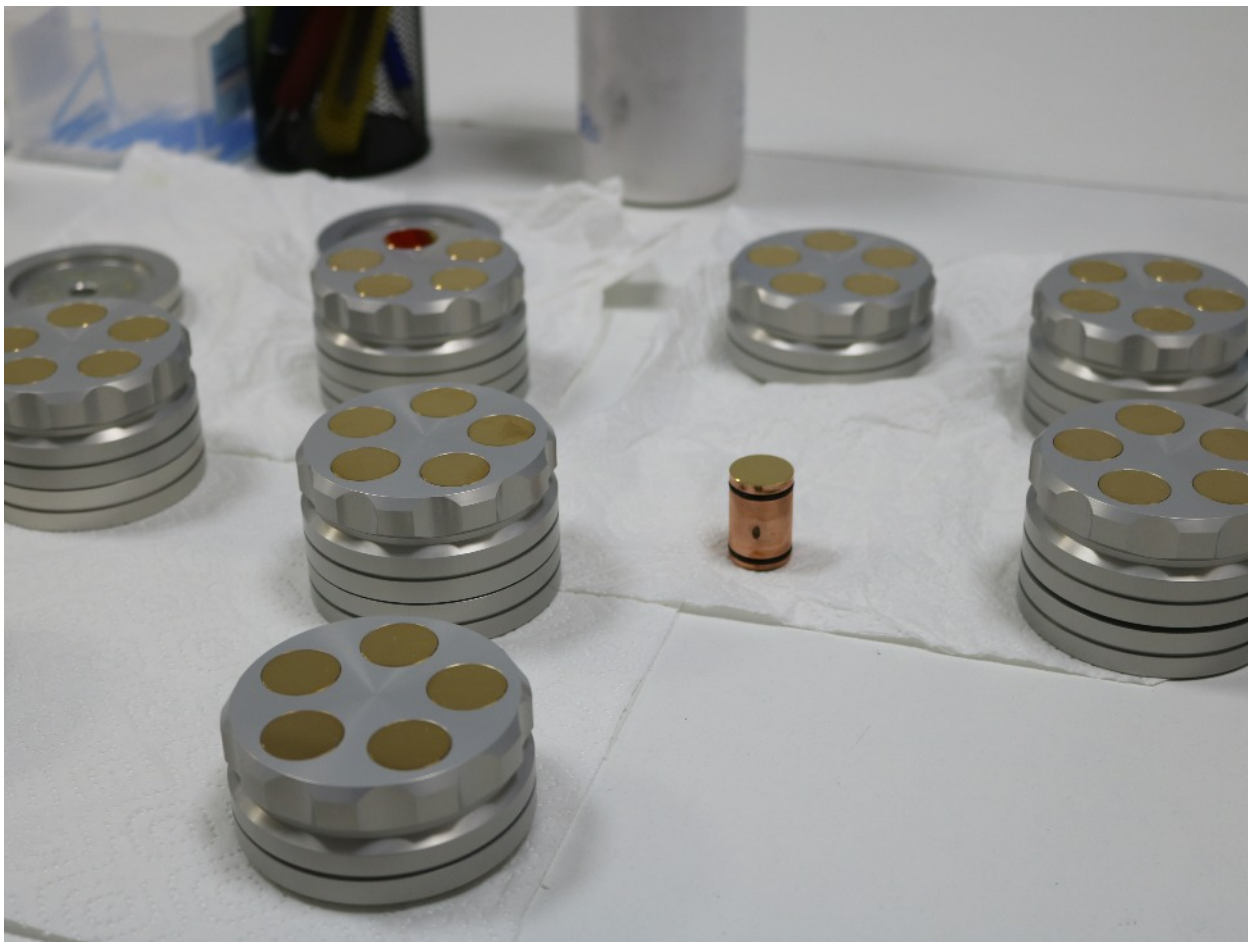
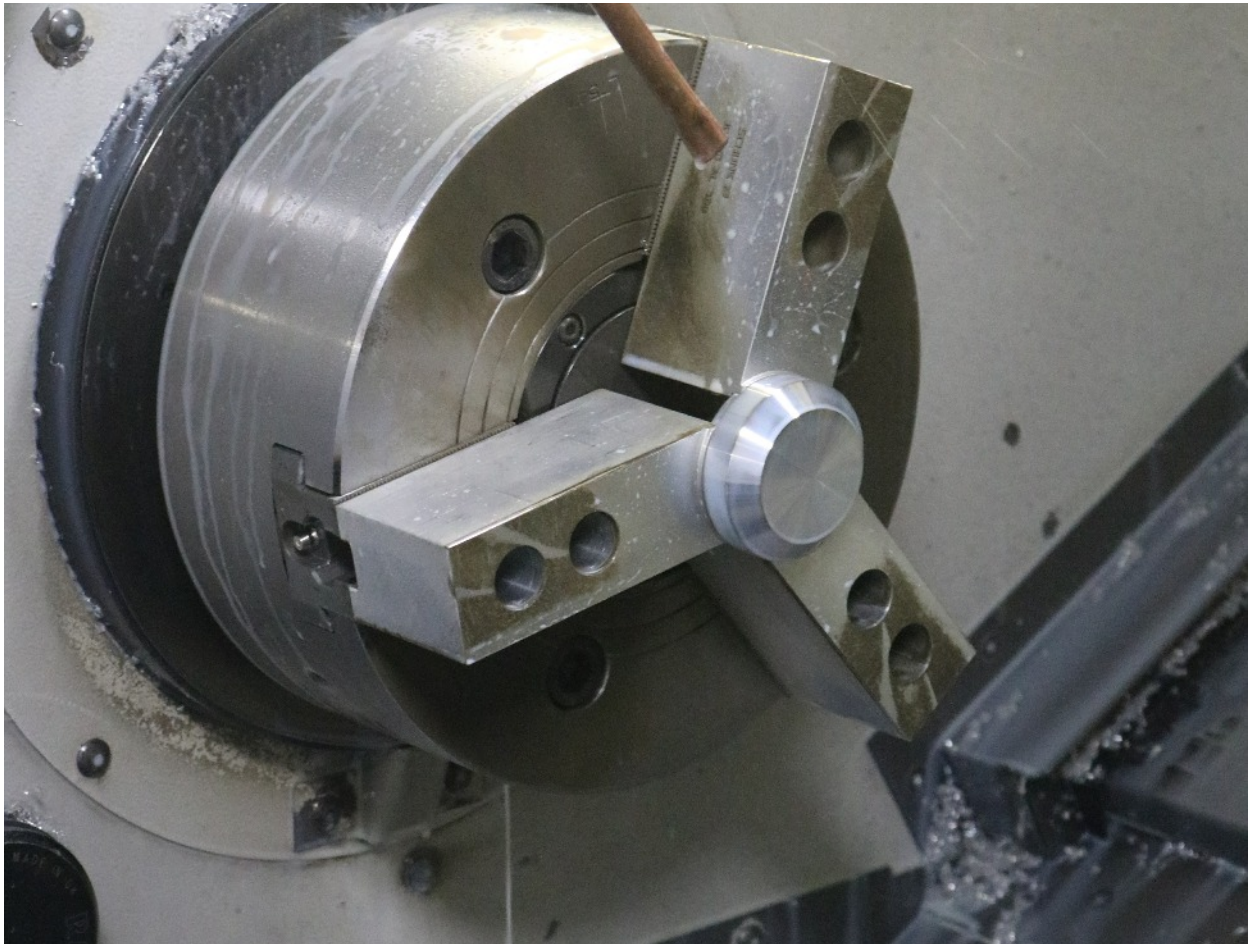


# ACOUSTIC SIGNATURE FACTORY VISIT





# ACOUSTIC SIGNATURE FACTORY VISIT





# ACOUSTIC SIGNATURE FACTORY VISIT



# ACOUSTIC SIGNATURE FACTORY VISIT



has to be said that they really do look beautiful. Behind the Double X turntables is a table full of Merlin (£1999) turntables and I ask the question about the strange band around the platter's rim, only to be told that this is there during production and testing to ensure that when the turntables leave the factory they are pristine and that the band is there to stop the rubber drive belt leaves no mark.

We're also showed the specially bought in printer that adds the company's distinctive logo to turntables. Like the rest of the processes we saw taking place, this printing was fascinating to watch and ultra-precise. I suppose it is this attention to tiny details that impresses most on this tour.

Each turntable has its own set of instructions with regards to its production and its packaging and at each stage of production individuals follow this set of instructions and sign off each step of the way. This perhaps seems an obvious thing to do but it ensures that each turntable is put together exactly the same as the last and that if anything does get sent back to base it is easy to find out who was responsible for each step and so any training needs can be addressed directly.

## SILENCE IS GOLDEN – WELL BRASS ACTUALLY

One of the standout features of many of the platters on the Acoustic Signature turntables is the inclusion of what look like brass discs atop each platter. In actual fact these are brass cylinders with rubber O rings around them which are inserted into the platter at points dictated by a very clever bit of software with the aim of stopping the platter ringing – and yes the effect is quite startling with the raw platter ringing like a bell but the finished platter being as dead as a dead thing. The Invictus has no less than 52 of these silencers in place. The Grip S clamp too uses these silencers to reduce vibration from the spindle.

## IN CONCLUSION AND A PLAY WITH SOME LEGO

I do like a factory tour and the Acoustic Signature tour has been a bit of an eye opener. Teutonic Engineering is an apt slogan for this company. Every step of the manufacturing process is controlled and regulated with a real eye for attention and innovation. Gunther's enthusiasm for the engineering side of the business is infectious and you can see he is forever looking for where improvements can be made, and rather than creating problems to solve that just don't exist, his way of working is to find and refine the process to give as highly engineered a product is necessary. You'd get the impression that Gunther is a cold and highly focussed individual but that couldn't be further from the truth – he is charming, entertaining but yes, he does know what he wants to achieve from his engineering and it shows in the finished product – look out for our forthcoming review of the company's Novum turntable.

The final thing we are shown on our tour was apparently going to be some Lego. Gary from Audio Emotion turned to me and asked if I knew what Robert Hagemann meant by the word "Lego" to which I jokingly responded "You know, the bricks" thinking that Lego was a German word that I'd hitherto not come across, but no, we were shown green Lego bases with more Lego laid out on them. Gunther had realised that the printing process was being slowed down by only being able to print one piece of product at a time. By making templates in which specific parts fitted and made of Lego, Gunter was now able to print several items in one take. This is the kind of mind the man has – Lego is uber-precise and made exactly the same the world over meaning that each template can be made specifically and accurately for a specific product – genius!

## INTERVIEW WITH GUNTER FROHNHOEFER

**When did you launch Acoustic Signature?**



# ACOUSTIC SIGNATURE FACTORY VISIT



# ACOUSTIC SIGNATURE FACTORY VISIT



Founding was 1996, with the support of Manfred Frohnhofer (a high-ranking police officer and the father of Gunther) with Gunther's ideas on high-end audio.

## **What was your background before launching Acoustic Signature?**

First and foremost, I am an engineer with university degree in electro-mechanics. During university I was a hifi dealer being a small shareholder in a high-end shop in Stuttgart Germany.

## **What is the over-riding philosophy behind Acoustic Signature and your designs?**

The philosophy is clearly not having a certain belief in "esoteric" issues but purely in achieving technical perfection, combined with ultra-low tolerance manufacturing in house and in Germany, using the best available materials. Turntable technology is not something new – is not rocket science, it is the bringing together of existing knowledge with my own attention to technical perfection in control.

## **Your turntables are all manufactured in Germany, how important is this to you?**

That is right, something "Made in Germany" is a kind of quality certificate, but I would go one step further "Made in Swabia" that is the area around Stuttgart, beside Mercedes Benz, Porsche, Bosch there are hundreds of small and middle sized companies being world market leader for whatever machinery and technical products - it is a little bit like what Silicon Valley in California is to IT- Swabia is the same for machinery (mind you I am born here so I may be biased). 95% of our materials, suppliers, machinery come from around this area. This means reliable, high quality and short communication pathways.

## **You have a wide range of turntables in your portfolio with the Primus being just over £1000 to the Signature Invictus coming in at £109 000, why do you feel it important to offer such a wide-range?**

From "normal" people who like listening music and entry level customers to the ultimate top performance high-end customer, we want to make a product available for all of them, but always with the same "philosophy". This overall philosophy being top technology, top musical reproduction, a long lasting reliable product made in Germany. Certainly, among the technical and manufacturing possibilities in the budgets that exist (from entry level to cost no object) we feel we offer the state of the art as to what is possible.

## **Do you find that once a customer buys into the Acoustic Signature brand they tend to stick with you and move up the range?**

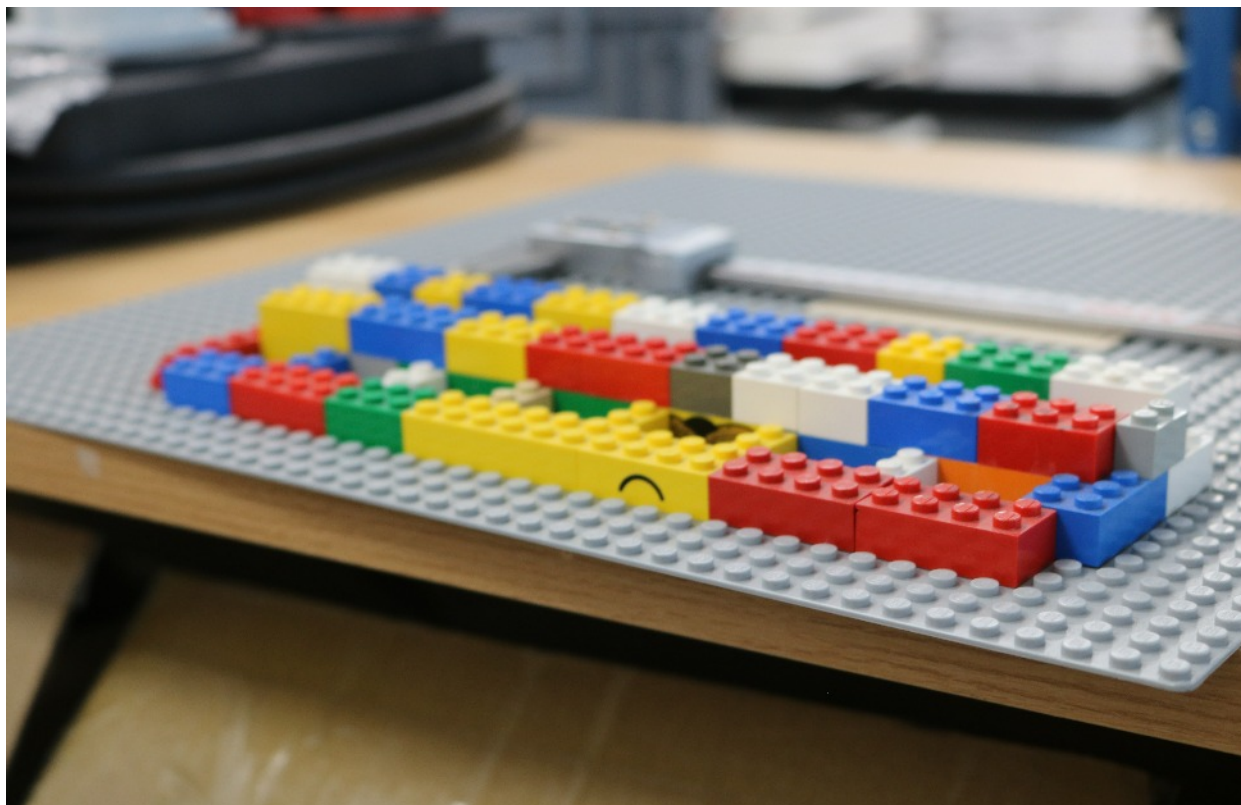
Turntable customers in general intend to buy new turntables not very regularly, what I found out is that they are looking for upgrades in the form of additional motors, new arms and new cartridges. People buying a new turntable is of course happening but more on the minority side, but once customers buy Acoustic Signature we have found they stick with it – i.e. we see very few products on ebay or Audiogone. We like to think we offer a reliable product for which (even if 15 years old) there are still parts available...and of not we produce them. This is one of the big advantages of having a 100% in-house production with various state of the art CNC/drilling and metal manufacturing machinery.

## **What do you feel stands Acoustic Signature apart from the competition?**

Acoustic Signature is a 100% in-house, made in Germany (made in Swabia) manufacturer with in total 22 employees all dedicated with



# ACOUSTIC SIGNATURE FACTORY VISIT



degrees in various areas of production, from goldsmith to CAD programming machinery engineer, from technical drawing to mechanical and material specialists. We are a manufacturer not an assembly company.

I love female voices as well as rock music, if it inspires me, well ... I get inspiration also from new machinery, technologies.

## **What are the features on the higher-end turntables that set them apart?**

Depending on price points and what is possible!

- Sandwich platters
- Silencer technologies
- Multiple motors
- Digital motor control

These are the most obvious differences. Certainly, mass turntables at the higher price points can have different layers parts of different aluminium - you remember the black and blue marked in the factory?

## **Which are the key markets for you and are there areas in the World you would like to be more prominent?**

Key areas are of course Asia (as for everyone in every industry, cars, watches and of course Hifi) Europe and the US, in addition to Asia where there are countries that have an analogue history such as UK, US Germany etc. We would certainly like to grow in all areas though due to geographical as well as price point limits we know the trees are not growing into the sky.... But there is a lot of headroom left.

## **Which of the turntable/arm/cartridge set-ups do you use at home?**

At home we have a Ascona with TA 5000 and Ortofon cartridge.

## **What music inspires you and why?**



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# READERS' LIVES

**PAUL GILBERT**



**Paul Gilbert lives in London and has a far-reaching taste in music, today he takes Hifi Pig readers on a journey through his Hifi history.**

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## How and when did your love of music begin?

Both my parents were musical. We had a grand piano that they both played and my dad also played classical guitar. They both loved classical music and most of all opera. We used to go to classical concerts a lot at the Fairfield Halls in Croydon. I learned to play piano and flute but never to a high standard. When I was a teenager I started to listen to rock music and broke the classical mould I had grown up in. However, I never lost my love of classical music, it just became less important as the freedom of rock music took over.

## What was the system you remember from your childhood?

We never had a decent system when I was a kid. We had a large gramophone made from wood with a basic Garrard deck inside it. In desperation I scrounged a basic system through donations and some savings. My eldest (half) brother gave me a 1960s Bang and Olsen valve receiver that formed the heart of my system for a few years. A second hand Garrard Lab 80 deck and cheap (really cheap) speakers completed the setup. The deck was actually quite passable and sported a wooden arm! Thank god the man in Lasky's persuaded me not to buy the Amstrad that I was attracted to and pointed me at the Garrard that I seem to remember cost me a princely sum of £12.00! That lasted me till fate landed me working in New York for a couple of years. I put together a system of Kenwood Direct drive deck, Onyoko receiver, and Accoustiphase speakers. Although it crossed the pond with me when I returned it didn't stay long and was sold on even though it was all 110v and I had to use a large transformer to power it all.

## What was your very first real Hifi system and can you remember how much it cost you?

I bought my first proper system in the early 1980s. A friend invited me to hear a Linn Naim Linn system (Linn LP12 Ittok Asak deck with

Naim 62 Pre and 250 power amps and Linn Isobarik speakers) and it was jaw dropping. I couldn't afford it however so I bought the best I could afford. Rega Planar 3 with R100 cartridge, Nytech CA-252 amplifier and Heybrook HB1 speakers on Linn Sara stands. The deck had a Sound Organisation Table to sit on. Totally I paid around £750 including table and stands.

## Describe how your system has evolved chronologically.

Changes have always been rare on my system. I have always tweaked my system to a point where I am happy and once I reach that point things have remained static for a long time.

In the late 1980s I added a cheap CD player, a nameless box that an enterprising bloke in a second hand shop had fitted a power supply as the CD platter came from a stack system that had shared power! I was a mature student at the time and my budget was non existent! This was later replaced with an Arcam Alpha Seven SE that I kept till the valve output stage of my current CD player tempted me too much.

I eventually upgraded the Nytech amp to a secondhand Exposure IV power amp with VI/VII pre/power supply which kept me happy for a while. Eventually valve power became attractive to me as the sound valves produced seemed so natural. So I started touring round HiFi shops looking at second hand valve amps. I had heard a SET system and wanted that, although the low power scared me off. A lucky encounter at Oxford Audio Consultants with a second hand Unison Research Smart 845 system was to be my saviour. Costing £2300 for Preamp and two monoblocs, the 24 watts of single ended triode power was enough for me and these are now the heart of my current system and have been for over 10 years.

The Heybrook speakers were replaced when the rubber surrounds perished with Rogers floorstanders. This was not such a good change and I wish I had known I could have restored the perished surrounds





of my Heybrooks. The Rogers died with one of the bass drivers failing and by that time Rogers had ceased trading so I started auditioning and eventually replaced with Opera Superpavarotti floorstanders that I kept until earlier this year when I replaced with my current Heco Direkt speakers. One of the deciding factors on the Superpavs was the domestic acceptance factor but in all fairness they did a great job for over ten years. Now I have a man cave the DAF problem has been abated although there will always be complaints about budget! The Hecos glorious retro looks are combined with high efficiency of 95dbw which makes them perfect for valve systems. The 11 inch drivers allow for powerful bass response too.

The Rega Planar 3 was a mainstay for many years and for many of those years had a Linn Valhalla power supply that powered it (in a most dangerous fashion as it was unboxed and just sat underneath the deck). The sound from the Rega with improved power supply was really good but eventually the Valhalla succumbed to a stray cup of coffee (big sparks and burning smells) and I returned to a standard Rega setup. Of course it wasn't as good and eventually, when my budget could afford it, was replaced by my current Michell Orbe.

## **What is your current system?**

### **Main source:**

Michell Orbe with SME 309 arm. Currently with a Hana SL MC cartridge but normally I use a Sumiko Pearwood Celebration cartridge. PureSound T10 SUT.  
Cary PH-301 phono stage.

### **Second Source:**

PureSound A-6000 CD player.

### **Amplification:**

Unison Research Mystery One preamplifier.  
Unison Research Smart 845 monoblocs.

### **Speakers:**

Heco Direkt.

## **What do you most enjoy about your system?**

This is the most musical system I have ever owned. The soundstage it creates is positively cavernous with great depth and width that is all served up on a blank canvas. I regularly lose myself in the music and love how this system effortlessly reveals the depths of a recording. No detail is too small to avoid being heard and yet everything stays in proportion. I won't claim it is the best but I think I have navigated the world of HiFi pretty well and produced a system that is pretty exceptional given the amount of money I have spent.

## **What are your thoughts on streaming and are you ever likely to be a convert, if you aren't already?**

The nearest I currently get to streaming is an iBlink that allows me to stream from my iPhone and iPad though Bluetooth. Lossy but a useful adjunct. My man cave is 30-40 yards from the house and currently the internet arrives over the mains supply. Plans are in motion to change that eventually to an external cat6 cable with decent switches at each end as the current connection can't cope with streaming very well. Once that is in place then I will investigate further as I have a NAS in the house that is full of live music, mostly concerts by the Grateful Dead that are freely available. Ultimately however vinyl remains my main source and I don't see that changing greatly as I am still attracted by records which remain quintessential in my world. Hi resolution digital is interesting however and I can see a streamer and DAC eventually replacing my second source. However I would want it to be able to play CDs and SACDs too.







**What is the music that really stirs your soul? Give readers a top ten of your favourite albums?**

My tastes are eclectic and offbeat in general and a top ten is almost impossible to select! What I write now will be different in a few days, but hear goes.

Love - Forever Changes  
Shpongles - Tales of the Inexpressible  
Beach Boys - Pet Sounds  
John Coltrane - A Love Supreme  
Miles Davis - Kind of Blue  
Grateful Dead - Live Dead  
Spirit - Spirit of '76  
The Velvet Underground & Nico - The Velvet Underground  
The Future Sounds of London - Lifeforms  
Kruder and Dorfmeister - The K & D Sessions

**What was the last gig you went to?**

A Halloween party with a Grateful Dead cover band: The Grateful Dudes and a Jerry Garcia cover band: Catfish John. An all nighter that ended with a streamed concert of Phil Lesh and friends from the US. That ended at about four in the morning! Who says that old hippies have no stamina!

**What is likely to be your next purchase and where do you want to take your HiFi in future?**

My current system still has a lot of legs in it in my opinion. I would love to revive my beloved Sumiko Pearwood cartridge or replace with a Koetsu Rosewood or maybe a Kiseki Purpleheart. Otherwise it's more a case of sorting mains cables which are still basic and some of the interconnects need upgrading too.

# **MUSICAL JOURNEYS**

## **WITH KATHLEEN THOMAS**



**Kathleen Thomas is Southeast Regional Sales Manager at Bowers & Wilkins and currently lives in Canada. Previously she has worked for ELAC Electroacoustic Americas and AudioQuest. Here she gives Hifi Pig readers a run down of what has shaped her musical tastes.**

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# MUSICAL JOURNEYS



Music was always important in our house growing up. My parents were both musicians in Athens GA in the late 60's and early 70's. My mother, beautiful with her long light brown hair, a bell-like voice, and a mean tambourine accompanying my dad with his serious folk-guitar skills and kind voice, always raising one eyebrow as he sung. By the time I was born, they had locked away their folk-rock dreams, but music was no less important. My dad would sing to me, guitar in hand and tear up a bit when the songs were gentle and reminded him of my mom and I. "Time in a Bottle" was always a guaranteed tearjerker in our house.

I am indeed, like my dad (the guy with the guitar in the pic above), the person that will cry at the drop of a hat at a song. When I was in preschool my mother got a call. "Kathleen is crying every morning, is there something going on with her?" My mom replies "You aren't singing Puff the Magic Dragon, are you?". I still tear up at the second verse in anticipation of the impending doom of Puff's lonely fate. My kids loved it when they were little, they would get me to sing it to them just to watch me sob uncontrollably.

Luckily it wasn't all tears. There were also kid dance parties of one. I could literally spend hours listening to the system. My parents generously allowed me access at a young age to my own records and player, and by the time I was in first grade, I was playing around with the "real" system. Heart's "Dreamboat Annie" was usually the record of choice. I would whirl and jump like a maniac. Couches were my stage. I would breathlessly collapse after the soaring "Magic Man" grateful for the reprieve of "Dreamboat Annie"'s gentle waves.

Once my brother was born, no visitor was immune to the endless variety shows filled with music. My faithful brother modelling diapers for "commercials" and banging away on the pianosaurus whilst I sang at the top of my voice. I imagined I was Annie, and dreamed of the stage with my freckles and reddish hair. I am sure every visitor was dazzled...at least in my mind.

I was different in my passion for music than the other kids. I knew more, listened to more adult music: Crosby Stills and Nash (never Young. NEVER EVER- an unpopular opinion I know), Gordon Lightfoot, Tim Buckley, David Bowie were my jams. I remember when John Lennon died when I was seven. Bummed out on the playground, I told my friends the sad news..."Who is John Lennon?" they answered. That was the moment I knew I was weird, and it was perfectly OK.

I do not want to paint myself as some sort of child of prodigious taste. I spent far too many hours with my radio tuned to Casey Kasem's American Top 40. My love for Duran Duran as a preteen was profound, telling my sweet mother she didn't understand their nonsensical lyrics because they were so "deep".

This changed when I was at Christian Clown Camp (thank goodness they spelled it with all "C"s) and an older boy there had a copy of Violent Femmes first album. It was so raw, so profane and filthy. It was GLORIOUS. Where did one find this sort of music! Gone were my Top 40 days and I dove head first into college radio and recorded hours of 120 Minutes on VHS. My new love was Michael Stipe. He was from Georgia and was weird like me. I incessantly watched the music documentary "Athens GA Inside Out", falling in love, for once, with where I was from and the majesty of Pylon, Vanessa Briscoe's swirling dance moves so much like mine.

My life seems to work best in sharp left turns and after a very nerdy, studious life in my teenage years of AP classes, mentors at Harvard, and summers at Duke University, I decided I was boring and needed to go to art school. There I learned many things, I dropped acid, I stayed out all night, I allowed myself to appreciate the dark and complicated ...and there, in the dark, lies Throbbing Gristle "20 Jazz Funk Greats" and Coil "Love's Secret Domain". Here I found the wonder of music torn apart and reconstructed again. Every piece of the destructed bits still there waiting to be found.

# MUSICAL JOURNEYS



Then, alas, adulthood found me. I got a job at a Hifi store, I moved to Seattle, built a great career in the audio industry, got married, had two wonderful girls, and felt utterly dead inside and lost. I slowly listened to less music. I could never have my audio system the way I wanted it. I didn't even know what to listen to anymore beyond hifi music. I loved my job, but I lost my music.

There was one album though, no matter what, that was there for me. **Velvet Underground and Nico**. It was the one thing I listened to when I laid on the bed in the dark with a concussion, realizing that my marriage would probably end soon. It was the album that sustained me when it did end a few months later, and I was bombarded with anger. It was there for me through all of the judgement and heartbreak. It is a dissonant, violent album, but beauty always pierces through and sustains. Beauty always wins and that carried me through my darkest times.

As I reconstructed myself from the deconstructed bits, I promised I would never lose my music again, and I haven't. I had, long ago, fallen in love with Montreal, and began spending more time there, living there part time. I started spending time with friends and listening to music again, going to shows, and staying up late listening to Laurie Brown on CBC2. It saved me.

It was easy enough to meet men, but none of them fit. Honestly, most of them either didn't care about music or had terrible taste in music. Then one day, I had a date, and he asked if he could come over early to beat traffic since I lived outside town. I said it was cool if he wanted to come over before traffic and we could listen to music, never really expecting this beautiful man to sit nervously on the couch for hours actually listening to records. He actually liked my music and I excitedly played **The Books "Lemon of Pink"** (a weird record that is a litmus test for me). The smile on his face, his joy in my joy about my record, was palpable. That night, Patrick drove home listening to

Radiohead "In Rainbows" and thinking about the date. I laid on the couch listening to **Portishead "Dummy"** doing the same.

I was bat-shit scared to hear his band, CHRIST. By the third date he brought over a copy of his latest record for me. I already liked him so much and would be heartbroken if it was terrible. It was wonderful. Dark and tense, but ambient and beautiful. Like driving in a blizzard at night. OK, he is my person.

We opened new worlds of music to each other. I had no idea there were so many types of metal, and artists like the **Suuns** and **James Blackshaw** are now favourites. I introduced him to Nils Frahm and Angus and Julia Stone. The soundtrack to our love though is **Sharon Van Etten**, who we simply can not listen to alone now without each of us crying. That is what music does, it fills our emotional cup and puts it to our lips to drink. The joy, the sadness, the heartbreak and the strength, filling in the gaps to make us whole again.

Now, very few things in our life are not touched by music. Our evenings are filled with listening and discovering music together, we go to shows whenever we can, and luckily, we both like weird music, so the shows are usually cheap and small. The music community in Montreal is much like the hifi industry where everybody knows everyone. I've met so many interesting people and made dear friends with talented musicians and recording engineers. My sometimes office is the breakroom of a recording studio, and when there is no session, I work surrounded by music in the light-filled studio (see image). I look at records with pride seeing friends' names on them. I beam when people enjoy Patrick's music and love the house being filled with the sounds of his projects in progress. I listen to Velvet Underground and Nico less and less these days, but I know it is always waiting, quietly, to soothe life's troubles...last shelf, bottom right.



# **UP CLOSE AND PERSONAL WITH BILL LIVINGSTON OF DYNAUDIO UK**



**Bill Livingston is UK Sales Manager with Dynaudio UK, but it's not all work, work, work and when Bill's away from the office or has time to himself he has lots of other distractions to keep himself occupied. Hifi Pig gets up close and personal with him.**

**Hifi Pig**  
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## What is your ideal day away from the office and why?

Because of the way we run the business, it is very difficult to have a 'day' away from the office, particularly as nowadays we have 24/7 communication via phone and email and neither of us find it easy to simply 'switch off'. From my days in retail, I know that our customers want support to be as simple and efficient as possible and I find it impossible to not answer a call or reply to an email immediately. I think it's our fast response time to retailers which has helped our business grow so quickly over the past few years... and besides... we enjoy it!

However, it is essential to have some down time... so what we do is make sure the other knows we are going to be 'off grid' for a period and then simply forward calls or emails to the one 'working'.

For 'down time' in the evenings and weekends I like to make or build things... I am an avid ship modeller and the research and building process on the sort of ships I build can take several years. That tends to take care of winter months 'downtime'.

However, I like doing anything creative and immersive. Recently I have taken to baking bread (believe it or not!) But currently I am rebuilding my sons Stratocaster which involves taking the whole thing apart, replacing the pickguard and all of the electronics inside and a full EMI/RFI screen built into it. I have already worked on the fretboard and frets and after I have rebuilt the guitar itself, it will be fully set up, with proper intonation, pick up heights, and so on. It's a really interesting thing to do, gives me another excuse to buy more tools and I have learned a lot about guitars and setting them up properly... and I suppose that's why I find it so interesting. I love learning new things. I know I can be a bit obsessive with detail, but I'm fortunately pretty good at working neatly and accurately, and it's an immersive process, so it meets my needs for a few days break.

In the summer months, however, I have my main passion. Carp fishing.

Before you all groan and think, what a boring thing to do, sitting beside a lake for a few days, doing absolutely nothing...

For me, there is no point simply turning up at a lake and camping in the nicest spot, casting out your rods and hoping a fish will 'bite'. Yes, there are people who do exactly that... and, as in most hobbies, there are people who spend an absolute fortune on all the latest gear and expect results... and on an 'easy' lake, or as we call them, a 'runs water', that's exactly what you *can* do.

I fully understand anglers who simply fish for relaxation, or for the social side of carp fishing where they meet up with a few mates for a weekend.

But it's not for me.

One of the most important aspects about proper fishing is that you have to be totally immersed in the environment you are in.

You have to totally switch off from your day job and for me, that takes a day or two. I need that time to cleanse my mind from any stray thoughts about work, family, anything... I literally tune everything else out so I am in the 'now'. Nothing else exists except for my immediate surroundings. Where I fish, we have no mobile phone cover and that helps. It is also a few miles from the nearest village and several miles from the nearest town. No shops, no pubs, no distractions.

Within a day or two, the world outside simply ceases to exist. I sleep when the sun goes down and I get up as the sun rises. I have a complete and utter 'reset'. No lying in bed at night tossing and turning, worrying about some little detail about work, or an issue with family or friends... it all just goes away. And it is replaced with something far





more primal, far more real, the environment is you, the lake and nothing else... you suddenly realise that you are simply part of the local environment.

The Robin that you heard making an alarm call when you first turned up, pitched your tent and set out all your gear, finally realises that you aren't a threat. At first, out of curiosity, it hops into your swim, checks you out and looks to see if you have any food it might be interested in. The local water rat or field mouse will stare at you for hours from behind some grass, again, assessing threat or any opportunities for a free meal... After a few days, larger, more nervous animals like deer or even a badger will come calling.

And you tune into *their* threats, too. You notice they all disappear when the occasional dog walker from the nearby farm walks around the lake. I know those dog walkers are there long before I see them, because the local wildlife call out their alarm calls and then disappear into their burrows or the denser trees and stay there until the perceived danger passes.

Or suddenly, after a brief alarm call, there is silence... total silence. You can't miss it, because a wood around a lake is a noisy place, with the noise of small animals scurrying about, or the birdsong. Silence means there is a predator about. The birds and the small animals recognise their presence almost immediately, and, when you, as an angler, are fully tuned in to the environment, you notice their presence too. You can even tell where it is, because the deepest silence is closest to where it is... waiting for its prey to give itself away.

Sometimes it's a fox, but more often than not it is a Sparrowhawk or a Kite. And when the predator finally realises his position is known, that the prey is wise to his subterfuge, it will fly away and the silence is broken as the birdsong restarts, at first with an 'all clear' and then later, with the general chatter of getting on with their day.

It really is beautiful.

Because by then, not only are the local birdlife and animals part of my consciousness, so are the carp. I know where they feeding, I know when and how they are moving under the water and I know when they are simply reacting to the changes in the wind or the rising water temperature as the sun moves out from the shadows of the trees and warms the surface of the water.

That's when I start fishing. It will often take two or three days to get to this point, and I may have just a day or two left to fish... but I am more often than not successful. Even at Redmire Pool, the lake I was thinking of as I was writing this. A beautiful, small lake in the Wye Valley that has been a notoriously difficult lake to fish ever since it was first discovered as a carp fishing water in the early part of the last century. The early British record carp were first caught here, by some of the most revered carp anglers in the history of the sport. Many well-known and very capable anglers have fished here and never caught a thing. 'BB', that wonderful angling writer known to any angler with a soul, fished there for years and never caught a carp.

It's a privilege to fish here, only a select group of people are allowed each year, but it is a greater privilege to share the place with the wildlife and the atmosphere and the history that such a place simply breathes...

And that's why I love carp fishing at Redmire Pool... and why it is my place of refuge when the world gets too noisy and too complicated... its where I go for a full 'reset'. I sleep well, I tune in to the real world, the natural world, and everything is suddenly put into perspective... and more reassuring than anything, I know my place in the world.

That's my ideal time away from the 'office'...

# UP CLOSE AND PERSONAL WITH BILL LIVINGSTON OF DYNAUDIO UK



## Best gig you have ever attended and why?

I have been fortunate enough to have seen most of the bands I have wanted to see at one particular time or another and it's hard to choose just one. Bob Dylan at Earls Court in 1978, David Bowie at Milton Keynes Bowl in 1990 stand out... then there was the Rolling Stones in Glasgow, which was dreadful, or at Hyde Park, just a couple of years or so ago, which was wonderful, or Yes at Reading Festival, too long ago to even think about, but the one I remember best was Pink Floyd at Knebworth in July 1975, just before Wish You Were Here was released. They played the entire new album, and all we wanted was Dark Side of the Moon... and then, after the band left the stage, everything was silent for a few minutes and as anticipation built, the round black screen rotated down and the first 'boom, boom', of the heartbeat started, played from a Revox reel to reel in the centre of the stage illuminated by a single spotlight, and the crowd erupted... An emotional moment!

## Artist you would love to see but never had the opportunity.

This one was easy. Led Zeppelin at Knebworth in 1979. We had a group of us from Cambridge who would go to all the festivals each summer and we were all looking forward to Zeppelin at Knebworth that year... and then my girlfriend at the time got ill, and I didn't go, thinking we could see them again together (she was a diehard Zeppelin fan, too) at some point in the near future. Little did I know that the following year, Led Zeppelin played their last tour of Europe, not playing the UK... with John Bonham's death later that same year. That Knebworth concert was the last time the Zeppelin we all knew and loved played in the UK. I will always regret not going...

## Top five tunes of all time and what they mean to you and why.

Oh my... where to start? I could think of hundreds... narrowing it down to five is going to be a problem.

Like most of us, music tends to be a virtual diary of my life... and as our lives change as we grow as people and we come to a better understanding of ourselves, perhaps it's easier to think of the songs that meant so much to me at those seminal moments...  
Can't Buy Me Love – The Beatles

One of my very earliest memories is this song coming on the radio in our kitchen in the early sixties and my mother singing along with it. I didn't grasp the sentiment of the song at the time, it was just a happy, catchy tune that stayed in my mind for ever... but looking back at the lyrics now, there is a lot said in such a few words and I still have a little of that naivete, even now.

Starman – David Bowie

I was fifteen, in mid puberty and then David Bowie came on Top of the Pops and played Starman. It was the first time I had seen anything like him... and I could feel my father watching him with a mixture of disgust and curiosity. It was the first time I had seen anyone so androgynous and I was slightly disturbed by the feeling of how attractive he was and how he seemed to embrace his sexuality. We are a northern family and we grew up being taught there are certain ways in which men are supposed to think and feel and look. This made me think that perhaps what my brother and I were taught was not really based on anything other than prejudice and fear and I have always remembered this. Ziggy Stardust was the first proper album I bought... I'm still a huge Bowie fan all these years later.

Tales from Topographic Oceans – Yes

Not the easiest albums of all time... and I hope it counts as a 'tune'! But I suppose this was an early indication of the 'intense young man' I was to become. I loved everything about it... not least that so few of my peers would even give it house room!



# UP CLOSE AND PERSONAL WITH BILL LIVINGSTON OF DYNAUDIO UK

## Led Zeppelin – Stairway to Heaven

I remember the first time I heard this... It became one of the most important songs of my life and was the backdrop for most of my college years in Cambridge... along with The Rolling Stones' 'Sticky Fingers'. I suppose it didn't hurt that I had recently read Lord of the Rings for the first time... and I have never been able to think of one without thinking of the other. Wonderful album. But we are not allowed albums... so I'll gloss over the other tracks...

## Anarchy in the UK – The Sex Pistols

This just changed everything for me. I had been a typical Cambridge guy, slightly effete, certainly a bit of a hippie and then suddenly something came along and destroyed everything... and I fully embraced it. The politics, the anger, the frustrations...

And Oh... I've run out of songs... and I have so many more to mention... No Talking Heads? No Bob Dylan? No Stone Roses and no Lou Reed? Stuart, we need more than five tracks!

## Analogue or digital and why?

I suppose I should be an analogue sort of person. My background was certainly analogue and my time spent at Linn in the early days should certainly have reinforced it... But I'm not. Not really. My current system is a Naim NDS based system with a 300DR power amp and Dynaudio loudspeakers, with all of my music stored on a Core hard drive, either ripped from CD's or in 24 bit bought from HD tracks. I have no vinyl left and no turntable. I can't listen to CD's on their own and hate the format... I don't use any of the streaming services because I just don't think any of them sound that good, but properly ripped digital music is fine. Working in the hifi industry and having a passion for music can easily become a conflict... I prefer to not get involved with worrying about the merits (or not) of different DAC's, the vagaries of various cartridges and let's not talk about cables and all the other things which just confuse my rather simple brain. I just want a system that plays my music in a way that I can forget about all the nonsense and gets to the heart of things. So I don't really have an opinion. I suppose a glib answer would be I prefer analogue if everything is analogue from the recording to the playback, and digital if everything is digital... but we don't have a choice. So I use a system that I can listen to music, be fully engaged with what I am listening to and forget I have any part in the industry. Its only in the past few years I can honestly say that I have been able to do that.

## You have an opportunity to dine with one person (living or dead), who would this be and why?

What a question! This is almost more difficult to answer than the previous one!

I spoke to my son about this, last night. We came up with Julius or Augustus Caesar, Churchill, Lincoln, JFK, Leonardo de Vinci, Cicero (mainly to argue with his later life!) and many, many others... But this morning, I decided there was only one person.

My mother.

She died when I was relatively young, so she missed most of my life. And as time has moved on, I have found that I have more and more in common with her. Her faults, are my faults, and her strengths are my strengths.... But more than that, she was a much more complex person than I ever understood as a child. Her early relationships were

not always easy and she was far more 'out of her time' than I ever thought. I saw a settled happy marriage to my father who adored her, but I learned recently that she had a child before she met my father (who always knew, but she didn't know he knew) and I found out a lot more about her early childhood... so I have so many unanswered questions... and as all our relatives say, she was very like me, uncannily so, I think I could spend another lifetime getting to know more about her... and she of me. I don't think one dinner would cover it...

## You're choosing the food, what would be on the menu?

Really, I wouldn't mind. I can't stand tofu, or tinned pineapple, but pretty much anything else is fine. I am particularly partial to seafood, so a seafood starter would be a must, after that, really, I would rather find out what my guests would like and choose something that everyone would enjoy.

## What's your favourite tippie?

I don't really have one. I'm not much of a drinker. If a beer, it would certainly be a Greene King IPA or a Greene King Abbot. Anything from a handpump... none of that over-cold gassy beer for me! Or a glass or two of a decent red wine. Not really a scotch drinker, but perhaps a Macallan... As I said, I'm not really a drinker.

## Favourite book and why?

Another question I could spend hours answering! I don't really have one favourite book, although a few spring to mind, Birdsong, for example... Ian Banks' the brilliant 'The Wasp Factory', 'The Shadow of the Wind' by Carlos Ruiz Zafon, Solzhenitsyn's 'One Day in the Life of Ivan Denisovitch' and more or less anything by Iain McEwan, although Atonement is a particular favourite.

Currently I am reading 'We' by Yevgeny Zamyatin, which my son recommended to me. It's the inspiration for George Orwell's 1984 and was suppressed in Russia until 1988.

## Name a film you can watch time and time again.

That's easy, if predictable. Casablanca

## If you weren't working in the Hifi industry what would your dream job have been?

That's easy too... if less predictable. I would love to be David Attenborough. To have spent a lifetime exploring the natural world would have been incredible. I can't think of a better way to have spent the one life we all have.

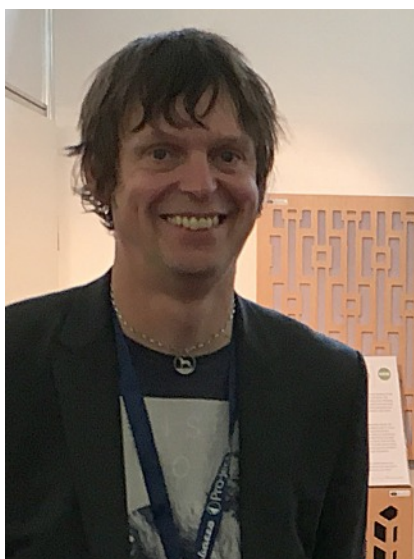
## What will your epitaph say?

I really don't know... I'm not sure anyone knows me well enough to able to write it.

Perhaps 'He had a lot to say, I only wish he could have taken less time to say it!'

# **SMALL ROOM ACOUSTICS**

## **OR HOW TO STOP GUESSING AND TRUST YOUR ROOM**



**David Shevyn is the General Manager of GLK Acoustics Europe and lectures on room acoustics and their treatment at both Hifi shows and at professional events. In the first of a series of articles aimed at helping home audio enthusiasts get the best from their system and understanding how their room interacts with the music, he introduces some basic acoustic concepts to explain some of the problems many of us will inevitably be suffering.**

**Hifi Pig**  
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# SMALL ROOM ACOUSTICS WITH GIK

## THE BEGINNING

When the editor of HiFi Pig, Stuart Smith, approached me to write a regular column about Small Room Acoustics I, of course, readily agreed. HiFi Pig is a magazine that bucks the trend of the more traditional staid HiFi magazines and has bags of personality. I knew it would be an ideal forum to talk about the topic and invite readers to submit their own problems and questions. What could go wrong? It will be easy, right? I mean I lecture on this topic all over Europe, from Music Production courses in Milan to audiophiles at the Munich High End Show. But then I came across the same problem that everyone does when looking at Room Acoustics: *Where do we start?*

I could jump straight into an article on room reflections or perhaps Speaker Boundary Interference Response (SBIR) or we could talk about diffusion and what that means. The trouble with room acoustics is that it is a huge subject and can be completely overwhelming when trying to study the topic via the internet. Add to that the fact that many things you may read contradict one other, then it gets even more confusing. Why is it that people have different opinions? One reason for inconsistencies is because opinions on how best to treat a room have changed over time. Another reason is because a little knowledge can be dangerous and not every "expert" has done their homework. And sometimes information appears contradictory because physics can be so fantastic and so complex that the same solution does not always work in every situation.

So, with all those glorious inconsistencies in mind, what we've set to do with this column is to focus on four things:

- Look into the science behind what is happening in your room and how that effects the listening experience

- Demonstrate that any room can be IMPROVED. There are never strict rules, only a set of guidelines; all of which are there to enhance the listening experience. For me, the science of acoustics is utilized in a positive way. If there is acoustic interference, then use that to your advantage and make it *positive* interference. I like to call this approach **sound sculpting**.

- Give the reader (that's you) the tools necessary to be able improve the sound in your room yourself

- Provide an opportunity to ask an expert about specific problems relating to you and your room

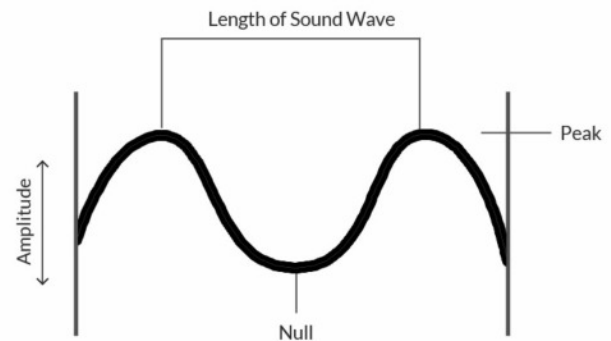
Normally when I give a lecture, I will begin with answering why we even need to treat a room at all. I demonstrate this by using two sound files of the same recording, using the same equipment, in the same room. The first sound file was recorded with the room empty (untreated) and the second was recorded using acoustic panels and bass traps. Even on a simple demonstration like this the audience is clearly able to hear the difference between the two recordings. In the first example where the room is untreated, vocals are echoey and the bass is muffled. Once room treatment has been applied the echo is removed from the vocals and the bass is cleaner and punchier. It's a simple demonstration but what it does illustrate is: *the room you are in effects how you hear sound*.

## A LITTLE MATH GOES A LONG WAY

In this initial article I am going to concentrate on the low end (bass) and how the physical dimensions of your room effect how you hear these low frequencies from your system. In acoustics when we refer

to the low end or Low Frequencies, we are referring to sound waves that are 200hz and below.

So, starting at the beginning we need to look at what the sound coming from your speakers actually is. What makes the music you are hearing? The notes in music all equate to a frequency. Technically a frequency is the number of soundwaves that pass a particular point in a fixed amount of time. We are all more familiar with Hertz, however which is more specifically the number of waves that pass by in a second. So, 220 hertz is 220 cycles which is also known as the note A3. Hopefully I haven't lost you so far. A soundwave isn't static however, so we are also interested in the amplitude of the wave. This is how far the wave moves from its average position, i.e. how far the particles are displaced. The reason the amplitude is important is it comes across to the listener as the loudness, or volume. So, we have the musical note (the frequency) and then we have how loud you hear it (the amplitude).



As you can see in the drawing above: the top of a soundwave is referred to as a peak, which represents the loudest part of the soundwave. Then we have the low part of the wave, which is called a null, which is the quietest part of the soundwave.

A wavelength is measured by the distance between two peaks (or nulls).

You can work out a wavelength from the frequency and speed of sound (343m/s)

Wavelength = Wave Velocity divided by Frequency

So, if we take 220 hertz

It would be  $343\text{ms} / 220 = 1.56$

So, the wave length of 220 hertz is 156cm's.

A very low wave like 40 hertz would be

$343 / 40 = 8.5$  or 856cm's (8.56metres)

## MODE DOWNLOAD

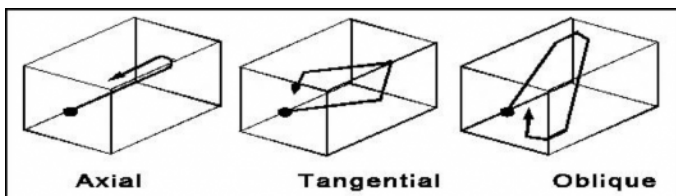
# SMALL ROOM ACOUSTICS WITH GIK

Now that you have a basic understanding of the physics of a soundwave, why is this relevant to your room? In basic terms: **room modes are pre-existing resonances created by the room's dimensions**. There's no way around it. The size and shape of your room dictate how soundwaves behave and react.

Room modes are activated when you play music and the soundwaves from your speakers hit the boundaries in the room. If the boundary is the same length as (or half or one quarter of) a soundwave, then they create what is known as standing waves. A standing wave occurs as a result of two different waves moving in two opposite directions. As they pass, they create interference which then make our nulls or peaks. This is because the boundaries are stopping the soundwave from fully decaying as they would if there were no boundaries and the energy remained in the room.

There are three types of modes in a room:

Axial modes are created between two opposite surfaces. Best to think of this in terms of length, width and height of the room



Tangential modes are created between four surfaces in the room, most commonly we see this problem in square rooms

Oblique modes are created by six surfaces, less common but I have seen this type of mode created in Bay windows for example

Axial modes are the strongest and many times, the only ones that are considered. Tangential and oblique room modes have less impact per mode but are also more prevalent. A combination of tangential and oblique modes can cause just as many issues as axial modes can.

## PEAKS AND NULLS AND WHAT TO DO

Room modes can cause both peaks and nulls (dips) in frequency response. When two or more waves meet and are in phase with each other at a specific frequency, you will have a peak in response. When they meet and are out of phase with each other, they cancel, and you end up with a dip or null in response.

Dealing with modes is accomplished by placing sound absorbers at a room boundary to minimize the reflections off it so there is nothing to combine or cancel. These boundaries include, but are not limited to: floor, ceiling, front wall, side walls, back wall, and all twelve corners - *a corner is defined here as anywhere a wall meets a floor or ceiling - not just the traditional tri corner*. While treating corners is not a complete solution, placing treatments in corners offers the advantage of being at the end of 2 or even 3 of the room boundaries so there is a lot of benefit to treating that area. However, in some situations there are modal issues which require treatment of the rear wall or even the ceiling over your head that treating corners would not solve.

In conversation with GIK Acoustics President Glenn Kuras he mentioned the following analogy which can really help to understand how sound works in a room. He likened the room modes to as the shape making a 'tone' like a hollow block of wood. The shape and size dictate the sound and the lowest frequency it supports. Also, as you dampen the sound you are changing the frequency, but really the major effect is stopping it from ringing/sustaining. If you filled a small hollow box full of rags it

would dampen/absorb the ringing and change the frequency, but more damping of the ringing then changing of the frequency which you want.

In our next article we will look into the different ways that you can deal with bass issues. We'll examine various methods of absorption, when absorption can be applied, how much to use, and how best to tighten up and temper the bass in your room.

If you have any acoustic questions or problems you would like help with, feel free to leave your comments on the [Hifi Pig Facebook page](#) or by contacting [Hifi Pig here](#) and we can answer them for you. Remember: no matter how difficult or simple the question is, someone else will likely be asking the same question.

**GIK offer free acoustic advice and you can [get yours here](#).**



# **BIRDS' EYE VIEW A BIT OF CHARACTER**



**Linette discusses why it's so great that the Hifi industry has some of the characters it does.**

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# BIRD'S EYE VIEW



Characters are important in every industry and the Hifi Industry, well let's just say that the Hifi industry probably has more than its fair share of characters. You know what I mean by a 'character'? It's probably a very British way of saying things... 'He's a bit of a character, isn't he?' meaning perhaps he's a bit out of the ordinary, a bit flamboyant, a cheeky chappy, not afraid to stand out. Spend any amount of time with people in the Hifi industry and you will realise that it is full of characters, male and female alike, all in all it's a lot more colourful than working in a bank. (Disclaimer: I have never actually worked in a bank, I'm going by what I perceive it is like to work in one, they could be up to all sorts that we don't know about in there!).

One of the reasons that our industry attracts people that like to work and play hard and generally be 'characters' is the fact that it is all about music. Many people in the industry come from a musical background, whether that's working in studios and pro audio, playing in bands, being a promoter or a music journalist, that connection to the music is what draws us all together and joins us as a community with a glue that is our love for all things musical, whether that's jazz, classical, rock, techno or any other genre. On the face of it you may see a representative from a Hifi brand at a show, looking very smart, suited and booted and very professional (which they are) but once you get chatting, you will soon realise that this person is not some corporate drone, they have a passion both about the music that they love and how to hear it reproduced at its very best, and they want to share that with you, the punter.

Some of the most 'colourful' characters, with the most unprintable stories, were involved in the industry back in its heyday, the 1980s. I have heard tales of drink and, 'ahem', substances and shenanigans that would make a rock star blush and beat a hasty retreat to rehab. So yes, the Hifi Industry is a very interesting and much less corporate one to work in than many others, the people really make it and are part of what gives the individual Hifi brands their character too. There

is a fiercely independent spirit and things are a little more alternative than in many other industries that you could work in.

The character of a Hifi brand is driven very much by its people and their passion, but there is much more to it than that. I've written before about the 'signature of style' the way a brand has developed its signature look and sound. This individuality is key. It is history and heritage and, that word of the moment, provenance. More and more people want to know the story behind a brand, where has it come from, who started the company, where is it made? Just like with craft beer brewers and independent record labels people love to identify with brands that are individual, that can proudly say that they are 'Made in Britain', 'Made in Italy', 'Made in Germany', that they always have been and always will be.

So, can the Hifi Industry maintain its individuality? I think that it is really important that it does. The individuality of different brands makes Hifi exciting and interesting and special. Different brands have their fiercely loyal fans who buy their gear and absolutely love it. Fans who will argue the toss for hours on the internet about why brand X is better than brand Y. Hifi brands can be just like Marmite, some people will love the sound and the styling of a brand whilst others will hate it...but the fact that a brand can stir up such emotion is such a positive thing. It's provoking a reaction, giving people something to care about, giving people choices.

But there is something happening, something that happens in all industries and areas of business, a sweeping globalisation that is, 'in the name of progress', hoovering up some of our well known Hifi brands, making them part of a bigger corporation. Just looking at the UK industry over the last couple of years, there are several classic British Hifi names that have been bought out by bigger companies that seem to have no connection to the original roots of the brand. People that have worked for certain brands for many years have found themselves side-lined as everything is brought under the wing



# BIRD'S EYE VIEW

of the new 'parent'. I know that this is seen as progress, but buying the name of a company, the right to produce its products, but not retaining its history and its people, is like buying an empty shell. A stark example of this that I experienced recently was going to a Hifi show, visiting the room of a well-known UK brand...and finding a whole load of products in there from other brands in the same 'stable'. None of the people that I associated with the brand, were there, just people that had been hired to do the show and who really, knew nothing about what they were representing, who didn't live and breathe the products, who had no passion...it made me feel more than a little bit sad.

I'll use an analogy here. My mother and father in law (Grandma and Grandpa Hifi Pig) ran pubs for over 40 years. They were proper 'characters' and made their pubs the place that people wanted to go to. They created a brilliant atmosphere, served delicious food and had a loyal and happy team that worked for them. They made sure that every customer had a wonderful time and was treated as an individual. But when someone came in to buy the pub they couldn't retain the character of the place because it was about much more than the bricks and mortar and the name of the pub. The last pub that they owned, and sold when they retired, went from the vibrant heart of the village and a destination pub/restaurant for people from all around, to a corporate shell. It still has the same name, but it has none of the soul that made it what it was.

So, it may sound here that I am against progress and against growth, but that isn't true at all. There is nothing better than seeing a Hifi brand grow, from humble beginnings to becoming established and well known. Many famous brands started in sheds, in garages and on kitchen tables. They now employ lots of people and win global awards

for design and export. But that growth has been organic, not forced. The employees are seen as a family, the brands have maintained their heritage and kept in touch with their roots. At Hifi Pig we have grown the same way, we are proud to be independent and in touch with our readers. We weren't just plonked down by a big publishing house with the aim of telling the public what they should be reading online, we have grown alongside our readers and many of the Hifi brands that we write about.

There is a question within the Hifi industry right now of 'how to appeal to the next generation'. This is an important question and not one that will be answered easily. Some companies are, to be quite honest, diluting themselves by thinking that simply bringing out a range of Bluetooth gadgets will connect them with younger consumers. But the younger generation are much more savvy than that. They actually care more about the environment, don't just want throwaway tat, they are turning away from 'throwaway fashion'. They are interested in the history and the heritage of products, they want individuality, they want to be and to have something a bit different...they want character.

If we don't keep the spirit and the independence of the Hifi Industry alive then we may as well just all be listening to utter rubbish pre-packaged, generic music on gear that all looks and sounds the same...and, if we don't support our independent Hifi brands and allow them to keep doing what they do best and growing in a natural and organic way, then we risk losing them. And once they are lost, we can't get them back. It's up to us, we have the choice of who we buy from, which brands we give our loyalty and support to. We owe it to ourselves, and to the generations to come, to make sure that the Hifi industry is able to retain its individuality, its diversity, its heritage and its character.

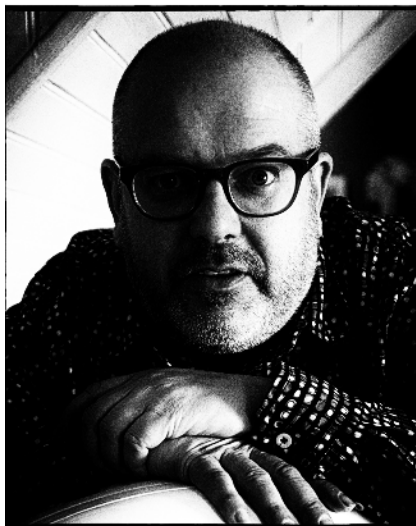
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# **STU'S VIEWS**

## **REFERENCES PLEASE**



**This month Stu gets a tad uppity about references and the relevance of some reviews in the grander scheme of things.**

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I'm currently reading George Orwell's essays, specifically in this case his thoughts on Charles Dickens and one of his comments prompted me to start thinking about this article/rant. Orwell uses the following line when talking about some of Dickens' beliefs - "Therefore, while attacking everything in sight, he has no definable standard of comparison" and it struck me that there seems to be a few people out there in Hifi-Land making what they think are definitive statements on performance without having definable and relevant comparisons, or rather in the Hifi case, definable and relevant references.

I've got a couple of cars; an original Porche Boxter from '97 and a Peugeot 206 hatchback. Both are very different cars and perform completely unlike one-another. Add to this the original price of each of these motorcars being wildly at odds and this will give you an idea as to why I've got a bit of a bee in my proverbial bonnet about making sure a review product is placed in a system that is priced relevantly and performs at the correct level.

When I drive the Peugeot I'm well aware that this is a simple A to B machine rather than a car that inspires and interests me. Don't get me wrong, the Peugeot is reliable (more reliable than the Porche inevitably given the latter's age), is more practical (it has space to do the shopping and transport IKEA purchases home) and it is cheap as chips to insure and run. But it is what it is – a small, unexciting car that gets us and our purchases to and from where we need them to be. On the other hand, the Porche seems to cost €20 in petrol even if we only nip to the local shops and is constantly in and out of the mechanics, BUT it is exciting to drive and I love it. One car was built to a very low price-point and the other was built with less constraints on the build costs. If I was asked to review the Peugeot (I'm still awaiting the call from BBC to host Top Gear) would I compare it against the Porche – of course not, I'd compare its features and performance against a similarly priced and similarly specified car. Likewise, the Porche would be judged on how it performed against cars of the same calibre and epoch. Why is it then that there are still

people writing reviews who are slotting components that cost, in some cases, tens of thousands of pounds into systems whose total cost is way less than that one product. I've done it myself in the dim and unenlightened past when I reviewed a very expensive moving magnet phonostage with a very modest vinyl front end. I could appreciate the phonostage was in itself in a different league performance-wise to what I was using, but I didn't have a relevant reference point from which to write a review that had any real meaning to anyone looking at spending over ten grand on a phonostage...I have already taken myself out and given myself good talking to for this crime.

At Hifi Pig we have a very different review process in place to what I expect is the norm at other publications and blogs. Here a manufacturer or distributor fills in a review request form outlining the product they want reviewing, price etc, and then we choose which reviewer, and more importantly which reference set up, is most relevant to that specific product. You'll notice that for some time our reviews have included a list of the equipment used in the online review and we feel strongly that this offers readers a real and tangible way of telling at a glance if the review product is relevant to them in terms of a purchasing option. Of course, not everyone reading a review is looking to make a purchase and I always remember reading reviews in my teens (and beyond) of wildly esoteric kit that I never for one moment thought I'd be in a position to own. Looking at the Top Gear analogy again (still no phone call) viewers love to see the Lamborghinis, Ferraris and other exotica on test, knowing full well that they'll never be able to own them, but the viewer would always expect these cars to be compared alongside each other – likewise mid-market and the more cheap and cheerful offerings. Who in their right mind would use a Ferrari LaFerrari as the reference point by which to judge the performance of a Dacia Sandero, it's neither a relevant or useful comparison, but that kind of thing happens pretty regularly in the Hifi reviewing world!

The relevance of a review isn't just about price-point too, it's also about the experience and relevant expertise of the reviewer themselves. For example, one of the team at Hifi Pig is Dan and Dan calls himself a "Computer Audiophile". His kit is based around a front-end that produces a series of zeros and ones and he eschews all things analogue. He knows his system intimately (steady!) but send him a record player to review he'd surely make a good go of describing the sound of the vinyl spinner but he would be doing so in isolation and without a reference point or relevant experience in that kind of analogue product. Horses for courses! Dan's kit list is pretty high-end too and he's tweaked and eked the last ounces of performance from his system, completely at odds then to send him budget items to use in this system – though he does have a more moderately priced rig for just this circumstance.

Often when people discuss a "reference" there is the inference that said reference is the best that is available, but this need not be the case; a reference is a starting point against which to judge others, a measuring stick if you like, but I firmly believe that that measuring stick needs to be relevant.

Anyway, that's my moan over and I ought to stop sounding like Marvin the Paranoid Android from The Hitch Hiker's Guide To The Galaxy and move onto what I've been learning on our journey in putting together a less expensive reference, and a relatively affordable mid-market system – it's been a thoroughly enjoyable experience that has seen innumerable products come and go, and we know both systems really well now – though that is not to say things may not change down the line when a more revealing/transparent product is happened across. A review system, to my mind anyway, should of course be well known to the reviewer, as outlined previously, but it should also be as transparent as possible at that price-point so that the reviewer is easily able to spot and hear changes made to the system. Indeed, we've been listening to the mid-priced system more than the much more expensive "big rig" and we've even had the discussion as to whether we should simply modify the main rig to be something purely for our musical enjoyment rather than, as is the current situation, a tool allowing us to hear new products, warts and all. Previously, if we knew we'd not have a high-end bit of gear in for review for a while, we'd plug in a little 2A3 amp into the system as it just sounds great – not as transparent as the Class D amps but thoroughly musical and enjoyable. The debate around this goes on chez nous.

What has perhaps been the most enjoyable, if challenging, reference system to put together has been the sub £1000 one, but again it would be daft to put a £150 pair of speakers on the end of our main rig's amplification – just would not be relevant. In today's Hifi market and bearing in mind all products had to be priced as new and box fresh, a grand is a relatively small amount to spend on a Hifi. It's still a chunk of money of course, but nothing when compared to the stratospheric priced demanded for some products. So is it actually possible to put a full system together for less than £1000 – well in short, yes, it is. In fact, there is plethora of kit out there that falls into this price bracket and some of it is bloody good, to the point that actually pinning down our final decisions has been a bit of a "to and fro" process with products going in the system, coming out and going back in. I think the process has been made somewhat easier for us given the times we live in and that pretty much everyone has a laptop they can use as a source – OK, this is cheating a bit but it made sense to me as we go through laptops at an alarming rate and renew them every 18 months or so, leaving us with perfectly good music sources for virtually no outlay. The software you need to play your music back is also available for free. So, we've got a pair of

Wharfedale D320s (£199) which we bought after having heard them with an Audiolab front-end, a Chord Mojo DAC (£399) and an Amptastic amp (£129) giving a total outlay for hardware of £727, leaving a good chunk over for cables, a decent pair of cans etc. Of course, the system has its limitations; it's never going to be able to be used in a large space given the modest output of the amp and in one way it's not very flexible in that the amp only has one input. However, the system is also pretty flexible in that if you do add a pair of headphones you have a system you can use in the home and even on the go if you use your smartphone as a source – the Mojo is a DAC and headphone amp in one compact unit. The main thing here in relation to the main point of this article is that this system will be listened to for many hours and many days so that we become intimate with its presentation and what it is doing. We'll be able to add other USB DAC, CD players, amps and speakers when they come up for review but the core of the reference will remain - which brings me back to the original point I was trying to make.

The same argument goes for music choices for reviews. We have a good few go-to tunes that we know inside out and can clearly hear what a different set up brings to the table. No one in their right mind would consider auditioning a new piece of kit they are potentially looking to spend their hard earned on using a wholly, or practically unknown piece of music, so why then do some think it acceptable to use kit they are not intimate with in review articles. Don't get me wrong, if we have kit in for review there's no doubt we'll pop it in and out the system and compare it to other kit we have in for review – that's just curiosity!

Anyway, that's this quarters moan over. Until next time dear reader.

[READ MORE STU'S VIEWS](#)



# OUTSTANDING PRODUCTS 2018



In 2018 Hifi Pig gave away just eight of our coveted Outstanding Product Awards for products that we thought were outstanding in their class.

Click the links or the images to read the full online reviews.

## Leema Acoustics Tucana II ANNIVERSARY EDITION Integrated Amplifier



## Boenicke W5 SE Loudspeakers



## SweetVinyl SugarCube SC-1



## Origin Live Resolution Turntable and Zephyr Tonearm



## Roon Nucleus +



## Chord Electronics DAVE DAC



NEXT PAGE



## OUTSTANDING PRODUCTS 2018

**Audiolab 6000A Amp With DAC & 6000CDT CD Transport**



**Kirmuss Audio KA-RC-1 Ultrasonic Vinyl Restoration System**



**Hifi Pig**

**OUTSTANDING PRODUCT**

# DIY AUDIO

## SPARROWLEG DESIGNS (JAMES MEACHAM)



**James Meacham and his unusual designs are well known on the DIY Audio circuit and with good reason. His loudspeaker builds are born of a desire to create loudspeakers that are challenging for him personally as well as out of the ordinary in their conception and implementation. Here we take a look into what he is calling his “Big Build 2018”.**



James Meacham is a dedicated loudspeaker builder who eschews conventional box designs, preferring to go down a much more esoteric route. Some readers active on the DIY groups on Facebook may well be aware of James and his Sparrowleg Designs. We first met James when he got in touch to tell us about an interesting looking speaker he's been working on. He's an expat' living about an hour away from us here in Brittany and we thought "Why not".

It's often said that necessity is the mother of inventions and this was certainly the case with this first speaker; a handmade snail shape for the bass and a DIY omni-directional speaker for the mid and tops. James told us how he used disposable aluminium cooking trays for the petals on his driver, meticulously flattening and cutting out each by hand. The drivers used to power drive the omni unit had been salvaged from old cars and the bass driver too was intended for use in car audio systems. Only one of these speakers was ever made and so it was difficult to evaluate the efficacy of the unit but James certainly had something here.

Fast forward to late Summer and we got a call from James telling us about the latest project he'd been working on and he sent along a photograph of it. The first thing that came to mind was a DALEK and some comments on social media were somewhat disparaging but, hey, beauty is in the eye of the beholder and anyway, surely it's what these speakers sound like that was important – and at least now there was a stereo pair for us to take a listen to. You can read what we thought at the end of this article.

We caught up with James more recently to ask him a few questions about the design of this latest speaker and to dig a little deeper into what drives him to create these loudspeakers.

**You used some pretty odd materials in the first design we encountered, why was this?**

Like everything, if you want to do something well, it helps if you have the correct tooling and materials, but when you're new to a hobby, whatever it is, you don't just go dive head first and splash the cash, as I've explained to my eldest, I'm not going to buy her a horse as she may get bored after a year of riding. Also, it could end up that you're not best suited to that particular pursuit. Audio engineering, in my case speaker building, could have been simple, purchase fantastic drivers with a price to match, but if you haven't experience, you'll end up with a box which may well end up sounding like a 1980's electric carving knife.

My initial material choices were a combination of past experience (for the last 10 years I've been in the interior renovation game), not knowing if I had what it took to actually design something from scratch and choosing materials I was familiar with, whilst knowing I could augment with the tools I had available at the time. For example, the initial omnis used crap (I mean scrap) car drivers and if they got broke during construction, I didn't care, at least I'd learned about the anatomy of a transducer. The same ethos was applied throughout my self-taught apprenticeship - the petals had to be light and stiff, do you order online, spend money and muck it up or look outside the box and scavenge what's local, knowing the supply is endless?

**The snail-like bass structure on the first speaker of yours we encountered looks as though it inspired by the designs of Laurence Dickie and the Nautilus loudspeaker, was this a conscious decision and what do you feel the shape brings to the party sonically?**

Honestly, I knew nothing about Laurence Dickie, Bowers & Wilkins, audio brands, acoustic topologies, nothing. I knew there was a good Richer Sounds shop on Whiteladies Road, Bristol, but when you live in France, that no good to man nor beast.





# DIY AUDIO - JAMES MEACHAM'S BIG BUILD 2018

Believe it or not, I just woke up one day and decided that I'd had enough of listening to music through budget bookshelf speakers and knew I had the capability to make something from scratch. The nautilus shape was chosen for two reasons; firstly, I knew that the rear wave of the driver shouldn't interact with the front, though I had no rationale behind the theory, so the shape seemed obvious. Secondly, I love a challenge and so this complex shape, no matter what the material, would give me a sense of achievement if I succeeded in pulling it off.

**All the speakers we have seen of yours have employed omnidirectional drivers. These are complicated and time-consuming structures to make, why didn't you go down a more conventional route?**

As much as people may not like to admit, we're all creatures of habit. Building on past experiences and notions, the Radialstrahler design was just a continuation of the Nautilus design but without the enclosure. However, I'll also admit there were other factors which came into play, prominently financial, having a young family I couldn't justify frittering away pennies, though creativity was (and is) free.

**The main body shape of your new speakers is certainly interesting and divided opinion on social media when you posted pictures, can you let readers know what is going on within the structure?**

My output of work is nothing more than repeating and improving on past experiences and the latest build is just a refined version of the nautilus with the various omni's sitting on top - though it was never the intention for it to be a 4-way loudspeaker.

The "Dr Who" cone shape was actually an accident, the girls and I were on a family outing to the local garden centre and spotted a *Cereus forbesii* (spiralis) – a cactus and like a flash of awakening I realised that if a helicoid was inserted into a cone then what you end up with is the nautilus. I also meshed all my prerequisite ideas; rear wave absorbent, sealed tapered horn (try saying that when you drunk!) which allows for an improved driver alignment and provides a more stable seating for the omni drivers.

There is a weird coincidence of the juxtaposition of both forms having their origins in something as freakish as natural numbers, though the symbolic reference to one of the most iconic speakers designed by Mr. Dickie was something you just couldn't plan, no matter how hard you try!

**You use DSP to shape crossovers etc, what do you think the benefits of DSP are and do you ever envisage yourself getting into the design of analogue crossover filters?**

I'm lazy, or just haven't seemed to find the time to learn another facet of this never-ending search for audio nirvana, DSP's, or specifically their software interfaces, particularly fit into my tight time frame. DSP allows me to see how far you can push the boundaries, mixing and matching drivers which usually have no belonging being paired. To be blunt, it's a great tool for putting theory into practise and when dealing with 3 or 4-way speakers why would you go through the heartache of a sink or swim design? Never say never though - for personal testing they're great and DSP are here to stay and I won't be straying, not unless I come up with something that requires a commercial vantage point.

**Do you plan to take your concepts to market or is this more an exercise in pushing the limits of what is achievable in the DIY domain?**

No one knows. Of course, there's personal aspirations to start a successful audio empire, many companies started in back street garages but there's also a reality - do we really need another speaker company and how commercially viable would my exotic contraptions be?

I wouldn't say I push any limits, especially with the current tooling at my disposal, it just a case of how creative one can be with what you have. This does raise a question regarding the fine line between DIY and commercial though, for example, if I had a CNC router or 3D printer, then is it really DIY? Actually, sod that, can you imagine what I would create? That really would be next level!

**What project are you working on currently and what else do you see in the pipeline design-wise?**

I don't really plan as such; all my projects are in essence a chronicle of where I'm at in the understanding of audio acoustics, though maybe I just have an odd sense of interpretation!

As per usual I'm juggling my time between various ideas, so, whilst waiting for some materials to arrive to build a version of a APM style driver, I'm still developing origami drivers. Also, I have a little experiment with comb filtering but on a largish scale. And to add to that list, if I can get my arse into gear, I'd really like to make the Daleks as a 2-way bookshelf version.

**Any final advice to would-be DIYists?**

A word of advice to anyone building speakers, no matter what your level is, just remember there's not actually a definitive right or wrong, the only truth is the physics but that is also where the rub is, you still have to compromise. If you make a speaker that can play all genres of music well, then you're half way there!

## BIG BUILD 2018 SPECIFICATIONS AND INSPIRATION

Sub woofer - Dayton Audio RSS315HF  
Woofer/low mid - Old stock Adrian Audio Extrimis 6.8  
High mid - Sparrowlegs Speaker Design Omni Mk5c  
Tweeter - Sparrowlegs Speaker Design Omni Mk7b

Active Crossover - I was meant to using the AIIDSP 1800b, however, one broke on delivery from the shipper so I used the freebie from Dayton Audio - 408DSP. (Shame it didn't have digital in!)

As it's a full active 4 way, the amps used (though more tweaking required) -

2x Pascal S Pro2 un-modified  
B&O Icepower 2ASX125  
And for the tweeter, your sons amp!

With the DSP, the XO was at 250, 800 and 4000hz. No EQing was done at yours as I didn't have the Mic with me. Though you did get me to reduce the tweeter gain by 6dB, which was a surprise as they are the weakest link with regards to sensitivity at 84db. (Proves my point though)



# DIY AUDIO - JAMES MEACHAM'S BIG BUILD 2018







# DIY AUDIO - JAMES MEACHAM'S BIG BUILD 2018

Why the cone shape enclosure? For those of you who haven't been following my Sparrowlegs Speaker design page, when I decided to make a speaker and I knew nothing about audio, the first design I gravitated to was a sealed tapered horn, IE the Nautilus. (Being wet behind the ears, I actually had no idea that this had already been designed and built Laurence Dickie when he was working for Bowers and Wilkins back in the 90's)

Making a Nautilus enclosure is a pig to build, trust me, I made one some time back. I was adamant to keep with this formula of eliminating the standing waves at the back of the driver whilst making the enclosure construction easier compared with a snail shape.

As mentioned earlier, I had a spot of luck when visiting a garden centre and quite simply I spotted a Cactus with a Helicoid structure! This was the eureka moment, I realised that I could continue with Nautilus principle, but carried in alternative forms. The "Conical Frustum" containing an internal helicoid was born.

The external Skin of the enclosure -

This is only a theory as I don't have a tooling to prove otherwise, however one of the goals all speaker designers try to implement, especially when dealing with subs and woofers, is to make the enclosure as stiff as possible.

Careful consideration of having woofer embedded in the same enclosure holding an omni-directional driver required some planning. Any colouration the enclosure contains will contaminate the sound produced by omni's due to the orientation of their voice coils.

Recently I made a Subwoofer enclosure using 50mm thick Granite, no ringing as some may question due to frequency range a Sub offers, but one strange note, which I thought about some time back. A Sub requires and dissipates a lot of energy, so if you have a stiff enclosure, what happens to the energy?

This got me thinking if a possible issue with such stiff enclosure is that the time in which the stored energy finally gets released, its timing is out of rhythm. It's only a hypothesis however I was pleased to see Lynn Olson making a similar comment on a post recently.

The skin does a few things, stiffens up the sub-structure of the enclosure, making it 40mm thick. Defuses the baffle and hopefully disperses any remaining energy within an un-noticeable timeframe.

## BUT WHAT DO THEY SOUND LIKE?

James lives an hour or so from Hifi Pig Towers and so we asked if he'd bring these speakers he'd been telling us about on social media for us to have a listen to, and so one Saturday morning in late 2018 he turned up with his "Big Build 2018" for us to have a listen to. In James' own words he was looking to gauge our thoughts on the sound more as a guide to see if he was going in the right direction, so far from this been a "review" it's meant more of an overview of what we heard on the day.

Detail in the mids was the first thing that was evident when these speakers were turned on and some music played and this was fine-tuned "on the fly" enabling James to tailor the speakers to the specific room. The speakers immediately came across as being very detailed with the drums at the start of Ziggy Stardust really standing out and with us being clearly to hear the stick hit the skin and the sound of the

"spring" on the snare. Playing some jazz in the form of Duke Ellington you can hear fingers moving on the fretboard of the double bass. Initially we felt that the speakers were too forward in the tops with that detail I just mentioned being the result, but a bit of a mess with the DSP and all is good with Lauren Hill sounding as good on these speakers as a good few commercial designs we've had the pleasure to hear. And the omnis do work in that you can move around and away from the hot-spot without losing the stereo image.

Whacking on Once Again Back by Hardfloor, a track we use to separate the men from the boys with regards bass response, with lesser speakers often unable to go so low or sound flabby and boomy. Not so here, these go low and are controlled in the bass with the drum machine hats being in the right places in the mix and the 303 acid box sounding convincing enough for me to be happy. The bassline and kick towards the break in this track were portrayed as two separate tracks in the mix and yet coming together properly.

Another test track of ours is Gil Scott-Heron's Peace Go With You Brother as it was recorded in a small space and there are lots of cues to the recording space on the track. James' speakers did a convincing job of recreating this ambiance and "room feel" with cymbals and their after-shimmer particularly standing out for me. Heron's vocal was nicely portrayed and with good insight into the emotion he carries in his delivery and bass, particularly on The Bottle, was easy to follow and nimble.

Last on the CD player was Daft Punk's Contact and I will repeat my mantra once again – if a speaker can't play this well it doesn't get to stay in the house. Suffice to say I'd be very happy to have a production pair of these in the house.

For a DIY build with a complicated design, these speakers perform remarkably well! They are detailed and insightful in the mids and tops and lithe and nimble in the bass.

**Got a project you'd like to share with our readers? Get in touch!**

# DIY AUDIO

## SHANE FAGE'S OPEN BAFFLE BUILD



Shane Fage is a keen DIY builder from Canada, here we talk to him about the design of his Open Baffle project.

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# DIY AUDIO - SHANE FAGE'S OPEN BAFFLE BUILD



I decided to become a musician when I was thirteen years old. Forty-one years later, I am still at it in one form or another. I went through the youthful rock band stage. I survived academe somewhat unscathed. I earned a bachelor's degree, a master's degree and Ph.d (A.B.D.) in music theory and composition, then did ten residencies at the Banff Centre in Canada, as composer-in-residence.

I have always loved loudspeaker design. It is challenging and rewarding. I sold audio for many years and have always found myself wanting, owing to the musicality of a lot of designs. I have heard everything from a thousand dollars to two-hundred and fifty-thousand dollars. I have heard everything I feel I need to hear.

As many people experience - no matter what their discipline - it is not something one can just turn off like a light switch. It simply doesn't work that way. I have heard many loudspeakers and I can't get past it: "That is not what a violin sounds like." I apologise but I have been around many violinists. I have written for violin many, many times. I have written for a lot of instruments many times. It's been my job.

I have really enjoyed this incredibly perplexing journey. The reward is making a thing that is musical. In my opinion, that is something a lot of designs fall short upon. We've all heard many loudspeakers built by some very fine minds on the subject. Unfortunately, we're after a measurement of the unmeasurable. This is what motivates me.

Open Baffle speakers are huge on the DIY scene, why do you think that is?

I believe it is a sound stage issue. We're all striving to find something as close to a performance as possible. Well, most of us.

**What do you think the OB design brings to the table that conventional speakers don't?**

There is a breadth and depth that conventional loudspeakers can't seem to do. I believe the reproduction of a well-recorded piano is a dead give-away, particularly if the recording engineer understood that this is chamber music. Let's be specific about that: In music history, chamber music is music that is in a room! So, the primary concern is to bring that piano in to my room, here at home. As far as voicing goes, the final tweak stage is done with my ears.

**Tell Hifi Pig readers about how you came up with this design.**

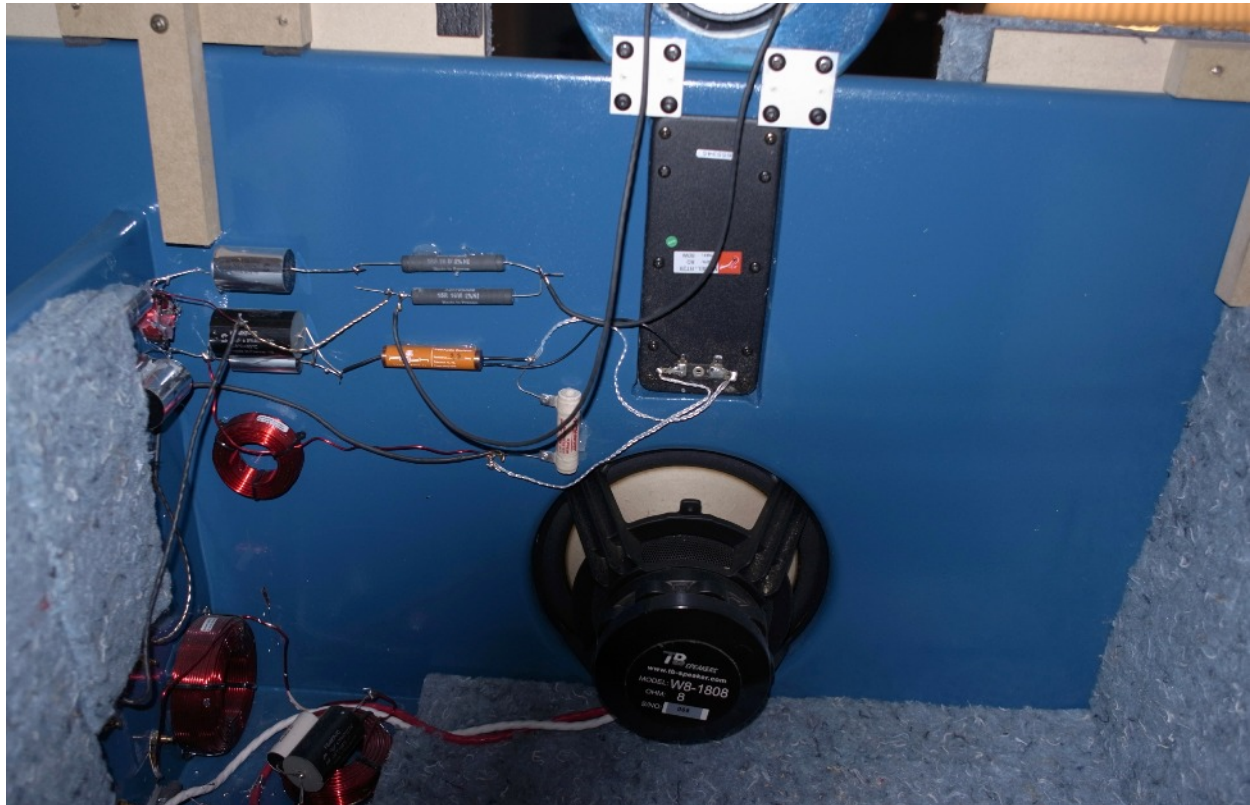
Originally, I was influenced by Gravesen's OBL15 project. I am lucky because I have the space to use a design such as this. The first issue is: room size. Make no mistake. It's a commitment that will not work for everyone's home environment. You need a big room. There is no getting around that because it's not what's in front of the loudspeaker... it's what's behind it. My room dimensions are 6.8 meters, 4 meters and 3 meters (a meter is about 38 inches). At first, I tried 1 meter behind the loudspeaker. It simply wasn't enough because it constrained the entire point of the design. We are looking for a BIG sound stage. I arrived at 1.5 meters (or, 5 feet) behind the loudspeaker. Some designs will vary slightly, but again, make no mistake. You will need this kind of space.

**There's a wideband driver in there, what is it and what frequencies is it covering?**

I chose the Tang-Band W8-1808. It is a truly outstanding driver at this price point. To get anything better is well within the realm of diminishing returns which we all hate so much.

Originally this was going to be a full-range design. That was the plan. Unfortunately, Steinbeck already wrote about that. That turned out to be a real mouse. I have come to a point in all of this loudspeaker design where I look at it the same way as buying a used tube amplifier. I no longer ask the guy what the tubes are like because it

# DIY AUDIO - SHANE FAGE'S OPEN BAFFLE BUILD



will be a load of bollocks. It's the same as the FR response on most drivers in my opinion...Bollocks.

The cone break-up up top is really nasty. I tried various iterations of filters of a simple coil and resistor and BSC set-ups. Musically, I came to the realisation that this thing will never happen. I am going to end up with a million LCR filters and I will still never be happy. So, I decided to can that whole idea and went forward with a third order BW filter. It worked. Music happened.

As a side note, many people say the Qts on this driver is very low. Too low. Quite frankly, I am getting perfectly acceptable bass response if the goal is to have the darned thing sound like a piano or double bass. Most importantly, car crashes and nuclear explosions are not my aim. I don't care about that. To be honest, originally, I had left enough space upon the front baffle to include a Precision Devices PD186. I opted not to because I built a sub, and really, using that properly - and musically, for acoustic musical instruments - it fires up 2% of the time, and that's being very generous.

**The tweeter looks interesting, what is it and why did you choose it?**

I chose the Hivi RT2Pro. I liked it because an ATM was something I always wanted to try and, the radiating area is quite large. The point of the entire design was: I wanted a big sound stage. The RT2Pro gave me what I wanted. As far as efficiency goes, it's reasonable with the WB-1808 so I don't have to go "too" nuts with an attenuation circuit.

**Tell us about your crossover design.**

This is a really loaded question, as it should be. "Do you have Xsim?" Yup. "Do you have spectrum analysis software at your disposal?" Yup. "Do you have a properly-calibrated measurement microphone?"

Yup. That too. I have it all... and do you want to know something? I came to the same conclusion all those cats at the BBC came to, decades ago. That "BBC dip" is awesome sauce. Sign me up. But, I didn't stop there.

I fiddle-faddled around with all of those pink noise measurements for days. Before I go any further and as outlined in my introduction, I have to tell you where I come from. I have been a musician for my entire life. I turned in to an academic, went all the way through the course work for a Ph.D in music theory and composition. I am not telling you that to brag. I am telling you that because I \*have to know\* what instruments sound like. I have already been down the "traffic jam for orchestra" road. It's damned embarrassing when you're sitting in front of 70 angry union-scale musicians that would rather play Beethoven. Believe me. It's not pleasant. I have to know that this thing works on paper before I even begin to dream of putting it in front of those people.

I used a 3rd order Butterworth slope for the tweeter at 2500hz. Here comes the part that's going to drive a lot of people crazy: I went with 1000hz for the bass driver at 3rd order, plus a zobel. Oh yes, I can hear everyone's head exploding, right now. Guess what? It works. It's VERY musical. Saxophones, trumpets, female voice, et cetera... work like a charm. Oh yes, I can hear a metric tonne of people getting out their calculators. Well, guess what? I don't care. It sounds just like a bass clarinet. That's what I care about. It sounds like a tenor saxophone. I care about that too. I have come to the conclusion that's the one thing that will drive an engineer crazy: measuring the unmeasurable: \*musicality\*.

The RT2Pro is a really great driver. They've stopped making them but you can still buy them. They simply look different now. The FR curves of the RT2pro are interesting. Yes, "interesting". It can play stuff way up there. Just... not very loud. The final iteration of this loudspeaker came with the addition of a Seas 27TFFC at 11.75khz 3rd order, no



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need for an attenuation circuit. It works like a charm in my room and for my ear.

I added shelves and side panels for this design. As I mentioned earlier, the original idea was to add the Precision Devices PD 186. In the end, I didn't bother because I was very satisfied with the bass response as it sits in this iteration. Then I took things one step further and added sound absorption panels on the front (to account for some of the BSC issues) and some reflection out the back. This was a minor fix but it tightened things up very nicely.

There is one interesting thing I took in to account when designing this thing: the angle, and how I could make it adjustable for a longer or shorter room. I added two 3-inch carriage bolts at the front, behind the baffle. I can adjust these upward and downward, depending upon what level of directivity and brightness you like. You can adjust how directly the ATM fires at you. That's a sweet little perk, by the way.

## **What do you think are the strengths and weaknesses of these specific speakers?**

As I mentioned, the sound stage is a million bucks. It's a work of art. The weakness is how the look in a domestic setting. If you have the room - and your spouse will put up with this nonsense - you should re-marry her. You lucked out there, cowboy.

## **How long has it taken you to complete the build, including designing them?**

It took me a week or two of consideration while looking at Gravesen's design. I knew from the outset that his was simply a point of departure for what I wanted. And of course, he may have wanted something different than me. All in all, once the parts arrived, I would say that I had 13 hours in to building and finishing the cabinets. Then I spent the next month or so fiddling with the math, hating it, revising it, then

completely ignoring it. I read dozens of pages of trolls and angry people. Who hasn't? At some point, you have to take a percentage of what they say, of what you think is musical and "bin" the rest.

## **Are there things in hindsight you would do different?**

Not really. It's not about the destination. It's about the journey, right? I am so happy with the way they turned out that I am not even using them anymore and I have gone on to another design, perfected that to a point where I am happy with that... and now I am on to something REALLY screwy! This new objective is absolutely hellish.

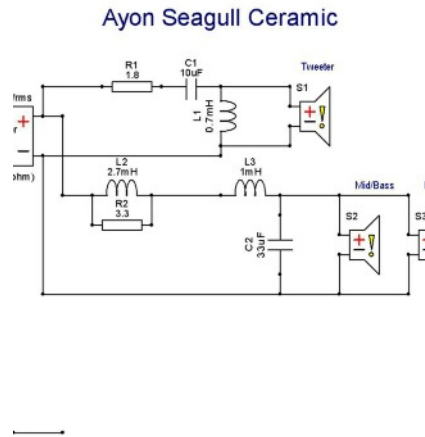
## **Are you more about the maths and physics or do you trust your instincts and ears more?**

Again, there comes a point where you \*have to trust your ears\*! If you don't then you're really in trouble. What I would recommend is that you go to a live show where you can hear instruments un-amplified. That's the most important part. You have to hear -just- the instrument. Then, go home and throw everything through the kitchen window, then pay for the divorce attorney. Well, and the glass guys, unless you're cool with plastic sheeting where the window used to be.

**Got a project you'd like to share with our readers? Get in touch!**

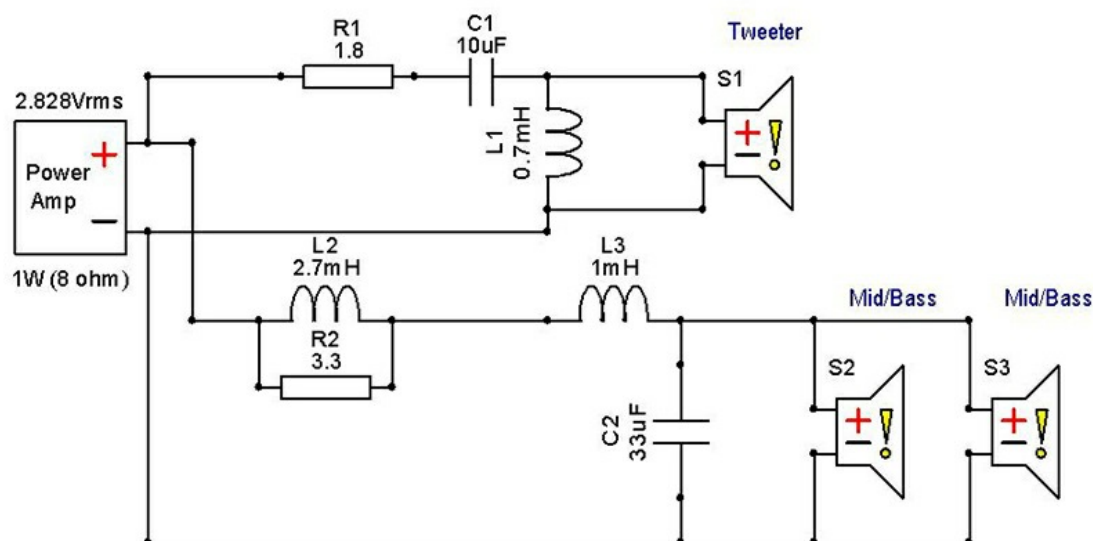
# DIY AUDIO

## THE SILVER AND GOLD EFFECT



Dan Worth looks at the effects of swapping out crossover components in his Ayon Seagull C loudspeakers. Not so much a review but a personal journey of exploration of what can be achieved by improving what is already there and of particular interest to those interested in DIY Audio.

## Ayon Seagull Ceramic



Working hard to get your system correct in terms of synergy and room interaction is always a matter of ongoing efforts. What may sound correct one day at a specific moment in time with a specific genre of music can often become after prolonged listening to just not cut the mustard at all. We buy and try various new components and speakers, try to balance tonality with different brands of cables and attempt to clean the sound with equipment racks and isolation supports.

What if I told you that there is another route to explore that will open a whole new area of technical and aural exploration, but could indeed also prove to be a cost-effective solution in some cases?

Now as no surprise to our American readers and many on the continent, modifying our system components can have huge benefits over selling them on and losing a fortune to only then spend an additional small fortune to upgrade, or as is the case in many cases sidestep - attempting to better our current sound. The U.K. has been a little slower than many other countries to cotton on to the potential of modifying existing equipment, with a handful of companies showing up over the past few years and offering such services. Myself, I've always been interested in updating and upgrading my equipment, but I don't have the technical knowledge to perform the calculations necessary to reform a circuit such as a speaker crossover or to cut and remaster a PCB in my electronics for maximum effectiveness.

I've been lucky enough to have a small group of friends both personal and in the industry, who can offer specific information on redesigning and implementing key upgrades, which in large has been extremely effective on overall sound quality and most importantly my wallet.

I started off initially by implementing aftermarket power supplies and building my own cables many years ago, with good levels of effectiveness and as time has gone on with some real perseverance and still limited knowledge I have a system today that far exceeds its credentials in comparison to its off-the-shelf performance.

The main focus around this write-up is to assess and convey what potential performance increases are gained using Mundorf's Silver Gold products within my Ayon Seagull C - all ceramic Accuton based driver speakers. The products will include Silver Gold Capacitors, Inductors, Resistors, Wiring and accessories.

Firstly though, I will take you on the journey of the changes I initially made to the speakers with more modestly priced component changes and my slow yet informative progression to higher priced components and their benefits - before moving on to Mundorf's bespoke Silver/Gold products and my review of them in this two-part write-up.

My speakers have been a project in the making for a fair few years now, using various levels and price-points of components (mostly Mundorf) as well as having them re-veneered, isolated and complimented with the addition of super-tweeters.

### ASSESSING CURRENT SPEAKER PERFORMANCE

When approaching a project such as this there is a requirement to be confident in the speakers; just like any other component in your system, you need to be happy that their integration of drivers and crossover points produce a cohesive performance. For me, the potential of my Accuton driver's performance superseded the crossover components which came as standard from the factory. I had already noted that the same drivers were already being used on speakers costing triple the price of my own. I was also happy with my room's response and general integration.

The issues I had with my speakers in standard form was primarily with the tweeters, they would often sound hard and wispy - a little edgy and bright. There was a clear lack of solidity in the upper-end and a lack of overall control, resulting in a less than natural presentation, with a somewhat mechanical or digital hardness. Midrange was always pretty exceptional with any amplification I had used and although smoother sounding valves amps paired well, I felt that I was



# THE SILVER AND GOLD EFFECT

lacking upper-end transparency in the trade-off for a more tamed treble. The ceramic drivers really have always excelled on projecting vocals, if not for a trade-off in depth, with a slight lack of depth complexity when it comes to multiple artifact positioning. Bass was always tight and fast, yet slightly lacked a richer tonality and overall extension in exchange for upper-bass attack.

In their standard form, Ayon had promoted the speakers as coming with "custom made Mundorf crossovers", something that more and more companies are championing these days. Although there is some validity in this statement as the crossovers were indeed custom tuned to the drivers and cabinets by the Ayon technicians, all parts were in fact, off-the-shelf and implemented to cost, though they were indeed Mundorf components. What I did admire once getting inside the speaker was how simple and clutter free the crossover design was. There had been great care and extensive listening done in order to complete the circuitry in such a minimalistic way, which in turn made me and my "solder slave" very happy. I have an eye condition that leaves me with partial sight, so a good friend of mine would come over frequently to implement the modifications I'd decided on for the crossover upgrades, as well as the various other modifications I often make in my electronics.

The crossover is a 2nd order design, with some response shaping on the bass section (an inductor partially bypassed by a resistor), this means the inductor allows low frequencies through and the resistor allows a limited amount of higher frequencies through. Which then feeds into the standard second order low pass section of the crossover. The tweeter has an attenuating resistor before the high pass section.

The most reasonable option in performing upgrades, especially when you are not very technically minded on crossover design, is to look to swap the components out value for value but using better components. The capacitors installed from new were Mundorf MKP throughout, air core and ferrite inductors and Mundorf's basic MOX resistors - although a far better compliment than many other speakers there was potential room for improvement.

Capacitor values can be broken down into values which accumulate to the same overall value using a range of capacitor types and brands to give a presentation of combined sonic traits, but this is an absolute minefield, and unless you have large stocks to play with, common sense and a more simplistic approach is suggested for beginners.

## THE BEGINNING

My initial planned changes were to swap out the capacitors in the speakers. Research and previous experience in changing power supply caps proved to have the most profound effects. My choice was to upgrade to the Mundorf EVO Oil caps - the EVO Oils are a reasonably cheap upgrade. I First changed the cap on the mid/bass circuit in just one speaker. On listening, there was a clear lean to one side of the soundstage, with more pronunciation from the speaker with the new cap in. So, the same was applied to the second speaker - where balance was found, but now I was in the position where the tweeter sounded less forward and the sound sat behind the mid/bass and struggled to engage cohesively.

Addressing this by installing the same caps in the tweeter circuit value for value brought everything back in balance. Although definition and detail were increased, my tweeters still had that whispyness I described earlier during testing. I gained more body and density to the treble, but it still lacked a degree of control.

With a little more research in hand and some good advice, I opted to try some Mills resistors across the whole crossover network. This helped, but I was still not convinced by the presentation; I felt as if the Mills had simply laid a hint of colour, masking over everything - less hard sounding now, but sacrificed leading edge clarity and definition. The Mills are a smooth sounding resistor, but I wanted to obtain greater transparency and control rather than smoothing out the nasties so that they grated on me less - liken it to blowing a high pitched whistle and then blowing it again under your jacket.

To combat this and to try and obtain some form of balance I opted to try some Mundorf Supreme caps, the standard kind. Very pleasingly the combination of the Mills along with the Supremes was offering a far better balance, a wider and more open soundstage and great depth in comparison to the EVOs. Leading edges were better defined, sharper, with less haze, and the small amounts of roundness balanced the tweeters to make them far more listenable and more sophisticated. After some extensive listening over the following month or so I still had a slight whisp and break-down in the top-end of a strong female vocalist, especially at higher volume levels and with busier music containing more aggressive notes in the treble area -this would pinch my eardrums at times and put out uncontrolled, rough distortions. The overall improvements at this stage in comparison to stock were vast and I was becoming addicted to the potential and real cost-effective benefits of the improvements over the thousands spent in other areas of my system.

I actually sat with this combination for a good couple of months, allowing time for the new components to run in before making any rash decisions. I had a visit from a couple of industry professionals that work in the Pro Audio/Studio sector and who also produce products for HiFi/Home Audio use (both engineers and company owners) and they had a new suggestion to make.

The current wiring inside the speakers was Shunyata 1.25mm solid core copper in a plaited geometry. The suggestion was to use a heavier gauge cable on the tweeter to give less resistance to the ceramic diaphragm and allowing it to breath more freely. The cable used was actually stranded copper of a very pure variety, which also contained a small amount of pure silver strands too, designed by one of these guys - Michael Whiteside under the Studio Connections brand - who is a physicist and who's cables I use predominantly in my system. I admire the combination of science and real-world testing that is used to produce them, so was confident in the suggestion - plus the same cable is used by the other guy in his own brand of speakers, which have been used in some serious studios as well as on Broadway.

The very instant the wire changes were made the tweeters came on song and any harshness that remained subsided dramatically. I didn't have the complete richness in tone I have now after more updates, but the improvements allowed for some real controlled clarity to emerge from the upper frequencies for the first time. I found that female vocalists such as Rachelle Farrell and Lorena McKennitt could get carried away and really wail without pinning me to the ceiling at high volumes. Result!

My experience with the Mills resistors and their very discernible sonic signature gave to the sound was on my mind for a while afterwards - I thought, if a simple cable change was able to make this much difference to the tweeter and knowing that the Mills gave a smoother offering to things, my brain was saying, would a more transparent sounding resistor in the treble now be applicable and would the tweeters open up further, but without sounding too explicit?

# THE SILVER AND GOLD EFFECT

Continued research brought me to Dueland, a company that I've heard wonderful things about over the years, but also a company that sell components that cost eye-watering amounts. Their resistors, which are often championed on DIY forums and people were telling me "Having a Dueland resistor in a circuit, is like having no resistor at all", suits me I thought. My goal as I said is to obtain absolute transparency with as much tonal quality and control as I possibly can.

So, a couple Dueland resistors of the same value later and the Ayons were put back together and listened to. Oh no, was my first thought, have I chosen or been sent the wrong values? Checking my invoice and the resistors themselves this proved not to be the case. What had happened was that the Dueland resistors sounded as if they had so little resistance that the treble was simply overpowering, not in the sense of harshness but in their perceived volume or dB level - I can't listen to this I thought, disjointed was an understatement. They completely took away the treble/mid/bass cohesive balance. My thoughts were that I obviously, I needed to get matching resistors for the mid/bass to bring the levels to a balance again and then work from there.

The most satisfying thing when I did install the Dueland all around was that I was so confident that any other changes made anywhere in the speakers would now be heard so easily and it was at this point where I began to feel excited about the journey ahead.

The definition I now had allowed the Mundorf Supreme Caps to really show their sonic signature, smooth, detailed and exploring a wider deeper soundstage with far better extension. The same was true for the Accuton drivers, they gained speed and poise, with more accurate control of leading edges and with a freer and more open decay.

When I had changed the internal wiring inside the Ayons, it was suggested to me to try some of the newer ClarityCap MR caps, so I picked up a full set and installed them. The differences between the MRs and the Supremes were surely noticeable. The Mundorfs' had a slightly warmer flavour and the ClarityCaps were definitely cleaner. The MRs didn't have the depth of the Supremes, but imaging on both sets was absolutely brilliant. The MRs for me would have suited a larger paper cone-based speaker, whereas, in my situation with the ceramic drivers and their sonic signature, I just loved the Mundorf Supremes as they gave a balance of tonal preference along with better depth and insight to the image - they sound more mature and elegant but still know how to conduct a beat.

## FIRST CONTACT

I initiated conversations with Mundorf soon after this and we talked about the benefits of capacitors utilising different materials and structures. Up until now, I had only used three of their caps with each being an entry-level cap from each of their ranges, predominantly using aluminium foil, with the EVOs being soaked in oil - a small step up from the plain aluminium version they offer and which I had used previously in amplifiers.

We also discussed the benefits of re-wiring speakers, a simple upgrade that many of us have made over time. I had been using Mundorf's Silver/Gold wire for some years, in various cables and also as internal hookup wire and have always greatly favoured it over pure silver conductors. The tonality obtained from the mixture of the two precious metals gives the extensive detail obtained from good quality silver, with more of the tonality of an ultra-pure copper wire - the combination is an absolute wonder and my choice of wire for any DIY project, such as my huge 50kg Balanced AC/DC Power Supply (which

I may also write about at some point) as well as the many cable designs I have made over the years.

With the increased performance I had found by changing from the Shunyata wire to the Studio Connections, especially with regards to taking away the whispyness of the tweeters, I decided that I wanted to pursue other elements, such as the inductors prior to another re-wire. So, I will look again at this when we come to the second part of this write-up which will be focused on Mundorf's Silver/Gold products.

Things got interesting here for me again. Interesting in the sense that advice I had been given previously from a couple speaker designers was that inductors, as long as they are at correct values really don't make much difference to performance. Of course, me being me I was sceptical, to say the least - I couldn't see why companies such as Mundorf and others would produce such a vast range of inductors if their performance differences were negligible. My conclusion has always boiled down to try it for yourself and make your own decision. Dan, along with the notion "will the rest of the electronics or speakers be competent enough to expose the attributes of such an upgrade?", which is something that causes many people to fail to understand the benefits of some system changes/upgrades. You have to have good components to begin with to appreciate other changes in the chain.

A lot of reading from multiple sources and some further conversations with other professionals and Mundorf themselves, left me very confident that if I was to purchase a set of new inductors I would indeed value the benefits in my speakers.

Mundorf offered me four upgrade paths to choose from, each being an upgrade to my current inductors and all options either copper wire-based or copper foil based. I opted for copper wire-based rather than foil. My plan was to allow myself to identify the benefits of an inductor combination which on paper far exceeds my stock inductors and go from there.

The inductors were of the air core varieties which are baked in hard wax, two of which were discs roughly two inches in diameter by roughly an inch thick and the other a 3kg four inch squared cube.

Installing the inductors required my entire crossover (which sits in the base of my speakers on a separate plate) to be completely removed and resealed, mainly due to the size of the larger inductor, but also due to the requirements of inductors' placement in relation to one another. Inductors, being a coil will generate an electromagnetic field, these fields need to be offset from each other by 90 degrees. The most obvious configuration was to turn one on its side, the next laid flat and the next on its side and also twisted 90 degrees. The method is very commonly known and will be something that anybody wishing to do component upgrades will come across very quickly during any research into these types of modifications.

The new inductors had an immediate effect on my sound. Mainly adding body to the entire frequency range, under-pinning tonality and lending each and every instrument, as well as vocals, some real distinguished tone, body, and timbre. The sound compared to stock was just so much more natural now with the entire combination of modifications. Spatial awareness gained a good few notches in performance and my background is far more silent, allowing inner detail to really shine. Over the past couple of months, the masses of metals have had the opportunity to settle in and run in and the entire picture has become more intimate and effortless, with better conveyance and attention to intricacies of micro-details and micro-dynamics. It is like adding superior tyres to a sports car, allowing the power to connect to the tarmac more efficiently.

# THE SILVER AND GOLD EFFECT

My advice through my experiences, and as someone who initially only concentrated on the external upgrades and changes that off the shelf products, is for anybody wishing to upgrade their crossovers to treat them just like a power supply or cable upgrade - purchase values of the same spec as the current, buy components within budget, start with a linear approach from a reputable company and work from there. Just like a power supply upgrade, you will need to retain electrical values, and just like cable upgrades you will find that cables from the same manufacturer will synergistically work, or like many of us, you may do some further research and add a cable or two from another company. You can go exotic, just like cables, but for price against performance... crossovers are, in my personal experience, where some real benefits can be made to an already established competent system.

## PART 2

Since the first part of this write-up I've been busy concluding the final crossover compliment for my Ayon loudspeakers. It's been a time consuming and interesting experience. Time consuming with regards to implementing, running in and assessing any changes incrementally and interesting with regards to the experience and journey the project has taken me on - at times working backward in order to strengthen the sonic bond between components once more experience had been gained through hours and hours of listening tests as each next stage was configured.

Like any other system change, it's often likely that one step forward can often result in two steps back. You may be fortunate enough to add a power cable to a component and instantly it's transformed with more detail and depth but possibly has lost some bass appeal. You may then take that change away, but when adding the previous power cable the benefits of the upgrade exceeded its losses. So then it's down to knowing and or experimenting where you may be able to regain some of that lost bass presence, whether it be isolation or an interconnect change, for instance, to reform the tonal synergy and at the same time retain the new benefits.

Much is the same when fettling crossovers, there is a process where the no-brainer upgrades from mediocre and cost-effective yet better components, to good strong upgrades at reasonable costs, begins to become a trickier task. Again, like cables and other tweaks, when you start to move past the mid-priced product band and start to delve into the high-end, ultimate refinement becomes a far more intricate task. I relate it to finely tuning a high-end racing car. Anybody can add an aftermarket £300 exhaust, a new air filter, and better tires to an everyday driver for a little more excitement but finely tuning any motor vehicle for hardcore racing is a task of synergy, very fine tuning, computing and timing expertise, you simply cannot just buy a range of expensive parts, bolt them together and expect them to perform flawlessly for you.

Now to a certain degree I will admit that my experience with Mundorf's Silver Gold products have all been fantastic but if I was to be uber critical I will admit that I balanced my speakers to a degree where I felt I had the best synergy when doing a little too and fro-ing and not just using every one of their highest level components and saying well this must be better (for me in my system with these drivers) because they are more expensive.

The task of installing the first Silver/Gold products was a real revelation in upgrading the sound quality all around and my initial task as before was to change out the capacitors. I reverted to the Evo range of products again, moving from the standard aluminium in oil Supremes to the Evo Silver/Gold - these added an extra level of

detail all around and an Evo being an Evo has a punchier quality over the more, I'd say, natural appeal of a Supreme, although the Evo is a good natural sounding cap especially in its Silver/Gold form they are a little more driven, which is something I like personally in my presentation as they add a touch more enthusiasm to the electronic music I do like to listen to. The next step up from these is the silver/gold in oil.

Introducing these gave me similar benefits in drive and soundstage size along with good layering from each capacitor, with the "Oil" versions offering stronger tonality and more naturalness. I spent a month or so with the Silver/Gold in Oil options in place as their potential was more appealing in texture, and background silences added an additional sprinkle of delicacy during passages of acoustic music that had fewer instruments playing, allowing for smaller artifacts to create a more complex and holographic rendition in overall presentation, whilst not losing any drive and enthusiasm when things got busier or a genre change was made.

Appreciating the combination of Silver/Gold in Oil my obvious craving came for the Silver/Gold in Oils with the Supreme winding over the Evo winding. These caps are Mundorf's signature capacitor - an expensive, yet incredibly well made and bespoke cap which is noted to be one of the very best on the planet and really only used in extremely high-end speakers, but again although expensive not beyond the means of many who spend large amounts on cabling.

The Supreme Silver/Golds in Oil are the most deliciously sweet, in-depth and vibrant sounding upgrades I have ever made - period. The connection with the music became so vivid that I hesitated to even progress with any other changes in my speakers and once again quietly commended Accuton for engineering a driver that could expose so much more than I ever initially expected possible due to the chosen crossover components originally found within my Ayon speakers as standard!

Listening to a range of Jazz and Acoustic music I experienced inner detail and micro details in a way that I had never obtained from my system before. Imaging and timing were more accurate and the devilish tweeter which I once believed would always have a love-hate relationship with me finally found its position in the overall picture as a leading force, just so delicate and airy with perfect tone and shape. I had a manufacturer bring some equipment over for review a little while after these had settled in and we sat listening for a couple hours, while we talked about the journey I had made with my speakers and what I still had planned for them and he said to me before he left that he felt I had probably the best sounding and most carefully put together system he had heard to date, he even said he would follow my progression and read these write-ups with the expectation that he would do similar with his speakers. The same has happened with other industry professionals, retailers and acquaintances just recently who have said after reading the first part of my write-up they too have made some critical changes to their speakers and many have stated that what once felt like a minefield of options along with a lack of knowledge actually proved to be a pretty straightforward and incredibly rewarding process, which was great to hear and exactly what I was trying to achieve with this type of story. I am in the process of helping a couple friends with similar upgrades and it seems like the general consensus really is, if we can obtain such benefits from changing a few internal components in our speakers then why isn't everybody doing it? Well exactly!

Moving onto inductors - the initial upgrades I mentioned within part 1 of this write-up were a distinctive benefit to overall performance, especially in bass stability and background silence, aiding finer details



# THE SILVER AND GOLD EFFECT

to emerge with more presence along with adding an extra layer of emotion and believability to my systems performance.

During some more discussions with the ever helpful and knowledgeable guys at Mundorf with the plan to start trying some of the Silver/Gold inductors, their Sales Manager Armin Tosta threw a spanner into the works "Dan, we have just released a new capacitor range, the Mundorf Supreme Evo". "Oh no!" I said. My experience with each of the top Evo and Supreme caps still gave me sleepless nights and at one time I even contemplated breaking down the values required and rebuilding them with different values of each cap to create the whole as both had such strong benefits.

Now I was confronted with a set of caps which were exactly where my mind had been wandering for a while and the benefit of less overall components and space used.

So inductors to one side just now I decided to take a full complement of the Supreme Evo Silver/Gold in Oils - and admittedly was very excited at the prospect of them being a combination that would keep me excited as well as maintain my interest in each of my favoured yet very different genres of music.

How very true this would be...initially during break-in the caps were a little exuberant in the top-end, but this soon faded and what was conveyed in its early days to be a slight lack in bass extension soon relaxed into its flow. The dynamic intensity is incredible with this cap, so impactful without ever overstepping the mark or becoming exhausting. They sit behind the fine line and effortlessly portray music in such a way that they never over-dramatise anything but keep you completely invested and drawn to the different appeals in excitement from each category of music you throw at them.

Timing especially was a notable point, their slightly faster and crisper leading edge abilities offered fast guitarists such as Nils Lofgren the ability to show off their handiwork and upper-bass notes had that extra touch of speed over the Supreme options. For those who enjoy a slightly more effective speed to their punch without losing control in the leading edges, these are a great option. Like the Supreme (none Evo) counterparts soundstage depth was fantastic and the ability to provide realism within the acoustic space exceptional.

As I had the Supreme Evo and Supreme top of the line caps here and with the ever thinking brain that I have, I came to the conclusion that even though I could wholeheartedly live with each set of capacitors in my system I needed to do a little experiment. So I ended up going back with the knowledge I had acquired through testing to replace the Supreme Silver/Gold in Oil back into the tweeter circuit and leave the Supreme Evo Silver/Gold in Oil in the mid/bass filter. This decision was somewhat of a revelation, now we are not talking huge differences here, we are talking about an ultra fine tuning process with a careful ear and much listening thereafter. The combination of the two in this position gave me additional delicacy and texture in the treble and brought my tweeter to a stage where it didn't just integrate as I had strived so hard to achieve, but now had a relaxed sweetness combined with the mid/bass crossover point and character of the mid/bass that now exudes such confidence that I found after the complete burn-in process finally spoke to me in a way that its confidence was more towards - simply enjoy the result of your efforts, rather than stand up and look at me.

The last couple of stages in upgrading my Ayons have all been to a point where I felt I could happily live with the presentation they gave but again, with further persistence and scope to try other components even further benefits were achieved that I couldn't actually

understand until they were made, remember this is as much a process for me as it will be for you.

Some time had passed since my capacitor changes and I was ready to make some additional changes - a package arrived from Mundorf containing Silver/Gold foil inductors, these are very pretty and the foil is absolutely impeccable and manufactured with perfection, rather a shame to be hiding them within my speakers in fact - but I'm not going to be moving my crossovers external just yet. Alongside the inductors were a set of Mundorf Supreme resistors, with a side note saying "I know you like the Duellands but give these a try".

When the chance arrived I had the inductors fitted over my Mundorf Copper wire variants, which were already a good upgrade over standard. Oh my!! I was admittedly at a stage where I'm sat listening to music more frequently and really enjoying it to the point where I'm thinking "can this really get any better?" Yes, was the simple answer, what I was contently believing was the most effortless, relaxed and confident sound I had ever had taken on an even more effortless, seamless and convincingly more natural appeal, whoever said inductors do not make a difference needs to explore a range of Mundorf's offerings as I have personally heard dramatic changes in them.

The amounts of air, space, and darkness within my background allowed for so much more prominence in detail retrieval, overall resolution and shape to the soundstage that once again I was just in awe of what Mundorf had produced along with these Accuton drivers, we can give some credit deservedly to Ayon for great cabinet design but these are now far from the speakers that left the factory. The increased transparency into the music is absolutely stunning now and each piece of music is just full of colours without having a rose-tinted glow to it - if you understand what I mean? Each track sounds more individual, each layer has additional space and individual timings of instruments are now more defined and the increased separation has more personality and stronger overall flow and rhythm, helped along especially with a depth a bass note that just resonated and decayed into a black void.

I hesitated for some time to implement the resistors I was sent, mainly because I didn't want to rock the boat and partly due to knowing that the Duellands were so transparent anyway, I didn't believe for one minute that the Mundorf's would compete in their wire form over the graphite Duellands.

I'd say I am right to a degree, but what I'm still currently finding is that the slight trade-off of transparency over the Duellands has been replaced with a slightly better tone and slightly better texture, along with being a little smoother sounding, it is a tough one I must admit, as opening up the window to the music and being able to hear through the layers with strong soundstaging is something I champion, but without great tonality and texture you may as well just have a budget system. The differences aren't so huge that I have been deliberating much I must admit and with the additional transparency found with the introduction of the inductors and each and every Silver/Gold product as a whole, my current decision has been to leave the Supreme resistors in as I have achieved the benefits of the Duellands elsewhere and realistically have complimented that with a little additional texture and slightly more relaxed presentation to gain a balance that is just addictive, to say the least.

## FINAL STEPS

As the final steps to complete the full Silver/Gold makeover I still had to add the Silver/Gold wiring loom to the speakers and attach the

# THE SILVER AND GOLD EFFECT

accompanying binding posts. I have a range of Silver/Gold wires here also from shielded to unshielded and multi-core variants, which when I have the opportunity, in time, will be building some speaker cables, power cables and interconnects from, and as Mundorf have collaborated with WBT to produce a Nextgen Silver/Gold RCA plug it only seems fitting to explore some wiring configurations.

As I said back in part 1 I have always championed the Silver/Gold wire and have used it in many projects for its tonal qualities over pure silver whilst retaining all the benefits of detail and transparency.

For the Ayons I used a two core variant from Mundorf which has a pair of 1.5mm Teflon coated cores, plenty enough current-wise for speakers and still keeping in line with my findings that the standard thinner cable wasn't just quite thick enough.

Now, this stuff is very stiff to work with, although can be shaped easily and will stay where you route it, - just ensure you relieve the stress of it coming off of the crossover itself by securing it to the board itself.

In any situation where I have used Silver/Gold wire previously a notable jump in resolution is immediately apparent and in this case the jump in resolution was again instantly noticeable. Presentation was cleaned, more transparent and the top and bottom end extended perceptibly further. I lost some texture for sure and this choice of wire I thought at first is not really the ideal choice for ceramic drivers, but after some extensive time settling down the Silver/Gold wiring does things that most wires can't. At times the sound is so resolute it becomes haunting and certain passages from certain tracks can be incredibly eerie. It never ceases to surprise me each and every time I switch the system on these days at how tactile the sound is and I think I will go forward and backwards between the Silver/Gold wire and the Studio Connections for a while as they have different characters, but both have incredible charm. As far as any other internal changes are concerned I'm going to leave the current combination to do what it does best...music!

I always believe that once you are able to stop analysing and are able to just comfortably relax into the music and forget the electronics, what you have been searching to achieve has finally become reality. HiFi is all about the electronics, I hear many of you groan at this statement but it's true! It's true in the fact that it has to be all about the electronics in order to be all about the music! Obtain a true musical performance that ultimately allows you to connect with the music in its most natural form and a true audiophile can't be happier. The issue we have with much of today's electronics is they are not voiced naturally enough, even in the high-end arena, which leaves the end user with either the need to constantly keep changing products, or, with a little investigation, start making the changes for yourself.

Addressing a speakers crossover is one of the most beneficial investments you can ever make given my experience - do it within reason and within budget and don't be afraid to buy and try, there is a large resale market for components.

# INTERVIEW

## MUNDORF'S RAIMUND MUNDORF

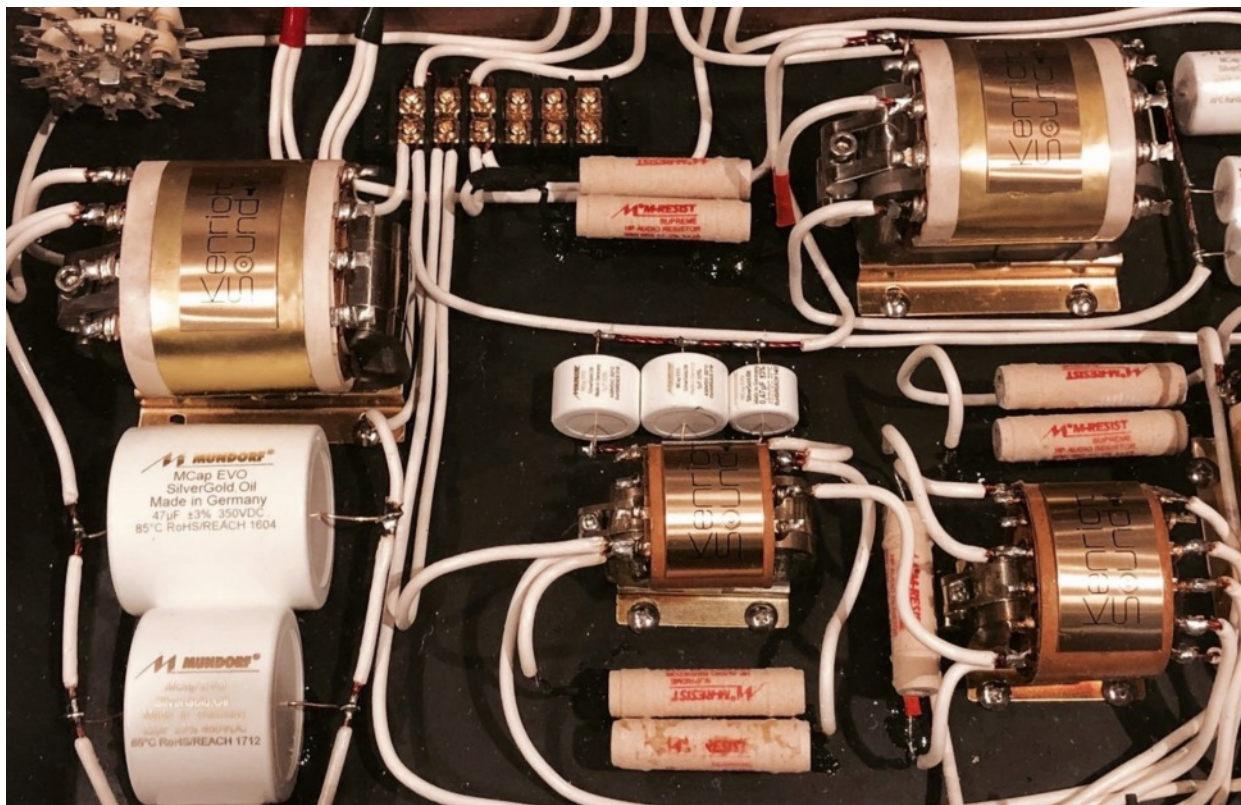


**Following on from Dan Worth's experiments using Mundorf components in modifying his loudspeaker crossovers, Hifi Pig speaks to Raimund Mundorf about the origins of the company and some of his thoughts on the influence of their components.**

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# MUNDORF'S RAIMUND MUNDORF



## What is your background and what motivated you to start developing Mundorf as a commercial venture?

In the mid of the 70's, when I was 14 or 15 years old, I helped my elder brothers building DIY speakers. Even then I had a special passion for fine tweeters, for example, I built an acoustic lens for a compression driver. Due my elder brothers I was introduced to electronics (the eldest brother was a amateur radio builder) as well as speaker building. (Both did this, but the 3rd born, Norbert, did this with growing enthusiasm over the years. In fact, later he owned a highly reputed Hifi Shop in Cologne for some 15 years)

At home I grow up with classical music as well as with Jazz, Rock and Pop Music. Besides music, in electronics my personal interest was attracted by digital components which were used in Computer Numerical Controlled machines.

This ended up in an offer to a friend of mine who was doing a lot of DIY speakers. He even bought wire and bobbins and would wind his own x-over coils. So, I offered to engineer and build a CNC coil winding machine for him. Since his parents were well-off, he agreed to pay for the needed materials. The first winding machine was realised using "Fischer Technik" (a construction toy similar to Lego).

When my friend lost interest in x-over stuff, I started to wind coils for Adrian Bankewitz, my first costumers and current Owner/CEO of Thiel Accuton Loudspeakers. In the 80s he had a DIY shop named "AB-Soundtechnik" in Cologne.

Later, in the 90s I decided to drop my High School studies and focused on production and retail of x-over components. I've always been keen to improve industrial components by focusing on the acoustically important parameters. These parameters are not taught in high school or elsewhere else. So I had to do my own tests. Also, I had to talk to my costumers so as to learn from their experiences. At

the same time, I had to talk to manufacturers too, so as to learn about their possibilities to modify the production process.

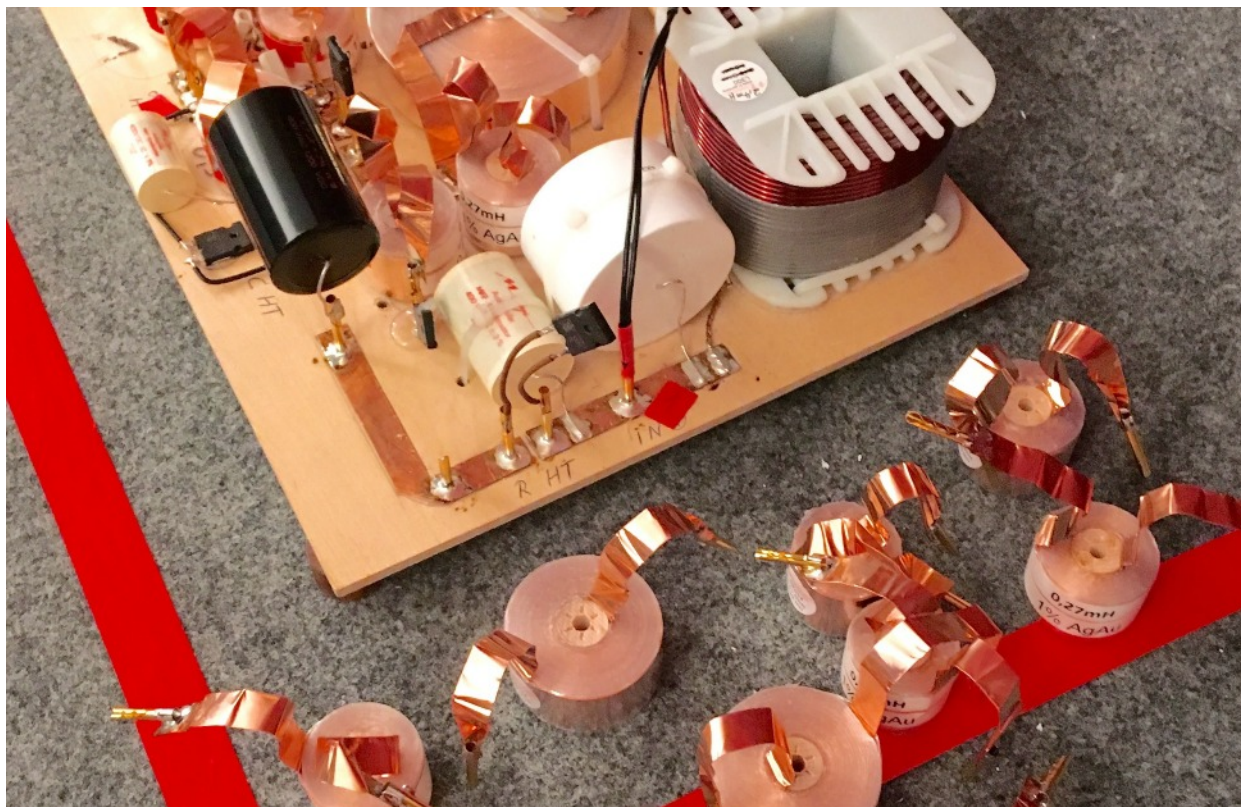
## What difficulties did you encounter when launching the business? Was there resistance from anywhere towards your products?

From the start I got good support from the first German DIY magazine "Klang & Ton". They reported about my "ZERO-OHM-COIL". In fact, it is impossible to make a definite 0,00 Ohm coil, but by 0,033 Ohm, I got pretty close to the idea. Apparently, this name had a deep impact on the audience. Even 20 years later, people still connected the brand-name Mundorf and "Zero Ohm Coil".

AB Soundtechnik started to order the required big quantities and started to sell the drivers in Germany to other dealers, too. I was very happy about this support. At least I was not in the position to compete with any industrial supplier. I was a student with no money and a self-built coil-winding machine. Therefore, I started offering a capacitor range and other x-over components, focused on excellent customer service and product quality. So I developed my business with international re-sellers based in Hong Kong, in the US and the rest of the world.

## What is your philosophy with regards developing a new product and bringing it to market?

The aim is to modify and reinvent electronic components by putting the main focus on the component's sonic quality. I am driven by perfection and I'm willing to find out about the limits of a given matter. Then again, I hardly accept a limit as such. The most recent and obvious example is my investment in the Air Motion Transformer tweeter. Being 100% convinced that AMTs (in respect to physics) are the ultimate Pro-Audio line-source tweeters. During the past 8 years I have invested almost €3,9M. At least, we achieved a breakthrough in



2012, when relevant sound engineers of the Royal Albert Hall in London decided to use a system using our AMT tweeter because of its excellent natural sound quality. But, for this AMT tweeter we had to develop our own membrane material, and even the etching process for this membrane is absolutely unique. Moreover, to create a product with the best value for money at a given budget is always a challenge I love to take on.

**What is the process when working with outside companies when you are approached to develop specific products for, for example, a new design of loudspeakers?**

We work quite closely with the R&D of many companies. We try to understand what they are looking for and we are prepared to respond to their demands. However, we are also in touch with new technologies introduced to us by suppliers or by scientific institutes - for example the use of nano particles). Simple things like the proper design of an x-over PCB can make huge differences. That too goes for the components/building parts. Small differences equate to huge impact in my experience.

**You create many variants of, for example inductors, why do you feel it necessary to do so?**

With regards to specifically conductors there are so many parameters of an inductor that have to meet the customers needs, such as price, inductance, RDC, power-handling, low-power distortions, high-power distortions, size, saturation and sonic characteristics. Sonic characteristics are mainly determined by the specific tonality of the chosen conductor material. Mechanical vibrations and electrical losses also play a big role and, of course, both differ with any other inductor design.

**You use precious metals in many of your products, can you explain to Hifi Pig readers the advantages, in your opinion, of these much costlier metals have over copper?**

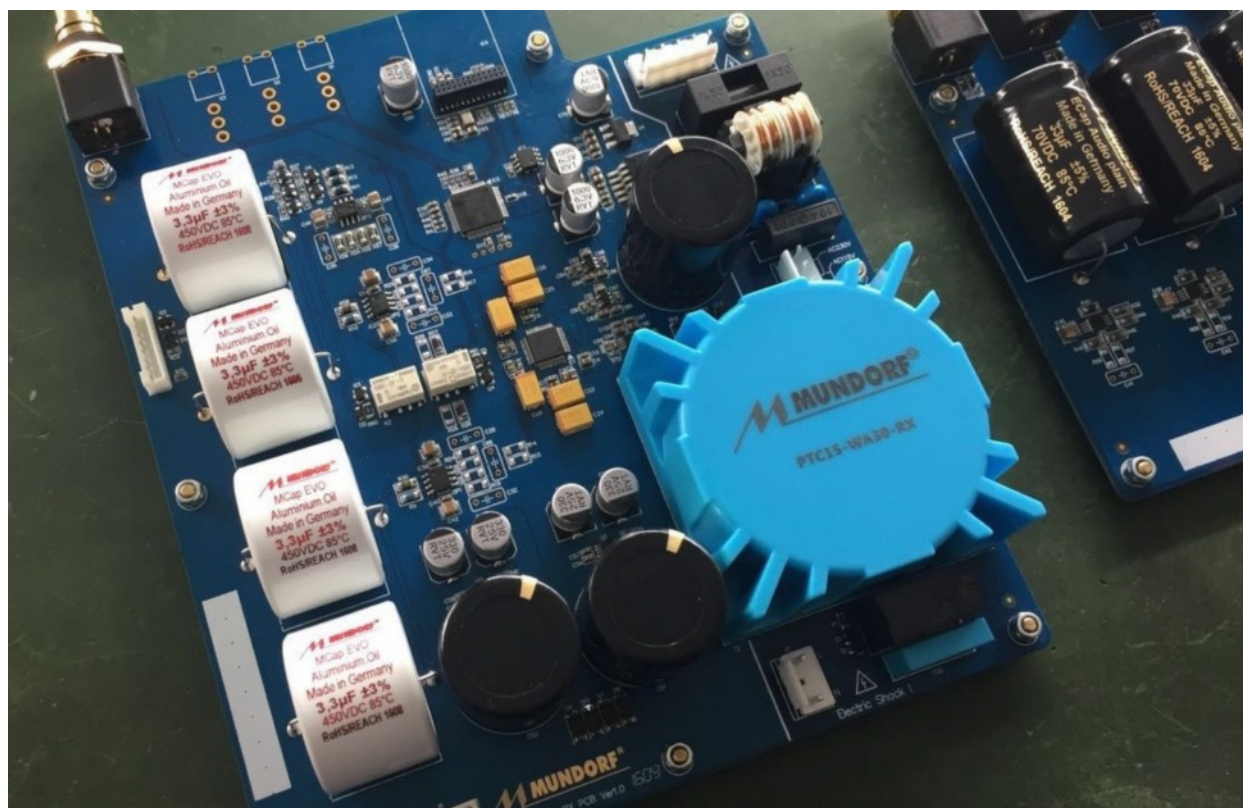
We found, that every material and/or special production process leaves its own "sonic footprint".

Copper sounds different to silver. Silver/Gold sounds different to Silver. To add 0,1% of silver/gold to a copper inductor will change the musical performance for sure. And to speak the truth, the impact of even of little changes is much bigger than I ever would expect it to be. To date, when I hear a story about the impact of a new material (e.g. for power chords), more often than not, do I think "This man/they are/is crazy!". But then, I would sit down and listen and forget my pre-judgement... in many cases I have to confirm the remarkable influence of just a single component in a crossover or an amplifier. I think it will need some more time in scientific research to understand exactly what is going on there. At least it is all about vibrations and information. I am sure one day we will understand how a specific quality or property of a material generates a sonically audible influence on the electromagnetic properties of the music signal passing through a conductor. My personal assumption is that there is also a link between this hidden imprint and the old alchemical traditions which connects several metals with specific emotional qualities. I am confident, that the "missing link" will be found in the field of quantum physics

**What would be the characteristics of the perfect metal, were it to exist?**

The perfect metal's sound characteristic would re-connect you with the deepest source of life. That is what alchemy is all about. Funny enough, for that connection one doesn't necessarily need music. But sure enough, you don't need High-End Hifi to get there, nevertheless, it can be very helpful to reconnect to life.





**There is a big move towards use of DSP in some quarters, do you see this as a positive move for the development of loudspeakers or are you firmly in the traditional analogue camp – and if so why?**

When digital music signal processing entered the audio world it caused a big loss of certain qualities. I remember my first CD player, which replaced my turntable at home. Years later, I realized that this was the very point I stopped listening to music at home. MP3 made it even worse. A whole generation grew up with a very poor sound quality. Certainly not knowing how touching and emotional a good music system can be. But now we have passed the bottleneck of compressed data. There is no need anymore to reduce the data volume, so digitally processed music sounds more and more natural. So I am positive about the digital future of audio and, I hope, there will be a revival of an “audiophile attitude” even among the pure digital users. Once high-end digital audio technology is available/affordable and easy to use, even young people will enjoy the emotional benefits of a real listening experience with good home-audio. Music is so fundamental for human beings. Deep inside, we all know that rhythm and sound are what make life go on in a very essential way. Falling in love with a piece of music is always a kind of coming home to ourselves. Our job is, to create components which support this process of falling in love and coming home. For this we reduce distortions, loss of details and sometimes we add some extra value by adding certain sonic properties of special materials. Materials which always were recognised by mankind for having their special relationship to our soul and spirit.

But I also believe that besides mainstream audio another sort of music lover and audiophile will always exist, too - those who are looking for more.

So, we will continue as we did before: Melting the best things of different worlds like science, industry, alchemy, our personal

experiences and our costumers' experiences and their constant demand for new products altogether in an ever changing audio universe: As to achieve the most touching musical experience as possible at a given price level.

**The DIY movement is still a very active and healthy community, how important is this market to Mundorf?**

DIY is where we come from. Indeed, we still do share the passion of DIY enthusiasts and we very much enjoy the fun which people have whilst realising crazy and/or serious projects. DIYers in general are very ambitious. We consider their comments and the DIY-market's feedback very carefully because it's another valuable input. Also, from a commercial point of view DIY is still important to us. .

**You have developed a “kit” loudspeaker using Accuton drivers, how did this project come about?**

Well, the idea behind was to show that a skillful combination of not too expensive drivers and high quality x-over components leads to an excellent speaker that almost sounds twice as expensive.

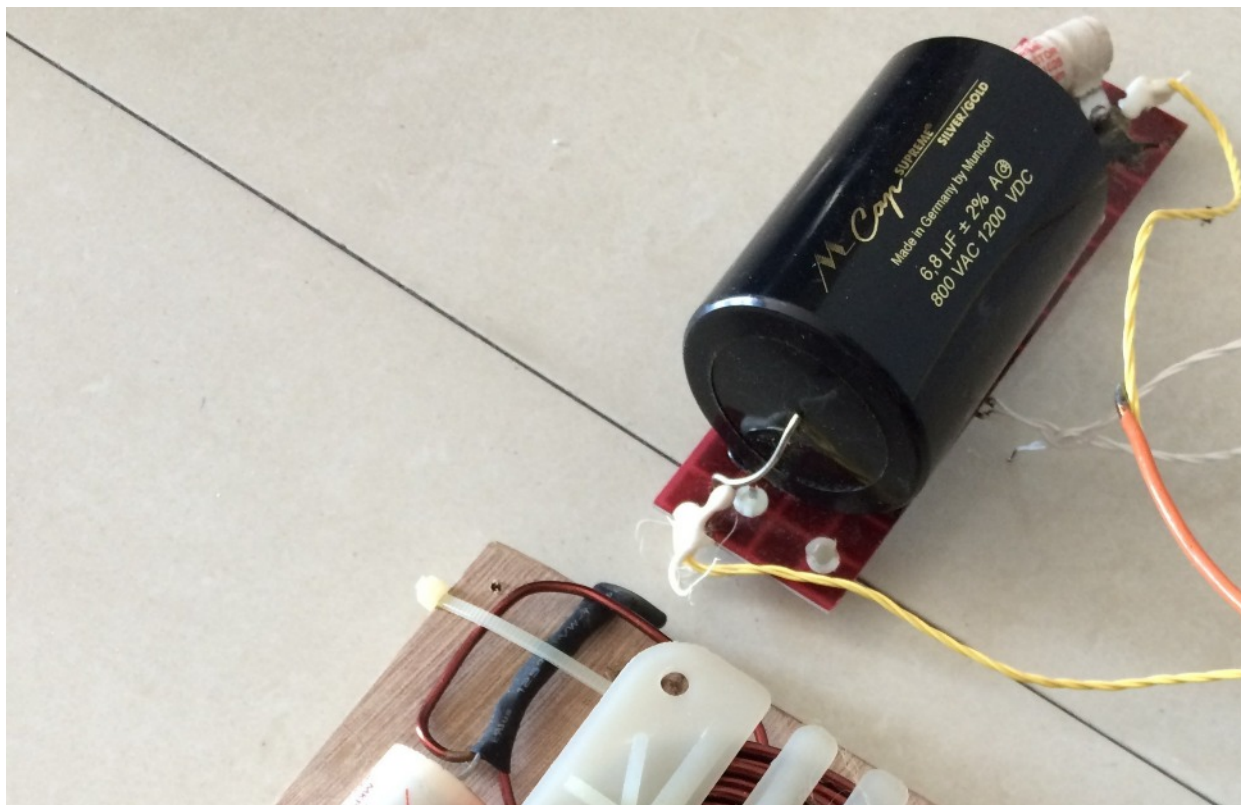
**What are your plans for future expansion of Mundorf?**

After focusing on R&D in the field of Hifi and Pro-AMT tweeters over the past years, eventually, our AMT tweeters are on a good path. We will continue to increase their presence in all thinkable market fields: Hifi, pro-audio, car audio, hometheatre, commercial cinema and whatever else might be there. Now it is up to our marketing to do a proper job.

The R&D department is busy with a wide range of new x-over components, which will be launched in 2019 and 2020.



# MUNDORF'S RAIMUND MUNDORF



We are in an earlier stage but we are also busy transferring our knowledge about X-over components into the digital world.

My personal attention for the next two years, besides being involved in R&D, will be the development of Mundorf as a growing team of experts - more experts in contemporary audio technology, but also expert in customer service and, also important, experts in having fun and enjoying personal development whilst doing our job. Celebrating the beauty of music and celebrating the beauty of life.

**Got a project you'd like to share with our readers? Get in touch!**

# DIY AUDIO

## DIY AUDIO POLAND



Suitably impressed by the sheer quality of the products and enthusiasm of the people involved in the DIY scene in Poland when we visited last year's Audio Video Show Warsaw, we got in touch with the biggest DIY community DIYAudio.pl to ask Technical Administrator Tomek Bielas a few questions about how the community came about and how it has grown.

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# DIY AUDIO POLAND THE STORY



The story about polish [diyaudio.pl](http://diyaudio.pl) community starts in june 2004. Where small group of people who knew something about DIY started a new, fresh community board with very simple information service.

Basically diyaudio.pl did not start exactly from scratch. There was another service about DIY audio called audiomania.info, a little bit more popular internet service with bigger number of registered and active users. After couple of years, those two services connected to each other and now, we are the biggest polish community about do-it-yourself audio (and only do-it-yourself audio). We have many articles available for anyone and many freely available projects to copy for yourself.

We are non profit and open community. There is no external sponsor, all is managed by two administrators, a group of moderators and the board users.

As I said, we are currently the biggest polish do-it-yourself audio community. The board connects hobbyists, professionals and other people who wants to talk freely about do-it-your self and all other related projects and problems.

Over the years do-it-yourself audio changed a lot. I remember when we started with cheap Czech TVM TESLA transducers projects. Years ago there was no possibility or money to buy much better and more expensive speakers from the western border. Not only were the transducers a problem, there were problems with availability of better capacitors, coils and other crossover parts.

Even I remember there was a problem to get a good do-it-yourself amplifiers or any other electronics – I don't even talk about good electrical parts for making them.

Do-it-yourself audio does not mean only the speakers or electronics. This is a full story including the background. I mean, the background – production process in our homes, garages, basements.

Almost 15 years ago CNC was not very popular in poland (mainly because of price) so for example, the only possibility to create housing for our speakers was to use an electric fret saw or any other tools like that. Precision was not so good as today.

About the electronics in those years I remember that the PA300, Holton's and LM\* TDA7294-like board ruled on the community. Many people wanted to have a Holton because its was called 'cheap watts'. A couple of pairs of MOSFET transistors with simple high voltage supply gave approximately about 400W/4Ohm. So it was a king in do-it-yourself amplifiers when we looked at power. If someone wanted to have some 'pseudo Hifi sound', one of the way was to get the LM-like (gainclone) amplifier. There were two schools, transistors fans and integrated circuit fans - something like endless war between playstation and xbox fans.

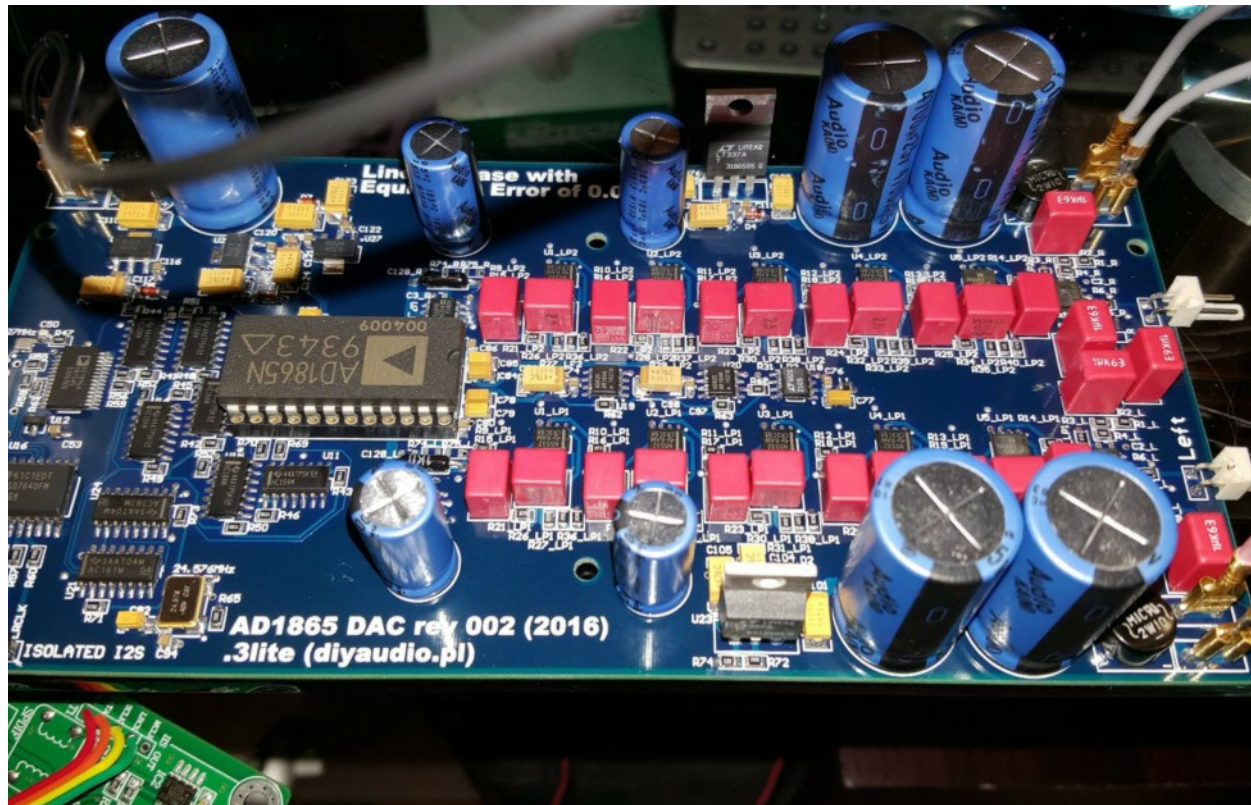
Now, almost 15 years since we started, everything has changed for better I think. There is no problem with availability of better speakers, parts, CNC and any other things needed to build very beautiful speakers and electronics. There are many different brands in the world, every one of them ships worldwide so there is no problem to buy a speaker for example in US and get it to Poland.

The knowledge and the skill of people changed a lot - really. Some of today's 'products' are made very carefully and they look like a brand new product from a big commercial company. You can't say that do-it-yourself speakers boxes are just a bunch of transducers mounted in a wooden box anymore.

Really no, there are many fully documented projects around the boards. Documentation includes box sizes, crossover projects, preview of the completed project etc.



# DIY AUDIO POLAND THE STORY



As I mentioned, do-it-yourself audio is not only about the speakers, but the electronics too.

Many years ago users were making PCBs at their homes by using iron. Now you are able to do a couple of clicks on a website and that's it. There is no problem to make a four-layer PCBs in software at home and later produce them in a specialized producer. One such example is the AD1865 DAC made by user .3lite (old school DAC in his new life, 4-layer PCB) shown above.

DACs are definitely something new in do-it-yourself. It is much harder to create a good DAC than for example a good speakers set. Nowadays PC audio comes to us. This is a very popular source of good quality music. I think much cheaper than a good CD player bought at a hi-fi store and of course it is easier to build for a regular user.

By writing about those projects, I'd like to show you that D.I.Y. now is very powerful and complete. Basically you are able to build a whole audio setup starting from boxes, DAC, preamplifiers to amplifier.

Those are only a couple of projects which you can find around the internet and our community.

We have many talented people who build a lot of cool projects.

**How close a community was the DIY community during the communist era and did you experience any hostility from the state?**

I think I'm too young to talk about DIY details in communism but I will try to describe it from my point of view and my Father's stories.

Basically in the communist era there was a problem with good electronics and foreign music from the state's perspective, with my Father telling me that western music and electronics were

generally banned in Poland. Most of the audio electronics that were available were made by Polish manufacturers like Unutra (and other related companies). My Father had a Unutra ZK-120 reel-to-reel recorder and he said that he and his friends would meet in basements to listen to the music. Why in basements? Because they wanted to play foreign music and they wanted to play it as loud as possible without drawing the attention of the state.

One of my Father's close friends was an electronics guy and so he produced a couple of DIY audio amplifiers based on Soviet radios. They separated the audio signal from the ZK reel-to-reel to all of those amplifiers and that's all. They played loud mono music on many various speakers in the small basement room and to make it more fun, the speakers came from Soviet TV sets.

I know from my Father and his friends that in the communist era the underground music scene was big and popular. There was a lot of DIY stuff in all of those basements, for sure. Most of them were of course speakers sets and various amplifiers.

**I notice that there is a huge knowledge of music within the Polish audiophile community, during the communist era how did people get hold of music from the West and what kind of risks were people taking in importing and distributing foreign music?**

Most users of the [diyaudio.pl](http://diyaudio.pl) pages come from the 80s and later years so seniors will have to help me again. One of the ways to get new music was to get it from family members living in Germany. Of course, in the 80s

# DIY AUDIO POLAND THE STORY



there was a possibility to obtain black vinyl (but it was very rare and very complicated). There was also a popular radio program through which people could record music onto tapes. In PRL (Polska Rzeczpospolita Ludowa - Polish People's Republic) in later years there was one more possibility to get the cool electronics and music - a PEWEX shop. It was possible to buy for dollars some electronics from the 'western world' and music was also available in those shops.

**When did DIYaudio.pl launch and what was the idea behind launching the forum?**

DIYaudio.pl started about 2004 year. I think the idea was to populate DIY audio and to show the people that you can build something yourself. Our goal was to keep our portal free and open for everyone including free projects to copy, free help and to be ad free. We thinks after 15 years all is working very fine and indeed we are still growing. As you saw at the [Audio Video Show Warsaw](#), DIY audio quality has changed a lot.

**How many members do you have and do you hold physical meet ups at all? If so tell readers about a typical meeting.**

Currently we have about 21 000 registered members. It is a shame for me because we didn't organize any official meet ups as yet. Of course we know each other (more or less) and we do organise private meetings but there has been no official meet up as yet. In 2019 we are planning to organise the very first, official meet-up for the 15 years of DIYaudio.pl somewhere in central Poland.

Additionally, I would say that in the past years many users got

to know each other at the Audio Video Show room. Basically if we meet in someone's house, everyone brings his project and we play a lot of music. We are talking about new projects on the forum, we are making many comparisons between configuration and we are connecting various DIY stuff with many other DIY stuff.

**One of the rules of your forum is that all designs are freely shared with other members, in a "open source audio" kind of way, how important do you think this philosophy is?**

Basically is not a rule, but it is it is very cool, when you are able to share it freely'. I think this is very important for new DIY users. They are looking for good, tested projects. Probably, it will be the first project so they want to try something complete and well tested, with good opinions. Most of new users have small budgets, so they want to spent their money on something good that they know will work.

**Visiting your room at Warsaw, the standard of DIY projects appears to be very high, how much competition is there between members to push the envelope of audio designs?**

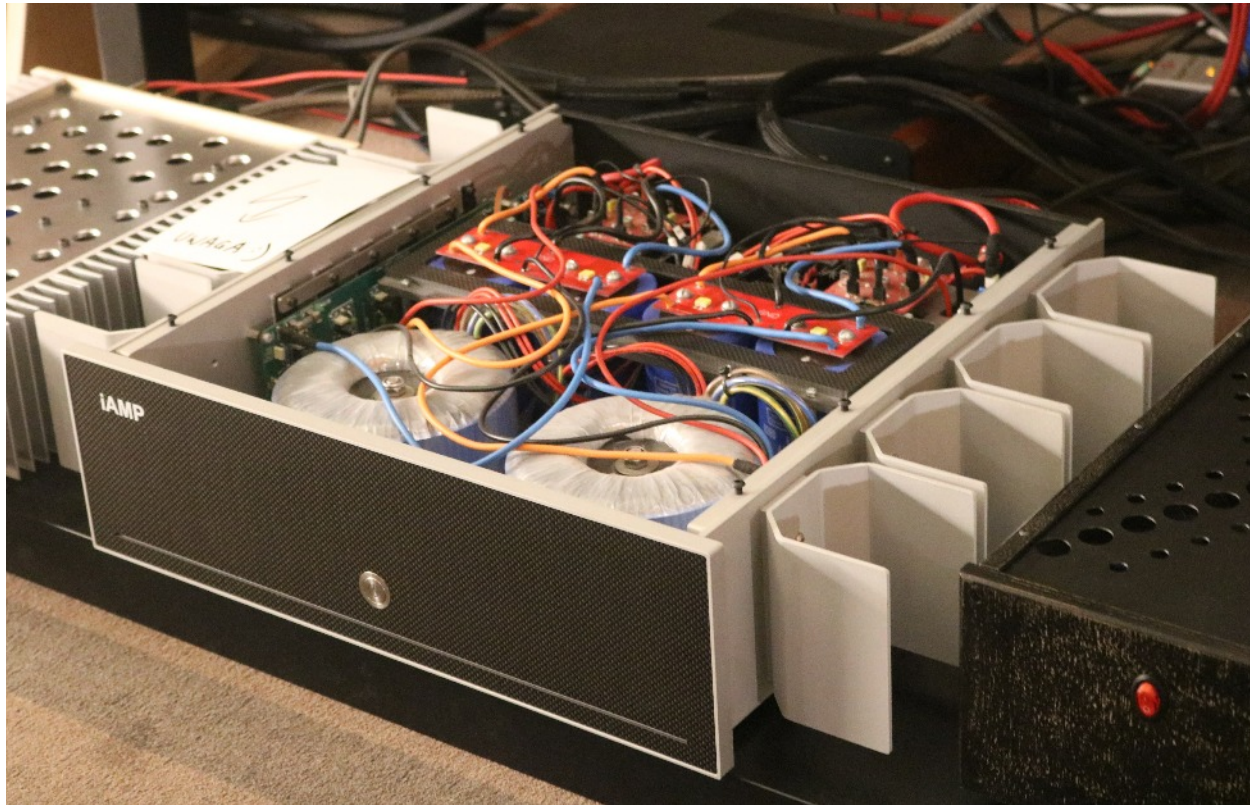
I think there is no visible competition between users. It all depends on budget. Basically, DIYers do not save money for their home-made products.

**What has been the most popular design on your forum?**

There is no one project that is most popular, but we have couple that are very popular, for example the AD1865 DAC by .3lite and the iAMP modular amplifier by Borys.



# DIY AUDIO POLAND THE STORY



**Have any of your members gone on to produce commercial designs of their DIY projects?**

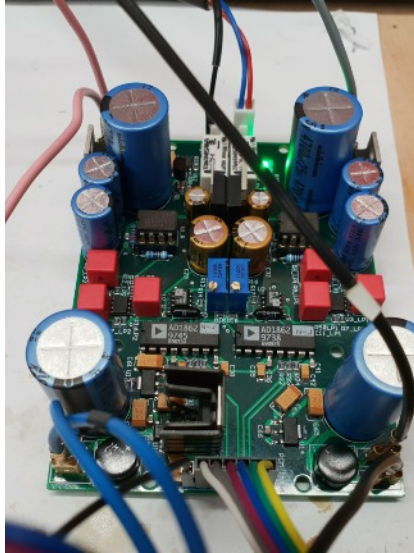
Some of the users started out as regular DIY users but now they are producing commercial audio products. Of course, those products are not publicised or shared on the open forum. We do not allow to use our freely available projects to be used in commercial products without contacting the author. I don't remember if there was a situation when some of the free projects changed into commercial and disappeared from forum.

**Got a project you'd like to share with our readers? Get in touch!**



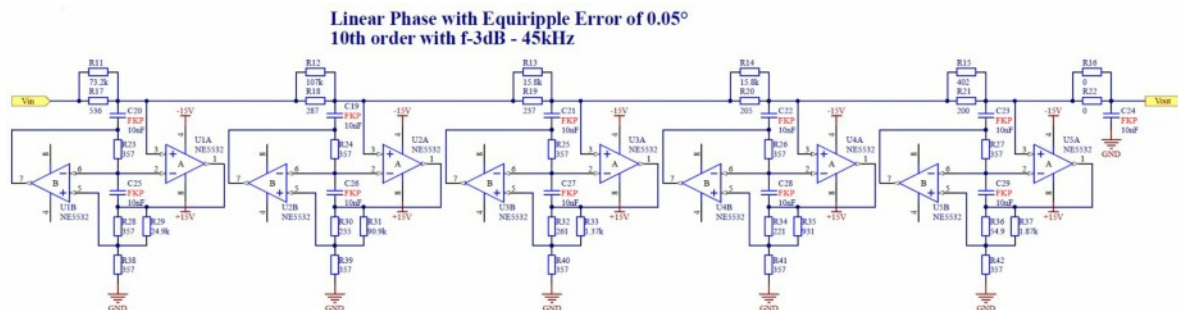
# DIY AUDIO

## DIGITAL STEREO WITH KONRAD KUSNIERZ



**Konrad Kusnierz (.3lite) is an active member on the DIYAudio.PL group and specialises in digital audio. Here he talks Hifi Pig readers through a few of his projects.**

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My name is Konrad Kusnierz and I'm a programmer in real life. I have graduated at the Cracow University of Technology resulting in my engineer and master degree of information and communication technology. In my entire life I've been always fascinated about low level programming (e.g. x86 assembly) due to the fact that it allowed me to actually learn how certain things work. That being the case electronics became my hobby as well since building something from scratch was always something I appreciated. In fact, most of the things I do in electronics are mixed between the digital and analogue domain due to my nature of being a programmer. In my life I have created a lot of projects and I've decided to share some information about a few of them.

I believe it would be wise to begin with a first DIY DAC project using AD1865 I have published for people to build it on their own. The main issue with those old R-2R DACs is basically a need of a digital filter which is required to properly filter out and interpolate the signal. A lot of people claim that NOS DAC without a digital filter is the best sounding DAC you can hear. I have to disagree with that. As far as I noticed the only reason people like the sound of it is because NOS DACs do have a high roll-off at 20 kHz (about -3 dB) due to their nature of zero-order hold interpolator. In general NOS DAC cannot reproduce the audio signal properly due to lack of a proper brick wall filter (whether it's a digital or an analogue one). That is why I did try to avoid creating yet another project like that and I had to come up with a solution for a digital filter. I did not want to use any older digital filter such as DF1706, PMD100, SM5847 or similar since, despite them being quite good it would be yet another part which is almost impossible to get nowadays. That being the case I came up with an idea to use AD1896 which is an asynchronous sample rate converter to work as a digital filter for AD1865. How can an ASRC work as a digital filter? Well, the math is basically the same except for the fact that a digital filter only interpolates the signal whilst the ASRC can both decimate and interpolate depending on the requirement. However, it's still not as easy as it sounds since there are certain

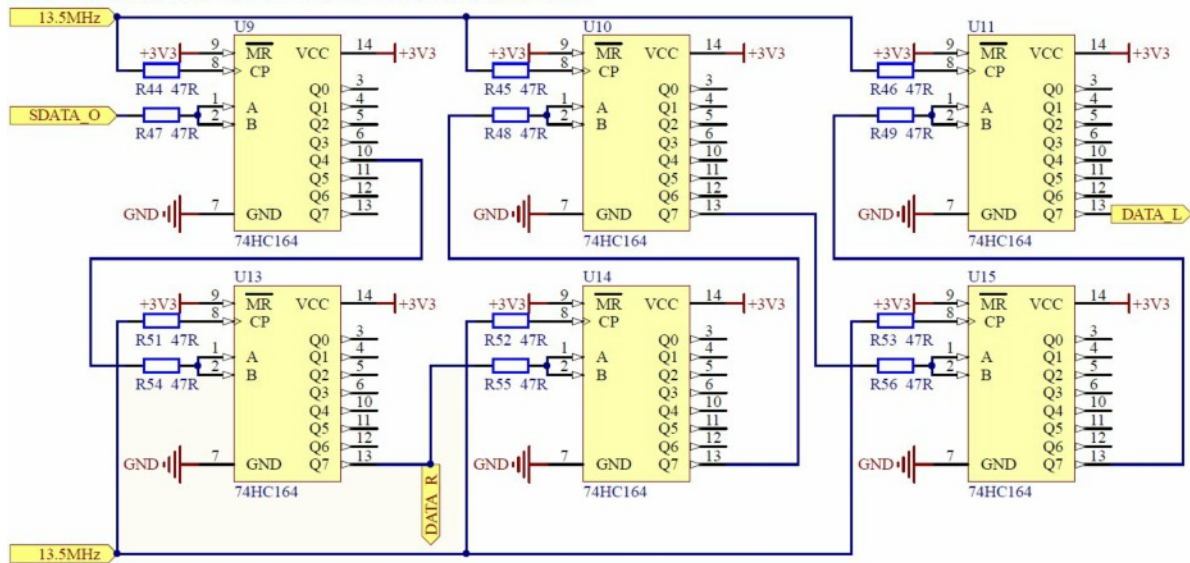
limitations with ASRC. The main one would be the maximum output frequency it can interpolate the signal into and that would be around 210 kHz for AD1896. The second issue would be the output format which isn't compatible with AD1865. Having that in mind I've decided that in order to mitigate the first issue with low digital interpolation ratio (e.g. from 44.1 kHz to 210 kHz) I have to design a high order analogue filter which can filter out everything beyond lets say 30 kHz and leave as flat response as possible within audio band (20 Hz to 20 kHz). It is quite difficult to do so since I did not want any active circuits within an audio signal path (such as operational amplifiers and so on), so I came up with a frequency dependent negative resistance circuit. Some might call it GIC (generalized impedance converter). It's basically a circuit with an operational amplifier which exhibits a purely real negative resistance, but it isn't in the path of an audio signal and is mostly used to implement low-pass active filters such as the one I used within this project. The schematic can be found in the image above:

It is not as advanced as it looks like. In fact, it is quite simple since such filter does consists of ladders or banks and they do repeat themselves with different resistors for correct filter poles. The filter implements a linear phase response with an equiripple error of 0.05° being a 10th order filter. The poles of the filter are calculated using an iterative method (since it's impossible to calculate them any other way).

Solving an issue with low interpolation ratio and an analog filter leaves us with an issue of incompatible digital format between AD1896 and AD1865. The output data of AD1896 is formatted as I2S (inter-ic-sound) which uses only one DATA line to transfer both channels (left and right). However, AD1865 requires two different DATA lines for both left and right channels which are then transfered simultaneously. That being the case we have to buffer one channel (whole 32 bits due to I2S frame of 64 bits - 32 bits for each channel) and simultaneously

# DIY AUDIO - DIGITAL STEREO WITH KONRAD KUSNIERZ

## 13BIT DATA DELAY & 32BIT LEFT CHANNEL BUFFER



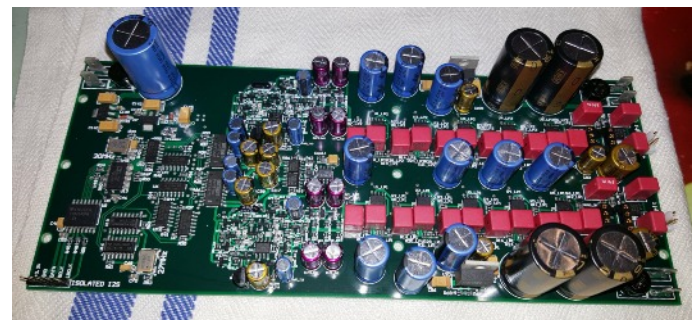
transfer both channels to the DAC. This was achieved with 8-bit shift registers and the schematic can be found above:

Basically it splits I2S DATA line into separate channel for AD1865. Also, it does delay the data by a few bits (13 in this case) to make sure that a low transition of LRCK (which indicates which channels is currently being transferred in I2S, that is whether it is left - low or right - high) is happening right after 18 most significant bits are transferred. The delay is required because LRCK signal of I2S is used as LATCH signal for AD1865 in which a low going transition of LRCK/LATCH signal does update DAC output, so we need to make sure that latching is happening only after all 18 bits were transferred (AD1865 is 18-bit DAC). As soon as LRCK/LATCH goes down the DAC updates its output with a new value from its shift register.

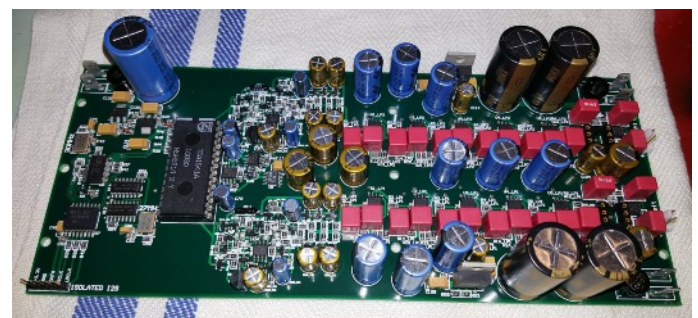
Having every issue solved it was time to design a final version of this DAC:



PCM1704:



TDA1541A:

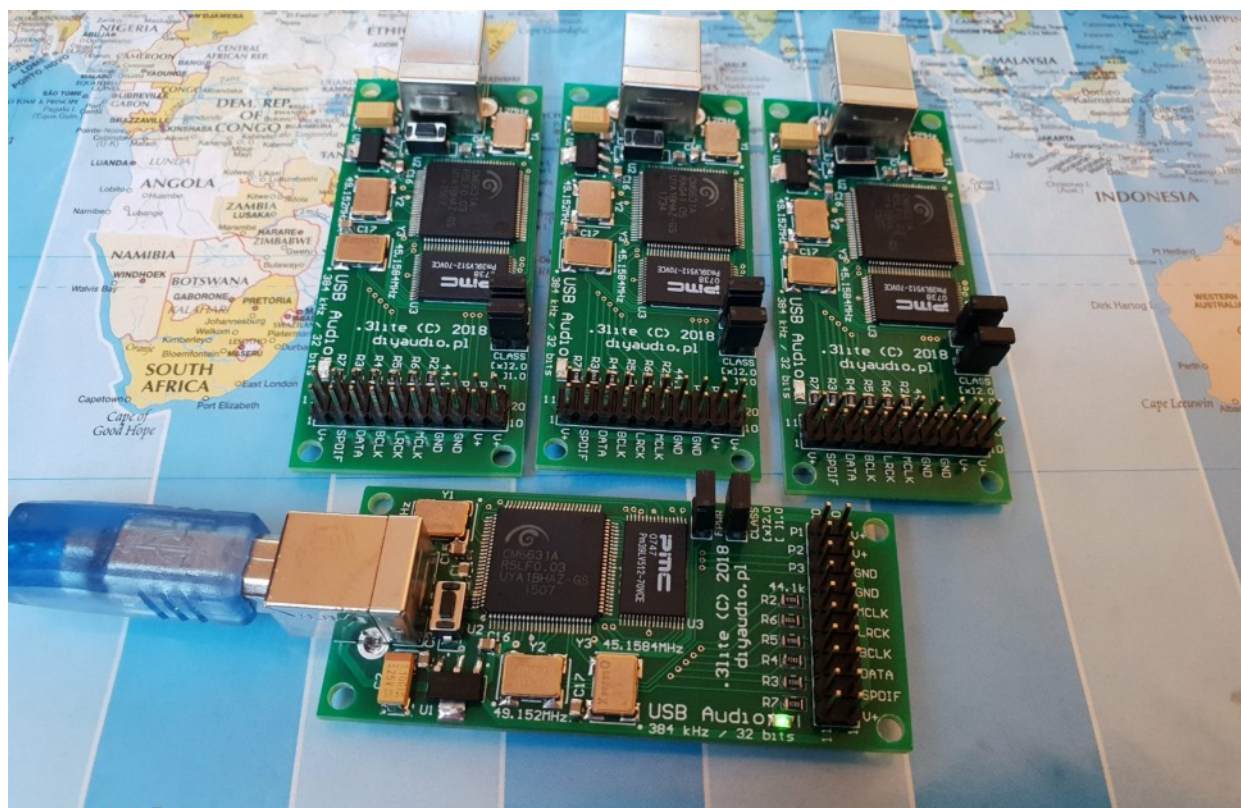


Also, there were several spin-offs of this project such as:

AD1865/AD1864 version with a discrete I/V conversion:



# DIY AUDIO - DIGITAL STEREO WITH KONRAD KUSNIERZ

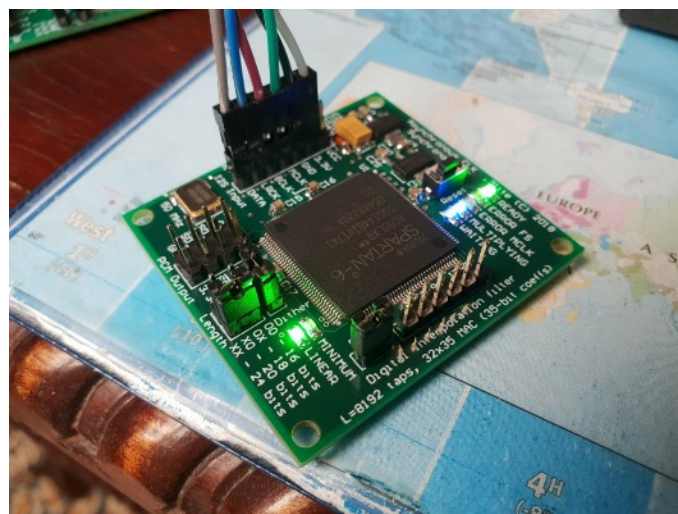


Anyway, about two years later after this project was published I created my own digital interpolation filter from scratch using an FPGA. It uses a high interpolation ratio of 16x (up to 768 kHz) and therefore the requirements for an analogue filter are quite relaxed, resulting in much more compact PCB with an unmatched digital interpolation filter. That being said lets go into details of this project. Basically the digital filter was implemented in an HDL (hardware description language) and synthesized on an FPGA from Xilinx (Spartan-6). The project itself does pretty much the same thing as other well known digital filters (such as DF1706, PMD100, SM5847, and so on), but its ability to reconstruct the signal is beyond those. It contains two sets of filters, both of size 8192 coefficients and it interpolates the data by a factor of 16 times (e.g. 44.1 kHz is interpolated to 705.6 kHz and 48 kHz is interpolated to 768 kHz). It incorporates several FIFOs (first in, first out queues) since its core is running asynchronously at 225 MHz and there are a lot of clock domain crossings which do require a proper synchronization. The filter does always interpolate to 705.6 kHz or 768 kHz depending on its input (the output is always an integer factor of the input) and it does accept data of up to 768 kHz / 32 bits. In order to achieve a static output independent of the input the digital filter does work like a sample rate converter which means it interpolates and decimates at the same time. However, it should be noted that for an input of 44.1 kHz or 48 kHz it does not decimate at all since multiplying either 44.1 kHz or 48 kHz by a factor of 16 results in 705 kHz or 768 kHz on its output which is the output rate set by the digital filter. Anything higher than 44.1 kHz or 48 kHz will still result in interpolation by a factor of 16 times, but depending on the input rate several new samples will be dropped. For example with an input of 88.2 kHz half of new samples will be dropped to bring its output from 1411.2 kHz ( $88.2 \text{ kHz} \times 16$ ) down to 705.6 kHz ( $88.2 \text{ kHz} \times 16 / 2$ ). Basically it's nothing more than a synchronous sample rate converter.

Also, it's worth mentioning that this digital filter incorporates multiply-accumulate units of 32x35 bits wide. It means that the input data is fully accepted up to 32 bits (without any truncation for that matter) and

coefficients are quantized on 35 bits resulting in unmatched accuracy of the math it does to calculate the output sample. That was never possible for any digital filter available on the market.

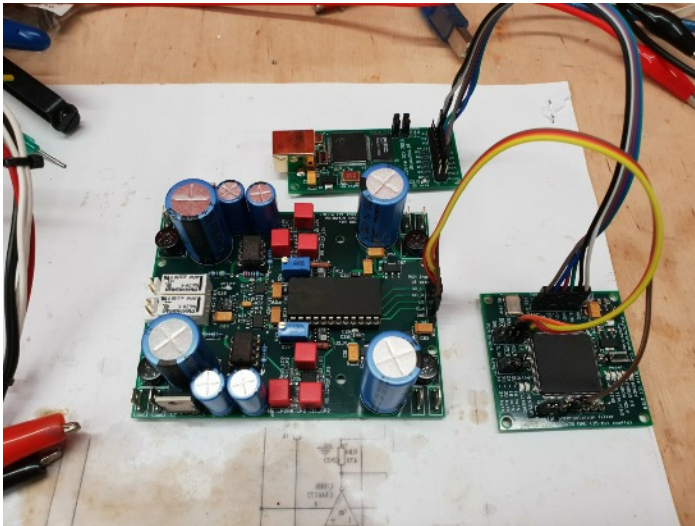
Another interesting feature of this project is its own reconfigurable oscillator for the output bit clock. The output clock for data is fully asynchronous towards its input. However, latch enable signal (which latches the data and transfers it from DAC internal register to output) is fully synchronous to achieve proper and jitter-less operation. That way, depending on the output word length (16, 18, 20 or 24 bits) the frequency of the bit clock is different allowing old DACs such as PCM56, AD1862, AD1865 and similar to properly work with 768 kHz streams which wouldn't be possible any other way. Below is the digital filter itself:



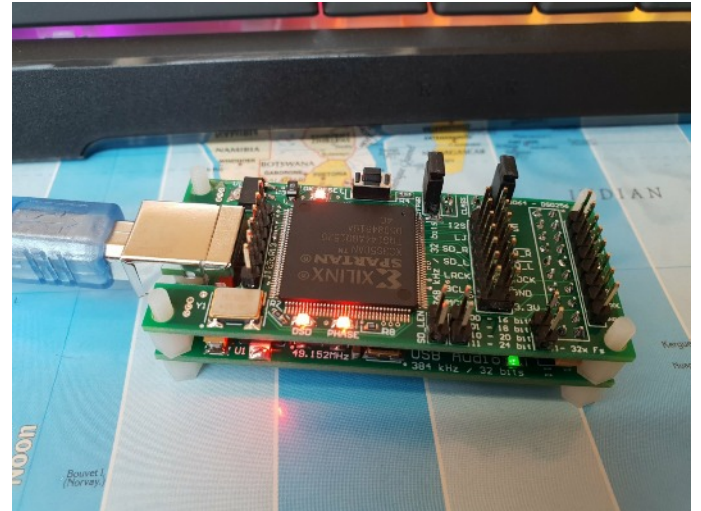
And several DACs I built to work with this filter:



# DIY AUDIO - DIGITAL STEREO WITH KONRAD KUSNIERZ



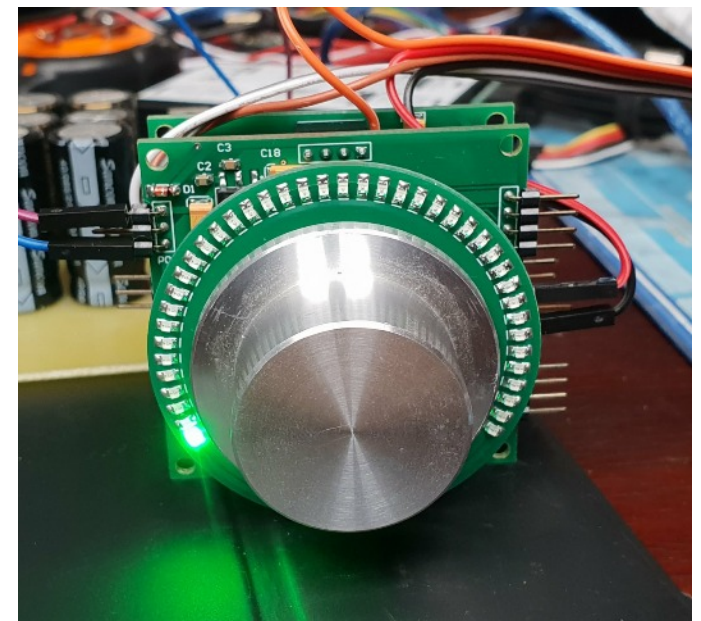
USB => I2S converter with an FPGA to achieve 768 kHz PCM and DSD512:



32x AD1865:



Signal attenuator:



Got a project you'd like to share with our readers? Get in touch!

These are just two projects I did create over past few years and honestly it would take hundreds of pages to describe them all properly. Among those projects they were things such as USB => I2S converter, huge DAC (32x AD1865), audio attenuators and a lot of others. Anyway, below are some photos of the projects I designed over the past few years:

USB => I2S converter using CM6631A:



# REVIEW

## AUDIOZEN ALCHEMY INTEGRATED AMPLIFIER



**Sicily is famed for its lemons. Fortunately, John Scott discovers that Sicilian amplifier manufacturer Audiozen's Alchemy amp is a bit of a peach at £3091.**

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# AUDIOZEN ALCHEMY INTEGRATED AMPLIFIER



## UNBOXING, CONSTRUCTION, AND APPEARANCE

The Audiozen Alchemy amplifier arrived in an impressively large, sturdy and heavy wooden packing case, branded with the Audiozen logo. Fortunately, my cordless drill had retained just enough power to enable it to unscrew the top of the case as I suspect there may have been a small degree of shouting and swearing if I had been required to exert my puny muscles to remove the screws. Solid, secure packaging is to be applauded though, and as my drill wheezed out its dying breath just as the final screw was removed, I lifted the top of the case to see that its contents were well-protected by the thick foam paneling glued to each of the interior sides. This was also supplemented by polythene packaging and bubble wrap.

It would be reasonable to expect that an integrated amplifier would be a single-box affair but the Alchemy is a two-box design, coming with its own separate power supply that powers both the pre and power sections of the second unit.

First out of the packing crate was the amplification unit. This was surprisingly light in weight but I was soon to find out why; the weight was all in the substantial power supply unit, with its three substantial toroidal transformers. Were these two units combined into a single box, it would come in at around 13kg. The units are slightly mismatched in size (the pre/power amp measuring 135 x 340 x 295mm and the power supply unit 95 x 340 x 245mm) but make an attractive pair when positioned either side by side on a shelf or on individual shelves. Marketing photos show the pre/power amp perched directly on top of the power supply but I wouldn't recommend this in practice; the top plates of both units I was supplied with bowed slightly when any weight was put on them. Having said that, I understand that future models will have improved cross bracing.

Both units have attractive brushed aluminium faceplates although a black finish is available on request. Audiozen have opted for a fairly minimalist, uncluttered design that speaks quietly of quality rather than shouting about its price tag. The power supply boasts discreet lettering and logos on its front panel and the amplifier unit is only slightly more ostentatious with the same lettering/logo combination and three solid rotary knobs – source selection, volume and stand by/on switch.

## SET UP

The connection of the power supply to the amp is achieved via two chunky power cables, one green and one red; one screw connection and one bayonet to prevent them from being mixed up. Having connected these, all that is left is to connect your speaker cables to the binding posts - bare wire, spades or banana plugs are accommodated – connect up to four of your chosen sources to the RCA inputs, plug in the mains cable to the power supply, switch it on and you are good to go. Almost. Audiozen recommends warming up the two NOS (New Old Stock) E88CC valves in the preamp section for a few minutes ( I went to put the kettle on) before turning the rotary switch to the right to turn the amp fully on.

The last thing to mention before we get down to how the Alchemy sounds is the remote control. This is something that is a particular bugbear with me; I feel strongly that the quality of a remote control should be commensurate in quality with the equipment that it partners. Unfortunately, while the Alchemy exudes elegance, the same can not be said of the oversized plastic remote. At this price point, I think Audiozen should seriously reconsider this.

## SOUND QUALITY

Since I'd gone to the trouble of boiling the kettle, I settled down with a cup of coffee and an album I know like the back of my hand: Mike

# AUDIOZEN ALCHEMY INTEGRATED AMPLIFIER



# AUDIOZEN ALCHEMY INTEGRATED AMPLIFIER

Oldfield's 2009 remix of Tubular Bells. Immediately, I found that adjusting the volume using the remote was entirely hit or miss; the Alchemy is a high gain amp and it only takes a very slight adjustment of the volume knob to achieve significant differences in volume level. As I tapped the + and – buttons on the remote, I watched the motorised volume knob move back and forward between not quite loud enough and slightly too loud. I decided to manually set the volume knob and use the volume slider on the iPad app that I use to control my digital library for fine adjustment. Since I carried out this review, Audiozen has reduced the amp's gain by 4db so more precise volume adjustment should be possible with future models.

Back to the music. As I moved through Tubular Bells Part 1, from the famous "Exorcist" introduction to Viv Stanshall's introduction of the various instruments near the end, I was struck by the Alchemy's ability to pull out detail while keeping the very many different elements of the piece integrated into a cohesive musical experience. On previous listenings, I've frequently found that subtle details can struggle to cut their way through everything else that is going on but that was certainly not the case here.

I moved on to some very different types of music: Iron Bar Dub from Linton Kwesi Johnson's LKJ In Dub allowed the Alchemy to show off its capabilities right across the frequency spectrum. Bass was deep but tightly controlled, the hi-hat cymbals were cleanly presented without any tizz and there was really impressive detail in the dub reverb effects; so good that I just had to play it again. Moving on to Find The River from REM's Automatic For The People, the Alchemy presented the track as if it was played live in the studio. In reality, the recording is no doubt made up of multiple takes and overdubs but there was a sure sense of the performance taking place right there in front of me. SuperBass 2 by Ray Brown, Christian McBride and John Clayton sees the three jazz bass virtuosos perform in what is very definitely a live performance. Their take on Papa Was A Rolling Stone contains a mix of frantic plucked and bowed double bass playing and it's all too easy for this to come across as a bit of a confused mess. The Alchemy made a good fist of this though, separating out the three instruments in the soundstage and picking up on the atmospherics of the performance and the enthusiasm of the audience.

All in all, the Alchemy was unfazed by whatever I threw at it during the period of the review and I always found myself looking forward to spending time with it, which is always a good indication that a piece of hi-fi kit is doing its job well.

## CONCLUSION

Audiozen's Alchemy sits within a crowded segment of the HiFi market, but its discrete power supply and hybrid valve/solid state pre/power design help it to stand out from the crowd. Refined in both looks and sound, if you are considering an integrated amp at this price point then the Alchemy deserves to be on your audition list.

## AT A GLANCE

Elegantly understated in both looks and functionality, the Alchemy simply gets on with doing what it was designed to do - producing an involving, musical experience time after time.

**Build Quality:** Both the amplifier and power supply units are finished to a high standard. As mentioned above, the slight weakness to the top plate of the units has now been addressed.

**Sound Quality:** Engaging and entertaining, the Alchemy regularly kept me up past bedtime as "let's have one more tune" saw the time just slipping away. Fully capable of being punchy and dynamic when the occasion demands, the Alchemy's real strengths are in its elegant subtlety, it knows how to deliver without having to shout about it.

**Value for Money:** While not a giant killer that tries to punch above its weight, the Alchemy is a highly capable performer at its price point and will provide years of enjoyment.

**Pros:** Good looks and quality manufacturing and it sounds even better than it looks. Separate power supply sets it apart from the crowd.

**Cons:** I really didn't like the remote.

**Price:** £3091.00





# REVIEW

## AUDIOLAB 6000A AMP WITH DAC AND 6000CDT CD TRANSPORT



The Audiolab 6000A amp with DAC and 6000CDT CD Transport cost £599 and £399 respectively. In a world's first review of the combo Alan McIntosh sees if this relatively budget pairing delivers the goods.

**Hifi Pig**  
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# AUDIOLAB 6000A AMP WITH DAC AND 6000CDT CD TRANSPORT



Having recently fallen in love with my Audiolab MDAC+ and considering more and more to move to a CD transport rather than full CD player (with DAC integrated) my interest was immediately peaked when the Audiolab 6000A amplifier/6000CDT pairing appeared on the market – and at a very reasonable price point. Could a company succeed to deliver both an amp and transport at the quality expected for under grand – if they could, then Audiolab may just have followed the 8000 series with another classic system.

## CONSTRUCTION

Taking the 6000A amplifier first, outwardly it has the fascia hallmarks of its bigger, older brother the 8300A, a smooth carbon black finish (also available in Silver), quite slimline vs. some of its class, with 3 sleek rotary knobs and lozenge-shaped digital display, power light, standby “soft” button and a standard  $\frac{1}{4}$ ” headphone socket –modern aesthetics, while retaining the Audiolab genetics.

Solid body and well laid out back panel comprising power, binding posts, 12v trigger (for connecting to other components), Coax/optical inputs (each x2), a USB for software updates and 3 line level Aux inputs- but usefully also a pre-out and power in.

Offering over 110dB signal to noise ratio the 6000A is by default an integrated amplifier but can be switched to act as a pre-amplifier (if you want to drive a power amp for example) or power amplifier mode (useful in an AV setup). A low noise JFET based MM Phono stage is also offered.

It not unusual now to see amps with internal DACs fed via USB inputs for attaching laptops to support Hi-Res streaming but it's less common still in this class to have this quality of integrated DAC and fed by Coaxial. The DAC here is the market leading ESS Sabre 9018 K2M (32 bit, sampling rates up to 192Kz and DSD at 11.2Mhz) – the same chipset in Audiolab's acclaimed M DAC+ (I have one and enjoy it immensely) and that employs what ESS call 32 bit Hyperstream for

delivery of strong dynamics and a Domain Jitter Limiter to reduce noise. Power is delivered via a substantial 200Va Toroidal Transformer while control and dynamic range are supported by a combined 60000  $\mu$ F of capacitance.

Onto the 6000CDT and the strong aesthetics carry through, a slot loader with minimalist fascia but including the usual operation buttons and “soft standby” button. The readout matches the 6000A and offers track number, timings, time to run/time left as expected and the ability to program order of play up to 99 tracks – all via the remote. As a transport, with no integrated DAC the focus has been on creating a solid running high-quality spinner – including a look ahead buffer technology to ensure even scratched or dirty discs play uninterrupted. This being the case you need to connect to a DAC for playback, in this case, it's ideally partnered with the 6000A amp. Connection is via a simple Coaxial or Optical digital interconnect (I chose Chords Shawline). You could as easily feed it into any DAC you have already and then into your amp, but the 6000A's integrated DAC does make it all a lot easier and the synergy feels right.

Very welcome is the solid feeling, comprehensive but clearly laid out remote that allows you to run both Amp and CD player from one (the 6000CDT does come with its own remote but this stayed in the box) – one less wand to drop down the side of the sofa! (Batteries were even included). All amp settings including standby timeouts, DAC filters and pause/play (on the CDT) are available in one remote.

## SOUND QUALITY

As the CDT and Amp are designed to work as one that formed the basis of my listening - simple to set up, and hooking the amp to my reference standmounts for first round (Fyne Audio 500) I power on and after allowing time for warm up I settle down to listen to some well-known test CD's.

# AUDIOLAB 6000A AMP WITH DAC AND 6000CDT CD TRANSPORT





# AUDIOLAB 6000A AMP WITH DAC AND 6000CDT CD TRANSPORT

Pushing the volume loud enough to hear details but not to overwhelm I'm immediately struck by how clear and smooth the playback in from this pair. After some playing around the I choose the (minimal) phase filter which Audiolab designed to offer a sound "likened to analogue but applied in the digital domain". That signature Audiolab refinement that I've experienced with the MDAC+ which takes the best digital source and somehow transforms them to a clear, detailed yet undeniable "analogue" feel. Floyds' Welcome to the Machine is delivering the dynamism and authority you'd expect but with a tempered edge that just makes it fun to listen to – power with polish. Melody Gardot's live in Europe really showed me what the combo was capable of. Soaring notes, truly natural voice, great staging, controlled yet powerful bass notes and a great timing on the fast-moving sections and I just couldn't stop listening – we say it a lot I know but for once I truly felt like I was in the front row, at times the bass notes made me feel like I could reach out and touch the strings. A number of other tracks return the same and I find it's late into the night and I'd hardly noticed the time (a recurring theme throughout the test week!).

Testing next the amps analogue inputs I throw a number of good vinyl pressings at it via my heavily modded Technics 1210 (see review kit at end) including recent Abbey Road half-speed masters of OMD and Simple Minds, and sit back to hear how well it delivers the synth and guitar pop of yesteryear with a great energy, smoothness of reproduction (nothing harsh or jarring here) and with a solid sense of thwack where needed. Again, the ease at which the 6000A delivers such an enjoyable playback really does belie the relative price point. I found myself LP after LP simply enjoying my music, often with some new found subtle yet evident details. Gilmour's Live in Pompeii (a key go to test LP for me) just confirms the quality as the opening guitar work of Shine On just sings.

Streaming via Bluetooth is simple and stable - simply choosing "Audiolab 6000A BT" on your device. AptX Playback through the Sabre DAC is very enjoyable, I don't Bluetooth music very often but for those that do you will not be disappointed.

Repeating the above round with the popular Dali Zensor 3 standmount's I again enjoyed listening thoroughly, but it's clear the more refined the speaker the more you can reveal what the 6000A has to offer (especially around the lower frequencies) so audition with that I mind.

Driving with ease a standmount like the Fyne Audio 500's is to be expected but I was able to drive them harder than with previous (some costlier) amps with far less harshness or distortion creeping in. For a medium (or small) listening room and those who want a solid, expressive but smoothly refined playback the 6000A for many will be a new force to be reckoned with and is definitely challenging rivals above its station – whether it's as an integrated standalone, or if you are considering feeding a power amp all the while gaining that integrated DAC, I struggle to see past this amp/CD combo... and as for the sub £1k mark – what alchemy is this?! The DAC uncommonly, while remaining exceptionally detailed, can deliver a hint of warmth at times (counter intuitively) while retaining great resolution and "air" which I enjoyed but you may want to audition with pairing of speakers to ensure your personal desired transparency of sound.

## CONCLUSION

If you are seeking to move to a dedicated CD transport you should definitely audition the 6000CDT for its smooth operation, sleek looks, and constantly robust playback. The 6000A alone is a strong offering and I suspect as more people hear it the market rivals will be working

hard to compete, as a combo for me this is a class leader and is punching up the weight class in spades. Solid, punchy, refined and delivering at times a truly detailed but analogue feel, this is one to watch. I suspect Santa may be visiting Audiolab this Christmas for many. I for one am seriously considering buying it.

## AT A GLANCE

**Build Quality:** Designed well, solid unit, high-quality materials and strong aesthetics

**Sound Quality:** Frankly wonderful in context of competitors - smooth, yet detailed on-board DAC delivering solid bass and smooth highs and mids but with an "analogue" feel at times. Staging, drive and timing very good.

**Value for Money:** No question - to achieve an amp of this calibre (with good DAC) and quality CD transport bundled for under a grand is a work of Audiolab magic.

**Pros:** Sound quality and punch, an option of inputs, DAC quality (including filters)

**Cons:** At this price, absolutely none!

**Price:** 6000A rrp. £599, 6000CDT rrp. £399



# REVIEW

## KR AUDIO VA 350i INTEGRATED AMPLIFIER



The KR Audio VA350i amp is hand-built, as are its enormous tubes, in Prague and it costs £11 500 in the UK and €12 900 in Europe. Stuart Smith takes a listen.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# KR AUDIO VA 350i INTEGRATED AMPLIFIER



KR Audio is based in Prague in the Czech Republic and hand makes all their own valves as well as their amplifiers. On test here, we have the VA 350i Integrated amplifier which uses two KR Audio T100 output tubes to give a power output of around 30 Watts per channel in pure Class A.

The company began the research to make improved triodes in 1992 and started its life as a tube manufacturer, first of all with reproduction of Marconi valves and then audio valves intended as up-grade options for amplifiers in 1994.

The company design and build 15 different tube amplifier models and two completely solid state amps. The tube division currently makes 12 models of valves

At this point, it should be noted that initially the amplifier was sent to our reviewer Dan Worth who felt that it did not match at all well with his Ayon Seagull C loudspeakers and it was thought the amp would be better matched to our Avantgarde Duo XD horns and hORN Mummy loudspeakers.

## CONSTRUCTION

Bombproof is a term often bandied around when describing audio products and the term certainly applies with the VA 350i with the unit weighing in at 37kg and having me put my back out when I tried to lift it out of the wooden packing crate. I'd have liked to have seen a box used that allowed either two people to get at the amp or that had fold down sides – dead-lifting 37kg is not to be advised. Visually the unit is certainly imposing and the T100 output tubes are massive and dominate the front of the amp in their protective cages. It's an all-black affair save for the silver volume knob, four silver selector buttons with red LEDs above to show which input is being used, a power button and LED and a KR Audio nameplate.

Around the back we have four RCA inputs a single pair of RCA outputs, some pretty standard but perfectly adequate binding posts that accept bare wire, spades or banana plugs, an IEC inlet and a master on/off switch. There is also a little screw switch to change output impedance.

The whole is well finished and all in all it's quite a handsome beast with a decidedly industrial and purposeful feel to it with metal fins around the side for heat dissipation and two heptagon casings each side the valves and their "cases" and a further case for transformers.

A basic but adequate remote is included in the package.

KR Audio amps are a little different to the vast majority of valve amplifiers and whereas you would normally see more tubes than simply the output valves adorning the top of the amp (drivers and rectifier) these amps use solid state JFETs and MOSFETs. This is an unusual topology and not one I have come across previously.

The T100 tubes are as mentioned massive, though not as big as the T1610 output valves used on the company's Kronzilla amps, and they do get massively hot which may be a consideration if you have inquisitive kids, though I've always been of the mind that you would naturally put valve amps out of reach until they are old enough to understand hot things burn.

## SOUND QUALITY

From the off, it is clear that this unit was a good performer with initial reactions being that it had good power and poise and with an engaging feel to its presentation. The first thing we played (on the Avantgarde Duos) after leaving the amp to warm up a bit was The Jam's This Is The Modern World and the opening blasts of the title tune had us look up and the amp had our full attention from there on in. The amp was reasonably fast and lithe, though not as fast as our Class D amp, but not as tonally uncoloured in the mid-band as our



# KR AUDIO VA 350i INTEGRATED AMPLIFIER



reference amps and I'd definitely suggest it has a character to its sound – slightly rolled off at the very top end, though clearly a musical and engaging listen. It's a funny thing, we listen to our Class D amps a lot as they are our reference tool and we believe them to be very transparent indeed, but every once in a while we like to plumb in our 2A3 amp as we just love the more musical character that brings to the table and I'd suggest that many will enjoy the presentation of the KA 350 from purely a listening pleasure perspective, though I preferred our Trafomatic 2A3 amp's presentation overall on the Duos, finding it more open in the mid-band and with less background noise - others will, of course, prefer the KR Audio amp and why home demonstration is absolutely imperative.

On the hORNS Mummy speakers, with passive bass (the Duos have active bass), I found that the grip and control the KR Audio amp had on the bass of Hardfloor's Once Again Back was not as tight as our Class D amps, though perhaps somewhat better than with the 2A3 amp. I'm sure many may scoff at using this kind of music to evaluate a piece of Hifi, but well-produced techno can be a very useful tool in uncovering failings. Hi-hats at the start of this tune fly about the soundstage when done properly and I had no complaints with this amp in this regard, though I'd suggest that the soundstage thrown is not so wide or deep as either our two aforementioned amps. Hats were crisp but failed to have that last degree of sparkle the Class D brings to the table and I'd perhaps suggest that the KR Audio amp was less analytical in its presentation – again some may say more musical and would no doubt prefer it.

Back to the Duos and a bit of Miles Davis' Sketches Of Spain and it is apparent that when compared to the Class D amps, which are silent on these 107db sensitive loudspeakers, the VA 350 is not absolutely quiet, but this was not so evident when using the less sensitive hORNS loudspeakers. I enjoyed this album greatly with this amp in place, with the music again having character to it, even if the not absolutely silent background did detract from my enjoyment a tad on the Duos. Here's the thing, most things in the Hifi world come down to

trade-offs and often the need to carefully match components to get the best from them – it's interesting to note that G-Point Audio, the UK distributor of KR Audio products, also sells hORNS' loudspeakers and there may well be a good reason for this. On the hORNS Mummys the same record came from an almost silent background and it may be that the Duos are just too sensitive for the VA 350, but it would be remiss of me not to mention this point. Musical is a term I keep wanting to use for this amp and speaker combo, which is to say it is an engaging and enjoyable listen. The full tonal range of Sketches is there in all its glory and the presentation is believable with the amp reacting quickly to dynamic changes. The amp felt speedy and agile and there was good and convincing space around the music with natural reverbs being (again) believable – that is to say not over exaggerated. Detail in the tone of flugelhorn and trumpet were excellent and the slightly "stepped back" playing style was represented well, bringing a real feeling of connection to, particularly, Concierto de Aranjuez.

If I'm sounding slightly critical of the amplifier here, specifically using the amp on the Duos and with electronic music, then I don't think I would be doing my job properly if I didn't highlight what I heard, but I did actually enjoy its presentation in many ways and with other music. Those opening lines of The Jam's album really did make me sit up and take notice and throughout my time with the amp, I felt that it had a certain and uncanny rightness to the sound with the Mummys. It is mellifluous in its presentation on the right speakers and not at all fatiguing to listen to for hours on end and in that way it is very much like the 2A3 reference I've mentioned. I don't believe the amp is one that is necessarily right for those whose main choice of music is techno etc based as I don't think it quite has the required grip in the bass end, but with vocal, jazz and "lighter" program it is very enjoyable indeed – perhaps it could be said that this amp is made for audiophiles that enjoy "audiophile music"? Again, this is a balancing act when buying Hifi as some products do lend themselves to certain styles of music and listening tastes and why we for reviewing purposes came to the choices we came to.

# KR AUDIO VA 350i INTEGRATED AMPLIFIER



Playing another of our reference records on the Mummys, Gil Scott-Heron and Brian Jackson's *Winter in America* showed that the partnership allowed a good insight into the recording of the tunes and the space they were recorded in (there is a good reason we use this record as it is recorded in a particular style). Vocals were presented very nicely indeed with Gil-Scott's somewhat fragile (read emotional) at times voice bringing a real connection to the music. Flute on *A Very Precious Time* was also nicely presented sounding honey-rich with nice fluidity to the sound. I found the same connection when listening to John Martyn's *Solid Air*.

## CONCLUSION

It is clear that this amplifier is very good when it is partnered with the right speakers, but get this partnering wrong and the amp does have limitations, and this is why I strongly advise that before you spend your hard earned, a not insubstantial amount in this case, I would insist on a home demonstration using your own speakers, that way you will know if you have an amplifier/speaker partnership that will last you a lifetime.

I don't believe this amp is tonally neutral (like most SET amps) and I do think it brings a character of its own to the show, BUT I do think it will find favour with audiophiles who enjoy a softer style of musical program – think light jazz and female vocals. I say this because I do feel there is a somewhat softening to the bass registers which is particularly evident on synthesised bass. There is also a slight roll-off at the very top-end which makes for an easy and non-fatiguing listen, but purists looking for absolute out and out fidelity and faithfulness to the recording may wish to look elsewhere - again a balancing act.

The price of this amplifier put it in the serious money category and whilst more expensive amps are certainly out there, and KR Audio do more expensive amplifiers, £11 500 is still a big number and our much less expensive Class D amplifiers are more transparent and have better bass response than this amp in the final analysis, but then they

are not as easy to listen to in a musical sense in that they lay a recording bare at the top end. What you do get for your money is a well-built statement piece that will please many with its presentation.

With the right speakers, I heartily recommend an audition if you are able to afford and justify the ticket price.

## AT A GLANCE

**Build Quality:** Tank like in its construction and very nicely put together. Remote is adequate

**Sound Quality:** With the right speakers and program this is a nicely musical amplifier that could tame harsh sounding electronics before it in the supply chain. It is a very easy to amp to listen to and become engaged with.

**Value for Money:** This is a matter of taste really. You are getting a big chunk of amp here with a unique set of features but sonically, depending on your taste, more accurate amps can be had for less.

**Pros:** Mellifluous and easy and engaging to listen to for long periods of time. Very well built.

**Cons:** Slightly rolled off at the very top end and not the best control in the bass. Slightly noisy with VERY sensitive speakers. Inability to tube roll – you have to use the T100s and only KR Audio make them.

**Price:** 12,900€ or in the UK : £ 11,500



# REVIEW

## M2 TECH ROCKSTAR SEPARATES



Crosby, Young, Gifted and, er, not Black...John Scott hangs out with M2Tech's Rockstar separates and finds himself helpless to resist their charms.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)





Italian manufacturer M2Tech's Rockstar series of audio components consists of the Young MkIII DAC/preamp, Nash phono preamp, Crosby power amp, Joplin MkII DAC/phono, and Van Der Graaf MkII power supply.

When I was originally asked to review the Crosby, Young and Van der Graaf units, Bill Leigh of UK distributors Auden Distribution explained that he would be arranging for a set of equipment to be shipped over from Italy to me. I prefer to carry out my reviews without doing too much research, or reading other people's opinions, beforehand, so, other than a quick glimpse of a photograph, I had no preconceptions of what to expect when the kit arrived. The result of this was that when I got my hands on the units a few weeks later, I was confronted with three small cardboard boxes – I had assumed the units would be full-sized but that was clearly not the case.

## UNBOXING, CONSTRUCTION AND APPEARANCE

The Crosby, Young, and Van der Graafs arrived, each in their own snug cardboard packing box and were accompanied by the requisite power cords and interconnects along with a remote control (more on this later). Measuring just 200x200x50mm each, the Crosby (first pic), Young (second pic) and Van der Graaf (third pic) are elegantly constructed from a matt aluminium chassis and possibly Perspex front piece; the Young has an OLED display, power button and volume knob which doubles as an input and other functions selector whereas the Crosby and Van der Graaf panels are relatively bare, with no more than a few LEDs (hopefully, you will only ever see one as the others indicate overloads) on the Crosby and a selection of small buttons and LEDs adorning the front of the Van der Graaf.

## SET UP

I decided to initially audition the Crosby and Young as a duo, rather than pairing the Young with the Van der Graaf straight off the bat; as standard, the Young is powered by a 15v wall wart. The rear panel of the Young provides a variety of inputs: Toslink, S/PDIF, USB 2.0 and AES/EBU cater for digital signals while a pair of RCA inputs handles an analogue source, if required. Additionally, the Young is Bluetooth compatible, allowing streaming from portable devices for added flexibility. Outputs come in one flavour only – balanced XLR – although a pair of RCA adaptors is supplied.

The rear panel of the Crosby is a fairly straightforward affair: power switch and socket, choice of XLR or RCA inputs and a pair of speaker outputs. One small switch toggles between balanced or single-ended input and another enables two Crosbys to be used as a bridged pair.

I opted initially to bypass the Allo Boss DAC in my Raspberry Pi streamer and connect the Pi straight to the Young via USB cable. I then used the XLR/RCA converters to connect the Young to the Crosby. The Young can be controlled either via its front panel, an Android app or the supplied remote control. Apps and remote controls are both things that I am quite fussy about; I expect their quality to match that of the products they support. In this instance I found both the app and the remote to be satisfactory, allowing the full functionality of the Young to be easily accessed. The remote, although a fairly lightweight plastic affair, was well laid out and responsive and was M2Tech branded which was a nice touch – not the best remote I have seen but by no means the worst.

## SOUND QUALITY

If I was surprised and slightly disappointed by the size of these little boxes when they arrived – and I was – those feelings turned to very pleasantly surprised then highly delighted once I started to pass some music through them.

# M2 TECH ROCKSTAR SEPARATES



I can't imagine why but as I powered up the Young and Crosby units I was in the mood for a bit of lumberjack-shirted protogrunge. The one-two punch of Cortez The Killer and Powderfinger from Neil Young's live album Weld really hit the spot. I have harbored a suspicion that Neil's cheap and dirty distorted guitar sound is probably the product of thousands of dollars of investment, and the Young/Crosby combo lays bare Old Black's overdrive in all its carefully sculpted, ragged glory. The Crazy Horse rhythm section is present and correct, harmony vocals still easily discernible despite the six string squall.

Like its namesake, the Young is nothing if not versatile, switching with ease between a variety of different "genres". PCM is supported at 16 through 32 bits at frequency rates from 44.1 to 384 kHz; DSD is catered for from 64x to 256x and MQA is also supported, as is Bluetooth. I'm not a fan of adding a laptop or desktop PC into my Hifi setup but I plugged my laptop and connected it to the Young via USB to try out the DAC's MQA capabilities.

Giving Your Song from Elton John's debut album a spin (or more accurately, a stream) in MQA, DSD and CD-quality FLAC, both the MQA and DSD versions were clearly preferable to the FLAC, offering a more detailed and finessed performance. Differences between MQA and DSD were less easy to determine; as far as Your Song was concerned, DSD scored a narrow win but further comparisons (Eagles' Hotel California and Eric Clapton and B.B. King's Key To The Highway) came out in MQA's favour. You pay your money and take your choice; MQA is not for me at present – if Tidal can deliver it without the need for their desktop interface, I'll reconsider – but it is good to know that M2Tech's Young DAC can deliver it if you want it.

Time to bring the Van der Graaf into play. Like me, you are probably wondering why this unit wasn't christened the Stills. I can only guess that the progastic idea of a Van der Graaf (power) Generator was deemed more appealing. Upgrading the power supply to the Young brings all the anticipated benefits: a quieter background and more focused soundstage. Simply put, the Van der Graaf lets the Young

DAC/preamp perform to the best of its capabilities. The Van der Graaf can power up to four M2Tech devices and, powering them up and down in whatever sequence you prefer. Fortunately, if your budget doesn't stretch to the Van der Graaf you will be far from disappointed with the Young's performance in its standard form.

## CONCLUSION

In essence, M2Tech's Young, Crosby, and Van der Graaf combo forms a high end system that you can carry home on the bus. Size, as they say, isn't everything and in this case it is certainly true. The sound quality of these little boxes is reflected in their price. This isn't a cheap alternative to a full-sized system - the three units won't give you much change out of £3,400 – but unless you measure value for money in terms of hifi rack real estate, they are well worth considering against other products at a similar price point. I'd certainly be happy to live with them.

## AT A GLANCE

**Build Quality:** These are well-made, solid little units. Visually, they are attractive in an understatedly stylish kind of way.

**Sound Quality:** It's impossible not to be impressed by the sound that this set of little boxes can produce. Even without the addition of the upgraded power supply, the Crosby and Young are capable of truly excellent results.

**Value for Money:** Physically, you may not get a lot for your money but in terms of sound quality and appearance, the Crosby, Young and Van der Graaf system represents really good value for money.

**Pros:** Full-size performance from pint-sized boxes. Supports an excellent range of audio formats.

# M2 TECH ROCKSTAR SEPARATES

**Cons:** Let's be honest, their size will be an immediate turn-off for some potential purchasers. For those that can see past this, it's all good.

## Prices:

Crosby - £1150

Young - £1275

Van der Graaf - £950



**HIGHLY**  
**Hifi Pig**  
**RECOMMENDED**



# REVIEW

## CYRUS ONE HD INTEGRATED AMP AND DAC



The Cyrus OneHD is an integrated amp and DAC with a whole host of connectivity for what looks to be a very reasonable £999. Alan McIntosh takes a listen.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# CYRUS ONE HD INTEGRATED AMP AND DAC



Having never been introduced to Cyrus before, when the OneHD integrated amplifier arrived I was looking forward to a test with completely fresh ears. Add to that the Cyrus OneHD adds even further inputs and versatility (including the new AptX HD Bluetooth technology deriving its moniker) to the previously reviewed Cyrus One - all for under a grand - I was very, very much looking forward to seeing if it could deliver.

## CONSTRUCTION

Picture the bridge of the Death Star in the film Empire Strikes Back. Picture Darth and his crew, in their 70's version of high concept sci-fi – all gloss black and red, dotted around with blinking console lights and you have my first impressions of the OneHD – and I loved it! Arriving very well packaged in a double skin box, packed out well and with a simple “get started” leaflet and CD of full colour info and instructions, it feels Cyrus see quality as important. Unveiling the well-known “shoebox” form factored black amplifier your immediately struck by 3 things – Firstly its diminutive well machined metal body (a dense 5.6kg), its positively bristling input panel to the rear and to put the icing on the aesthetic cake a gloss black, with only 2 oversized “frog eye” rotary wheel controls (subtle power button under one of these) with just ONEHD in small white and red writing and a headphone socket – as I sat it out my wife entered the room and for the first time I heard the words “that’s a sexy amp!” – off to a good start then – on the design front at least!

It may be a niggle for some that not included, is a remote – that however is covered via the very slick and intuitive ONE Remote app available for both iOS and Android.

On power-up, you get a rather snazzy light display (LEDs are dimmable) round the dials and a brief hint of a “fizz” through the speakers which Cyrus assure is normal for the OneHD and is such a low volume that it’s nothing to be concerned about.

Turning first to that forest of connections at the back we have a plate packed with every conceivable input with bi-wire capable outputs either side offered up via sturdy binding posts and a pre-out for feeding a power amplifier if desired. The only thing lacking here I think is better labelling of sources.

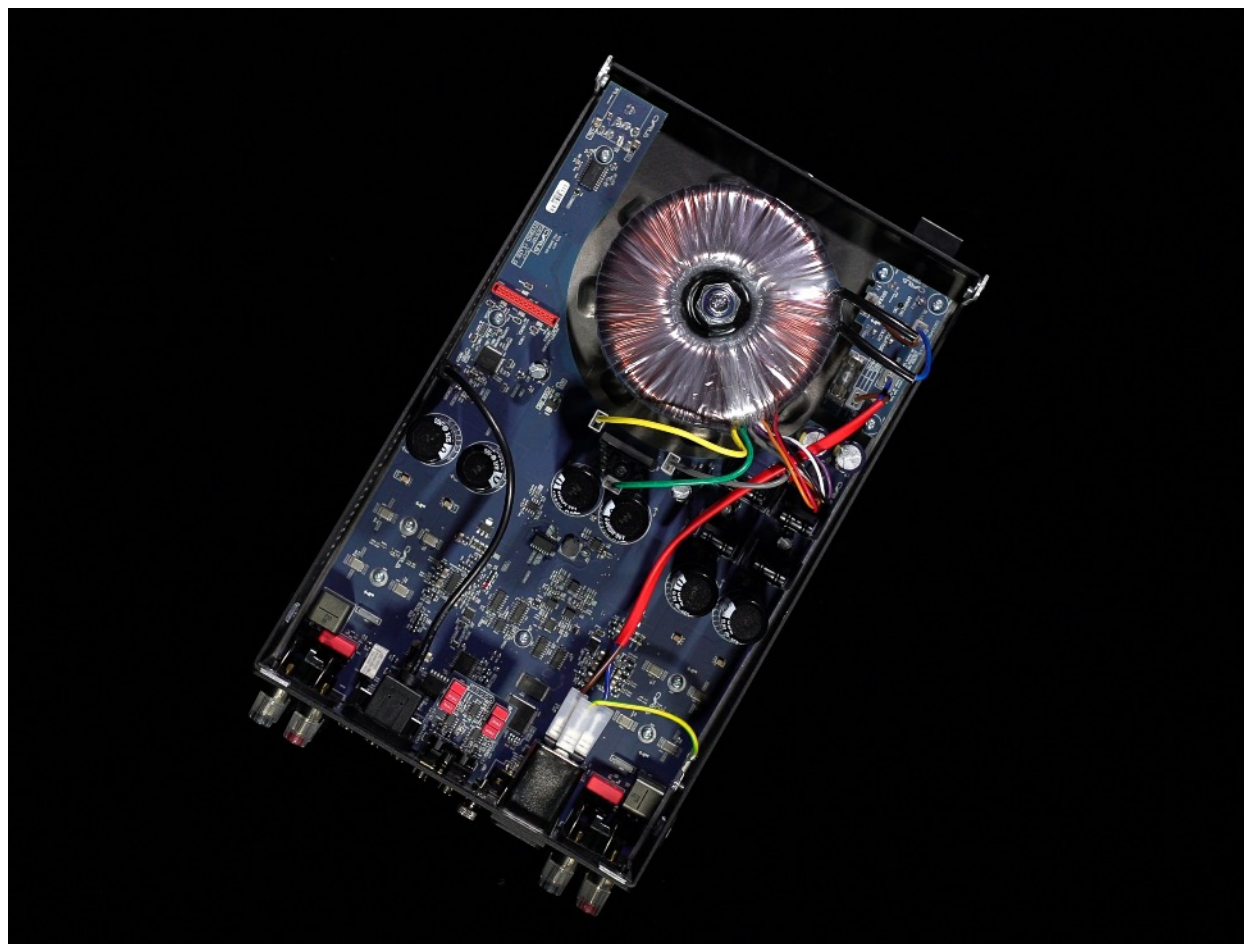
Included is a passive RIAA MM phono stage which Cyrus has now separated from the main circuit, aiming to lower the noise floor and making it very turntable ready. Streaming options are via Digital Coaxial/SPDIF input, USB 2.0 for laptop streaming and Toslink, all being fed into an ESS 32bit DAC helping to earn the Cyrus that “high definition” tag. The Asynchronous USB handles up to 32/192 and DSD 64 and 128. The Coax and Toslink options both managing 24/192. Three line-level inputs include an AV integration option for running a simple 2 channel home cinema rig or use the OneHD as a preamp to drive a bigger system. Add to all of this the latest aptX HD Bluetooth which the makers (Qualcomm) suggest is “better than CD quality” if fed a good source (Tidal HiFi for example) and you can start to see the possibilities this integrated amp could offer. In fact, we may need to invent a new class – HyperIntegrated! (I’m trademarking that).

Cyrus 4th Gen Class D in nature, with a large toroidal linear power supply, it outputs at 100w to 6ohms. Distortion is listed at 0.1%, but we have to consider that in the context of the mighty power combined with the versatility it offers at a very reasonable price point. The output is already regulated via Cyrus’ Speaker Impedance Detection (SID) system. The Headphone stage when activated has all power driven to it creating a Class AB delivery with the power to drive even power-hungry headphones.

## SOUND QUALITY

Before I begin I think it’s worthwhile discussing who I believe the target user for the ONEHD is. It’s not going to be the heart of a pure audiophile setup, instead I think this amplifier will appeal massively to someone who needs a small footprint and extended versatility,

# CYRUS ONE HD INTEGRATED AMP AND DAC





# CYRUS ONE HD INTEGRATED AMP AND DAC



# CYRUS ONE HD INTEGRATED AMP AND DAC

perhaps listens to vinyl or CD on occasion, but often as not streams their music or wants to run an AV or games console – basically a do it all, and do it well enough to enjoy and not have to faff with different components – rather than “do some” at a higher delivery point – Cyrus has plenty in their other range for this. In that vein, I’ve tested with components I feel would be a good balance.

Vinyl first– using the integrated MM stage I set up some usual reference tracks with my reference Fyne 500 standmounts, which despite their size are both revealing and have good tight bass and so give me a good feel for any source or amp. Using an Ortofon 2M Red the sound achieved isn’t perhaps as refined as that achievable using a dedicated Class A amp and MC capable phono and cart, but it sure is musical and easy to listen to and given the versatility on hand this little guy really does impress me, especially with some volume behind it. Onto the Arcam CDS27 CD/SACD (pretty uncoloured signature) and again I’m finding I’m just enjoying the music, almost forgetting to “listen” for sound which I guess is what’s it’s all about – strong staging and drive. The hint of warmth in the bass, perhaps wanting a smidge more resolution and brightness in the mids compared to more pricey Class A amps, so you may want to choose to pair with a little care if you prefer a clinical sound. Staging is open and dynamic - the 100W driving the Fynes with ease.

Streaming from my Pioneer N50 via the Coax input and same story, fun to listen to, no obvious detractors and already I start to realise the flexibility of one box, controlled with one remote is very much growing on me! Laptop via the USB2.0 delivered similar results. I didn’t have DSD files to test but at FLAC quality it performs well.

Next, I move the OneHD to my new LG HDR TV and take the Toslink route to set up a simple 2.0 set up. I also switched to Dali Zensor 3’s. Musicality again is pleasurable, warming a little more (the Dali’s have that signature) but I can also hear a slight loss of refinement in mids and highs, staging a little further back, to be expected that this price point and via Toslink. Feeding it with the Arcam and the effect is consistent, suggesting you might want to audition with different speakers for your preferred pairing.

Lastly Bluetooth via that aptX HD technology. It should be noted you need an aptX HD compatible handset to take full advantage of this (I had to borrow one - Android has well embraced it but Apple not so...). I have to say colour me impressed! “Better than CD” I can’t confirm or deny, but it’s not lacking in detail or musicality. In fact, I’ve found myself spending more time on streaming via Bluetooth on this amp than ever before – again a nod to simply how extensively versatile it is.

## CONCLUSION

If you have a budget of a grand and are seeking a true all in one amp that offers the latest quality Bluetooth is turntable ready and with good power output, a very respectable headphone amp and decent DAC to stream from laptop or phone and seek a small footprint or want to use your AV or games console and don’t need the latest word in high resolution and refinement, then you simply need to audition the Cyrus ONEHD. I kind of fell in love with it for its simplicity and can see it spurring a lot of other manufacturers to consider this level of integration as a new generation of listeners return to vinyl and CD as well as streaming. I may just find a spot for this and keep it!

## AT A GLANCE

**Build Quality:** Designed well, solid unit, high quality materials and strong aesthetics – if a little busy at the back

**Sound Quality:** Fun! That’s overall my impression. It’s not going to beat some of the better quality and purely integrated amps where you seek resolution and refinements. The Cyrus has some warmth overall but its power drives speakers with ease and listening is a pleasurable experience – and remember the sheer number of inputs that very few, if any can rival means far less components to faff with

**Value For Money:** At an RRP of just under a grand I think Cyrus has worked wonders here – I’m genuinely feeling sad to see it go, It’s just so easy to set up and listen and jump from one source to the next.

**Pros:** Sheer versatility, the inclusion of latest aptX Bluetooth, great looks and ease of use as well as good fun musicality, linear power, and great power delivery and high-quality headphone stage

**Cons:** If I’m being hypercritical labelling of the many inputs could be easier as looking from above its hard to see L+R, the number on the input etc

**Price:** £999



# REVIEW

## SMSL A2 AMPLIFIER



Not everyone needs a 5 input 2x250W, DAC integrated Class A amp weighing in at 40kg. Some are seeking an amp that keeps its simple, allows 1 or maybe 2 connections, as few knobs as possible, power efficient and in a compact size, with a price point to match... enter the SMSL A2 Class Amplifier costing less than £40.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)



# SMSL A2 AMPLIFIER



## CONSTRUCTION

At about the same size as a medium paperback book with black casing and a silver face (Black/Gold also available) the A2 isn't something that will make you consider warming up your back before unboxing and hefting into place that's for sure.

At the front we have a simple push standby button (which also allows us to select between 2 inputs), 3 LED's indicating power, source and also tone control and an "infinite" rotary wheel (i.e. no start or end to rotation) to control volume and which also can be pushed to activate & reset the tone controls allowing you to trim Bass and Treble if desired. There is also a 3.5mm jack input. Turning to the rear and you have a single 2 channel RCA input, pretty decent looking binding posts like the baby brother of the ones commonly now found on larger integrated amps which are both bare cable or banana/z clip compatible (however I recommend banana or z clip due to space available and bare wire connections would get fiddly) and .. surprisingly a simple subwoofer out.

Hailing from China the A2 is a very simple Class D in design, the power is delivered via a 19v DC power cable with transformer block in line rather than a wall wart which keeps things a bit neater. Rated at 2x40W into 4 Ohms with a listed response of 20Hz to 20KHz and a rated sensitivity of 90dB.

It's not only small - so much so that it won't take up any space really at all on a desktop, or in a bedroom/office setup, or even nestled into your AV set up - but it's light - very light. This isn't a problem per se, however connecting a fairly sturdy gauge speaker cable (in this case the Ecosse 2.23) and the tension in the cable can lift the amp and so it's worthwhile taking time to position or use very flexible cable. I don't have a sub to test, but I would note that most subs have an RCA type fitting and the out on the A2 is a 1/4" jack so you will need some sort of adaptor - cheap enough to buy but a bit of an irritation to have to. Again not really a surprise but no remote is included for the A2.

What is a surprise given the positioning of this amp in terms of the "who" might buy is the lack of Bluetooth or digital input? While this may have driven the costs up I suspect many initial viewers at this price point would look for this.

## SOUND QUALITY

Before I begin I think it's worthwhile discussing, as I like to, who I see the most likely user for the A2 being. The list for me is a pretty wide section of the lower end of the market including someone starting out, someone who just needs to hook up speakers to say a CD or Turntable (with inbuilt phono stage) or connect a tablet via headphone jack, or maybe even a home DJ who just needs a way to connect mixer to speakers, for someone looking at a bedroom, office / shop or even workshop setup who really wants to keep the budget right down, but wants a half decent sound this may just be the ideal way to go. In that vein I've tested with components I feel would be a good balance for the amp's price-point (and some better to see what it can do).

Vinyl first- sitting the A2 in my main rack with my standard rig (driving my Fyne Audio 500's) I connect my SL1210 via ProJect phono stage and stick on some go-to vinyl reference pieces. It's not a surprise that the intro guitar on Dave Gilmour's 5 AM live at Pompeii doesn't sing as sweetly, with the same detailed decay as my Musical Fidelity M3Si (almost 20 times its £40 price point) or have the same overall drive and warmth of my old budget Onkyo A-9155 Class A, but it's actually not bad. For its size, it represents itself pretty robustly, not quite managing to open the stage and deliver the strength of lows I'm used to, but it's a listenable and easy to get on with amp, it has to be said. And I wouldn't expect more at his price point, but I've heard a lot worse. The only sounds I've heard to date that is substantially better at a similar sized form factor box is the incredible Aeron C101 amplifier but that's coming in at around 20 times the cost.

# SMSL A2 AMPLIFIER

Streaming from my Pioneer N50 via the Audiolab MDAC+ and same story - fun to listen to, a pretty decent sound across the spectrum, not making me sit up and take notice but I'm sitting enjoying my music. Electronic music pumping and synthing along nicely, no real trouble with timing or musicality but lacking the grip you'd seek in a mid-level solution. The sheer lack of anything over-engineered or complicated is in a way taking away a lot of the faff we get caught up in.

Moving the A2 to drive the much more budget but lovely sounding Dali Zensor 1's, which for me is a more appropriate partner in terms price point and you retain the A's overall sound but less capable speakers do uncover some more of the A2's limitations.

Predominantly in bass control. The Fyne's compensated somewhat and with the Dali's the bass is certainly looser and less coherent (adding a sub for a budget setup may compensate somewhat), and the mids are certainly a little more closed in – but remember this is a £40 amplifier!

With each set up I experimented with the tone control. Both bass and treble can be adjusted by the common volume/tone rotary and certainly, there is a substantial modulation enabled for those who want it. One niggle here is there are no readouts/markings to offer visual guidance on the exact setting, so really you don't know where each is set, however, if you want to reset it's a simple task to press and hold the rotary.

## CONCLUSION

If you have a decent budget and seek an audiophile sound you're probably not going to consider a sub £50 box and so you probably didn't read this far and that's fine, but for anyone in my suggested target list above, or with a sub £500 budget for a full system and needing a simple solution for 1 or 2 sources and who's pairing with similar budget speakers this should certainly be on your must-try list. No, it's not going to satisfy critical listeners that's for sure, but for those on a very tight budget or wanting an inconspicuous amp for background music away from the main rig it offers a great solution. It would also work well for those wanting to add a cheap 2.1 system to their telly. The inclusion of tone control can compensate for some of the limitations and help you manage your room and output sounds and this will attract some users. It's cheap, it's cheerful and used in the right context it works well, so really, what's not to like for thirty-five quid and so I'll give it a highly recommended.

## AT A GLANCE

**Build Quality:** Compact, neat, well laid out, choose your speaker cable carefully

**Sound Quality:** Easy to listen to, overall represents itself well given its ridiculously low price, pretty punchy and musical even and lower volumes, doesn't have the drive of bigger amps, limited control of bass and lack of dynamics when compared to mid-level offerings

**Value For Money:** At £40, you get a lot – ideal for the right user with a very restricted budget

**Pros:** Price, size, simplicity, tone control

**Cons:** Limited capability, lacks Bluetooth or digital inputs, lacks control, requires an adaptor for the sub out. The instruction manual is not well translated into English (but understandable).

**Price:** £35



# REVIEW

## GOLDNOTE IS-1000 AMP, DAC AND STREAMER



Italian brands Gold Note IS-1000 Streamer and Integrated Amplifier does what it says on the tin and has an impressive range of connectivity, high power output and even has a built in MM/MC phono stage. It costs £3820 (around \$5000) as tested in the UK (a version with an updated DAC is available for £4500) but does it all add up to a great deal in the final analysis? Stuart Smith finds out.

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# GOLDNOTE IS-1000 AMP, DAC AND STREAMER



## CONSTRUCTION AND FEATURES

When a product arrives well packaged there is an immediate sense that you are dealing with a company that takes pride in its products, trust me many even supposedly high-end products arrive poorly packed and it's a major gripe of mine, but I needn't have worried about this unit – purpose made side cheeks slide into an inner box and there is a second box for extra protection... so we are off to a good start.

Take the IS-100 out of its box, it's a heavy beast but on the shelf is the epitome of understated Italian class. The chassis is an all-aluminium affair with nicely carved air vents on the top and sides and the Gold Note logo on the top. On the front panel, we have the power indicator, a screen and a single knob that is used for navigating the screen and changing source etc. It's all very uncomplicated and simple to get your head around even for someone like me who tends to (initially) bypass the manual and jump straight in. A remote control is included and is functional in that it gets the required job done but I would have liked to have seen the remote match the IS-1000 itself.

Around the back it's a lot busier, but it is well set out. Left to right we have XLR balanced inputs and two pairs of RCA inputs. One of these RCA inputs can be used for line or phono (MM or MC) whilst the second can be used for line or AV inputs. You then get a couple of pairs RCA outputs with one being fixed and the second variable. There's a pair of good quality binding posts above which sits the digital input area. There is an RF in to connect the included WiFi antenna, a mini-usb for firmware updates, a firmware button for manual update, 3 TOS Links, an RCA coaxial input, an ethernet port for a wired connection to your network and a USB in port. Finally, you've got the master power switch and the AC input.

To be honest and primarily for the sheer convenience, I mostly used the IS-1000 in wireless mode and to control the unit in this mode there is, of course, an app for both Android and iOS devices called

Mconnect Control. Set up is a doddle with great guidance from the logically put together and not over-complicated handbook that comes with the IS-1000. The app lets you access your favourite streaming services including Deezer, Tidal, Qobuz as well as internet radio stations and music stored on Dropbox or One Drive. I used Tidal as that's what I have a subscription for. The app also allows users to add favourite musical choices to a favourites folder and to make playlists.

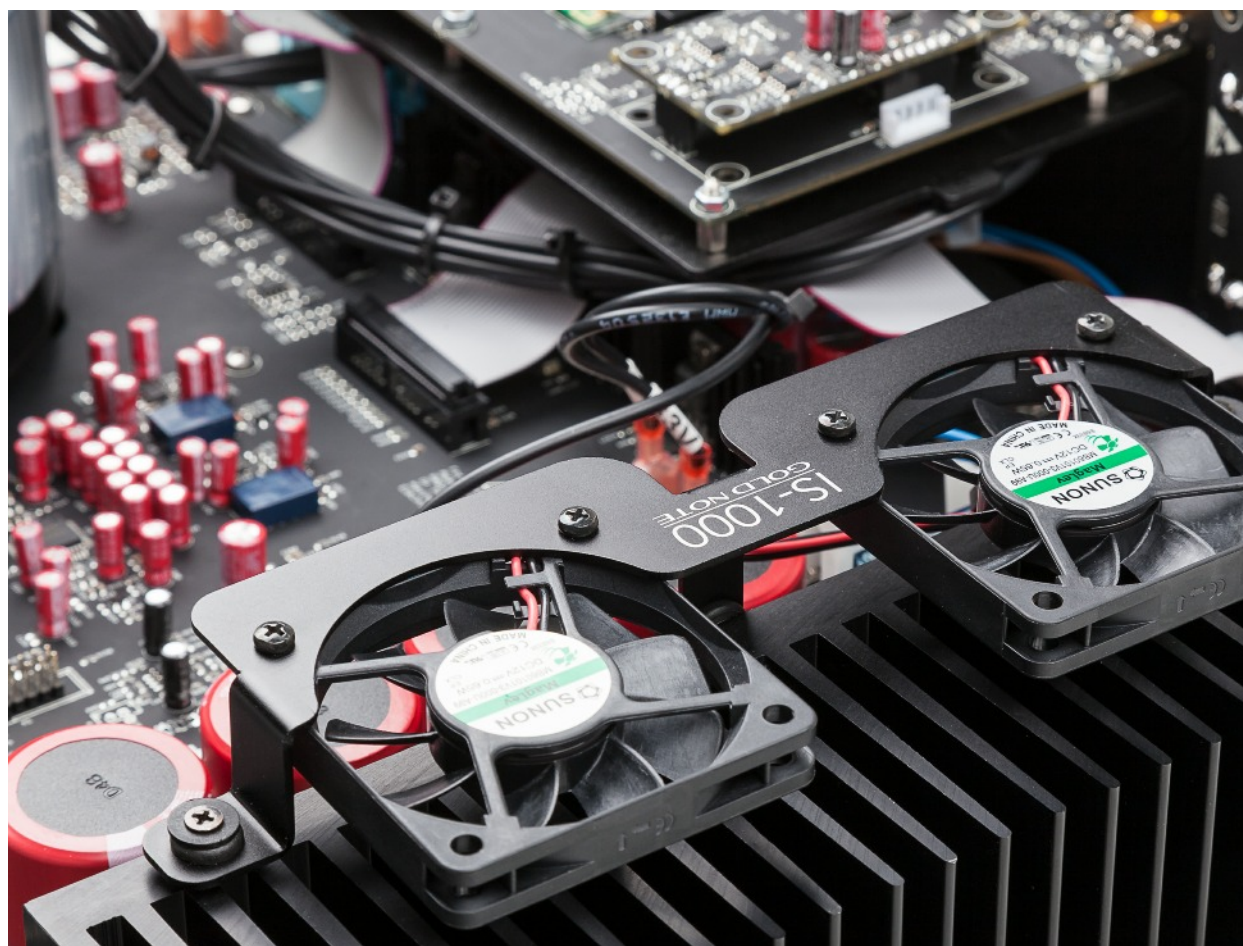
Turn the IS-1000 on, the screen lights up and you are presented with a very simple and well thought out navigation that uses, as mentioned, the control knob. Top left and right of the screen you have balance (a useful feature often lacking in integrated amps), centre top you can turn the display off, bottom left and right you choose the source and switching between MM and MC cartridges. Also on the screen and not immediately obvious as to what they are is DF-High/Low and Booster On/Off. The DF button is a nifty and I think pretty clever idea as you can change the damping factor of the amp to suit your particular speakers. Set it to high (250) for speakers that are low to mid sensitivity and low (25) for higher sensitivity loudspeakers. Gold Note claim that in low-mode the IS-1000 will act as a low powered valve/tube amplifier. As I said, I think this is a useful feature and makes good sense in that it widens the potential user-base for this unit. It's also very useful for me with my reviewer's hat on as I do like to put kit that arrives for review through as many speakers as I possibly can at the time.

The other virtual button, the Booster, acts as far as I can tell like a bass boost that used to be pretty common on amps but seems to have fallen out of favour.

Of course, all the above can be done from the comfort of your armchair.

The IS-1000 supports, as mentioned, Tidal plus MQA via Tidal, Qobuz, Spotify, Spotify Connected and Deezer with Roon but you can also connect to your NAS drive, Hard Disc Drive and also to USB

# GOLDNOTE IS-1000 AMP, DAC AND STREAMER





# GOLDNOTE IS-1000 AMP, DAC AND STREAMER

sticks. It allows for DSD 64 native and via DoP on USB and LAN and PCM up to 24/192. File-wise it plays all the usual suspects.

Worth noting is the fact that the IS-1000 does have cooling fans inside the unit but I can honestly say I never noticed these running at any time during the review period and it is worth noting the "Updates Since This Review" section at the end of the review.

## SOUND

We've got a pair of Pure Audio Project speakers open Baffle speakers in for review (they have been here a few months so we know them pretty well) and to be honest I wasn't really getting the sound I was expecting from them with a pair of 50W monoblock amps we have at the relevant price-point. However, hooking them up to the IS-1000 set to high damping factor really got them on-song and with the amp feeling to have much more grip and control - it's a simple matter of fact that these speakers needed the extra power the Gold Note was able to provide - it outputs 125 Watts into 8 ohms. I'm not going to the sound of the Pure Audio Project/IS-1000 combo as they are not part of our reference speaker compliment and I really only mention this point to highlight the Gold Note's ability to bring these open baffle speakers alive. I had a similar experience when connecting the amp to a pair of Boenicke loudspeakers (Review here) – in fact I'd suggest that the Gold Note/Boenicke combo were a very good partnership and I spent a good couple of days simply enjoying music through this pairing.

Connecting the Gold Notes to the Avantgarde Duo XDs and switching to low damping factor I was rewarded with a mid-band that was sweet and slightly on the warm side when compared to the class D amplifiers we use as a reference. I don't really see this is a criticism of the Gold Note as the amps we use for reference have been chosen specifically to be analytical and somewhat clinical in their presentation – they are after all a review tool and some people will prefer the more relaxed yet powerful sound of the Gold Note. Female vocals were presented really beautifully with bags of detail and no harshness in the upper frequencies. Instruments sat properly and stable in the stereo mix and I really do think that the IS-1000 played to the Duos' strengths giving a highly enjoyable and engaging musical experience that was somewhat addictive. A good sign of something being "right" is when you stop actually analysing the sound and just sit and enjoy the tunes you are playing.

The Duos are active in the bass department and so out came our hORNS Mummy speakers and I heard that same feeling of grip in the bass I'd heard with the Boenickes. Dub reggae and other bass heavy music sounded great, but then popping on Concierto De Aranjuez showed the IS-1000 to be a deft performer with classical music, being fast and dealing with dynamic changes without missing a beat.

Up to now I'd been using Wi-Fi or wired ethernet connection and also attached a hard drive and found the flavour of the IS-1000's presentation to be consistent across the board. Connecting a CD player with balanced outputs and I had the same experience of a dynamic if slightly warmer presentation that is easy to listen to and certainly non-fatiguing. If you are reading this and think my calling the Gold Note slightly warm in its presentation is suggesting that it's woolly and a bit lacking in detail then don't – what you have here is power with a certain amount of grace.

Sadly, I only had access during the review period to MC cartridges and so was unable to make use of the MM part of the phonostage but found the stage to be very, very, very quiet, again with a dynamism that really let you get into the records you were playing and it's pretty

transparent allowing the music to flow. Is the phonostage as "accurate" or as good as our reference, well no, but that costs pretty much the same as the whole of the IS-1000 so we're really comparing apples with oranges. Do I think the phonostage could hold its own with competition up to the £750-£1000 mark? - I'd certainly say so. The phonostage here isn't going to satisfy the die-hard vinylista who has spent thousands and thousands on their record players, arms and cartridges, but it is well good enough for the market that I believe this unit is aimed at – those looking for a nice looking, well connected all in one streamer and amp that also has the option for playing records.

## CONCLUSION

The Gold Note IS-1000 is stonkingly well built and looks the business. It offers those looking for a one box/just add speakers solution a great product at a price that I believe to be very reasonable for what you are getting.

Connectivity is comprehensive and I can see many having the IS-1000 as the hub of their entertainment system and having it not only for playing tunes saved on NAS/HDD or from streaming services but also for putting the television through.

It's a fab product that is most definitely in the mid-fi audio bracket in the way that it plays music but also caters for those that just love music, want great sound but really don't want to go down the whole multi-box route.

The inclusion of a phonostage is a stroke of genius and whilst not everyone will have the need for it, many will given the seemingly unstoppable revival of vinyl.

## AT A GLANCE

**Build Quality:** Very, Very nice and solid. Needs a nicer remote.

**Sound Quality:** Grippy and controlled in the bass, erring on the slightly warm side of neutral in the mids but nice and detailed in the upper frequencies with plenty of power and dynamic range.

**Value For Money:** You are getting a lot of product in the one box and fit and finish are very good so I think it offers very good value for money.

**Pros:** A highly connected and good sounding bit of kit that is simple for non-technophiles to get to grips with.

**Cons:** I did have the app crash on me a few times when using Tidal. You are paying for a phonostage whether or not you want or need it. The unit did need resetting a couple of times when left on and we had an electrical surge - though this could also be seen as being a positive point from a safety/protection point of view.

**Price:** £3820





REVIEW

TAGA HARMONY DA-300 V.3

DAC



Ian Ringstead checks out the £200 TAGA Harmony DA300 v.3 Digital to Analogue Converter

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# TAGA HARMONY DA-300 V.3 DAC



I'm very familiar with TAGA Harmony having reviewed their excellent speakers and recently the brilliant little TTP 300 phono stage. When Przemek sent me the TTP 300 to review he said I'll send you our new budget DAC as well to try. I love cd as a format and my cd collection keeps growing, but with regards to DACs I have had an occasional dalliance with them but that has been it. There are a plethora of DACs out there now ranging from the budget models like the TAGA DA300v.3 to the serious models from companies like Chord's DAVE and DCS's Debussy where £8500 is required. TAGA have always strived to offer great value for money and at £200 the DA300 v.3 is precisely that.

## CONSTRUCTION

The lovely aluminium and steel case housing the DAC is the same as the TTP300 so saving on production costs which are passed onto you the customer. The 3rd version is a miniature Digital-Analogue Converter, which converts digital audio signal from any digital source to high-class analogue audio with clearer, richer and more powerful sound. You can connect three digital signal sources to the DAC 300 v.3 - USB, optical and coaxial. The traditional inputs of coax and optical are supplemented by a high quality usb asynchronous input to allow users to hook up their laptop to play their music files or use a music server or smartphone. The analogue output uses very good quality solid machined brass RCA sockets for an excellent connection and signal transfer. They certainly felt solid and made a good tight connection with my leads. The small dimensions make it easy to add to any audio system, a computer or a video game console. I can vouch for that because my hifi rack gets very crowded with review product regularly passing through, so a neat compact unit is a blessing. The front panel sports just an input selector button and the leds to denote which input has been selected. Simply pressing the input button cycles through the inputs, dead easy. The back panel although crowded is well laid out with the input and output sockets

and the power switch and dc input socket for the off-board power supply. It couldn't be any easier.

As I don't regularly use a separate dac first comparisons were made with the built in dac of my Marantz SA11 S2 sacd player. My Marantz is a reference class machine both in build and technical quality to my ears and I wouldn't swop it for anything else unless a Marantz SA7 S1 was given to me. The Marantz SA11 S2 has an NPC multi-system (DSD/PCM) digital-to-analogue converter. (For those people who are technically minded the SM5866AS is a D/A converter compatible with both the DSD SA-CD signal format and the PCM CD/DVD-Audio and similar formats. DSD employs a 1-bit data stream, from a high-order Delta Sigma conversion at 64fs (fs = 44.1kHz), that contains high-level quantization noise in the high-frequency band above 20kHz. The SM5866AS, in DSD reproduction, has a DSD-dedicated FIR digital filter that attenuates the DSD quantization noise in the digital domain, and the resulting multi-level signal is D/A converted. In PCM reproduction, an oversampled PCM signal input, provided using a SM5847AF or similar digital filter, is converted to a multi-level signal by the 3rd-order noise shaper and then the multi-level signal is D/A converted) The Marantz is about ten years old as a design but in its day was highly regarded and still is to my ears.

The TAGA uses the very latest technology in DAC chips. The built in dac is high resolution 32bit/384kHz PCM, DSD USB DAC which is an ESS Sabre32 Reference ES9018K2M with patented Time Domain Jitter Eliminator and SA9227 chip.

## SOUND QUALITY

I know the sound of my Marantz very well, which through my system sounds superb so the TAGA had a tough job on its hands to compete. Straight away the TAGA sounded great but there were certainly differences in sound between it and my Marantz. I played Bob James's album "Joyride" an eternal favourite of mine because it not only excites me every time I hear it but is a great test of a system.

# TAGA HARMONY DA-300 V.3 DAC

Bob James is a sublime pianist whom I have seen and met so I have first hand knowledge of his abilities as well as most of his albums in my collection. The opening track "Take Me There" just captivates my ears and a close friend of mine took this cd into a recording studio in Sheffield where we both live and played it to the engineers, one whom he knew well, and they loved it. They thought my friend had done the album at first (he wishes!!) but it was a testament to a great artist to touch the heart of these engineers who were mainly into reggae and garage. The TAGA dac certainly could convey this emotion that Bob James wanted to pass onto the listener with its infectious beat and rhythm. The bass is deep, tight and drives the track along with the piano interspersing with the guitar of Chuck Loeb and percussion and sax in the background clearly defined. Doing A-B switching between the TAGA and my Marantz built in dac showed that the Marantz had the edge for me adding weight and colour to the music and moving the sound stage forwards as if adding depth. It was a perspective I preferred but is not a criticism of the TAGA as the Marantz dacs are highly specialised and tuned for the SA11S2 to work in harmony.

**Price:** £200

In isolation, the TAGA is very good and would not disgrace any system. Without direct comparisons, you would be unaware. It's a credit to the designers of the dac chips and engineers who implemented it within this unit for doing a great job. Dacs do vary in sound but the beauty of modern designs is that they don't have to cost a king's ransom to work well in budget units. I also tried the USB input hooking it up to my windows laptop with the cable provided. Having the latest version of Windows 10 on it there were no issues with drivers and my laptop recognised the TAGA making plug and play straight forward. I played a variety of audio files mainly cd tracks recorded at 44.1 kHz as I don't possess any downloaded high-resolution music and refuse to pay high prices for it when I have great cd's and sacd's in my collection. The TAGA played the music files seamlessly and at the higher sampling rates compared to mp3 was equal to my cd's. Mp3 is fine for background music but for serious listening WMA, DSD etc. is the way to go. There is a plethora of file formats now and I am no expert on these but having heard many types at shows it's down to personal/cost preferences.

## CONCLUSION

Good digital sound doesn't have to cost a fortune and if you want to implement it in your system, whether to improve the sound of an older cd player or incorporate music from a laptop or satellite receiver the TAGA DA300v.3 is a brilliant way of dipping your toes into the digital arena. Digital has certainly driven the audio market along since its inception with analogue hanging in there for good measure.

Budget audio just gets better and better so there is no excuse for newcomers to join the club when products from companies such as TAGA Harmony make the entry fee very attractive and affordable.

## AT A GLANCE

**Build Quality:** Excellent.

**Sound Quality:** Very clean and clear sound which doesn't disappoint

**Value For Money:** Excellent compared to its competitors of which there are many.

**Pros:** For enthusiasts on a tight budget a great sounding DAC.

**Cons:** Very little. I nit-picked about its presentation but for the money, you can't complain.





# REVIEW

## EXO GAL COMET DAC



David Blumenstein takes a listen to the Exogal Comet Plus DAC costing \$3500 or £2500 in the UK for the DAC and £2950 with improved PSU.

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# EXO GAL COMET DAC



For me an actor is memorable if he/she is forgettable. After all it is about the performance. I don't remember the actor for who they are but rather who they portray. I want them to get lost in the role, in the performance, much like the late Phillip Seymour Hoffman. Almost instantaneously, he was the embodiment of Lester Bangs (editor of CREEEM) in Cameron Crowe's opus Almost Famous.

This is how I feel about the Exogal Comet Plus DAC. I know it is there. I can see it is there, but shortly after powering up my system and selecting the music, the Comet Plus just disappears and does what is intended. No flashing lights, and with its understated minimalist display it becomes one less thing to think about and detract from enjoying the experience of listening to music. Who wants to listen to a DAC anyway? One shouldn't and if one does there is something amiss.

The Exogal Comet Plus that I am reviewing came with the optional external power supply. I tried the unit with and without, and am now firmly in the camp that if you can, and your equipment does support an external power supply, avail yourself of the opportunity. It really does make a difference, in both soundstage and depth.

Staying on the topic of what I referred to as the clunky power supply, here's four reasons for it, four damned good ones straight from Exogal's CEO Jeff Haagenstad:

The power supply noise is isolated from the computational and audio electronics.

It allows a smaller chassis for the product (because the power supply can be tucked under the rack.

The power supply uses a phased-array bank of capacitors where each bank releases energy based on the demands of the DAC dependent upon the frequency of the audio being converted at the moment.

It allows customers to use their own analogue supply if they're just dead-set against digital switching supplies.

With all the debate online, offline, and in the hallways of HiFi Shows about the efficacy of external power supplies, here I found the opportunity to have someone eloquently make the case, so I leapt at the opportunity to include the above in the review.

I met Jeff wholly by chance at AXPONA 2017 (Chicago) as I visited a room intent on listening and examining relatively affordable speakers which had been getting more than their fair share of attention online, and as it was mentioned that the music in the room was digital it took me some time before zeroing in on the DAC in the room. Exogal's Comet Plus is quite simple in its visual design, as I alluded to in my introduction above, and I had to know more. With so many DACs on the market, I am no longer satisfied with qualitatively and subjectively better, but rather want to understand quantitatively what is different about the design, the approach to have me and prospective customers choose the Comet Plus. Not being a wallflower by any stretch I am excerpting from Jeff's responses to my curiosities:

Jeff: 'The essential difference in our DAC (and PowerDAC designs) has to do with how we deal with the digitized audio data. Where all other old technology DACs based on any type of DAC architecture, whether it's Ladder, R2R, Sigma Delta or whatever all take the quantized digital data and attempt to connect the dots and rebuild the original waveform.'

Exogal's quantization of the original analog waveform when digitized by its ADC is quite close to the original. I was supplied with a slew of technical waveform graphics and can attest to this. What follows is more from Jeff about what this means and the role of FPGA [field programmable gate array] in DAC architecture. And if it seems/appears that I am going full throttle on this, it is because I hear all too often that all DACs should sound the same, because they are all built the same. Well guess what...they are NOT!

# EXO GAL COMET DAC



Jeff: 'Since our (Exogal's) waveform is closer to the original, we can apply filtering with a much lighter touch which has less impact on the overall signal. Remember that a filter affects all data, even though its intent is to only affect the bad parts of the signal – the jagged or ragged bits.'

In Jeff's words this is a dramatic oversimplification, but an essential difference between Exogal's DACs and others on the market.

Jeff: 'Other manufacturers talk about how great it is that they use FPGAs so that their DACs are field-upgradeable. The so-what about that is that they've simply taken textbook DAC designs and instead of using a hard-coded chip like an ESS chip, they've implemented the same architecture in an upgradeable chip that allows them to fiddle with the filtering on the jitter rejection but doesn't cure the essential problem that their starting waveform is sub-optimal.'

Jeff: 'We (Exogal) also use and FPGA, but in ours we built a 6-core DSP processor customized to do the math transforms necessary to create the curved segments and assemble them properly. Then, since we filter it more gently, our simple filters are also implemented in the FPGA and the whole thing is integrated.'

Summing up, Exogal is attempting to faithfully re-create the original waveform, and in doing so can do a better job of re-creating the music as it left the mastering console and in turn closer to what the artists/musicians and recording engineer had in mind for the listener. Yes, this is a lot to take in, but in order to pull the trigger on a DAC purchase, prospective customers should know that all DACs are NOT THE SAME. There are reasons why they can indeed sound different and in essence possess their own unique sonic signature.

At this very point in time, as I write this, my listening area is populated with DACs (Exogal Comet Plus Pro, Mytek Brooklyn/Mytek Brooklyn + and exaSound e22) and to go with a raid array containing TERABYTES (let the uppercase signify more than a few) of digital

audio files. I have spent a great deal of time with this DAC because of what I have learned above. I wanted to hear this for myself and in the process have swapped the other DACs in and out to hear the differences between them. On everything from redbook files all the way up and through to high resolution PCM and DSD recordings.

The music I play does not matter. It is what I like and may not be to others' liking and that's fine. We all have different tastes, but what we all do seem to like is depth, soundstage, separation – a natural, encompassing experience when listening to music and this is what I am getting from the Exogal Comet Plus Pro. I am playing tracks which I know intimately, ones which are indelibly etched in my mind and ears, and I'm hearing just that bit more, reaching right out at me; grabbing my attention at each successive play.

Could it be a psycho-acoustic phenomenon with what I have learned about what makes Exogal's DACs different? Perhaps, but I seem to be forever in learning mode and the human condition dictates that this will impact both my perspective and observation, to the point that it just might alter some of my long-held beliefs.

## CONCLUSION

The Comet Plus is more than a DAC. It can serve as a preamplifier as well as a headphone amplifier. This multitasking has become the norm and with that it no doubt has become expected. I prefer to look at these functionalities as gravy and not the meat and potatoes, because at the end of the day its ability to what a DAC should do, is why I would purchase the unit. Honestly if it cannot do that, I just couldn't be bothered. Readers know that I can be slothful, so the fact that the Comet Plus can be controlled by its supplied remote control as well as by the Exogal Remote App for Android or IOS. This comes in quite handy as I sit more than arm's reach from my gear.

## AT A GLANCE



# EXO GAL COMET DAC

**Build Quality:** The Comet Plus DAC and its Power Supply are built as we say in the States like brick outhouses – made to last. To say that the components are solid would be an understatement. Lift them up and you know you've got something in your hands. It is not they are hefty, but constructed in such a way to make you feel confident that they are in it for the long haul.

**Sound Quality:** It's what you don't hear. Nothing added. You get what the source provides. Sound is unadulterated. As it should be. Listening to music through the Comet Plus DAC is anything but fatiguing.

**Value For Money:** \$3500 is a fair bit of change no matter how you slice the pie. You get what you pay for here. It's not just money but peace of mind. Look at this way, once you accept the Comet Plus solution as part of your system, it frees you up to concern yourself with your other components.

**Pros:** Great sonically. Fabulous build quality. Intuitive ease of use.

**Cons:** For those of you who just have to play DSD 256 or unfold MQA files move along.

**Price:** \$3500 for the Comet Plus DAC and Power Supply or £2500 in the UK for the DAC and £2950 with improved PSU.



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**RECOMMENDED**

# REVIEW

## BAKOON SATRI DAC-21 D2A



The Bakoon Satri DAC-21 D2A DAC is diminutive in size, but does it make up in sound quality what it is lacking in stature? Janine Elliot finds out.

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# BAKOON SATRI DAC-21 D2A



I have played with a number of DACs over the years of reviewing hifi, some of which I would actually rather have DUCKed from doing if truth be known. The Bakoan is something different; not only is this Japanese/Korean product cute and small, and therefore very unimposing, but it uses a technology I wrote about before with the Questyle QP1r DAP. Using Current Mode Amplification there are distinct advantages over conventional voltage transfer of signals. The latter can be very sensitive to outside noises such as RFI/EMI interference, largely because output impedance is low and the input impedance is high. With Bakoan's own "SATRI" circuitry supplied from a 5th generation chip on the distinctive purple PCB the reverse happens; the input to the device has impedance very low (around 3 ohms) and with higher output impedance (we're talking mega ohms), with the circuitry working with the current signals rather than the voltage. Using basic physics, if resistance is negligible then the voltage is converted straight into current. The DAC output stage does not include a conventional OP-amp, rather it takes the DAC chipset's current signals directly into a SATRI circuit. Although the beginnings of SATRI go back to the 1980's the first chip only appeared in 1998, a simple epoxy moulding, with SMD dual transistors and carbon resistors. The latest generation has a total of 48 micro-sized transistors, achieving an even higher level of linearity and precision. As well as a conventional RCA output (voltage controlled) the DAC-21 also has a BNC SATRI-LINK (current controlled) output to connect with other Bakoan products (the AMP-51R), and consequently it allows cable runs of 100m with minimal signal loss and RF/EM interference, should you happen to live in a stately home. This will be familiar to Krell owners using their C.A.S.T. technology (Current Audio Signal Transmission) where the connection between components is current based rather than voltage. The DAC-21's DAC chipset's current signal enters to the SATRI Circuit, where it is converted to a voltage by the analogue filter network for conventional voltage outputs (RCA), plus the signal is also converted again to current by a set of resistors for the SATRI-LINK output via the BNC sockets.

The DAC-21 is also a zero negative feedback design, which gives it an accurate and fast response with the lowest distortion. On top of this, the Bakoan uses their latest buffer circuitry. What makes the DAC-21 even better is that the design is pure DC, the device running on a total of three internal Li-ion batteries, meaning there is zero noise interference, nor the need for tons of smoothing capacitors. The batteries are recharged in 3 hours for 80% capacity or 6 hours for full charge and give up to 12 hours operating time. The batteries in the Bakoan are controlled fully in the analogue domain, which again reduces noise interference. The power supply which runs the digital, USB, and analogue circuits are controlled independently of each other, which – yes you guessed it – reduces interference. Finally, the circuit grounds of all sections are separated from each other and this reduces that interference further and boosts performance. All in all, nearly four years of development bringing to fruition a product that any company would be really proud, as long as (of course) the audio is just as sound.

The Japanese company Bakoan, run by inventor Akira Nagai, might not be too well known here in the UK but this brand is becoming more international as the years go past. With big sales in Korea it has now become 'Bakoan International Corp.', interestingly set up by a South Korean gentleman called Soo In Chae. They now have an R&D centre in Kagoshima, Japan, with their director of engineering Keng Koe Ho (formerly from Sony), and a local corporation in Silicon Valley, USA. This DAC-21 might be mid-price at £2775 + VAT, but it is very high on design features and design engineering. The unit is available in Black, gun-metal or silver. The front panel is very simple; just two switches, one is power off/on and the other is to select between USB and Coax inputs. To the right of these is the now popular idea of six LED lights, the top three to indicate PCM 44.1, 48 and DSD64, and the bottom three indicating x2, x4, and x8. Therefore a DSD256 would indicate "DSD64" plus "x4", and a PCM 32 bit 384kHz signal would indicate "48" and "x8". The unit will play up to 32bit/384kHz and DSD256 (Windows) and DSD128 (on a Mac), and whilst the conventional and now popular USB input works a treat, the coaxial



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input is done via a BNC socket, meaning I needed to get a converter to RCA to operate from my portable DAP. The rear side is well laid out with good connectors, though it is a shame there is no Toslink or AES/EBU connection. There is no reference in the instruction manual to suitable drivers for WIN or IOS, but the website does provide a Windows driver, should you need it (though my Norton security didn't actually want me to open it). There are two outputs; conventional RCA and also a BNC SATRI-LINK should you have a Bakoon amplifier. Perhaps a disappointment is that there is no volume control, something appearing in many DACs these days, but I didn't feel this was an issue affecting my judgment of the product. This is a simple featureless product with no need for a remote or toggle on/off switch at the back (hurray!) All it needs is two switches; one for on/off switch and the other to toggle between USB/BNC. USB seems to be the preferred playback system for music files, and so will meet the needs of most audiophiles. If you want Toslink, AES/EBU, balanced outputs or volume control, then you will need to look somewhere else.

This half-width unit is impressively engineered; with straight-lines to the front and sides, but a curvy lip at the rear to hide the cables entering the back. Some might find these looks too conservative compared with a curvy Chord or dCS separate, but it is still a highly stylish but minimalist miniature unit, and the design and build reminded me of Nakamichi's penchant for straight lines. Only the thin felt feet are an afterthought, unlike the massive stilts holding up their larger and impressive AMP-51R SATRI amplifier, which also interestingly work as additional heatsinks. It did mean I needed to add my own KM Sounds ceramic isolating feet to raise it above the unit on which it was sitting at the time of the review.

## IT'S IN THE NAME

I always like to examine the names of manufacturers and their products as it often enlightens me as to what is going on in the minds of the designers. Imported into the UK by Martin Gateley from SoundKaos (whose company name and "Liberation" speaker, recently reviewed in HiFi Pig, gave insight into what he was aiming to do in that product), it is equally the case here with Bakoon. A Baku is a supernatural creature from Japanese mythology associated with dreams, and the word Un means 'luck'. Whilst 'lucky Dreams' would probably be more suitable as a manufacturer of mattresses, the term 'SATRI' means "Enlightenment", and I was certainly educated whilst listening to my prized digital files; a sense of detail and precision that gave me new insights into much of the music I played through it.

## MUSIC

This is no Baboon, but nor is it anaemic in its portrayal of the music. The output into my Krell/MFA amplification was very quick and controlled; this animal was being very well behaved. Nothing stuck out either as OTT or conversely missing. I did wonder if the unit would cause me problems working for 12 hours and then needing to be charged for at least another three, but this was no less inconvenient than the portable DAP and DAC I use

Initial listening was from 1bit DSD256 recordings I had obtained. The Dvorak New World Symphony was clear, if not a bit clinical, though the depth between instruments front and back was delivered with startling realism. This recording was a simple coincident pair of microphones, void of complex multitrack mixing, which often makes things less musical particularly in the digital domain. The Bakoon had a great deal of warmth and emotion sounding less 'digital' than many DACs at a higher price. Turning to Wagner's The Flying Dutchman

(Netherlands Philharmonic Orchestra, Yakov Kreizberg) the music was forceful but well controlled, as Wagner should be. I only wish I could have used the SATRI output into a Bakoon amplifier, but the quality did not suffer at all. The design means for a very quiet operation however it is connected, and clarity and analogue finesse missing in many DACs.

The attention to detail in the music is met equally in the metalwork, something typical of South Korean audio products particularly their DAPs, and in the use of components, including the inclusion of an ESS Sabre ES9018S chip. As well as a very simple operation using the machine, the charging is just as well thought out; the three white LEDs at the top start to blink when the battery level is low, and the unit will automatically turn itself off. The circuitry also determines which of the three battery packs, positioned on the underside of the purple PCB, need to be charged. The charging will only start when the power switch is turned off, though I did feel it a pity that it couldn't just do it automatically, though of course such a feature might have affected the sound. To show the state of recharging of the batteries the three lower white LEDs change to red lights, and only turn off one by one when fully charged.

As well as USB and DAP sources I also decided to use the digital output of my loved antique Philips DCC900, playing Gershwin "An American in Paris" (Andre Previn/Pittsburgh Symphony Orchestra). This might well be highly compressed audio, but the clarity and sense of control make this a very enjoyable and surprising listen for me. ESS DACs can at times sound rather "digital" and lack realism that is abundant in analogue reel to reel and vinyl, but what the Bakoon does is bring in a very natural realism into the music. Listening to Van Morrison Avalon Sunset "Whenever God Shines His Light" showed not only the clarity, speed, and separation of all instruments, giving a good wide soundstage, but also that the DAC-21 is very sensitive to vocals, even to Cliff Richard's voice pairing with Van in this toe-tapping track.

Turning to USB and Nirvana 96/24bit remaster "Smells Like teen Spirit" from the album (Nevermind), suddenly all let rip as if the DAC had just woken up. However, it didn't sound as brittle as it can from other DACs I have tried. "In Bloom" bloomed with boisterous bass drum and sizzling cymbals, but less digitised as I have heard it. The bass is extremely well catered for in the DAC; plenty of energy when needed, but never 'over the top'. Mid voices are also clear and fast.

## CONCLUSION

This is a well thought-out unit, with many years going into its design, which ultimately works its way through to the music it plays. Music has sensitivity but also emotion, clarity, and determination, nothing is too much and nothing missing. However at £2775 + VAT there is great competition out there, so it is well worth auditioning along with a few other designs in this price point. I wasn't able to use it with their SATRI amplifier, but there were no issues with noise or interference, as I wouldn't expect to hear in my well-designed music room, so this will work very well with any amplifier. Being small means you could fit more audio into your shelving, which could be a good or bad thing.

## AT A GLANCE

**Build Quality:** Good looks, an excellent minimalistic design only as big as it needs to be. No screws or joins to spoil the looks. Very well put together.

**Sound Quality:** Clean sound, will good bass and vocals.

# BAKOON SATRI DAC-21 D2A



**Value for Money:** At £3260 including VAT this is in the mid-range for DACs. It certainly warrants this price but worth listening to other DACs at this price to decide your ideal partner.

**Pros:** Design and SATRI system ensure well controlled and pure sound at long cable runs, with minimal EMI/RFI. Dynamic and detailed, with excellent bass and mid-range. Minimalist and clean looks.

**Cons:** Only 2 input choices. No balanced output

**Price:** £3260



# REVIEW

## ROON NUCLEUS +



**The Roon Nucleus + is essentially a Roon specific dedicated network streamer costing £2500, but what does it bring to the whole Roon experience sonically? John Scott finds out.**

**Hifi Pig**  
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# ROON NUCLEUS +



Way back in the mists of time – in 1983 to be precise – home computers were all the rage and, jumping on the bandwagon, I bought an Acorn BBC B microcomputer. The BBC B was the undisputed king of home computers; it has a massive 64 kilobytes of memory, half of which was taken up by the operating system. Being a music geek, it wasn't long before I decided that I wanted to put this titanic computing power to use by compiling a database of my 200-odd LPs. I spent the then not inconsiderable sum of £25 – I could easily have got 5 or 6 LPs for that – on a database programme for the computer and immediately set about planning the structure of my database. I figured that if I included all the information about all the musicians that played on each album, the producer etc. then I would eventually have a deep insight into my collection. I'd be able to tell, for example, not only how many Brian Eno albums I had (in fact I already knew this – even I could count to 4 without the aid of a computer) but I'd also be able to call up a list of any other albums he'd been involved in. Similarly, who knew how many albums I owned that Phil Collins drummed on? After only a couple of hundred hours of my one-fingered typing I would surely have the answer; perhaps – my imagination was running away with me now – I'd even be able to identify the albums that had both Brian Eno and Phil Collins on them!

And so I set to, building my database 5 or 6 albums at a time. It all went splendidly until I reached my 24th LP at which point the BBC B politely flashed up a message to say that it's memory was full. And that was the end of that, for a while anyway. Fast forward almost 20 years and the itch to catalogue my music collection had returned; it was CDs by now, of course. As a present to myself for my 40th birthday I bought a programme for my PC for £40 – I could easily have got 5 or 6 CDs for that. This programme read the contents of any disc inserted into its CD drive and magically retrieved information from the internet, automatically updating its database. Okay, so it couldn't tell me how many albums Phil Collins drummed on but it could tell me how many versions of Elvis Costello's *Watching The*

*Detectives* I owned and which CDs they were on and that kept me happy for a while.

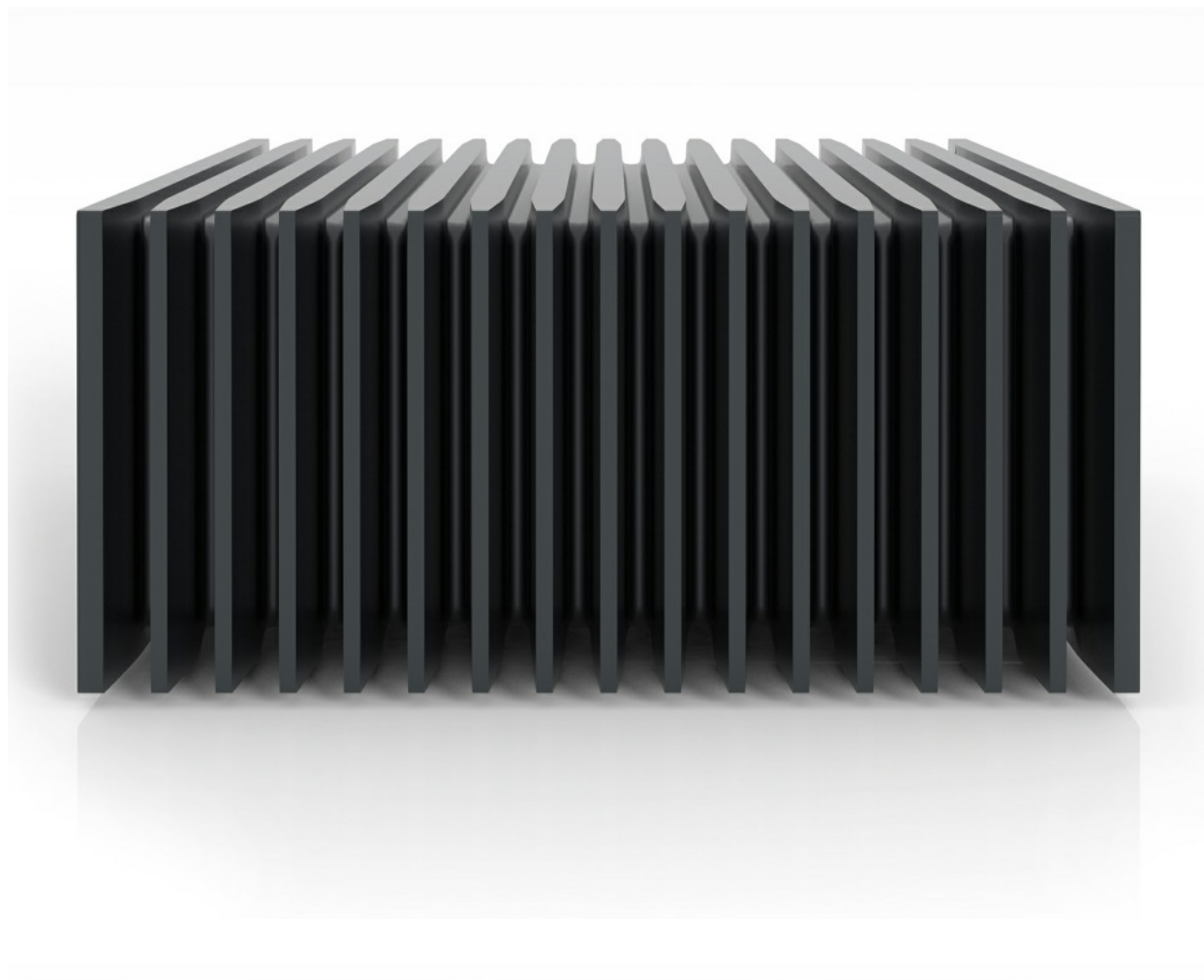
Before another 10 years had passed, I'd ripped all my CDs to a hard drive and banished them to a cupboard. I'd discovered the joys of streaming and by using a Squeezebox Touch and the excellent Squeezepad app I was able to call up any of my albums at will using my iPad. Not only did the music flow straight into my hifi, but there right in front of me on the iPad screen was the cover art, all the album tracks and, at the press of a button, links to further information on the internet about the album or the artist. I couldn't be happier. If you'd asked me the Collins Question I still wouldn't have been able to tell you the answer but with all my music instantly at my command, I was pretty much past caring.

And then along came Roon. If the BBC B had been the undisputed king of the microcomputer then Roon aimed to be the undisputed champion of music library management systems with built-in streaming capabilities to boot. There was only one problem: Roon required a high-spec computer with a solid state hard drive to run its software. While I was happy to use a NAS drive to store my music files I had no desire to involve a PC or laptop in the playback process, and mine weren't up to the job in any case. Roon, it seemed, was not for me.

Perhaps recognising that I am not alone in wanting to remove the computer, in the traditional sense, from computer audio, Roon has now produced the Nucleus and the more powerful Nucleus+. These are computers, albeit computers disguised as highly stylish metallic bricks, designed with one purpose only – to deliver everything that the Roon experience has to offer, both now and in the future, as a plug-and-play, no hassle option.

Before sending out the Nucleus+, UK distributors Henley Audio was keen to emphasise that they were looking for a review of the Nucleus+ as a product in its own right rather than a review of the

# ROON NUCLEUS +



Roon library management software. I'm more than happy to oblige but having said that it seems like a missed opportunity not to at least give an overview of Roon's cataloguing capabilities. So, the following review of the Nucleus+ will touch on all aspects of what Roon has to offer.

## UNBOXING, CONSTRUCTION AND APPEARANCE

The Nucleus+ is housed in an elegant Roon-branded black box, well cosseted by foam protection and accompanied by a power lead and a quick start guide which, naturally, I promptly ignored. Externally, the Nucleus+ is a solidly built not-quite-black metal box measuring 212mm (W) x 156mm (D) x 74mm (H) with fins running along its width to act as heat sinks. A small embossed, almost imperceptible, Roon logo adorns the front panel. The unit weighs 2.5kg but it's solid appearance makes it somehow feel more massive; like a heavyweight boxer, it just seems to exude heft and a sense of purpose. The back panel features an on/off button which glows white when powered on, a power input (12-19V DC via the supplied switching transformer), 2 USB 3.0 input/outposts, 1 HDMI stereo/multi-channel audio output and 1 Gigabit Ethernet LAN port. There is also a Lightning port but this is currently disabled – presumably, Roon has some plans for it in the future.

Internally, the Nucleus+ houses an Intel I7 processor and 8GB of RAM on an Intel NUC motherboard. Internal hard drive storage is not included but can be added if desired. 2.5" SATA drives (SSD preferably) up to 9.5mm in height are supported. Alternatively, your music files can be stored on external hard drives attached to the USB ports or on a NAS drive located on your home network.

## SET UP - PART 1

Set up of the Nucleus+ was incredibly simple. Firstly I downloaded the Roon Continues app to my iPad, then plugged in the Nucleus+, attached it to my network via the Ethernet port and plugged my Spectra DAC to one of the USB ports; Roon recommend connecting a DAC via Ethernet using one of their "endpoints" for best performance but I'll come back to that. For now, the USB connection was what suited me best. I switched on the Nucleus+, fired up the control app and watched as the magic started to happen: the Nucleus+ was detected on my network and the Roon software set about cataloguing my music library and analysing each track to determine the audio format and dynamic range. This happens remarkably quickly but if you have a large music library it will take several hours to complete both the import of the files and the audio analysis. The good news is that it runs as a background process so you can happily listen to the files as they are imported while Roon gets on with the job of adding more. For best results, directly hardwire the Nucleus+ to your router via Ethernet cable. I started off using power line adaptors and while these did work, the process was noticeably slower and I later encountered dropouts when playing DSD files. If you are going to be investing in a Nucleus or Nucleus+ then I would seriously recommend running Ethernet cables from your router to any locations where you will be streaming music if at all possible.

Fast forwarding into the point where all my files were imported, I was able to browse the vast majority of my collection in all its Roon-enhanced glory complete with cover art, artist/band biographies, and album reviews. Clicking on a band/artist name brings up all their albums in my collection along with any other albums that they have been credited as contributing to. At last, the answer to those elusive Brian Eno and Phil Collins questions were just a couple of taps on my

iPad screen away\*. The Roon software is, of course, not perfect; if you have multiple versions of a disc or CDs by particularly obscure artists then Roon might identify them incorrectly or not identify them at all. Similarly, it can struggle with box sets and classical collections. Fortunately, the manual overrides to correct these errors are fairly simple and intuitive to use.

As this isn't supposed to be a review about the Roon cataloguing software, I'm not going to go into any more detail about the myriad ways in which Roon will allow you to slice and dice your collection but I will say that its ability to highlight connections between artists and/or pieces of music shone a whole new light on my music library and was an enduring source of joy; a genuine enhancement to my listening experience.

## NUCLEUS + FUNCTIONALITY

Okay so leaving behind Roon's cataloguing capabilities, why should you buy a Nucleus+? Well, Roon describe the Nucleus+ and its little brother the Nucleus as the best way to experience Roon. Yes, you can run Roon on a suitably spec'd PC, Mac or laptop but the Nucleus products deliver the Roon experience from one little box that just sits silently – utterly silently – getting on with its job. And that, to me, is a very attractive proposition. Suitably connected to your home network, you can position the Nucleus along with the rest of your hifi kit or you can hide it in a cupboard, in the basement or the attic. Wherever it sits it will be the heart and brain of the digital audio set up throughout your home. The Nucleus supports up to 6 simultaneous "zones", potentially either playing the same music or working completely independently of each other; the Nucleus+ supports more than 6 zones. The other main differences between the Nucleus and the Nucleus+ are that the less powerful Nucleus supports music libraries of up to 100,000 tracks with the Nucleus+ supporting larger libraries – Roon say that they haven't yet found an upper limit to the more powerful unit's library handling capabilities. Also, the Nucleus + will handle, if required to do so, all of Roon's digital signal processing (DSP) capabilities while up-sampling audio to DSD 256 whereas the Nucleus can carry out most of the DSP functions but will struggle with simultaneous up-scaling.

These DSP functions, and the dedicated processing power required to carry them out are really what you are paying your money for. The Nucleus+ detects the playback capabilities of whatever DAC is connected to it and, if desired, up-scales or down-scales the audio files to suit. For example, if your DAC is able to handle DSD 256 files then the Nucleus+ can convert all your files to DSD 256 on the fly before sending them off to your DAC. Other DSP functions include parametric equalisation, speaker set up, and the ability to carry out room optimisation. Also included are a set of optimisation filters for a range of Audeze headphones which I imagine is similar in concept, if not execution, to Diavelet's SAM speaker matching technology.

## SET UP - PART 2

Having achieved a fairly basic setup of the Nucleus+ by plugging my DAC directly into one of its USB ports, it was time to take things a step further. Roon's preferred method of connection is via Ethernet into what they term an endpoint. This allows Roon functionality to extend anywhere in your home that you have an Ethernet or wireless connection. Taking this further, I was also able to use my iPad as an endpoint, allowing me to play music anywhere in the house on my iPad or alternatively to send the signal on to a Bluetooth speaker.



# ROON NUCLEUS +

Scores of audio manufacturers including, Linn, Naim, LUMIN, Auralic, Novafidelity, and many, many others have worked with Roon to classify their devices as "Roon Ready". If, like me, you use a Raspberry Pi in your system then are a couple of options for updating your device. I used the incredibly quick and simple Ropieee update. Using Ethernet and power line adaptors – as mentioned above, these are not ideal but they do the job – I very quickly had two "zones" set up, one in the living room and one in a smaller sitting room. This was then expanded into a third zone in my son's bedroom using his TV sound bar and my iPad served as a fourth zone being used either in the kitchen, bathroom or my bedroom along with a Bluetooth speaker. I was even able to press my old Squeezebox Touch into service as Squeezebox devices function as Roon Ready endpoints. In normal use the Squeezebox Touch is only capable of passing through files up to 24/96 to an external DAC – although an unofficial software hack extends this to 24/192. Using the Touch as an endpoint though enabled it to pass through DSD files as well.

As a result of me inputting the distance from each speaker to my sitting room listening position and measuring the output of each speaker individually using a SPL meter app on my iPad, (there is a setting within the Roon software to mute each speaker channel and therefore allow it to be independently measured) the Nucleus+ carried out a simple speaker adjustment; increasing the gain of the left hand speaker by 1.1dB and introducing a tiny time delay of 0.29ms to the right hand speaker. Did it sound better? Yes, it did; vocals were positioned more to the centre and there was a definite broadening of the overall soundstage. And no, before anyone writes in I'm not suggesting that I could hear the 0.29ms delay.

Currently, more complex room compensation adjustments are possible by using external measurement software to build a "convolution" filter which is then imported to the Nucleus+. Unfortunately, I didn't have the equipment required to try this out at the time of the review. I believe, however, that Roon is actively looking at ways of building this kind of adjustment into the Nucleus as a native process. I did have a few plays with the parametric equaliser – adding a bit of bass, rolling off a bit of top end – and there is no doubt that it is a sophisticated tool that can tailor the sound of your hifi to your individual tastes. I was happy however to leave this function disabled for the most part.

## SOUND QUALITY

Ah, sound quality. Following previous reviews of digital music servers, I have been castigated by readers for suggesting that certain products have a "sound" and, on other occasions, been berated for suggesting that other products have no perceived sonic impact. My time spent with the Nucleus+ left me in no doubt that it improved the performance of whatever kit it was partnered with; it was as if the Nucleus+ was lining up the little ones and zeros, straightening their clothes, wiping their cheeks with a hankie and giving them a pat on the head before sending them off to the DAC to do their best. A fairly modest system made up from my elderly Linn Keilidhs, an Audiolab 8000A integrated amp and the Spectra DAC was greatly improved by the introduction of the Nucleus+ as was my reference system (Etalon Supra amp, Audio GE Sincerus 80 speakers and Raspberrypi/Allo Boss DAC). In both cases, and without enabling any of the Nucleus+'s DSP features, the soundstage was greatly enhanced, taking on a more three-dimensional aspect and overall the music was simply more involving and exciting than before.

I also had a brief opportunity to try out the Nucleus+ in combination with an Audio Note Jinro integrated amp, a pair of ART Dram Monitors and a COS D1 DAC. At a total cost of over £45,000, this

was, as you would expect, a high performing, revealing system and the Nucleus+ had less to offer in terms of improvement. Nevertheless, while the difference was nowhere near as dramatic as with the other two systems, I still preferred the sound of the system with the Nucleus+ rather than without it. My brain still tells me that all the Nucleus+ is doing is moving a digital signal around my house but my ears tell me otherwise.

## THE FUTURE

Whether you run Roon through a PC, laptop, Mac mini, through a Nucleus or Nucleus+ or even build your own NUC-based box – and if you want to do this, Roon will happily supply the software free of charge – then you will still need to purchase either an annual or lifetime Roon license. I've heard it said that Roon should include the cost of a lifetime license in the purchase price of the two Nucleus products; before trying out the Nucleus+ I'd run that thought through my head a few times myself. However, you don't have to spend very much time at all on the Roon community internet forum to realise that Roon is deeply committed to ongoing enhancements of the Roon experience. If you want a great example of a company actively inviting feedback from its user base, carefully considering it and then, when they consider it the right thing to do, implementing a change then you need to look no further. Of course, everyone has ideas about what they would like to see Roon do in the future and some of these ideas are better than others; the tact, patience, and restraint shown by the company from the top down when presented with some of the suggestions is quite admirable. The upside of all this feedback is that Roon does improve iteratively. It is clear from all the online discussions that Roon won't make a change unless they believe it is a genuine enhancement and they won't do it until it is fully ready to go. They don't set timescales for changes as they would rather not implement a change than releasing a fudged update just to meet a deadline. As an example, lots of people asked if Roon could be integrated with voice-activated products such as Amazon's Echo range. Roon looked at it, worked on it and decided that it could be done but not very well. So, it's not happening; not yet anyway. One of the things that is under consideration at the moment is a mobile version of Roon, able to offer the Roon experience for music streamed to devices outside your home network. Will it happen? As ever, there are no promises but the discussion on the community forum suggests that it is likely. When will it happen? True to form, Roon isn't saying (I asked; their answer: "Watch this space.") This continuous improvement takes time and resource which is why the annual or lifetime subscription is a necessary expense.

## CONCLUSION

The Nucleus+ provides an elegant, unparalleled plug and play one-box solution to digital library management, digital signal processing, and multi-room capability. It's undeniably expensive and to be honest, unless you have, or plan to have, a really huge music library or need to play music in more than 6 zones in your house then the cheaper Nucleus will probably serve you more than adequately. I didn't particularly feel that I needed a Nucleus in my life before I carried out this review but now I don't want to live without one so I've put my money where my mouth is and the Nucleus+ is now a permanent part of my set up. And that's the best recommendation I can give it, there was no going back.

## AT A GLANCE

Build Quality: Solidly built, the Nucleus/Nucleus+ is simultaneously elegant and unobtrusive

# ROON NUCLEUS +

Sound Quality: Sophisticated DSP and up-sampling ensured improvement in sound quality in whatever system Nucleus + was used in

Value For Money: At £2500 the Nucleus + is not cheap and then there is the added expense of the Roon subscription, but I believe this is money well spent for the overall experience and improvements in sound quality, plus there is the advantage of the online forums and support

Pros: Ease of use. Plug it in, connect it to your network, power it up, fire up the control app and you are good to go. Sophisticated DSP functions provide the ability to optimise your DAC and to tailor the sound of your system, should you wish to do so.

Cons: Did I mention it was expensive? It is (you could buy a lot more than 5 or 6 CDs) but if you want to get the most out of your digital music collection then it is, in my opinion, definitely an investment worth making.

*\*Currently I have 11 Phil Collins solo albums in my collection – don't judge me – along with 16 as a member of Genesis, 5 with the jazz/rock band Brand X and 20 as a player or producer on other people's albums. As far as Brian Eno goes, I have 21 of his albums and another 21 as a contributor or producer. Phil Collins and Brian Eno together? – 4 albums.*



# REVIEW

## AUDIO PHYSIC CLASSIC 5 LOUDSPEAKERS



Audio Physic are a German manufacturer with a great reputation, Ian Ringstead takes a listen to the company's Classic 5 floorstanders costing £1598.

**Hifi Pig**  
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# AUDIO PHYSIC CLASSIC 5 LOUDSPEAKERS



I'm no stranger to Audio Physic speakers as I own a pair of their superb Avanti iii floor standers which were very highly regarded when first released back in 2003 and still are fantastic to my ears. The company is based in Germany and their motto is "no loss of fine detail". I've seen and heard a few of their models both at the Munich show and recently in Warsaw at the Audio show last November. The company makes a large range of different models and the Classic series is their entry into the high end, the Classic 5 being the latest introduction. They came securely packaged in a strong single cardboard box with very good internal expanded foam support and the grilles were packaged in a folded section of the box along with the comprehensive instruction manual, spikes and an Audio Physic cd of high quality recorded classical music.

## CONSTRUCTION

The tweeter and bass mid units were specifically developed for the Classic 5 with the bass mid made from woven glass fibre which has the advantage of being light and well damped. This means the cone doesn't break up or oscillate unlike older designs did being very well controlled. A drive unit acts as a piston or motor because when the AC signal from the amplifier (i.e. the music) is passed through the wire coil at the centre of the bass-mid unit inside a magnetic gap the cone moves back and forth creating sound waves our ears and brain can understand. The Classic 5 bass mid ensures rich bass performance and excellent stop-start response, whilst the fixed phase plug controls any compression issues to a minimum producing a better mid-range result. When the speaker is driven hard (played loudly) any heat generated in the voice coil is dissipated more effectively, so reducing distortion and less likely-hood of melting the drive unit.

The tweeter is a silk dome design common in a lot of manufacturers models and its motor unit can handle a lot of power. The front faceplate is slightly horn shaped to allow better integration between

the tweeter and bass mid unit. This is said to produce a better three-dimensional image with excellent depth, a trait that Audio Physic designs are famous for.

The crossover has what Audio Physic describe as intelligent architecture. In other words, it doesn't use the traditionally printed circuit board but is directly wired from component to component and uses high-quality film capacitors.

The slim elegant cabinet feels very solid and expertly crafted looking very smart and relatively compact bolted onto an oversized plinth to give the speaker stability. The speakers come with standard M8 spikes that screw neatly into the plinth base. Alternatively, you could upgrade the spikes with Audio Physic VCF II M8 feet which act as vibration control feet and decouple the speakers from the floor. The performance they say is therefore considerably improved but at £278 for a set of 8 not a cheap upgrade. I stuck with the spikes supplied and sat the speakers on granite slabs so as not to damage my solid oak flooring. My review pair came in white and looked very smart but you can have black ash, cherry or walnut for that.

## SOUND QUALITY

From the opening bars of music, I was greeted with a lovely open sound with a large sound stage and running in these speakers didn't seem to be an issue. I don't know whether Audio Physic run them in before sending them out, but any tedious waiting for fifty hours or so for them to blossom wasn't necessary. Like my big Avanti iii's the Classic 5 casts a good wide and deep sound stage with plenty of detail. I tried out on vinyl a favourite old album by the Average White Band live in America called "Person to Person" made in 1976 when they were at their peak. The AWB are a Scottish funk and rhythm and blues band who debuted in 1971 and I was lucky enough to see them then as they started out. There are many gems on this album and songs such as "Schoolboy crush" really come over well with the band's obvious enjoyment of performing live to a highly appreciative

# AUDIO PHYSIC CLASSIC 5 LOUDSPEAKERS



# AUDIO PHYSIC CLASSIC 5 LOUDSPEAKERS

audience. The bells and whistling by lead singer Hamish Stuart used in the opening to this track are clearly defined and hover in space between the speakers, just as you would hear them live, giving that convincing illusion that great HiFi is all about. Alan Gorrie's bass lines are infectious and underpin this track so well. "Pick Up The Pieces" live allows the group to show off and do their own solo's. For a track that is over forty years old, it still thrills me whenever I hear it and I will never tire of listening to it. There is so much energy in this track and the funky rhythm is explosively aided by the superb horn section of Roger Ball on saxophone and Malcolm "Molly" Duncan on tenor sax and Steve Ferrone on drums. If you aren't moved by this track, then you ain't got no rhythm and soul. The Classic 5's portrayed the sheer enthusiasm beautifully and located all the band clearly on stage making the listening experience a pleasure. The bass was really tight and well-defined suiting my average sized living room well with no sign of boominess. I hate speakers if the bass isn't tight and controlled and it is one of the key things I listen out for initially in any audition. The mid-range vocals were very accurate and believable whilst the treble as mentioned earlier was very well controlled with no splashiness or tiresome hardness.

So, a great start and things just got better. Next up was Michael McDonald, an old favourite who originally started out with Steely Dan in 1974 and then joined the Doobie Brothers in 1975. He has had an illustrious career working with many top artists and his distinctive voice can't be mistaken. Blue Obsession released in 1990, is one of his solo albums is well worth owning. I love his arrangements and as a backing singer as well as a lead vocalist he has a knack for blending all the musicians together like a great smoothie. The backing singers are always spot on. McDonald is a very talented keyboard player as well to boot so he rarely fails to impress. The album is a bit bass heavy in the mix and the treble is enthusiastic (I reckon the engineers got carried away), but it is a good test of equipment and rooms. The Classic 5 had no issues and reigned in this exuberant album well, not an easy task always as I have noted on some past speakers and systems. The opening track to the album "Change the world" is layered with harmonising vocals along with a string section, plenty of horns, a chorus and a classic Hammond B3 organ. The Classic 5's loved this music and revealed the song in all its glory. Track two "No love to be found" had lead vocals shared between Michael and Wendy Moten who has real raw power like a wild cat on the African plains. She really can belt a song out and Michael struggles to keep up with her when she gets in full flow. The song starts off with keyboard and heavy bass licks with Michael's vocals and then a tenor sax joins in. Wendy has a short harmony with Michael and she then hits the accelerator at full throttle. The sheer raw power of this track gets me every time and the Classic 5's lapped it up staying tight and revealing all the intricate harmonies.

Rock music was thrilling to listen to from the likes of Pink Floyd with "The Division Bell" and the iconic track "High hopes". It starts with the sound of a bell being tolled and then mimicked by the keyboard of Richard Wright. As the track progresses it speeds up and then falls back to the plaintive sound of the keyboard and takes on its majestic journey with Dave Gilmour's vocals and superb guitar along with the string accompaniment to finish with just the sound of the tolling bell again. A great track embodying all I like about Pink Floyd. The Classic 5's did justice to this album and carried on with whatever I threw at them.

## CONCLUSION

As you will have gathered I rather liked the Classic 5's. I would say they are a scaled-down version of the more expensive models in

Audio Physic's range, offering a taste of the high end for those on a tight budget. My Avanti iii's are noticeably better, but so they should be, being six times costlier. The Avanti's have a lot more weight and authority and even better depth and imaging capabilities which you would expect. Think of the Classic 5's like crème fraiche light and the Avanti's as the full-fat version, both delicious, but the full-fat version has that touch/taste of luxury about it.

## AT A GLANCE

**Build Quality:** Excellent build as you would expect and a solid design.

**Sound Quality:** Clear and spacious sound stage that has great depth and imaging with tight bass, a clear mid band, and sweet highs.

**Value for Money:** Excellent value, very well presented being slim and neat to look at.

**Pros:** Great sound overall and very easy to listen to, being room friendly and easy to set up.

**Cons:** Nothing really unless you demand more bass which I thought was fine for their size. Being double boxed made carrying them in and unpacking awkward compared to single boxes.

**Price:** £1598





# REVIEW

## BOENICKE W5 SE

### LOUDSPEAKERS



Made in Switzerland the Boenicke W5SE are a very small speaker with a reasonably high price tag of £4595. Stuart and Linette Smith take a listen.

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# BOENICKE W5 SE LOUDSPEAKERS



When Ian Ringstead who reviews for Hifi Pig heard that we had got these diminutive speakers (they are only 2.8L in volume) from Swiss manufacturer Boenicke, he was, to say the least a little bit green with envy commenting that they were his favourite small speaker when he has heard them at shows and demonstrations. Of course, I too have heard these speakers many times at shows and I'd always been suitably impressed by what they managed to achieve and so having the opportunity to hear them in the reference system was something I jumped at.

As mentioned these really are small speakers with a width of 104mm, a height of 293mm and a depth of 231mm. On their stands they stand 747mm high. The speakers are 87db sensitive, have an impedance of 4 ohms and weigh in at 3.5Kg. driver wise you get a side firing 5.25" long throw bass driver, tuned to 50 Hz, a forward firing 3" wideband driver and rear firing ambient tweeter situated on the speaker binding post plate. There is a rear-firing bass slot just below the speaker binding post plate. Finish wise you can get them in a variety of woods (these are solid wood cabs and not laminated): walnut, oak, ash, and cherry. This is the SE version of the W5 and benefits from electromechanical parallel resonator to bass as well as on the front firing driver, longer throw bass driver and an improved cross over layout using better components than the standard format W5; the premium for this is £818 taking the price to £4595 thorough Elite Distribution in the UK. The speakers arrived very well packed with custom made boxing.

## BUILD QUALITY

The first word that springs to mind when you unpack these speakers is "solid". I assume these are made in two halves and presumably glued together with all the CNC machined inner chambers coming together perfectly (see diagram below). Fit and finish throughout is exemplary and you can see the care and attention that is taken when putting these speakers together. The speaker binding post plate is

beautifully finished with just one set of binding post so bi-wiring and bi-amping is not an option. The tap test shows the cabinets to be petty inert. The speakers were supplied with a set of Boenicke's own stands onto which the speakers bolt. Now, the stands do wobble about a bit on their single thin stalk (though they are very well made and thought out) but I am assured this is part of the design, and to be fair once I'd got used to their looks didn't worry about them at all, even with two cats running about the listening room.

## SOUND

One of the downfalls of many a loudspeaker is that at low volumes they just don't communicate enough of the music to sound credible, not so here and listening late at night to Massive Attack's Blue Lines is a delight. Voices on the title track are communicated very nicely and with pinpoint accuracy in the stereo mix with the bass and the beats being easy to follow even at these low volumes. Lovers of a monitor style speaker will enjoy and appreciate the Boenicke's imaging capabilities, as will people who need, for whatever reason, to play at low levels. Whilst at these volumes bass is not earth-shattering, it is tuneful, tight, communicative and easy to tap along to. Chilled out, unforced accuracy is what I'm getting through the W5 SE at low levels.

I should point out that I had the speakers well out into the room and well away from room boundaries as I have seen them set up at shows and the spatial image thrown by them is impressively wide with good depth to it both forward and backward.

Turning up the volume and playing the late Robert Miles' Children was a great experience with the opening synth stabs having all their reverbed effects in place and when the well known and loved piano line comes in I really did sit up and take notice – likewise with the plucked strings which spring out of the mix brilliantly. Really fabulous imaging is what I am getting with loads of detail and texture to the instruments. The bassline comes in and here I expect to be

# BOENICKE W5 SE LOUDSPEAKERS





# BOENICKE W5 SE LOUDSPEAKERS



# BOENICKE W5 SE LOUDSPEAKERS

somewhat underwhelmed given the modest 50Hz tuning and the size of our listening room, but I most certainly wasn't – as mentioned you are never going to get the trouser flapping bass you will get from a big woofer in a big enclosure but what you lose in sheer depth you gain in clarity, texture, and speed. Strings soar around the stereo image, no doubt helped by that rear firing ambient tweeter that just seems to add an airiness to the music laid before you. Now, regular readers will know that I am a bit of a bass-head, which I put down to years of playing house and techno in clubs and parties and I genuinely thought these speakers would fail to satisfy these tendencies, but I wasn't at all. It could be argued that for the majority of listening rooms in domestic situations bigger speakers can tend to over-energise the room leading to lead to bass bloat - something I cannot abide – and as such the Boenickes may well benefit from not having the very lowest octaves present; with that said the Union Jack mix of Poltergeist's Vicious Circle sounded brilliant in our room with slam and energy aplenty.

Todd Terry's Blackout from the excellent Resolutions album has a woofer killing synth bass-line that comes in at around one minute into the track. It really is a monster and whilst the Boenicke couldn't deal with the very lowest tones in the synth's makeup, I was pleased again with what I was hearing – fullness and coherence over absolute depth with imaging and separation is very impressive.

Pink Floyd's Is There Anybody Out There gets put on for a change of scene and it starts with a "click" which on these speakers made me look up and take notice. The spoken word taken from TV/Radio was as clear as a bell and very easy to hear what was been said – not something that can be said for some other speakers we've had in the house. Comfortably Numb's snare and hi-hat hits were sharp, detailed and as a whole, I felt these speakers played the track in a dynamic way. The guitar lines had good texture and there was a feeling that you were hearing the track as it should have been reproduced in the home environment.

Like all speakers I've ever encountered, there is always a particular sweet spot and we spend a lot of time setting up speakers that come in for review to find that sweet spot so the speakers get the attention they deserve. The Boenickes have that hot seat, of course, but when we sat and listened in two chairs side by side and obviously left and right of the sweet spot and whilst you did lose a smidgen of the previous image accuracy I personally didn't feel it was missing much, which I believe is down to the rear ambient tweeter coming into play. So if you are a social listener rather than an isolationist listener these could do the trick for you.

You can push these speakers pretty hard and they just get louder with no loss of detail and more scale to proceedings. We had a Gold Note all in one system in for review at the same time as the Boenickes and our front end and reference amps cost probably 20 times of what the Gold Note does but I do like to put review items in relevant systems after they have been in the reference system. The review of the Gold Note is coming up in September but the partnership certainly impressed me with perhaps a little less refinement of our system but certainly a very enjoyable listen for less than £10K.

## CONCLUSION

I really loved my time with the Boenickes and was sad to see them go – I kept them set up much longer than I really ought to have. If you have a "not huge" listening space then they go well loud enough to satisfy anyone, though I did find they liked to be pushed pretty hard and so a beefy amp would be in order I believe. With that said they

performed at high levels in our large room very well and without me thinking I needed to go louder.

Their standout features are an overall very balanced sound and a level of detail that is nothing short of astonishing, but without becoming fatiguing.

They are easy to set up and get a lot of what I'm looking for in a speaker very, very right and I'd be happy to give them house-space. They do, as mentioned, benefit from being given a bit of welly and to get the best from them they deserve to be partnered with good quality kit.

At lower volumes, they lose very little which is an added bonus.

## AT A GLANCE

**Build Quality:** Exceptional.

**Sound Quality:** A fabulous presentation across the board with bags of detail, insight into recordings and great stereo imaging. Bass doesn't go massively low but I didn't miss it given the detail I was able to hear in complex synthetic bass sounds.

**Value For Money:** At this price, the Boenickes really should be good and they are, but I can see some not able to get away from the perception that "you're not getting much for your hard-earned", however, move beyond this perception and you will be well rewarded.

**Pros:** An accurate and detailed presentation with fabulous imaging even when not in the hot seat.

**Cons:** Won't go as low as some would like. The perception that they are a small speaker at a high price.

**Price:** £4595

And now to Linette for her comments on what I consider to be a product deserving of our highest accolade. .

The Boenicke W5 SE Loudspeakers are, at first glance, what you might call dinky, however do not be deceived, these are not just some cute little wooden box of a speaker, far from it. I've been fortunate to hear many different loudspeakers from the Boenicke range, at various Hifi Shows, and I have always been impressed. Walking into a big room at a Hifi Show to see a tiny pair of speakers tends to make you a little sceptical, but these little Swiss beauties know how to deliver. Stuart has covered our listening sessions with these in more details above, but, suffice to say, I am in agreement. Accurate but without being clinical and toe-tappingly fun. They deliver bass much bigger than you would expect from such a small speaker. They also have a really lovely style to them looks-wise and would grace any modern interior. I like the pared-backness of the design with the wood and other components speaking for themselves in a simple yet elegant presentation. The use of the wood makes me think of Swiss log cabins, all very nice indeed. At just under £5k UK price they are in the higher end price bracket for a small speaker, but the sound delivered is that of a much bigger speaker. Plus you are buying a piece of Swiss craftsmanship....something that you would expect to pay for!

Overall I would say these are an outstanding little speaker, and totally liveable with.



# REVIEW

## FYNE MODEL F500

### LOUDSPEAKERS



With a fine heritage of experience behind them, Fyne are a new company based in Scotland. Here Alan McIntosh takes a listen to their £600 Standmount model f500.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)



# FYNE MODEL F500 LOUDSPEAKERS



As a Scotsman who hill walks often and enjoys the finer things in life (beyond Hifi) the name Fyne instantly resonates with me as the loch that's home to some of the best shellfish in the world. At the risk of a bad pun, Fyne isn't just a name in the case of these speakers, fine is the clearly the aim of the design. With manufacturing based in Scotland the name is valid, and with a team who have worked together for over 10 years, with a couple centuries of Hifi heritage behind them, the brand may be young – but is the offering grown up enough to play with the big boys? Spoiler alert – yes – and in spades!

## CONSTRUCTION

The 500 are the midrange, standmount offering from Fyne, the little brother if you will of the award-winning 501 Floorstander's (Fyne offers a 300, 500 and flagship F1 range of various capabilities and price points). Arriving in a pretty ubiquitous sized box they are well packaged and once out and freed of their cotton shipping covers it's immediately evident these are not your run of the mill offering. The main enclosure is black oak using real wood veneer (dark oak also available) with a point source design dubbed Isoflare where the Titanium constructed tweeter sits inside the 6" paper/multi fibre bass/mid cone and shares a common centre allowing for a more isotropic stereo image even off axis. A twin cavity muffler design and down firing bass port with an internal "Tractrix" diffuser technology complete a dispersion design that Fyne calls Basstrax. These together with the grille outlet, direct plain directional waves into an expanding 360-degree wavefront that Fyne suggests interacts far more uniformly with the room and allows for less fussy placement. Bi-wired at the rear they employ a 3rd key technology design feature in their "fluting" of the bass cone edges. A slight curve to the front and rear baffle makes for a strong aesthetic as well as removing colouration of sound. A subtle and understated Fyne Audio logo is etched into the aluminium band at the base of the oak casing. Magnetic grilles with the Fyne logo in silver can be removed or

attached as needed without the spoils of holes in the fascia. Visually the 500 impressed me greatly suggesting authority, strong design and power.

## SOUND QUALITY

For this test, I employed Ecosse MS4.45's to allow a true bi-wire setup and allow the highs and low cones to perform as designed.

First up is Trevor Horns production masterpiece "Welcome to the Pleasure Dome" by Frankie Goes to Hollywood - anything but a superbly engineered and musically capable speaker just fails to really deliver what's on offer from this LP in my experience – thin or bloaty these are not – the bass is up front but controlled without being flat or restrained. That 6" driver complimented with the superbly designed down firing port provides lower notes that are musical, smooth and liquid in their feel, but with definition and a strong hand on the tiller to ensure they don't bloom or wash away - with lesser stand mounts it's like a poor relation of the original sound. With Crossover at 1.7Khz and a 1st order hi/2nd order low combination in play, vocals and the dynamic synth and percussion sections have real timing, velocity and just .. sing – no other word for it. It's like hearing the album with fresh ears. The resolution and delivery is very impressive, musicality is wonderful and listening is simply more fun than many other speakers in this price bracket I've heard (few if any have been as good to my ears if I'm honest ).

Sticking with Pleasuredome, when I hear the gibbering of monkeys it's like I can almost smell them, they are so realistic and staged, the icing on the cake is when Holly Jonhson's voice announces "the world is my oyster" - his voice, free of any sibillance, hits you in the ears and just grabs your attention to seat edge levels - my listening companion at the time uttered an audible "Wow" at this point - not a bad start I'd say.

# FYNE MODEL F500 LOUDSPEAKERS



# FYNE MODEL F500 LOUDSPEAKERS

Typically with standmounts I have them roughly 4 ½ -5 feet apart and allow for a good 18 inches at least from the back wall (to allow for rear porting) and this was my initial placement, so deciding to experiment I widened them to give them more air and reduced the back wall gap to half of before (just enough for the bi-wiring clearance of the Ecosse MS4.45's). Running Pleasure Dome again I was impressed to find more air further drove resolution and staging in an already impressive sound stage and there was no detriment to bass response – this being a proof point of the BassTrax system for me. Sitting way off axis the overall sound is still very impressive – this isn't a speaker you need to show deference to as a listener in terms of placement or even seating – they are just great fun regardless.

Already enjoying the 500's I decided to try the staple if the tired, reference of "Tubular Bells pt1". As the guitars enter the fray at around 4 minutes the drive is wonderful – overall there is space, timbre, and resolution that just excites me – and belies the form factor of these stand-mounts. Pushing the volume knob north and none of the ragged edges I've found with other speakers is apparent, finesse and refined "grunt" is here in spades.

With Coltrane's "I'll Wait and Pray" (Naima, Le Chant du Monde 2017 ) John's tenor sax play is just wonderful, the highs sing out with a soulfulness and clarity that is rare at this level, smoothness through each note and delicious, well machined lows courtesy of Paul Chambers masterful bass play really shows what these can do.

When Art Blakely opens in "The Egyptian" (Indestructible, Bluenote ST-84193) and then Lee Morgan joins him you hear just how well the Fynes can cope with busy dynamics in a fashion I find many others can't – that Isoflare, single centre design delivering coherency in every note, strum, and hit – the energy is infectious . The only "weakness" being you need to let them run free a bit, don't expect to listen at whisper levels or you're missing the main act!

When Wayne Shorter's sax steps up, the staging and image is abundant and correct – each player projected in their own space, no muddling or loss of details even in the most frenetic of playing. It just sounds real and alive in front of you, not a sheet of vinyl originally put down in 1966!

## CONCLUSION

Place these well and you are going to enjoy them immensely, give them some volume and put your favourite music on and be prepared to enjoy it like perhaps you haven't before. They are a well designed, good looking and incredible sounding standmount for the price (or well above it). Detail, immediacy, liveliness and resolution of sound is what I find myself repeating time and time again. Bass is simply wonderful – getting down to 45hz it's solid enough to excite and tight enough to satisfy the audiophile pedant in me. Whether its Jazz, rock, electronics or classical, the Fyne 500's should most definitely be on your "must audition list". Smaller or medium rooms where their big brother may overwhelm when driven at higher volumes are perfect for the f500s. The technology and heritage of the team at Fyne have come together to deliver a class-leading system. Put plainly I didn't want to give them up so - they are now my reference standmount!

## AT A GLANCE

**Build Quality:** Designed well, high-quality materials and strong audiophile aesthetics – Titanium Isoflare cones and diffused Basstrax porting with its base grilles make for a high-quality offering in my book.

**Sound Quality:** Whether it's acoustic, jazz, rock or electronic the 500's delivered well for me, indeed very well for their class, and will stand up to many at a loftier price point in my opinion. Clarity and refinement where it matters, air and strength in equal measure – all down to that single point driver and superbly executed porting. Close your eyes and you will forget the position of your speakers and maybe even that they are stand mounts – or in fact that you are listening to speakers at all instead of sitting mid-row in red light, dim and cozy jazz club or gig joint.

An impressive ability to deliver even with highly dynamic tracks. Staging and resolution is strong, bass and lows are deep enough to feel real and handled easily and well enough to not wash or become lazy.

Don't require overly sensitive pairing or positioning, even off-axis listening is enjoyable. Give them some welly to really hear their soul sing.

**Value For Money:** At an RRP of £600 no question, I'd put these side by side with many at up to twice that price. You are getting an incredible sound for your money (maybe that's the Scottish in me coming out again, or maybe the Scottish in the design). So much so – I kept them!\*

**Pros:** Overall delivery especially of bass, handling of varied styles, resolution even with dynamic pieces, design and looks.

**Cons:** Absolutely none at this price

**Price:** £600





# REVIEW

## GOLDENEAR TRITON 5

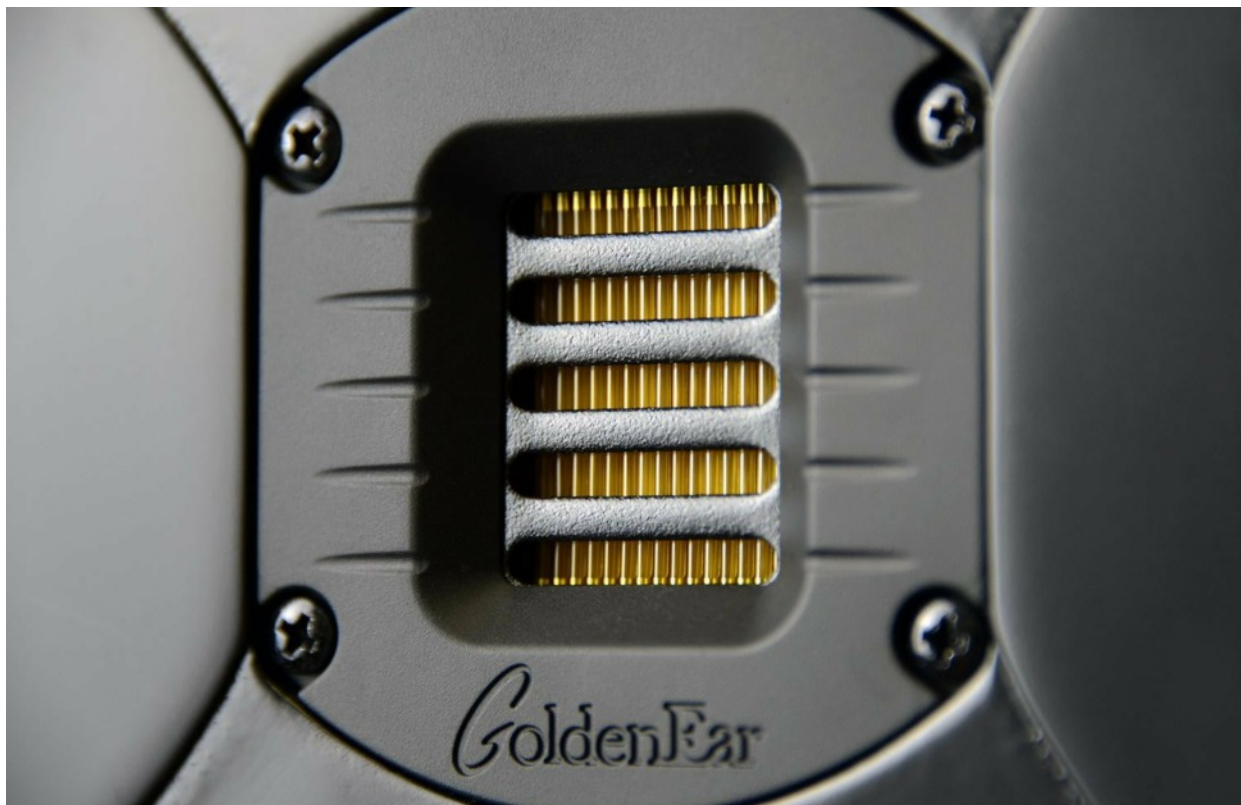
### LOUDSPEAKERS



Dan Worth takes a listen to the Goldenear Triton 5 floorstanding loudspeakers which for £2300 looks at face value to be a lot of speaker for the money.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# GOLDENEAR TRITON 5 LOUDSPEAKERS



The Goldenear Triton 5 is a slim, wholly passive floor-stander just over a metre tall, which sits in the brand's flagship range between a smaller passive floor tower - the Triton 7 - and four larger semi-active systems equipped with powered subwoofer sections. Each is the lovechild of Sandy Gross, the founder and protagonist-in-chief of the Goldenear brand. I've never met him but having met the T5, I feel I know him. Not just by the complex way the T5 is engineered, but also how it behaves in-room and in different systems, and from reading the enormous amount of biographical/philosophical information on the web.

After 40 years of refining his formula through instrumental roles at Polk and Definitive Technology (many of whose speakers I've owned), the things that make a great sound for Sandy are obvious in every Goldenear speaker. I know he wants smooth detailed high frequencies, a wide even mid-band and low frequencies that belie the dimensions of the cabinet, and I realise that Sandy and his team have taken enormous trouble and skill to engineer these attributes into speakers you can live with at a price you can afford. There's certainly great passion behind the brand, but does all this belief actually succeed in creating the ideal audiophile bargain?

For many, especially on Goldenear's home turf in the US, the answer is yes. Across the pond in the UK and Europe however, the reaction has been mixed. Why does this brand so clearly divide opinion? My search for an answer led to Goldenear's UK distributor Karma-AV, who provided the passive Triton 5s as the best introduction to the experience and it was certainly an experience – but more of that later.

## DESIGN

On first encounter with the T5 it's obvious you're dealing with an unusual design. There's nothing standard about a speaker covered head-to-toe in a stocking like a shroud, which conceals the drivers and their configuration completely. Unlike virtually every other speaker, it's not easy to suss the architecture. You can't remove the

'grille' because there isn't one. Instead, you need to lift off the glossy plastic top cover, remove a grip clip securing the top of the stocking and then peel it back down the length of the speaker to the base. The manual that came with the T5s doesn't even mention this enclosed grille design – it's as if Goldenear doesn't want you to meddle. However, rather than a pre-finished look, I discovered a sculpted polymer baffle beneath: obviously the brand has prepared for the possibility of sock removal. Weirdly, with the drivers on show, I felt happier and also a little less anxious about leaving them set up in my listening room with a marauding cat at large: the T5s could well be the most expensive scratching post on the market.

You can go the whole hog and remove the sock entirely by unscrewing the black plastic plinth at the base of each T5. Without the sock, they look fine, and you get a much clearer impression of the angular T5 cabinet, raked backward for optimum time alignment, and slimmer at the front than at the back. The non-parallel cabinet walls are designed to eliminate the internal standing waves that inhibit driver function.

## DRIVERS

As you'd expect with an audio design so rigorously prescribed, the drivers are clearly a cut above the norm. The tweeter, which Goldenear calls a High-Velocity Folded Ribbon (HVFR) design, is a proprietorially-tweaked Air Motion Transformer, invented by Oscar Heil. His revolutionary idea has been widely interpreted following the patent's expiry and can be found on speakers such as Martin Logan and Monitor Audio (the Micro-Pleated Driver on MA's Platinum II range is an AMT). Only this week I've received a pair of Mundorf's AMT tweeters for a project I'm undertaking. Essentially the AMT comprises a voice coil etched onto a precisely folded diaphragm which is suspended in a strong magnetic field. When the current flows it causes the diaphragm to expand and contract like an accordion, squeezing the air outward.

# GOLDENEAR TRITON 5 LOUDSPEAKERS

The midband and bass from the T5 originate from the twin 6" drivers arranged either side of the AMT in an M-T-M configuration. Goldenear has opted for a more costly cast basket mid-bass driver design, providing greater stability for the suspension during long excursions. The motor combines a high temperature 1" Kapton former for the voice coil and a high-gauss magnet assembly, the entire caboodle is crafted to propel the radiating surface (which appears to be a doped polypropylene of some kind – Goldenear doesn't specify) a long way very quickly.

The benefits and drawbacks of the M-T-M (D'Appolito) array are well known: you get great timing and focus of frequencies on-axis, but the off-axis response is generally poorer than from a conventional tweeter/mid arrangement. This means you need to be more careful when positioning the T5s for optimum results – as I discovered.

Ultimately every speaker design is a compromise, you simply have to decide the mix of priorities and trade-offs that produce the result that pleases you the most. It's clear to me that Goldenear's checklist is very clearly defined and ticked all the way down to the four 8" planar sub-bass radiators positioned just above the floor plinth on the outside of each side of the cabinet. The horizontally opposed motor free 'radiators' use the rear energy from the bass drivers to generate the lowest frequencies from the T5's closed box system. They're what Goldenear terms 'inertially-balanced', which I'm guessing means that they use the air spring most efficiently.

## SOUND

So what to make of this impressive mix of acoustic technologies at work in the same box. Have they been integrated well enough to create that completely coherent and believable sound that Sandy Gross is after? The answer is a qualified yes, but in my experience, it takes some effort and precise system matching to deliver it.

Initially, I hooked up my reference disc player and Tidal playlist through my Gamut D3 pre and Gamut D200 mk3 power amp to the T5s straight from the box. They were cold, I was unmoved.

Yes, the HF sounded unusually detailed but mid-band lacked focus and the bass was soft and lumpy.

I just couldn't detect the revelatory Goldenear imaging and accuracy I'd been reading about. So I let the system run for a few hours and returned to toe-in the speakers a little more for a narrower sweet spot. The sound improved. Listening to 'Hey Now' from London Grammar, the bass notes were fuller and richer but still the timing of dynamic low frequencies from, say, the snare skin, was out of kilter.

What I was getting though was a greater appreciation of the Goldenear AMT. The AMT design's response is fast and its radiating area large compared with a typical dome tweeter, so it's more sensitive and operates over a wider frequency range than is typical, providing much lower distortion, greater transparency, and dynamics. Goldenear's successful application of AMT tech on the T5 means that with the correct toe-in you encounter sparkingly fluid detail from further down in the mix, which sort of jumps out at you like the icing on a cake, keeping your focus on the smaller sounds that end up defining the soundstage – just, I suspect, as Sandy and his team intended.

Working in tandem with the AMT, Goldenear's 6" drivers are capable of producing bass with sufficient speed to keep up with the AMT for a

startlingly coherent outcome. It's clear that by specifying a D'Appolito array of this quality, Sandy's objective is a most revealing sweet spot. But I played for many hours to find it.

After a great deal of experimentation I discovered that locating the closed-box T5s about 10 feet (3 metres) apart, just over a foot (300mm) away from the wall and toeing each 40 degrees in from the vertical, generated a very tightly defined sweet spot right in the middle of my sofa about 6 feet back (I'm now calling it the 'Golden Zone'). Now I was getting what I assumed to be the fabled Goldenear experience - or something like it. I was bathed in a warm soup of frequencies laden with a powerfully flavoured midrange, punctuated by an almost holistic high-frequency detail. The effect was intoxicating.

Get the position of the T5s in your room correct and you will be rewarded with exceptional vocal quality, reproducing complex vocal textures beautifully within the mix. Loreena McKennit, for instance, took centre stage with excellent poise and clarity, and with all the venue acoustics attached.

Replacing the rubber feet with the supplied spikes improves the bass and lower-mid focus, cleaning up a little congestion and allowing cleaner and freer dynamics to emerge. Be sure to get some spike shoes even if you have hard floors, or to appreciate the differences simply place some pennies under the spikes and gauge for yourself. Even so it's in the deepest bass that the T5 faces its greatest challenge in my opinion.

I realise that Sandy will have refined the passive bass radiator design during his years at Definitive Technology (they're still using it). However, in my experience, the T5 still needs some tuning in this area. The configuration of four 8" radiators may be an extremely innovative means of producing deep bass from a slim box, but the T5's deepest bass frequencies still lag a little behind the rest. Although the effect is not obvious enough to ruin the appreciation of the T5s warm rendering of other frequencies, it's more pronounced when the T5s are out of sync with the room. I've never encountered a speaker that is quite as sensitive to room position. It's almost as if Sandy and his team demand that you experiment as part of the joy of owning a Goldenear T5!

Sandy uses a wide range of amplifiers in voicing his speakers - Marantz, Rotel, Hegel, Denon (no looney toon esoteric gear), and is presumably happy with the T5's compatibility with likely partnering equipment, but this is a speaker that demands sensitivity in system building because in my experience it's so very transparent to any changes in the chain of command. Replacing the Gamut with an ATC P1 power amp and a Townshend Allegri+ preamp, for instance, brought a cleaner more agile balance to the upper bass, and greater width to the soundstage, but I lost some of the intimacy of the Gamut.

## CONCLUSION

With everything in sync the Goldenear T5 speakers can be very special indeed, and great value. Hit the sweet-spot and you'll have the 'Eureka' moment that Sandy Gross and his team want you to experience. Just like a new dish or fine wine the T5 could be an acquired taste, and the chances of you missing the flavour altogether quite high. This characteristic could explain why several reviewers on this side of the pond have failed to get on with the brand. The T5 is very obviously different in character from, say, an ATC monitor. The T5 has a softer, warmer balance with a loser bass response, but put the work into room positioning and partnering equipment and the result could prove addictive. Style-wise, they're slim enough to blend



# GOLDENEAR TRITON 5 LOUDSPEAKERS



# GOLDENEAR TRITON 5 LOUDSPEAKERS



with most rooms, and I'm sure you could have a sock dyed to match décor!

Having spent a long time with the T5s I know and understand why they have polarised opinion: if you're not prepared to contribute, neither are they. So take your time and ensure that you discuss suitable system matching with your dealer. Experiment with several combos and take your current amplifier along for an informed audition - you could hit the jackpot, and isn't that what Hifi is really all about?

## AT A GLANCE

**Build Quality:** Very well constructed and implemented using high-quality components. Style is interesting and hinges on whether you can live with the sock. I would like to see options for colour of the sock

**Sound Quality:** Very coherent and communicative once matched with the correct amplifier and positioned responsibly in the listening space

**Value For Money:** Very convincing indeed once synergy is obtained

**Pros:** Very informative, smooth and detailed performance, high-quality components throughout, a real mainstream capable value for money speaker for those with high-end aspirations at a more realistic price point

**Cons:** Need some care to implement and the sock may not be to everybody's taste

**Price:** £2300



# REVIEW

## JERN 14 EH LOUDSPEAKERS



Jern 14 EH Loudspeakers from Denmark are an unusual design both in the way they look and the materials they are made from, Stuart Smith takes a listen to them partnered with REL t5i subs which are vital as the speakers only go down to 90Hz. The Jern 14 EH are €/\$3.998 for a pair, the Jern plate for REL T/5i subwoofers are €/\$399 each and the REL subs are available at £549 each. Stands for the 14 EH are available, though not tested here, for €/\$1198.

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# JERN 14 EH LOUDSPEAKERS



I first came across the Jern speakers a year or two ago at Munich High-End whilst Linette was off doing her Women In Hifi meeting and was mesmerised by their unusual design and the materials used to build them. I was somewhat taken aback by them in the less than ideal listening booth, noting that they imaged really well. When the opportunity came to have a listen to a pair at home I jumped at it. They arrived whilst we were at the Warsaw show and so helpfully the delivery driver forged my signature and left them in our open barn, which is right next to a main road (well, as main a road as you get in rural Brittany) for all to see and help themselves. By some small miracle, they were there when we got back and we found them.

## CONSTRUCTION

In Danish, Jern translates into English as Iron, which is apt as the cabinets of these diminutive loudspeakers are made out of cast Iron. It's something I don't think I've ever encountered before and so I was pretty excited to get the chance to review these speakers. The cast Iron used is a special grey cast Iron (Vibrakill®), with a high amount of Graphite (Carbon) mixed in the Iron with the intention being that the Graphite dampens the cabinet's vibrations "100 times better than Aluminium, and much better than MDF and wood". Needless to say, the speakers weigh a fair old bit, 12.5Kg to be exact, which is pretty significant for a speaker that measures just 30 cm tall, 19.5 cm deep and 21 cm wide. I spoke to a few people about the speakers and as soon as I mentioned the fact that they were cast iron I got, from two people at least, "Don't they ring like a bell?" but the answers is a simple "No they don't".

The cabinet shape is interesting in itself in that it is rounded and looks not unlike BabaPapa, the cartoon character. This is a sealed box design with a five and a quarter inch Scan-Speak woofer in a 1/4 inch 149 mm frame and with an SBR Rubber Surround. The cone is a coated NRSC Fibre Glass Cone in a die-cast Aluminium chassis. The tweeter is a Hiquphon 20 mm textile and gold dust dome tweeter with

an excursion of  $\pm 0.9$  mm. You even get a signed off spec' sheet specific to each tweeter in the package. When talking to the designer of the Jerns, Ole Lund Chrstensen, he claims these tweeters are as good as it gets and that the guy who has developed them has made them his life's work. The phase linear 6dB/octave custom-made crossover uses a Mundorf polypropylene capacitor and an air core coils. The speakers are designed to work with subwoofers as their frequency response is 90Hz to 30 000Hz and in this case they were supplied with the REL t5/is. A pair of Jern cast Iron subwoofer stands was also supplied. Round the back is a nice quality pair of speaker binding posts. Packaging is excellent and despite the courier managing to quite badly damage one box, the speakers arrived perfectly safe and sound. Finish is a sort of matt black and they look very well finished. The magnetic driver covers are removable and, particularly when removing the tweeter cover, there was an opening up of the sound and so they were left off for the duration of the review period.

The RELs have an onboard 125 watt Class A/B amplifier and have an 8" downward firing cone are finished in black gloss and connect to the power amp via a pair of supplied cables that are terminated with Speakon connectors on one end and bare wires on the other. You get to dial in the crossover frequency and volume of the sub. I've not set up subs before as I've never had to, but this was a doddle and within a quarter an hour or so we had a sound that we were happy with. Speaking to the Ole, he thinks the supplied cast iron "stands" for the RELs are the best solution to integrate the MDF cabs of the RELS with the Jerns...that is until the Jern sub is in production. The stands are an extra £500 but adding them does make for a somewhat tighter sound in the bass department and yes, there does seem to be better integration – I was expecting nothing to be honest.

Set up of the main speakers was a doddle as a rubber ring is included which sits atop your speaker stand and the Jerns, in turn, sit in it. Point the speakers at the listening position, do all the usual faffing making sure they are the same distance from the back wall (a metre

## JERN 14 EH LOUDSPEAKERS



# JERN 14 EH LOUDSPEAKERS

or so) and off we go. This “room” has been set up specifically to mimic a typically sized listening room and is part of a bigger space with the space being treated with GIK acoustic panels. The associated system has been put together to echo what someone looking to get a great sounding system for around 10K might put together themselves.

## SOUND

Needless to say, I jumped right in without reading anything about the speakers', their frequency response or anything for that matter – I never do, I usually just set stuff up and then sit down and have a read. My thoughts were that imaging was very good but there was nothing in the bass registers and so THEN I popped over to the Jern site and then the penny dropped as to why a pair of subs were included in the review package. I really ought to start to read about products before I jump right in and set them up.

Anyway, the subs were set up and the crossover dialed in, the level set and all was right with the world. Setting the subs up is relatively painless and a case of trial and error – initially I had them set a little too loud and they sounded boomy, dial that back a bit and they integrated beautifully with the Jerns. I was happy with the RELs placed directly in front of the Jerns and placed on their Jern stands which are solid cast iron and bloody heavy.

The first thing that you will notice about the Jerns is how well they image. I love this about small standmounters and point source loudspeakers, but I've never experienced such an accurate rendition of the stereo image in terms of how solidly instruments sit in their place in the mix – it really is something to behold and it's a really addictive character of these speakers. Reviewers often talk of loudspeakers disappearing and I've often taken that with a pinch of salt, but with the Jerns this is as close to a pair of speakers doing a vanishing act as I've heard. I don't know if it is the weight of the speakers compared to their size, the wonderful tweeter or what that is doing this but I do like it.

First on is a CD called Songs For A Better World from the 2 Meter Sessies series of recordings. The first track on this album is If I Had Rocket Launcher by Canadian Bruce Cockburn, it's recorded in a radio studio with just two microphones and is just Cockburn and his guitar and the detail the Jerns bring out is nothing short of astonishing. Every nuance of his guitar playing is brought to the fore in wonderful detail. There are a few parts where Cockburn clearly moves away from the vocal microphone slightly and the mic picks up more ambient from the room – it's very subtle and ordinarily, I don't think I would have noticed it, but the Jerns make it so obvious without you feeling the detail is being over-exaggerated. I've heard some loudspeakers that boost the top-end to make them appear to be more detailed than they actually are and that makes for a fatiguing listen and an unreal presentation, but the Jerns just feel natural and unforced in the upper registers. That is not to say they are in anyway rolled off, they are not at all, and everything is there. Now, this level of detail is often only apparent on some speakers when they are cranked up, and I do tend to listen pretty loud, but with this set of speakers, I have found myself to be listening at lower levels without losing any enjoyment. Ian McNabb's version of Working Class Hero from the same 2 Meter Sessies CD is almost whispered in parts and then belted out in others but the Jerns are unruffled, super-fast and articulate dealing with dynamic changes wonderfully.

All well and good but so far we've played relatively simple tunes through the Jern/REL combo but what happens if we throw something a bit more hectic at them and so I dug out a copy of LFOs "We're Back" and the volume goes up. This track goes LOW and I found

myself dialing the subs back a little – great to have this flexibility. This is music meant to be played on big sound systems and was made at a time when sound systems of the day were all about the bass, but look beyond the bass and the Jerns are bringing out so much more by way of detail which in this case may not be such a great thing. This is about as far away from audiophile music as you are likely to get and in parts it is rough, with the Jerns hiding nothing, warts and all. Popping on Logic's classic house tune The Warning which is a cleaner kind of record rather than an all-out assault on the e'd upped senses of the LFO track. The beats skip along, are fast (in a stop-start sense) as you could hope for and remain steadfast in the mix, locking you into the beats and drawing you into other textures and sounds in the mix. So yeh, this partnership can do well-recorded techno and house which is good as I'm going to be throwing a lot more of this program at them for my own enjoyment whilst they are here. Be warned though, a record that is dirty, for want of a better word, like the LFO tune has no place to hide.

As you continue to listen to the Jerns and the RELs it becomes apparent, or it did in my case, that you do need to fiddle with the bass somewhat to get them properly integrated. I said at the start of this review that setting the bass up was a doddle and that they integrated from the off, and they do, but I found the need to refine and fine-tune the RELs to get the very best from them integration-wise.

Royksopps' Poor Leno from 2001 (wow, it seems like yesterday) sounds huge on this set up with the mix, particularly the vocal, projecting well out into the room. Percussion hits towards the start of the track fly about the room and the whole thing is, and I know this is a reviewers' cliché, somewhat holographic. There is no harshness in the top-end and, as I've mentioned before, and there is just a feeling of things being right in a natural kind of sense. I am liking these loudspeakers a lot it has to be said.

Fleetwood Mac's Rumours often gets rolled out for reviews. It's a great record of which I have several copies and it's a useful tool for review purposes. Songbird, recorded in an empty auditorium, is useful to get a sense of how the recording space is presented and here I'm certainly not disappointed – close your eyes and you could be in the room about halfway back in the stalls. Decay on the piano and the softer after-touches are all there by the bucket-load. The dry kick on The Chain which follows opens the track and here I'm made to sit up and really take notice, particularly when the bass line comes in; really you could be in the studio listening to the final mixdown -only with less cocaine. Hard panned guitar stands out and again it is the stereo image that has me hooked with me being able to almost look at (and into) the mix. Ordinarily, I'll often jump from tune to tune when I'm reviewing a new bit of kit but unconsciously I've not done that with the Jerns, I've gone to my chosen test track and then let the record play out – this is a good sign.

## CONCLUSION

It's easy to be beguiled by a new product and what it does well whilst overlooking what it doesn't do so well. I tend to take a listen to a product, go “yeh, yeh all very good but let's take a step back and listen more critically”, I did this with the Jern/REL combo too but when I went back with fresh ears I was getting the same excitement and utter joy at listening to different tunes - and that's all different genres.

Where these speakers score very highly is, if you have read the review you will know what's coming, their imaging and level of detail. I was expecting to be disappointed with the bass and thought it would be slow and dragging, one of my pet hates, but adjust the bass



# JERN 14 EH LOUDSPEAKERS



# JERN 14 EH LOUDSPEAKERS



throughout the period of a day or longer and you'll find that it is fast and not at all overblown once you get them dialed in right.

Stands for the 14 EH are available, though not tested here, for € / £1198.

OK, I like these speakers, I like them a lot. They are my kind of speakers – fast, accurate, detailed without being harsh and they image wonderfully.

## AT A GLANCE

**Build Quality:** Impeccable. Solid and reassuringly heavy as they are cast in one piece.

**Sound Quality:** Detail and imaging are what these speakers are all about. The tweeter is a work of art and deserves special mention.

**Value For Money:** With the need for subs adding a further £1100 to the equation and their associated "plates" another £800 we are into the realms of serious outlay. With that said, you are getting a unique product that looks as good as it sounds and will certainly be a talking point.

**Pros:** Stunning imaging and detail to mid and tops. An almost reach out and touch sense with good recordings

**Cons:** Brutally unforgiving of poor material. The need to integrate subs. Price will be a deterrent for some given their size.

### Price:

As tested £5894

Jern 14 EH loudspeakers - € / £3.998 /pair

Jern plate for REL T/5i subwoofers - € / £399 each

REL subs - £549 each



# REVIEW

## RMB 40/4 LOUDSPEAKERS



The RMB 40/4 Loudspeakers (£3000) are a distinctive and interesting design, Dave Robson takes a listen.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)



# RMB 40/4 LOUDSPEAKERS

These striking and unconventional looking RMB speakers are born and raised in Ilkley, North Yorkshire. They are the creations of Richard Best, a man who has Mechanical Engineering in his blood, but who has been busy planning, designing and testing his speaker line for some time. Richard hand delivered the 40/4 speakers personally. He was compelled to tell me about his speakers and that they were an early pre-production model, and that there are some small changes to things like the felt diffuser ring on the bass driver phase plugs and speaker grill fixings will be much improved on production models. Although everything else sound-wise will be identical. Richard also gave me a "user pack" which comprehensively tells one about how to set up the speakers and to glean the very best of their performance. Richard also supplied the speaker cables, DNM Solid Core Resolution, which he told me were paramount to reproducing the best sound from the speakers and had been used in the development of the 40/4.

## CONSTRUCTION

These RMB 40/4 speakers are constructed from 18mm high-density birch plywood, there is heavy and complex bracing internally holding the cabinets together. Listening tests in the early research and development stages found the plywood sourced from Europe outperformed material from elsewhere around the globe. Such is the lengths Richard went to in an effort to perfect the sound of his speakers. There is also felt wadding internally in critical areas for added damping.

The speakers are a 3-way design, each speaker consists of two aluminium and magnesium bass drive units measuring 170mm. These both have 39mm Voice Coils. The mid-range and high frequencies are handled by a 54mm hand treated mid-range dome and a 26mm fabric dome tweeter. The tweeter has had some in-house modifications to lift performance and operates above 6.5kHz. The speakers have an enclosure at the top which houses both the Tweeter and the Mid-range drivers. This keeps the top and bottom sections of the speaker separate. At the rear of this enclosure, the back is made from 3mm thick alu / plastic / alu sandwich material commonly used in the sign making industry. It is stiff, lightweight, with a durable finish and is able to withstand extremes of exterior temperature and sunlight and this is screwed into the wood with standard cross-head screws.

The cabinet has two bass ports located at the rear, on the lower half of the speaker and situated towards the floor. Efficiency is measured at 89db and amplification above 40 watts per channel is recommended.

Speaker wires are connected to the rear by terminal sockets by decent quality gold - plated brass, of a design which has minimal metal mass. The removal of the wire links would enable the speakers to be bi-wired, although according to their designer brings no sonic benefit.

The supplied finish of my pair of speakers is classed as "Natural" and there are three other standard finishes or "Tints" are available; "Whiskey", "Chestnut" and "Black Ink" and all are available as a no-cost option and topped off with a clear lacquer, Richard will also look into bespoke finishes as requested. Each speaker has two grills one covering the top enclosure and one covering the lower two bass drivers. As mentioned above there will be some modifications to the magnetic fixings as the glue on this early sample has corroded the metal, this will not be a problem with the standard production models. It is recommended that listening should be carried out with the grills off. This then has the magnets on show, I would prefer not to be able

to see these magnets, and would look to design them to be invisible or have the magnets incorporated into the grill somehow, as I think it detracts from the handsome looks of the RMB 40/4.

Standard m6 Spikes are supplied and fitted via screw in sockets on the foot outriggers.

Size H/W/D 121cm, 25cm and 38cm respectively, and weigh in at 22.5kg each.

## SOUND QUALITY

Thankfully my pair of speakers are ready run in and I could get to grips with listening tests virtually from the off, I gave them a couple of days to acclimatise in my listening room playing several albums from my little "regular" collection, thus allowing me to bond with their sound characteristics.

I followed Richard Best's instruction manual as to positioning as much as my room would allow. Toe-In is recommended and having the tweeters aimed either side of my head I set about putting in my first few CD's.

I was quite worried as my smallish listening space doesn't react well to big drivers and rear bass ports. I've come quite accustomed to performing juggling acts with foam boards and bass traps to accommodate different speakers though! How surprised was I when the first few CD's were played, no bloom, no buzz, no bloating or any other signs of problems in the bass department. Quite a lot of my collection consists of Blues, Rock and Acoustic style guitar music and playing Robert Cray (Sweet Potato Pie) and Peter Greens Splinter Group (Destiny Road), Fleetwood Mac (Rumours), Derrin Nauendorff (Natural) and Steely Dan (Gaucho) brought about nothing but tuneful and syrup like bass riffs that were easily followed and led the way forward to heightened enjoyment of what was to come from the rest of the albums.

As all good speakers should, the RMB speakers managed to disappear from the audio party in front of me. Soundstage was perfectly formed, the vocals sitting central in the music and the rest of the instruments and sound spread out in isolation and coming from exactly where I was expecting them to be. The detail of the Harmonica conveyed in the instrument solo during "You'll Be Sorry Someday" (Peter Green), has you sitting in a smokey old jazz club, the accuracy of ambiance transferred from the speakers to your ears is quite strikingly real. All that was missing was the smell of damp-course failure, stale beer and cigarette smoke (or vape odour as it is now). The mid-range was also just as detailed, with the ability to create that "in the room" presence and realism of vocals, with backing singers clearly ensconced either to the left or right in the background and this was delivered somewhat effortlessly from the 40/4. This sound was growing on me immensely. Needing to change CD's to move the review onward became difficult, as I just wanted to hear track after track of my favourite albums. High frequencies are handled with the same ease, even when the volume is pushed nothing becomes grating, it just comes out the speakers at a higher volume as perfect as it does at lower levels. There is a level of delicacy here that is quite pure and clean. Don't get me wrong, these babies can rock when asked to. At lower levels, the sound has a very clean and polished sheen that makes listening at this and any level a complete pleasure. Even some recordings that are less than perfect seem to be cosseted by the RMB 40/4, and thus made to sound listenable. The albums you have become used to flicking past can get an airing and the abilities of these speakers make the experience once again enjoyable. I'm thinking that these speakers are not too system

# RMB 40/4 LOUDSPEAKERS



# RMB 40/4 LOUDSPEAKERS

dependent either, their easy-going sound doesn't seem phased by any genre of music I tried with them. Rock, Jazz, Vocal, Acoustic, Soul, R&B and Big Band the RMBs just lapped them all up. Nothing seemed to phase these speakers at all. I can't really find a negative to say, if I had to put a single stamp on their sound I would struggle, I'd be picky to say they err on the side of warmth, but that's about it!

## CONCLUSION

I like these speakers, no I actually love them. From their design to their effortless sound, the RMB 40/4 fulfill every need I have for music. The long listening tests and constant development have paid dividends. A few niggles to iron out in the design as mentioned above, but that takes nothing away from the sound these speakers make.

## AT A GLANCE

**Build Quality:** Solid build and nicely finished, Richard has already stated the retail speakers would have a few improvements. Speaker grills, speaker grill attachments, and spiked outriggers could be improved on a little further. I would also look at custom finishes as the design and shape could offer many options.

**Sound Quality:** Effortless, smooth and delicate delivery but can still throw a Rock party if needed.

**Value For Money:** Sonically superb for the price. You need to add on the price for the recommended DNM speaker cables.

**Pros:** Fantastic sounds, fantastic looks, and design. Easily integrated into many rooms and systems.

**Cons:** Shape and design may not be to everyone's taste. Grills and their coupling method would be better concealed, and the sheer see-through grill cloth could be somehow bettered. The Spiked feet could also do with a little improvement to make leveling them easier and look a little more upmarket.

**Price:** £3000





REVIEW

TAGA HARMONY TTP-300

PHONOSTAGE



Ian Ringstead checks out the £200 moving coil and moving magnet phonostage from Polish manufacturer TAGA Harmony.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# TAGA HARMONY TTP-300 PHONOSTAGE



I've reviewed TAGA Harmony speakers in the past and when I visited the Polish Hifi show last year I was told by the company that they were bringing out some exciting new products, one of which is this phono stage the TTP-300. The vinyl revival has really caught the imagination of companies in the last couple of years and there is a plethora of new turntables and associated products being produced now to attract old and new enthusiasts to spin their vinyl on and with.

## CONSTRUCTION

The TTP-300 is neat and small in a very solid aluminium case that is well styled with nicely rounded corners and rubber feet on the base to protect any surface it is stood on. The unit is clearly labeled with the company name proudly shown on the top plate and on the front, there is a selection switch on the left side for the input between moving magnet and moving coil cartridges with a corresponding green led for which one the user has selected on the right of the front panel. On the rear at the top left is the power rocker switch with the 12v dc input socket below for the plug-in mains adaptor. In the centre of the back panel is the earth terminal to ground your arm cable and finally to the left are the two phono input RCA sockets and RCA output sockets being gold plated of course. All beautifully neat and simple. I couldn't resist taking the top off the box to look inside where I found two well-made circuit boards for the input selection switch and selection LEDs and the main circuit board for the power input and RIAA equalisation and amplification of the signal. The unit is designed and engineered in the EU and made in China to keep costs down so maximising the value for money to the customer. Set up was a doddle (quick and easy) and I left the unit powered up for a few days to run in.

## SOUND QUALITY

Noise level was very good on first using the TTP-300 with no hum and just the usual surface noise inherent with vinyl records solely dependent on the quality of the record of course. I recently attended

the annual Record Store Day at a local dealer in Sheffield as it was a great opportunity to hear some new equipment and buy a lot of second-hand vinyl. Of course, I came away with a fair few classic albums, some of which I had had before plus many new ones to delight in. One of these was the Sheffield Labs "James Newton Howard and Friends" direct cut from the legendary US label started in the 1980s. For those of you not aware of this technique, direct cut meant the whole recording of one record side was done in a single take direct to the cutter to make the master lacquer. The musicians were under immense pressure to play perfectly or sing as any mistakes made couldn't be edited out later. The benefit of this technique was superb dynamics and quality on the recording. Musically this album will not be to everyone's taste, but I love it and it sounded great via the TTP-300 in my system. The musicians are legendary with James Newton Howard, David Paich and Steve Porcaro on synthesisers and Jeff Porcaro on drums and Joe Porcaro on percussion. All top session musicians meant that the end results would be spectacular, and it is. Putting the musical genre to one side the dynamics are breath taking for a record that you only normally hear in a live situation. My system certainly sprang into life (rather like eating a chili or hot curry for the first time and catching you by surprise) and the TTP-300 did a very credible job of conveying these dynamics with excellent clarity of each instrument. The sound stage had good depth and width with precise location for its price range and although not on a par with my reference phono stage (a Gold Note PH10 which costs nearly seven times as much) it does a sterling job.

I then tried another favourite group of mine Acoustic Alchemy who are superb guitarists and I have many of their albums. "Natural Elements" is one of their earlier efforts dating back to 1988 and like all their albums is beautifully recorded. The concept for this album was conceived in a cottage in the New Forest in Southern England using two acoustic guitars and a battered cassette deck. The title track will be familiar to anyone in the UK who is an avid gardener and watches Gardner's World on the BBC. It was for years the theme tune to this iconic programme and on a good Hifi system sounds sublime. The

# TAGA HARMONY TTP-300 PHONOSTAGE

TTP-300 conveyed the artistry of the two guitarists Greg Carmichael and Nick Webb with great aplomb and the accompanying synthesisers and percussion were all laid out well in the sound stage showing good depth and subtlety. In contrast to the airy and dreamy sound of the title track the track "Evil the Weasel" is far more upbeat and has a persistent drum beat throughout with the guitars duelling along with the synthesisers. The TTP-300 had no problem with the fast pace of this track and unravelled the complex interplay between the instruments very well.

As a contrast from instrumental albums I switched to Gloria Estefan and Miami Sound Machine and the 1989 album "Cuts both ways". She has a beautiful voice as well as looking great and the classic Cuban-American style of her song writing is infectious. I defy anybody not to want to get up and dance to her music. The album is a mix of ballads and upbeat numbers with that Latino vibe running throughout it. Again, a well recorded album the track "Here we are" a well-known single had me transfixed by its simplicity and subtle arrangement. I am a sucker for beautiful women and their voices (I would have no chance if tempted by sirens !!) and music like this is what makes a good hifi system a joy to listen to. Vinyl is a medium that has always had me in its grip and when a product like the TTP-300 can aid me on this journey I'm happy.

## CONCLUSION

As you will have gathered I really enjoyed the TTP-300. It's a great plug and play product that is honest and simple. The fact it has both moving magnet and moving coil is a real bonus and it worked so well in my reference system that this is a real attribute to the design. Compared to my reference Gold Note PH10, of course it lacks the magic that a much dearer design brings, and the main differences were that the PH10 added flesh to the bones of the music and made it just that more real and enjoyable. You must bear in mind though that this is not a criticism of the TTP-300 as it ranks highly in its modest price range of £199.95.

I used both my Goldring 1092 mm cartridge and Ortofon Quintet Black mc to compare both types and no problems were encountered with either. The Ortofon won out for greater depth and detail but the Goldring is no slouch.

## AT A GLANCE

**Build Quality:** Excellent solid build

**Sound Quality:** Clear and articulate with good stage depth

**Value for Money:** Excellent value compared to others in this budget range

**Pros:** Hum free and low noise design offering mm and mc.

**Cons:** None really given its price

**Price:** £199.95





# REVIEW

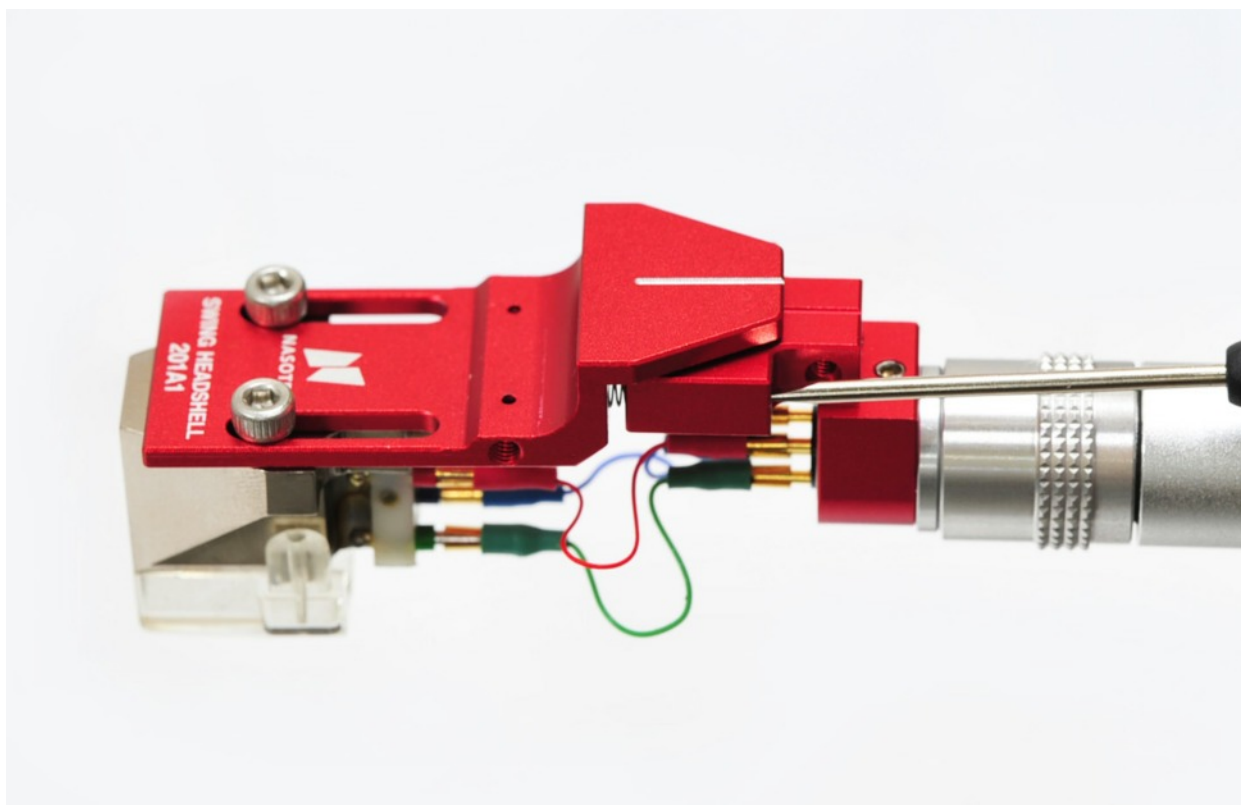
## NASOTEC SWING HEADSHELL



Nasotec Swing Headshell 202A1 is a novel approach to achieving better results from your vinyl replay system. It costs £305 and here Janine Elliot gives it a try for Hifi Pig.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# NASOTECH SWING HEADSHELL



It has been a life-long objective of turntable manufacturers to create a system where the cartridge stylus tracks the record as close as possible to the way the grooves were originally laid. With a conventional pivoted arm this is not easy. At two points on the record the stylus will be perpendicular to the groove, but at all other times, it won't track to grooves in the same manner as the record was created, using a tangential cutting lathe such as Neumann VMS80. At the start and particularly at the end of the record the stylus will track the groove at an angle. Doing so not only means that one leg of the signal will be slightly earlier adding phasing issues, but it also adds distortion and is not so good for the stylus. Luckily tangential arms have been around since Edison's first cylinder player. Models from Harman Kardon, B&O, Revox, Clearaudio and Pre-Audio amongst others, have been a panacea for this lifelong conundrum, however, these can add other flaws that conventional arms don't have to such a degree.

Some have devised other means of tackling the problem, including the famous Garrard Zero 100SB (and which led to their GT55P) Introduced in 1971. This turntable had a dual arm with zero tracking error by virtue of the constantly changing angle of the head-shell as it traversed the record due to the pair of parallel arms. Actually, that was an idea copied from an earlier arm design from another British company Burne Jones from thirteen years earlier. Much more recently this idea has been bettered by Thales. But, no one has yet succeeded in creating a device that can be retrofitted on any turntable using the universal SME head-shell connector. Until now.

What the Nasotec Swing Headshell 202A1 has done is allow the friction from the groove itself to force the head-shell to change angle as it plays. All this comes in at £304.99 and a choice of red, blue gold or black (but no silver). Constructed out of aluminium it is fairly heavy at 11.5g, but ideal for today's low compliance arms and cartridges. Using springs it can change angle fairly easily and comes supplied with Cardas Litz copper connectors, screws, and nuts coloured to

match the head-shell (mine was bright red), Alan key and miniature screwdriver.

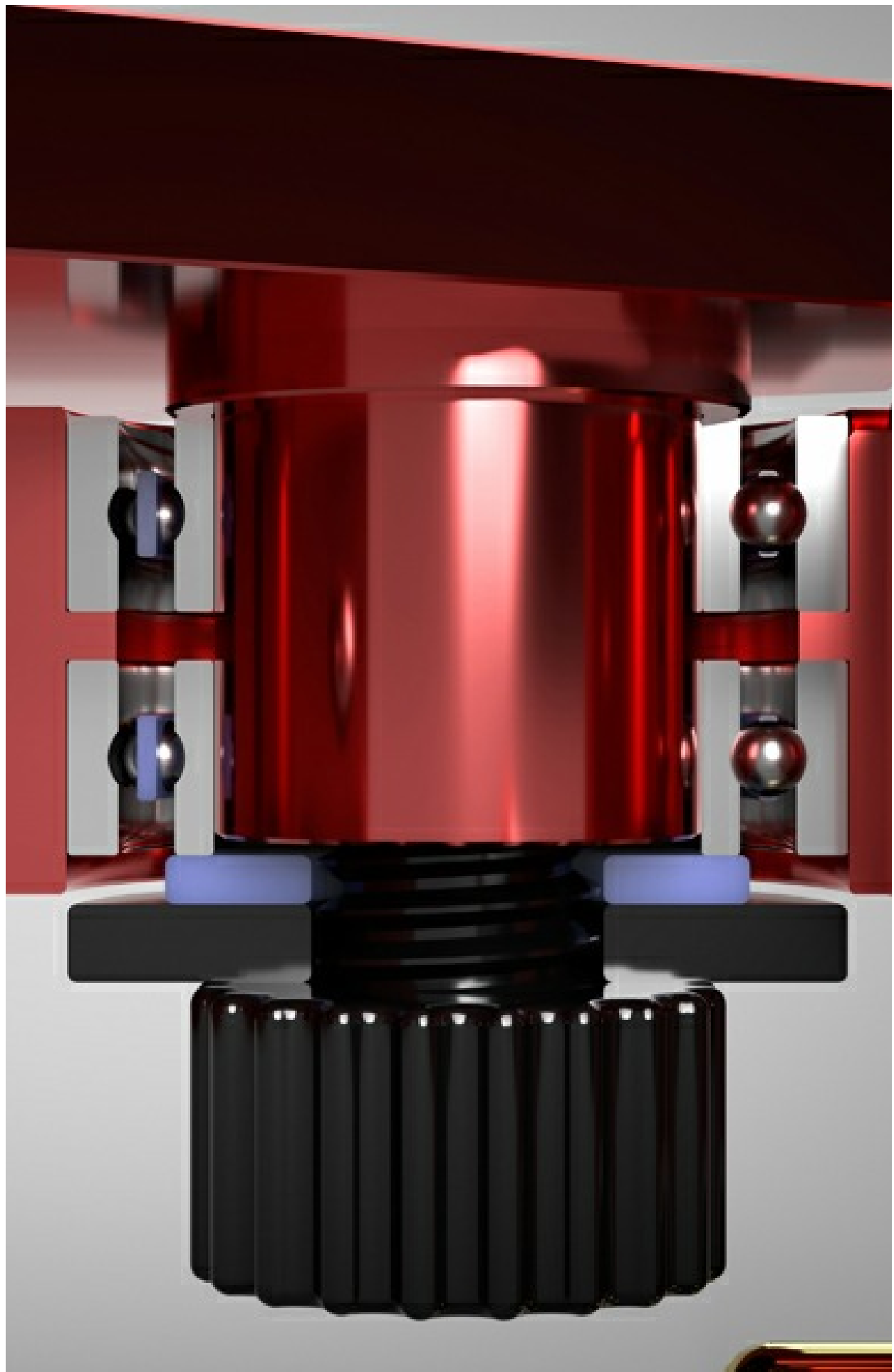
## THE COMPANY

The Nasotec Corporation is a South Korean company run by Dong-Chan Son since 1999. This company sells DIY parts for audio including OP amps, amplifiers, connectors, spike shoes, record clamp, tweezers, headshell alignment block, loudspeaker Binding Posts, isolation spikes and shoes, and of course the Swing Headshell.

## CONNECTING

Connecting the unit did not give any problems and is well supplied with instructions to help you. Good quality Cardas Litz copper cables to connect to the cartridge are supplied and which have different size connectors at each end; the cartridge side is 1.2mm and tonearm side 1.0mm. My designated tweezers came in invaluable as always in these situations. It is important to make sure that the leads are carefully affixed to the cartridge and headshell, as off-centred records will cause a lot of movement of those delicate Litz connectors. I loved the 4 gorgeous colours with matching screws and nuts. I remember my excitement at purchasing an ADC Magnesium headshell back in the 70's, but this one was even more exciting in looks and design. It is supplied with a screwdriver to loosen the springs at the back that control the swing movement. It is suggested that you loosen these before connecting your cartridge, and then tightening it up once you have affixed the headshell to your turntable arm, making sure that there is an equal tension of movement on both sides, otherwise swing movement won't be equal. It is also important that the wiring between cartridge and headshell is not done in a way that prevents movement of the Swing arm. If the cable catches to one side it will give an incorrect movement of the Swing headshell. All this is not so easy bearing in mind the short distance between the pins of the cartridge

# NASOTECH SWING HEADSHELL





# NASOTEC SWING HEADSHELL

and those of the headshell. Fixing the headshell on the arm was interesting as the headshell wobbles about like jelly, obviously intentional but looked entertaining! It meant being careful when lifting the headshell by the handle, so best do it all by the viscous damping lifting mechanism if your arm has it. My initial set-up was the excellent Technics SL-Q2 direct-drive turntable from my youth. The arm is nothing to write home about, but my test was to see just how good the swing action was and connecting my high-compliance 1g VMS20E cartridge would be interesting to see if a lightweight playback would hinder swing movement, bearing in mind it is operated by friction from the stylus on the groove. I connected it to a Creek OBH-15 phonostage and Elliot solid silver connectors to an Earmax headphone amp. Listening on cans I would hear phasing or noise problems greater than with speakers, though later I connected it to Manley phono-stage and the excellent Burson Bang power-amp via MFA Baby Reference pre.

## IN USE

Whilst using the Nasotec Swing Headshell depends on your arm having a universal SME headshell (and there is available a version for the SPU mount cartridges), I realised that the results depended on several other factors. Firstly, the stylus contour and playing weight will affect the amount of drag that will change the profile of the headshell. For that reason, I tested the unit on low and high compliance cartridges. One also needs to bear in mind the record you are playing. Stereo records rely on vertical movement of the cantilever whereas mono discs have horizontal movement, meaning that changes in a horizontal movement will alter the effect of the Nasotec headshell. Also, the result also depends on whether the centre hole of the record has been placed correctly in the centre. Another factor is where the record is being tracked; at the start, the velocity will be greater than at the end of the disc, so the swing will be more effective where the record is traveling with more friction (faster movement). Even the type of record will affect the playing weight of your records (thicker 180-220g could cause the cartridge to play slightly heavier if a very low centre of gravity at the weight-end). Finally, angle of change required by the Swing headshell depends on the size of arm (the smaller the arm the greater the angle of adjustment to ensure 90 degree angle between record groove and centre of record). Dong-Chan certainly has a lot to consider when creating this lovingly engineered vinyl product and I needed to determine whether it was an accessory or a necessity. For my tests I used two turntables; one with a straight arm and one with an S-shaped arm. Cartridges were Ortofon Kontrapunkt b (2.5g) and VMS20E (1g), and an aged Stanton 681 EEE (more on that one later)

Horizontal resonance was reduced in my playing of albums, just as the Trough on the Rock intends to do, though the latter is aimed at vertical resonance. Asia was one of my favourite bands from the 80's, largely because of its links to "Yes" with Steve Howe, plus Carl Palmer from ELP. This album can sound complicated and phasing issues with its thick orchestration. Amazingly all was allowed to play and breathe with greater ease, just as I notice the difference between going from my pivot arm on my Rock 7 to the tangential arm on my Pre-Audio turntable. Top frequencies seemed clearer and better timed, with a tight and well-mannered bass end. Only that the swing itself wasn't as great as I hoped at the end of the record, in that the swing of the headshell wasn't able to cause the cartridge to sit 90 degrees to the radius of the record. But the accuracy of performance was still surprisingly good. I checked this more thoroughly with an old 45rpm 7" disc that runs nearer to the central spindle. This was 'A Walk in the Black Forest' by Horst Jankowski, the intro being the signature tune for my own broadcasting station that I had in my

bedroom as a 9-year-old child. I haven't played it for decades and so it brought back some memories!

Playing my mono Schubert Unfinished symphony (Rudolf Kempe – The Bamberger Symphony Orchestra) – my favourite of all symphonies – the Nasotec working well to cope with the horizontal grooves and my stereo cartridge. However, on all the music I played at 1g the movement of frictional-based 'swinging' was more of a slow waltz, with less ability to travel at that perfect tracking angle consistently across the record than I had hoped, despite some audible improvement in sound. For fun I decided to play a record I didn't mind scratching, 'Rainbow' from Peters and Lee, using an old Stanton 681 EEE cartridge which I ramped up to 4.5g, much higher than suggested playing of 0.75-1.5g. I played blindfold; I just didn't want to listen to it tracking at thrice the suggested playing weight, and not that I was in sympathy with Lennie Peters who was blinded in one eye age 5 in a car accident and lost sight in the other eye when a brick was thrown at him age 16. Some will remember Peters and Lee appearing in Opportunity Knocks. I do. I shouldn't have admitted that. Now, that certainly allowed a much greater swing of the headshell and the amount of swing at both ends of the record was near to ideal. This proved to me that the headshell, if set up correctly, can do fully as its name suggests.

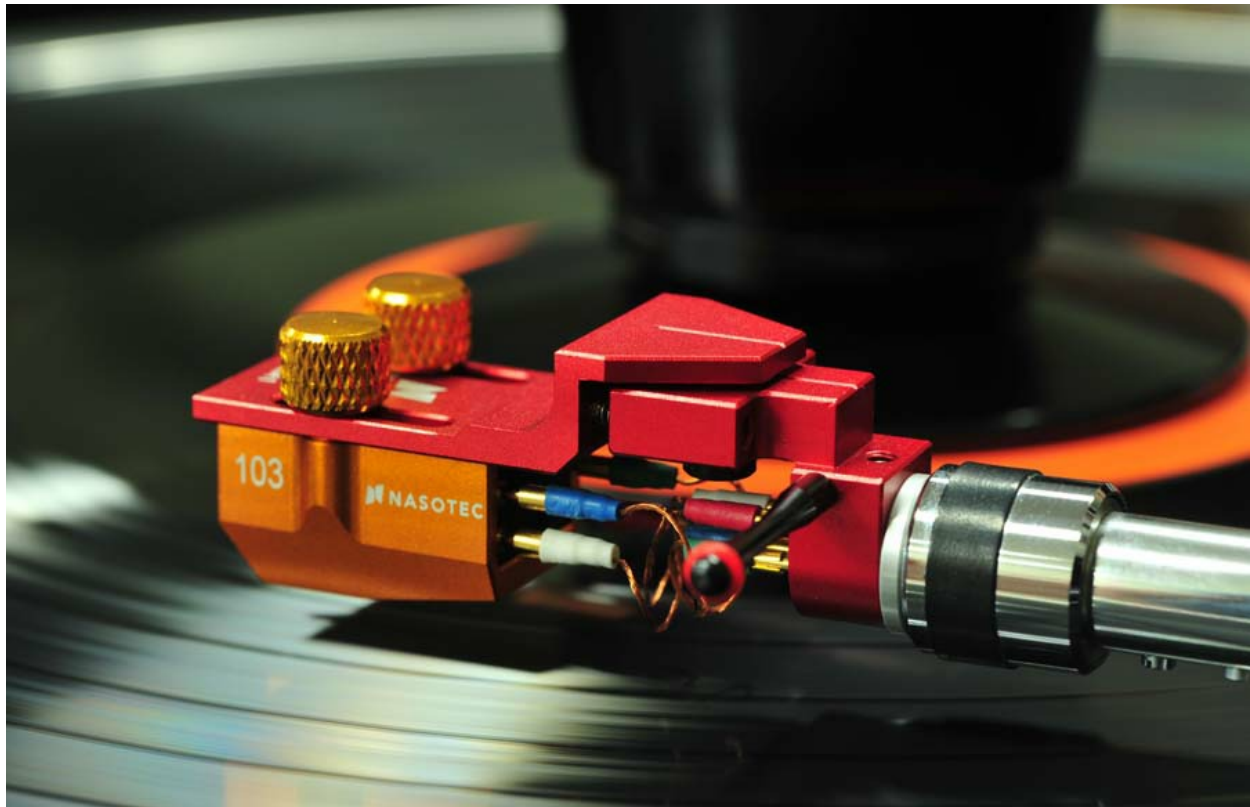
Turning to my Kontrapunkt b tracking at 2.5g the movement was improved on the original high compliance VMS20E. Playing Bowie Legacy thicker 180g records the weight was slightly higher (0.05g) and musically the sound was close to my tangential turntable. I did notice that also adjusting azimuth had an effect on the amount of swing. The ease of movement of the Swing was, however, not as great as I had hoped initially but it did improve significantly as I played during the first few weeks. I did wonder if removing the springs would improve it, though that would bring with it its own problems. I did loosen the springs which did help. The improvement in tracking angle near to perpendicular did mean a much more open and real performance creating better timing and 'air' between each instrument in the soundstage. Also, it meant that a record without the centre hole exactly at the centre would cause the angle of stylus to the record to change very slightly adding slight phasing, BUT it didn't mean so much wow and flutter. My Bowie Legacy double album has a rather large centre hole, meaning the record can be seated badly on the platter and wow like mad with a conventional or tangential-arm turntable! Also, badly seated or incorrectly centred discs can add pressure to one side of the groove, which the Nasotec prevents. Indeed, they claim that there is a longer lifespan of the stylus, equal pressure on both sides of the groove, and of course better tracking ability. Listening to Tonto's Expanding Head Band (on this expanding headshell) with its associated tracking difficulties due to extremes in frequencies from bass to treble, the Nasotec coped admirably, creating a spacious and open sound when the music warranted it. I was quite impressed just how effective this £300 device was in improving the music; much more than I felt when I first set up my ADC Magnesium headshell back in my youth.

## CONCLUSION.

This is a very unique and clever product. £304.99 might seem a lot to pay for a headshell, however, if your arm can fit it and your cartridge warrants the expenditure, then this could be a good investment. When I was young and played my Trio KD1033 turntable I longed for the day I could have a tangential B&O turntable. If the Swing had been round in the 70's I perhaps wouldn't have needed to worry.

## AT A GLANCE

# NASOTECH SWING HEADSHELL



**Build Quality:** Well engineered and good looks

**Sound Quality:** Effectively helps to straighten cartridge close to perpendicular with the groove, pertaining to more focus and improved soundstage of music, reducing phasing and tracking the record almost as it was cut

**Value For Money:** £304.99 is not cheap but helps to replicate a tangential arm at a fraction of the price, so it is good value and unique

**Pros:** Improved imaging. Reduced phasing. More space between instruments.

**Cons:** Wish a greater angle could be possible. Not cheap.

**Price:** £304.99



# REVIEW

## SWEETVINYL SUGARCUBE SC-1



Janine Elliot takes a listen the SweetVinyl SugarCube SC-1, a device aimed at removing the clicks and pops from your vinyl collection and costs £1500.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)



# SWEETVINYL SUGARCUBE SC-1



I first got interested in the idea of scratch removal equipment when a child playing some damaged records and not able to enjoy them to the full. I would record them onto reel-to-reel-tape and manually remove them using a razor blade and splicing tape. In 1978 I was introduced to a very clever click reduction system under development by a major turntable manufacturer of the time, Garrard, their MRM101 Music Recovery Module (in 1979 priced at £130.78). Later employed at the BBC in the record library I was again introduced to this device, copying LPs, EPs, and 78s onto reel to reel tape or cassette for use on air or for producers' offices. However, the limited design technology of the day meant clicks and scratches were never totally removed, especially those below the peaks of the musical content, though it was a brave attempt. It even included a built-in MM phono-stage. This early digital design was being developed by the company at the same time as they were looking into designing players for Laserdiscs, both ideas sadly being dropped almost immediately. Later, digital models by SAE and Marantz bravely attempted to resolve a menacing characteristic that has existed since Edison's first cylinder player. Today, with the use of improved digital technology for processing of sounds things are much easier, and filtering of clicks is common practice on computer-based audio recording software. However, a standalone device for your HiFi has been absent for far too long and I was excited to find out about this American product and requested a review from UK distributors Henley Audio.

SweetVinyl is a Silicon Valley-based company, founded, by Dan Eakins and Leo Hoarty, both of whom have successfully created a number of other hi-tech companies. With a team of staff, Dan (who plays the guitar and races cars) took the idea of SweetVinyl from concept to reality, and Leo (who flies planes) and another gentleman Roger (who like me loves caffeine and music) do the digital designing of the SC-1, and the soon to appear top model the SC-2. Their first product, Sugar Cube SC-1, was first shown in the UK at the end of 2017. Coming in at £1550 the unit has a total of three processors in operation; the first a Linux CPU and the rest developed by them. Indeed, the major work is done with the software designed by them,

using sophisticated proprietary algorithms to detect, isolate and remove only unwanted noise whilst not affecting the musical performance. What makes SweetVinyl SC-1 unique is that it has an updatable database of already understood clicks and pops from which to identify and remove from your damaged LP. Using an ADC (Asahi Kasei AK5572) to convert the analogue signal to digital so that it can be processed, and then a DAC returning it back to analogue (ESS Sabre ES9018K2M) the SC-1 is easy to install, requiring output from your phono-stage (i.e. line-level EQ'd audio rather than the output directly from your cartridge) and then feeding back to your amplifier via a spare line-level input. Alternatively, if your integrated amplifier has a phono-stage section one can connect it via the tape loop or aux in/out sockets if your integrated amplifier is so equipped, or perhaps between the pre and power stages of the integrated jumpers - if it has jumpers. To use the machine you simply need to press a button to initiate the 24-bit/192kHz digital clean-up process, and then turn a dial to adjust the strength of the process from 1 to 10, with "5" being standard setting. It also has a bypass mode whereby a high-quality internal relay isolates the audio signal from any digital process to make sure that you only hear the original audio, just in case you have a perfect LP. Indeed, it is simply connecting the 'in' RCA to the 'out', as it still works whether the SC-1 is switched on or off.

I must be old fashioned in being happy to get up to press buttons, but if you are the kind of person who needs to use their Android/iOS device to see the inside of your fridge or controlling your lights, then these guys have thought of everything so you can operate the device from the comfort of your armchair using LAN or Wi-Fi. Indeed, the unit is supplied with a USB fob and has a socket to connect to your wired Ethernet so that you can calibrate, adjust and switch the SC-1 process 'on' or 'off' from your PC as well as iOS and Android devices, via a downloadable app. The unit is supplied with a 7" record (note it is 33 rpm) from D.r Feickert Analogue for automatically configuring the correct level setting, as well as to 'tune' up your arm/cartridge.

## CONSTRUCTION

The unit, whilst only 54mm high, is actually deeper than its 304mm width, coming in at 350mm including the rear RCA's and front knob. It is carefully manufactured from aluminium, available in anodized silver or black, looking very well thought-out for both looks as well as ease of use. It was good to see it included substantial feet, being metal with rubber O-rings, though I would rather have seen more rubber. It uses good quality chassis-mounted, gold-plated in/out RCA jacks with the on/off toggle switch on the rear plus socket for an external AC power adaptor, two USB2 and RJ45 LAN sockets plus a 'pairing' button to connect with your Android/iOS device. At the front are the "bypass", "Click Remove" and "Click Mon" buttons with indicators so you know when they have been pressed. The latter allows you to just listen to the crackles on their own if you missed them, and to help set up the best amount of processing. Next to these is the very prominent adjust button to select the strength of control of click reduction. On turning on the unit the screen to the right of the knob goes blank for a short while whilst its clever algorithms sort themselves out, but I wished it would perhaps indicate "setting up", "please wait" or even tell me a joke on switch on, as the first time I turned it on I did worry that the review sample didn't work! The user manual is not helpful in this respect, concentrating on showing you how to connect to your hi-fi and setting up the Wi-Fi and Ethernet. There is nothing to help you set up the device, though I worked out that it was best to use the enclosed 7" LP, playing side-one 3.15kHz (-10dB) tone on first use of the unit so that the electronics are optimised from the output of your phono-stage. This record is also handy for checking out wow and flutter, crosstalk and phase. After a minute and 10 seconds, it all came to life telling me it is "SweetVinyl". Phew. I wanted to set it up initially as if the user didn't have the ability or desire to connect Wi-Fi or Ethernet, though I did the latter options later in my review. It can be done either way; setting up via iOS or Android gives you the option to "calibrate" on the main screen of your device, so perhaps a pushbutton for "calibrate" on the front panel of the device would be useful. Once you have done it for the first time you won't need to do it again unless you use a new cartridge or phono-stage. If you do use it connected to the Ethernet it will automatically update the drivers to improve the performance as new algorithms become available, particularly for computer sounds which can look like crackles and pops. Nice one. Their more expensive model SC-2, at around £1000 more when it comes out later in the year, will allow you to play and save your LP onto 192kHz/24bit external storage, and the Android/iOS app automatically tags metadata as you are recording the LP, including track splitting, somewhat like the Convert Technologies Plato system I reviewed in 2016.

The design is far superior to noise and click removing software from the 20th century, such as DNL, Dolby B and C, which simply work on specific frequencies to reduce the offending material, and the digital 'peak detecting' Garrard click remover. Very simply put, the SweetVinyl "algorithms" identify the clicks and pops before you would get to hear them, and then removes that section via it's known database of pop/click symptoms, and "edits" the sound either side of the 'gap' that would have arisen, and smooths the join. A bit like clone stamping in photo editing to remove moles and wrinkles, and indeed, how I removed offending sounds as a sound engineer at the Beeb. As Dan, from SweetVinyl informed me;

"The SugarCube algorithm instead of identifying frequencies or bands of audio with problems looks for events in the time domain and then corrects the audio to remove them by interpolating the slope of the preceding audio. These repairs are so small and distinct that humans

can't perceive them and is actually how a sound engineer would remove them manually".

Generally clicks and pops have a quick transient and easy to identify on a computer screen for you to remove them, as they look so different to longer musical and vocal interjections, but percussion instruments such as the rim of a snare drum and digital drums have very quick starts and not so easy, perhaps, for a digital algorithm to identify, though in my testing the algorithms on the SC-1 weren't confused in any way.

"Clicks and Pops are distinct from music in that musical sounds typically have an attack and decay that look quite different over time than clicks and pops. (Music has repeating patterns while clicks and pops are isolated impulses that stand out in duration and strength.)

Our algorithm hunts in real time for candidates to repair and then applies pre-defined rulesets on these to make sure they are not music. This is pretty straightforward for most instruments - but some things can look like clicks and pops. For instance; a drumstick on a drum rim, a muted horn, where the attack and decay are roughly symmetrical. We have identified many of these and update the software rules as we find corner cases".

Indeed, I decided to use good quality percussion based LPs in my reviewing to see if they were affected in any way. Dave Brubeck's 'A Cut Above' direct cut disc has some great percussion from his son Dan. Listening just to the "Click Monitor", all I heard was a few scratches and no drumsticks. When setting up the ideal setting for your LP it is useful to listen just to the crackles, so you can adjust it to not include anything other than a clear undistorted click, pop or crackle. I also listened to complex synthesiser music with square waves that have sudden transients similar to crackles to see if that confused the unit. It didn't!

## SOUND QUALITY

I was a little worried that after praising analogue vinyl over the years above digital replay systems I might find this 192kHz/24bit crackle crunching contrivance somewhat of a disappointment, but actually, the overall quality was surprisingly good as I attempted to scratch the surface of this hi-tech tackle. My first listening was to After the Fire 'Laser Love' album from 1979 complete with many squares and saw-tooth waveforms from the synthesisers, as well as electronic drum-sounds that can look like clicks on a computer screen. It handled them with surprising ease and even set to "REPAIR - 10 max" none of these waveforms get missed.

Next, I listened to albums that I knew had lots of annoying crackles. Firstly was my copy of David Bowie's final album 'Blackstar'. Where side 1 is totally clean the second side starts to sound bad after the first track. I did take the LP back to my local HMV shop and exchanged it, but even the replacement suffered. The SugarCube can do great things but not miracles. The SC1 could remove the odd crackle, but not the constant bed of noise that so spoils my listening on the right channel. Only EQing the audio would mask some of that. Turning to Saint Saëns Piano Concertos 1,2 and 3 (Aldo Ciccolini, Orchestre de Paris EMI), the openness in much of this lovely album is so spoiled by clicks and pops, and the SC1, set at the nominal "default" level of 5 carefully removed all of these, creating an as-new record with no hint of change to the musical performance. With 192kHz processing, the frequency response from the Audio Technica AT33sa cartridge wasn't hindered in any way. The included SC-1 manual quotes 15Hz - 80Hz (-3dB), missing out the very important "k" in the higher frequency range, though 80kHz will be more than you

# SWEETVINYL SUGARCUBE SC-1





# SWEETVINYL SUGARCUBE SC-1

will need and not far from the Nyquist requirement of removing everything at or above half the sample rate. Only the 24bit ADC/DAC could cause some concern from die-hard analogue fans. However, in my reviewing never did I consider I was losing out listening to the music, and only A-B comparison occasionally gave me hints of slight change, something you shouldn't do whilst relaxing to your music! In some music, the very deepest bass sounded slightly attenuated. I was very impressed with the processing as well as how quiet the unit was in operation. Only on widely panned music did I perhaps hear a slight narrowing of the soundtrack. That is my only real observation. However, in some of my listening, I noticed a much more controlled and musical mid-range, slightly more prominent actually making me feel that the presentation and dare I say musicality, improved.

Turning to one of the first records I was given as a young child learning the piano, Grieg's piano concerto played by Maura Lympny, someone who I actually got to meet before my teens, this record is mono and nothing is more annoying than listening in mono with stereo crackles. OK, I could switch my Manley phono-stage to "mono", but that would mean getting up off my chair. With the SC-1 all the interference was removed, just leaving the background noise of the recording itself. What could have been assumed as a very slight reduction in the very top end was actually the fact that violins were sounding clearer and more forward in the soundstage. Using the device switched to "Click Remove" creates a very slight delay in audio due to the digital processing required, which meant lifting off the stylus at the end of the playing continues for a few milliseconds, and which I found entertaining!

Listening to the excellently engineered Dave Brubeck 'A Cut Above' album and the track "Forty Days", the music starts with a very quiet ambient piano. With the SC-1 switched in I could now just concentrate on the music rather than the occasional crackles. The wide soundstage of the drumming that then joins in is slightly narrowed but lower bass was still as strong and the top ride cymbals sizzled away with no loss of top. Rachmaninov 2nd Symphony (Previn and the LSO, EMI) has a beautiful slow movement including luscious clarinet solo which was slightly more forward and improved my listening experience. Only the fact that a really bad scratch on the record that caused the music to continually repeat the same groove without the offending "pop" being audible, and sounding rather Steve Reich' minimalism, I wondered if my stylus might get damaged if I were to continually play really bad records and not be able to hear that they were really too bad!

Mark Williamson Band "Get the Drift", recorded in May 1980 was next on the list. This album sounds like it was recorded over a very short time, though I do love the Yamaha CS80 and PolyMoog synthesisers. This album tries but is not exciting at the best of times, one reason I played it, and also because it has a lot of scratches and wide soundstage. This was a band trying to sound "fashionable" but failing in my view. The music has lots of phasing and the SC-1 very slightly reduces this as it becomes marginally more central. What very little excitement there is in the music is very slightly lost in the process. I am not trying to belittle what the SC-1 can do, as I very much enjoyed using it, and the fact that the algorithms are able to be improved with a connection to the Ethernet makes this product even more desirable.

Finally to be played was one of the favourite groups from my youth, Supertramp 'Breakfast in America', and I am happy to own a demo version sent out to important broadcasters and reviewers just after being recorded in 1978 before being released the following March. Unfortunately, my copy has been well played and played-about-with by all accounts judging by the scratches on it, particularly side two. Luckily the SC-1 could turn it into a brand new record. Unfortunately, I

did notice the top end wasn't quite so bright and whilst Roger Hodgson's incredible vocals were clearer I did sense the music as not being quite so brilliant, including a very slightly reduced bass. Levels were matched exactly between no-processing/processed, something I made sure during my review, but it just didn't quite sound so energetic and the stereo width was slightly narrower. I found this latter point puzzling in my testing because a phono cartridge itself has only ~35db channel separation. However, one has to sum up the pros and cons, and I quickly came to the conclusion that the SC-1 would be the very best investment for my record collection.

## CONCLUSION

Would I want to suffer playing vinyl through a 24bit DAC to get brand spanking new playout? Absolutely. SweetVinyl has hit upon a problem that no one has successfully remedied and come up with a product that magically maintains the analogue performance, particularly vocals and violins, and gets rid of those horrible pops and crackles with virtually no detriment to the overall musical performance. Indeed, some music actually sounded better. And, for those virgin LPs that don't need any processing, well, you can just switch off the digital technology.

## AT A GLANCE

**Build Quality:** Well made, all aluminium construction and good use of components such as ESS DAC and gold plated RCAs.

**Sound Quality:** Whilst most of the music I played was as good as the original source, some complex music very slightly narrowed the soundstage. Some vocals and mid frequency instruments actually sounded warmer. Surprisingly good for 24bit/192kHz.

**Value for Money:** Priceless if you value listening to your records without the interruption of pops and clicks.

**Pros:** Improves your scratchy records admirably. Doesn't make records sound "digital". Has a defeat switch for you to use without processing.

**Cons:** Can very slightly narrow soundstage on some records. I wish the front panel button was a push-button to allow users to configure easily without using your phone/tablet. The manual needs improving for set-up

**Price:** £1550



# REVIEW

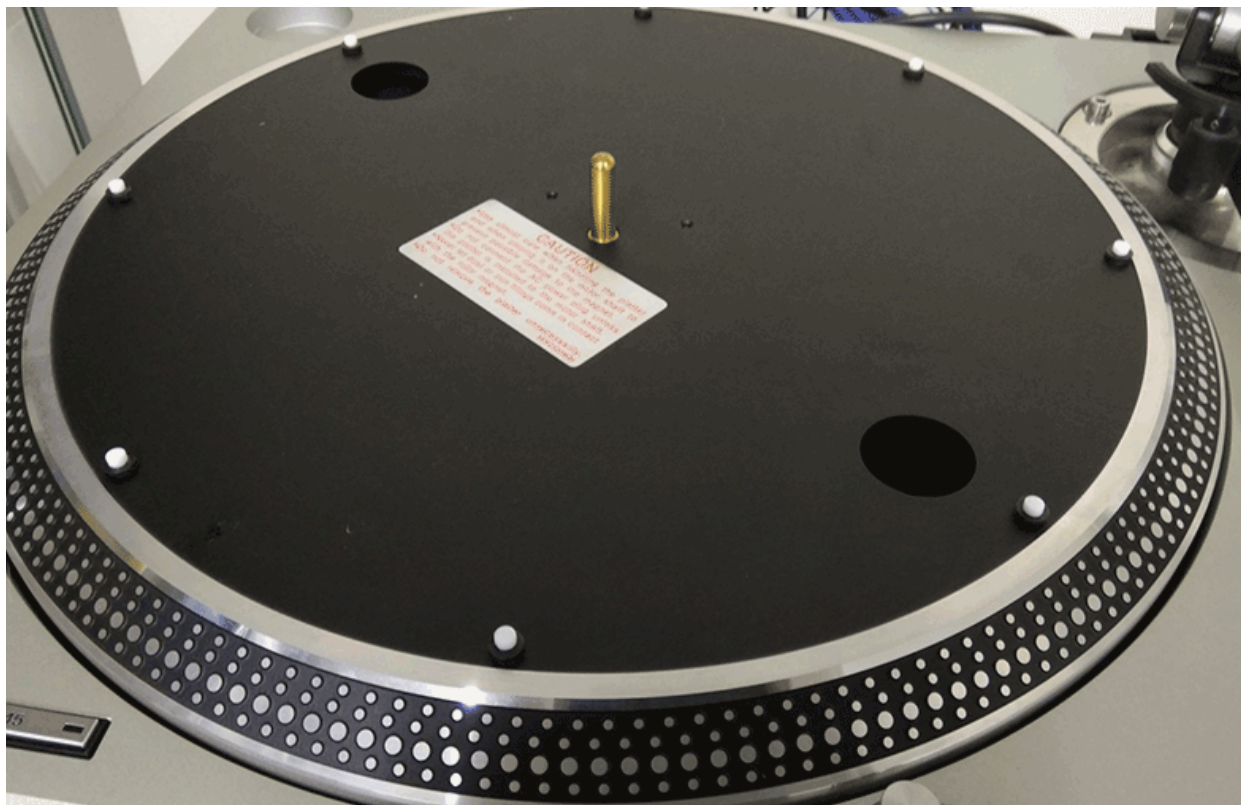
## MCRU PRESSURE POINTS



Eight little feet that sit around your platter and which your record is placed on from English company MCRU and costing £24. Janine Elliot takes a listen.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# MCRU PRESSURE POINTS



David Brook is a passionate audiophile and retailer working up North in Huddersfield, UK, who also dabbles in his own additions to the HiFi chain such as cables and rubber feet. He recently presented me with a CD at the Munich show containing eight minuscule pressure point rubber feet stuck on the surround of the disc sourced from a local charity shop. These were to be transferred on to my platter. The idea of these £24 additions is to minimise contact with the record (and therefore the platter), forming isolation from rumble, something tackled by a number of manufacturers in the past, such as Michael Gammon at Transcriptors with their Hydraulic Reference and Skeleton turntables. These feet contain two plastics; the rubbery black base that sticks at 8 regular distances around the circumference of the platter with more malleable white rubber tips which the record sits on.

I own a Hydraulic Reference which I always felt lost much of the detail from the music in the bass end, compared to my conventional platter Garrard 301, for example (using same arm/cartridge). So I was rather worried about trying David's Pressure Points. However, I didn't need to be so concerned.

## CONSTRUCTION

The 8 feet were to be placed at equal points around the periphery of the platter. Where the Transcriptors decks had points of contact recessed to allow playback of 7" discs as well as to prevent drooping of the record at the centre, since my Pre Audio turntable relies on a record clamp I had to be careful to ensure the disc was kept flat. However, having 8 points of contact around the record edge does average any warping of the disc if you have badly deformed records. The base of the feet is a gel-polymer with the white tip of harder material and of a specific size and shape and is totally non-abrasive.

Sometimes simple new ideas based on old creations can be the best, such as Missing Link's invaluable Dust Buster stylus cleaner using a similar technique as the old Nagaoka record cleaner, so I was

particularly keen to see if this idea based on isolation feet would work with my turntable. At £24, the cost of a decent remastered LP, this is a cheap addition to your turntable and definitely well worth trying out.

## SOUND QUALITY

I must admit I was quite sceptical trying this out. One turntable I tried didn't give me the results I had hoped for, and I couldn't use it on my Rock 7, as you place the records straight onto the platter, but then testing on my Pre Audio tangential arm set up I was quite surprised just how good it all sounded. I first decided to play Saint-Saens Piano Concertos 1, 2 and 3 (EMI, Aldo Ciccolini, Orchestre de Paris, conducted by Serge Baudo) an LP with very forward strings that can sound quite penetrating. The feet allowed more of the detail around the strings to make its way to me allowing me to hear more of the bowing as well as details from other instruments, including a widening of the soundstage.

Turning to Patricia Barber 'Live in Paris' album the amount of increase in detail was quite obvious; the speed of percussion and closeness of the voice made for more enjoyment of this album than I would normally get. This was no Peter Belt moment. Whilst his particularly non-traditional range of accessories of electret cream, Rainbow Electret Foil, and Morpheic Paper Clips didn't make an iota of difference to most people's living-room, rather only their minds, I felt this more standard device did. For a start, it removed that link between the turntable motor and the record, a problem that is tackled by any manufacturer worthy of note. My turntable has three illuminated platters placed on top of each other with small ball bearings joining them, so I didn't think the Pressure Point Feet would make a difference. However, there was still a loss in level from the motor, even with the puck carefully screwed in at the centre of the record; the Pre Audio turntable is very quiet in operation. More importantly, there was no loss of bass, it was just tighter and clearer. With ride cymbals, even my cat sat up and listened at the improved



# MCRU PRESSURE POINTS

speed and accuracy. There was increased clarity at the ends of piano phrases, particularly when notes from the close mic'd piano were ending and the damper hitting the strings to deaden the sounds, all adding resonances. The third song "Crash" was decisively punchy. Sometimes it can sound rather disturbing if you just want a relaxing listening session. The MCRU feet allowed me to get closer to the music and join in the fun Patricia and her musicians were obviously having.

Turning to a very awful record in terms of audio quality and production (just listened to Justin Hayward's awful double-tracking of his voice in "Forever Autumn") I played the start of Jeff Wayne's 'War of the Worlds' based on the book by H G Wells with Richard Burton opening in spoken words and the dated music containing synths and drum machines played the famous opening track. Not much delight, but when I switched to MCRU feet there was not only better musical timing leading to a greater excitement but also a more mellow string section and more musical synth flute passages. The spoken words at the start were clearer as well. Turning to Eagles 'Long Road out of Eden' title track on disc 2 the mysterious wind and bass start with Indian woodwind more controlled and the bass drum was tighter. I did lose some of the overpowering bass that was certainly evident with my standard cork mat. The bass end was now clearer and with more excitement using the Pressure Points Feet, but I did notice slight recessed lower bass that might concern those liking power in the bottom end. Finally I turned to one of my favourite discs that I know has a great bass and bass drum, the group Love Song and "Feel the Love", and whilst the overall spread and detail and speed was noticeably improved I did feel the bass was more recessed and whilst it was all there it didn't stick out as it did using my cork mat.

## CONCLUSION

Whilst David Brook has made the Pressure Points Feet removable I will certainly keep them on my turntable for now. At £24 this is a really cheap improvement in the presentation of the music, particularly speed and dynamics which worked well on my turntable and may well work on yours, too. Just remember that lower bass end might sound recessed though more controlled.

## AT A GLANCE

**Build Quality:** Good adhesive base which allows it to be secure on your platter and removed without problem. Two different plastic materials, and doesn't look cheap despite their diminutive size.

**Sound Quality:** Increased detail from the music including the positioning of instruments in the soundstage, tighter at higher frequencies and improved speed of the bass.

**Value for Money:** At £24 well worth checking out to see if it improves your music

**Pros:** Tighter and clearer soundstage. Can be removed if necessary

**Cons:** Will mean you cannot play 7" discs if placed at the rim of the turntable. Perhaps 9 feet would be better (6 placed at rim and 3 inside for 7" discs). The controlled bass end might sound too recessed depending on turntable design.

**Price:** £24



# REVIEW

## KIRMUSS AUDIO KA-RC-1

### ULTRASONIC RECORD RESTORATION SYSTEM



Linette Smith gets into the groove with the Ultrasonic record cleaner KA-RC-1 from Kirmuss Audio.

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# KIRMUSS AUDIO KA-RC-1 ULTRASONIC RECORD RESTORATION SYSTEM



Having encountered the Kirmuss team at Hifi shows, including at Cranage this year where they were demonstrating their machines abilities on visitors' records, and also spectacles, we were very keen to give their Ultrasonic Record Cleaner a spin. Kirmuss Audio are based in the USA but the international versions of the machine are available from their authorised dealers and distributors globally. Our review model was supplied by Kirmuss Audio Europe, based in the UK.

Cleaning records is something that nobody really likes doing, but it is essential to preserve your vinyl and also your cartridge. We buy a lot of second-hand records and I have also recently rediscovered some of my records from my teenage years..records that have only ever been cleaned with a spritz of WH Smith's record cleaning fluid in years gone by, and that have been festering in their sleeves for the last 30 years. The ultimate test for the efficacy of any record cleaner though has to be the dreaded 'DJ' records. Stuart was a club/radio DJ in the early 1990's so records from this era would surely show how well a cleaning machine works. I decided to rootle out some of the filthiest that I could find to see if the Kirmuss machine could revive them.

Everyone has different methods of cleaning records, from spraying and wiping, brushing, painting them with PVA glue and peeling it off, to buying machines that cost as much as a decent turntable to wash and Hoover the grime from the groove. We once encountered a second-hand record dealer who swore by cleaning vinyl with Pledge furniture polish, I would say that is one to avoid, don't try this at home kids!

## HOW THE ULTRASONIC METHOD WORKS

The system controller generates high frequency ultrasonic waves oscillating at 35 kHz, from three strategically located generators on the bottom of the machine. These waves then pass through the distilled water and 70% Isopropyl alcohol mix in the bath, creating

cavitation which leads additionally to the generation of microscopically small bubbles. These micro-bubbles burst when they come into contact with the surface being cleaned. This collapsing action dislodges, then pushes the contaminants away from the surface of the material being cleaned. Additionally, gentle heat also aids in the cleaning action.

## UNBOXING & WHATS INCLUDED

The machine arrived well boxed and with everything included to get going other than 6 litres of distilled water and 40ml of 70% Isopropyl alcohol per bath. You also need a spray bottle with distilled water in for rinsing. I would also add that you need to buy yourself a stack of new record sleeves, we have plenty of MoFi Original Master Sleeves, basically the last thing you want to do is spend time cleaning a record and then put it back in a dirty sleeve. The water can be picked up easily at the supermarket and we ordered the IPA online. Full instructions and a quick start guide are also included. At first glance the machine looks a bit like a printer but is ergonomically designed and easy to pick up with the handles on the top. It has a weight to it but is not overly heavy. There is also a touch screen controller on the top.

The 'lid' part houses Kirmuss' Patented Record Suspension System where records of different sizes are dropped into slots. It spins the records in the stainless-steel bath which holds the cleaning liquid, without getting the labels wet.

The records are spaced for optimal cleaning and you can clean two 33/1/3, one 45 and one 78 at the same time. One 'bath' will clean 15 to 20 records.

The accessories all seemed to be high quality and I liked the cheeky touch of the Rabbit logo. You get a mains lead, draining hose, combination carbon fibre brush/para-static felt brush, anti-bacterial/anti-static surfactant spray (99% distilled water and 1% diol2



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propyl), stylus cleaning kit, opticians microfibre cloth, 7" felt mat, camel hair brush and a rabbit microfibre cloth. The machine has a 2 year warranty.

The only gripe that I had thus far was that the supplied instruction pamphlet is a little 'busy' in its layout and the text is tiny, making it quite difficult to read, this is carried through to the website which again has a lot going on, I would suggest a redesign of both the site and the literature to make it clean, clear and simple and therefore easy to follow.

## THE PROCESS

There is a very helpful video on the website, I watched it and then outlined the steps below to ensure I followed the instructions to the letter. It all seemed pretty simple, the process is as follows.

Fill the bath with distilled water up to the full mark, the instructions say this will be about 6 litres. Measure 40 ml of 70% Isopropyl alcohol and add. Then plug in the machine and switch on the power switch at the back. The LCD screen will show 5 minutes.

To get rid of bubbles you then press the pulse button twice and the ultrasonic pulse activates to de-gas the mixture. This takes 1 min 36, once done repeat for a second time.

Place the 'lid' with the record suspension system on the top of the machine and connect its cable at the side.

Press the power button twice, the motor starts and then slip in the record. The record will spin for 5 minutes.

After 5 minutes take out the record and place onto the felt mat which is placed on the microfibre 'rabbit' cloth.

Take the bottle of surfactant and apply one spray at each of the positions of 12, 3 and 8 o'clock on the record. With the camel hair brush, lightly brush the surfactant into the record. Turn over and repeat. (Don't be worried if you see a toothpaste like residue on the record).

Put the record back into the machine and run through another 5 minute wash cycle.

Make sure you rinse the brush with distilled water from a spray bottle and brush dry on the microfibre rabbit cloth to clean between each use.

Repeat step 6 again, you will probably see more of the white 'paste' appear. Repeat step 7.

Keep repeating steps 6 and 7 until no more of the white tooth paste like stuff appears, when you don't see the paste at step 6, you just need to do step 7 and then move on. Really dirty records may need 7 to 8 cycles.

Keep an eye on the indicator on the display, if this goes into the red zone and flashes you need to turn off for around 15 minutes and allow the machine to cool down, this is perfectly normal if you are running the machine for several cycles.

Mist the record lightly with some pure distilled water and gently dry with the opticians' cloth. Repeat on the other side.

Wipe the record in a circular fashion with the parastatic felt brush.

Before playing or storing the record, put it on the turntable and set it spinning. Take the clean and dry camel hair brush, spray it lightly with surfactant and then hold it gently against the record as it spins to apply the antibacterial solution. Repeat on the second side.

Then you can either play the record or store it in an antistatic, antifungal sleeve.

## RESULTS

Visually, the results were very obvious. As you get used to the process you soon get a 'feel' for when the record is clean and when you need to keep repeating the cleaning cycle. Of course, cleaning will never get rid of actual scratches in a record, so don't put in a badly scratched disc and expect miracles.

I spent a full Sunday afternoon cleaning various records for my test. Given the filthiness and general DJ battering that the Tresor record in particular had received over the years, I wasn't expecting a 'water into wine' type miracle, however that's what I got. Yes, it took me a long time to get that pair of discs clean, but it was worth it. The sound was like a new record, no surface noise at all. The record also seemed to have a lot less static on removing it from its fresh sleeve and attracted much less dust from the environment. Like I said earlier, I specifically selected records to really give the Kirmuss machine a difficult test, it has gone above and beyond what I expected from it...to say I am impressed is an understatement.

## CONCLUSION

At just under £1200 in the UK the Kirmuss is not really an impulse buy, but for anyone serious about vinyl I would say it solves the cleaning issue very elegantly. If you were very strict with yourself and made sure that every record that you bought was cleaned straight away (even new ones) I am sure that it would prolong the life of both your records and your cartridge. For a professional second-hand record dealer, I would say it would be an essential piece of kit as it does transform dirty records. Once you get a feel for the process it is very, very simple and as it is very 'hands on' you know that your precious records are being taken care of, there is nothing to worry about as you are in complete control and can see what is happening all the time. If the cost was an issue, it is the kind of product that you could club together with a few like-minded friends to buy between you, perhaps record cleaning parties could be the Tupperware parties of 2019.

There are a lot of record cleaning solutions out there but for me, carrying on trying different methods now would just be a false economy. You buy the machine once and then all you need to buy as you go on is distilled water, 70% isopropyl alcohol, fresh sleeves and more surfactant (available for £19.99 a bottle from Kirmuss who say that one bottle will clean 100 – 150 records). The Kirmuss system should not be seen as simply a record cleaning machine, it is a professional grade archival system that has been made affordable to anyone wanting to preserve or restore their vinyl collection and as such thoroughly deserves Hifi Pig's Outstanding Product award.

## AT A GLANCE

**Build quality:** Feels very 'professional' and high quality. Looks serious and fit for purpose.

**Ease of use:** Quite time consuming, especially for a very dirty record, however, the process is very simple and once you pick it up, becomes



# KIRMUSS AUDIO KA-RC-1 ULTRASONIC RECORD RESTORATION SYSTEM



like second nature. It is actually quite a relaxing way to spend an afternoon!

**Value for money:** Comes with everything you need other than the 'bath' liquids, spray bottle and new sleeves so you can basically get going straight out of the box. It is a big investment, however will be something that once you have bought you would stick with and use forever. I can't see myself bothering with trying other methods now as this does exactly what it says on the tin.

**Pros:** Video is much easier to follow than the supplied written instructions or website. The machine is not silent when the motor is running, but is a lot less noisy than machines that 'hoover' up the cleaning liquid. The ultrasonic bath can be used to clean other things such as jewelry, glasses etc (using a basket adaptor that is available for £47.99, or by holding your glasses in the bath). When the records are clean, they are REALLY clean. You feel confident in the fact that it is not doing any damage to your records.

**Cons:** Literature and website are difficult to follow and read, a bit of a case of 'too much information' rather than the simple steps you need to know.

**Price:** EU price £998+Vat, USA price \$850.

# REVIEW



## ISOTEK SUPER TITAN AND GENESIS MAINS CONDITIONER AND REGENERATOR



Is messy mains mucking up your Mahler? Richard Stevenson turns main conditioning and regeneration convert with Isotek's eye-wateringly priced flagship EVO3 Super Titan 20A (£9 995) (A super Titan 32A is available at £11 995) and EVO3 Genesis (£18 495) models. Is £28 500 a buck too far for perfect power? Probably not...

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# ISOTEK SUPER TITAN AND GENESIS MAINS CONDITIONER AND REGENERATOR



## CONSTRUCTION & FEATURES

You know a piece of audiophile equipment is 'serious' when it arrives on a pallet pulled by a middle-aged man with a face puce from the effort. In fact, I struggle to think of many audio components that qualify quite as mind-boggling 'serious' as Isotek's flagship mains conditioning system, the EVO3 Super Titan in top-spec 32A output guise and the EVO3 Genesis. To you sir, £28 500. Gulp.

The Super Titan is also available in a slightly lower-output 20A guise for systems with less current thirsty equipment, saving you £2,000. While we were rummaging through Isotek's jewelry box, we also borrowed a Corvus 8-way mains distribution strip at £695, and an EVO3 Ascension mains cable at £3,000 for the 2m length. I am going to have to open a really fine wine to complement this review.

The 32A EVO3 Super Titan is probably the world's most powerful mains conditioner, boasting the capability to supply 7,360W of continuous power to its four outlets. For the UK version, these are 3-pin UK mains configured although 110v US and 220v Euro versions are also available. The rear panel also houses two heavyweight RCD breakers and looped in/out 20A connection to supply another Isotek component such as the Genesis.

On the inside of the Super Titan, Isotek eschews isolating transformers in favour of four seven-stage filters in a series-parallel combination in what the brand refers to as its Direct Coupled Design. Additional circuits reduce crosstalk and improve isolation between components attached to each outlet. The result, says Isotek, removes both differential and common mode noise, improving sonic clarity and definition, without restricting the transient ability of the current supply.

The Genesis is a high-current mains regenerator. This creates a clean 50Hz synchronous sine-wave and amplifies it to 230V RMS with a high-end design Class A/B amp and enough reserve to supply a 300W demand. Two such generators are built into the Genesis,

delivering 300W + 300W across two groups of two 3-pin outlets. Various decoupling techniques are deployed to ensure no distortion or artefacts from the original incoming mains are present in the buff-new outlet supply.

The Super Titan and Genesis share a very similar anti-vibration chassis design, with the Genesis sporting more ventilation for cooling its amplifier sections. The chassis design is a heavyweight, extensively milled aluminium box, point-clamped between two laminated panels. These are 8mm thick Corian plates with a proprietary resonance damping layer in-between. The Corian laminates are themselves supported by four hefty aluminium pillars on stainless steel spikes.

Isotek refers to this as Independent System Isolation Support or ISIS. Its purpose is two-fold. First, it claims to reduce the effect of airborne vibration and microphony, subsonic vibrations and resonances within in the device itself. Secondly, its shape, strength and resonance-damping abilities provide a superb platform on which to place other components up to 20kg. The design also means the Super Titan and Genesis can be stacked.

The idea of holding a £10k of very heavy and seriously spikey audio component above £20ks worth of polished Corian and finely finished aluminium, while trying to line up the spikes into the receiver cups, seemed like an Only Fools and Horses sketch waiting to happen. I bottled out, keeping them side by side on the floor using spike cups to protect the soft-wood covering.

Interestingly though, I latterly tried an all-analogue pre-amp sat directly on top of the Super Titan's upper Corian plate. The effect compared very favourably with some of the best isolation platforms I have tried even if A: that wasn't exactly Isotek's intended use for it and B: it looked rather odd.



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The front fascia panels of the two units vary in cosmetic design and, rather more annoyingly, colour of their respective display and indicator lamps. The Genesis has a quite vivid blue display to show the Isotek logo plus instantaneous Voltage, Distortion and Current draw for each output group at the touch of a fascia button. The Super Titan has a non-illuminated logo and four blue LEDs that are a marked colour hue difference from the blue of the Genesis display. That irks my Hi-Fi OCD.

The units were supplied with Isotek's Intense mains cables and Evo 3 Optimum link cable, all terminated with top-end connectors up to the high current task. You plug the Super Titan into you mains and use a second Intense cable to loop into the accessory input. That then supplies clean mains to the Genesis via the Evo 3 Optimum link cable. You can of course power up the Genesis directly from your wall-socket mains if the Super Titan wasn't on your shopping list.

Powered up there is a few seconds boot-up time before you are ready to go. Hefty current draw units like big Class A power amps are connected to the outlets of the Super-Titan, while lower demand source equipment should be connected to the Genesis.

## PERFORMANCE AND SOUND

Thirty-something years of Hi-Fi pursuit and I had barely given mains power a second thought until a few years ago. Given the huge power supplies and stepped down voltage of most audiophile components, I didn't think 'mains conditioners' could make much difference. Some early mains conditioning filter units I tried actually made things worse, flattening dynamics and detail. I was a mains-conditioning sceptic.

Then the distributor of PS Audio turned up with some power amps to review and left a Power Plant Premier (PPP) mains regenerator to try. Long story short, it worked. I ended up buying two PPPs' for my system, feeding source, amplification and even a cinema projector, all of which benefited from subjective performance improvement. Sadly, they were purchased in an era when PS Audio was having quality issues, and both units were eventually resigned to the scrap heap after several failure and repair cycles.

Probably no surprise then that the Super Titan and Genesis combination blew me away. It really is quite incredible improving the subjective performance of pretty much any audio component connected to it. And I am not talking notional Hi-Fi n'ths here. With source components in particular, there can be a dramatic uplift across a broad range of perceived performance criteria, most noticeably in the spaciousness of the soundstage, cleaner less-gritty top end and reduced high-volume listening fatigue. I will go into more detail, but let's look at a 'why' first.

Back when I first got hold of the PPP's one of the main reasons there was such a dramatic performance improvement in my system transpired to the quality of the incumbent mains supply. Or rather lack of it. The same is just as true today. Living on a farm in rural East Sussex with miles of aged and tree-chaffed overhead power cable supplying the entire village, what we get is barely within the government's legal framework. 255volts in the dead of night is not unusual and 215v is equally common when the entire village makes tea after Eastenders.

Quality is even worse than the voltage with regular flickering, pulsing, current dips, surges and the 50Hz wave coming with THD between 3% and a staggeringly grim 10%. There are phase errors, frequency deviations and equipment on neighbouring farms punt a whole load of harmonic currents into the mix. There is clearly a lot of room for

improvement. The Super Titan / Genesis combination makes the most of that potential.

According to the display on the Genesis, during the first test (an innocuous Sunday afternoon) it was receiving mains at 238volt and 4.1%THD. Output voltage measured within 1 or 2 volts of 230v every time we got the meter out over several weeks. Push one of the two buttons on the fascia and a snapshot of the current draw and output THD for each block of two outlets is shown on the display.

Output THD was low. Very low. It ranged from 0.08% attached to just a very small load from a pre-amp (20w) up to 0.4% THD supplying a big Class A/B power amp drawing 200 Watts. Even supplying a heavier load to multiple components, that is a 90% reduction in mains supply THD. For lighter loads such as source equipment, the improvement is upwards of 95% and a staggering 98% in our first test running the pre-amp alone. If your mains is bad to start with, the Genesis will absolutely deliver performance gains from any audio equipment attached to it. No question.

Set up started with the Super Titan supplying bi-amped Sony TA-N1 power amps and the loop input for the Genesis. The Genesis fed a NAD Masters M50.2 streamer and M12 preamp, Michell Orbe PSU and Primare R32 photo stage. Straight off, the difference is palpable and expensively addictive.

The system sounded bigger, more engaging and it polished the occasionally harsh charter of the horn-loaded compression tweeters in the Westminster Royal GRs. Nils Lofgren's Keith Don't Go live (CD via streamer) sounded notably more spacious and 'live' with ambient details of the venue and audience playing a greater role in the mix. Nils's aggressive playing had all the bite and attack you could ask for yet felt more natural and less 'engineered'. The result was a desire to go large with the volume for real live concert SPLs rather than back down when the notes get aggressive.

Switching to vinyl, there was a notable upgrade in performance across the board. While the Westies trade a good deal of absolute accuracy for the ability to image like few other speakers on the planet, the clean-mains fed Orbe/R32 seemed to gain even greater space between instruments allowing more thorough articulation of the notes. This was most starkly obvious on piano, with Elton's John's version of Candle in the Wind (from Goodbye Yellow Brick Road) sounding incredibly natural and expansive.

The Isotek system also made me realise the Westies might not have been the only facet responsible for my vinyl systems often 'colourful' presentation. A romp through the superbly remastered Led Zeppelin Mother Ship boxed-set turned into an engaging, foot-tapping, head-banging evening. Both Page's guitar and Plant's vocals sounded more natural and realistic that I have ever heard them on my set-up. Again, the lack of grain at the top end really urges heroic use of the volume knob and, before the evening was out, sheep three fields away from the house were nodding along to Whole Lotta Love.

Given the Genesis's prestigious output I tried a strip-down system using the regenerator alone. Plugging streamer and preamp one side and one of the TA-N1 stereo power amps the other gave a High Res Audio streaming set-up running on fully regenerated mains. Touching 250Watts on the power amp side, the Genesis didn't break sweat although a very quiet fan did engage internally to keep things cool.

The effect was sublime making me debate the benefits of a Genesis and single power amp over bi-amping with straight-out-of-the wall mains. Arguably the Genesis system had greater detail and certainly

ISOTEK SUPER TITAN AND GENESIS MAINS CONDITIONER AND REGENERATOR



# ISOTEK SUPER TITAN AND GENESIS MAINS CONDITIONER AND REGENERATOR



sweeter HF extension which resulted in better HF detailing, and lower fatigue. Switching back to bi-amping with both power amps run from wall sockets felt dirtier but perhaps subjectively more dynamic. The natural conclusion was a Genesis for each power amp and another for the source components. And a mortgage to pay for it obviously.

I was lucky enough to have the Super Titan and Genesis on test for several months and it was nothing less than a privilege. Lots of high-end kit comes and goes through these doors but few components depart leaving such an obvious hole. At my house, with its frankly howlingly bad mains supply, the Isotek combination delivered marked performance improvement to everything I plugged into it.

## CONCLUSION

I suspect that if your mains supply is a whole lot better to start with, the Isotek pairing's relative upgrade in performance is likely to be less marked. Yet given the dramatic difference witnessed I can't help thinking that the Super Titan / Genesis combo would wash its face in the context of any high-end system, wherever you are. Down in rural East Sussex, from budget vinyl players to high-end analogue pre-amps and affordable streamers to eye-wateringly complex AV processors, the effect of the Super Titan and Genesis pairing was uniform, unequivocally positive.

## AT A GLANCE

An effective, universal high-end system upgrade, the Isotek's high-tech mains conditioning and regenerating magic, outstanding build and sumptuous looks go a long way to justify the eye-watering price ticket.

**Build Quality:** Gorgeously crafted from acres of chunky aluminium, Corian sandwich isolation and the highest-grade connectivity terminals, the build quality of both units is beyond reproach.

**Sound Quality:** The dirtier your mains the greater the effect but the Istook's key strengths translate to a more refined sounding system performance majoring on a smoother top end, improved soundstaging and fatigue-free listening.

**Value For Money:** Well, that rather depends on your point of view. If you already enjoying an 'ultimate' sound system then dropping 30 grand on mains conditioning to hear it at its very best is undeniable value. If your system is topping out at a £500 integrated amp... probably less so.

**Pros:** Staggeringly effective at bringing a high-end system to peak performance with clean high-current power from the Super Titan and unrivaled regenerated mains current supply (2 x 300watts) from the Genesis. The tech is clever, the operation faultless and there are plenty of outlet sockets for a comprehensive system. The cosmetic design is a triumph of heavy-metal engineering that delivers real pride of ownership.

**Cons:** There is only one major con, that clearly being the breath-taking price tag. Somewhat less of an issue is that overall system enhancing performance is likely to be inversely proportional to the incumbent quality of your mains supply. Being picky, the blue of Genesis's display is not the same hue of blue as the indicator LEDs on the Super Titan. Hey, you are allowed to be picky at this price!

Price:

Titan 20A - £9,995

Super Titan 32A - £11,995

Genesis - £18,495





# REVIEW

## TITAN AUDIO CABLES AND POWER BLOCK



Titan Audio, A relatively new company, starting out in 2013 and based in Northern Ireland with a passion for getting the best mains power to your HiFi equipment. Not only do Titan strive to construct the very best power cables and connections, they back their work up with a “Lifetime” guarantee too. Here Dave Robson will be testing their Styx Power Distribution Block and the first three power cables in their line up. The Styx, Tyco and Helios power cables.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# TITAN AUDIO CABLES AND POWER BLOCK



## CONSTRUCTION

### Styx Power Distribution Block. (£150)

The Styx Power Distribution Block, is a relatively slim and lightweight affair. It is constructed from aluminium with acrylic ends which also form the feet for the module. Fit and finish are excellent, the Titan Audio logo embedded into the acrylic is a nice touch and although quite simple in external design there is a quality look and feel to the product. It's inside the Styx Block where the technology surpasses some of the other distribution blocks on the market. Now I'm to expert when it comes to "electric-trickery" so I'm not going to try and bamboozle you with science, but most power blocks use a "Bus-bar" to distribute the electric within the block, this takes the electric connection at one end and then the other plug sockets run off that supply. Not so here, the Styx sockets are individually hand wired with OFCC copper cable so that the supply of the current is the same to the first socket and through to the last socket. This ensures each component attached has the same supply and does not degrade sound quality down the power supply chain.

You need to fit a separate power cable to the Styx and as the company have sent me several cables I choose to use their "Helios" power cable, as this can supply double current to the other cables here due to the amount of copper used in it's construction. The operation of inserting the plugs into the sockets is a fuss free affair, and feels secure on all sockets with no variation in tightness or tension.

### Styx Power Cable 1m. (£50).

The Styx Power Cable is the base model in the Titan line up, it offers an entry onto the upgrade path and its main intention is for use with ancillary equipment like CD players etc. Fit and finish on the Styx Power Cable is fantastic. Even though this is the base model in the lineup, there is still an individual reference number where you can

register your product for it's "Lifetime" guarantee. The Styx has a three core construction, each using 30 x 0.25 strand OFCC copper cabling. It has extruded PVC and galvanised steel braid internally and finished in a classy black and green woven outer jacket, all there to reduce RFI and EMI interference. The IEC plug has Copper pins and all plugs are screw fixed and hand tightened, no solder involved in their construction, which may reduce final sound quality.

### Tyco Power Cable 1.5m (£100).

The Tyco Power Cable is of the same excellent finish as the previous cable and distribution block. The cable I have here is the standard 1.5m version but longer lengths are available. The cable is constructed with the inner OFCC cores laid out in a twisted pattern and shielded in PTFE outer and shrouded in a polythene woven jacket. The plugs on the Tyco can be either UK, Shuko or US type, at the component end is a Wattgate style plug, and all plugs are cryogenically treated. The Wattgate plugs fit positively and snugly within their housing and give a secure connection.

### Helios Power Cable. (£175).

The Helios Power Cables comes third in line, no need to elaborate on the build as I'm accustomed to the qualities and attention to detail the artisans at Titan purvey. The Helios has been designed to supply a greater current delivery, so perfect for Power Amplifiers and A/V equipment alike. Its use is also recommended for plugging into the Styx Power Block where several pieces of equipment may be plugged in and drawing on power from your mains. Like all cables in this series, there is plenty of shielding to reduce EMI and RFI interference and the smart clear blue plugs are cryogenically treated. The only downside to these "Hosepipe" type cables is that they are all quite stiff and don't bend and twist easily, that's the same for all manufacturers so quite normal.

## SOUND QUALITY

# TITAN AUDIO CABLES AND POWER BLOCK





# TITAN AUDIO CABLES AND POWER BLOCK

After following the advice from the very knowledgeable guys at Titan I decided to wire up my system and their cables using the Helios Power Cable to supply the Titan Power Block, the Tyco to supply my power amplifier, and the rest of the Styx Power Cables to supply the power supply to the DAC and the CD Transport. My thought was to swap the power to the Amplifier which is sensitive to where or what it is getting its power from between the wall socket and the Styx Block.

After a week or two of occasional listening, I took on some serious listening sessions. My initial thoughts over the previous days where positive, the sound had settled quickly. My other Power supplies were of a good standard and upgrades from the supplied ones, all identical and all wall mounted. When I had my listening space built I had quite a few sockets fitted and a mains spur and consumer unit fitted, so new and hopefully clean electric to the system.

Clean and clear, my thoughts on these Titan products, playing several of my favourite test tracks and albums, I had the feeling of a little lift to the whole performance. A deeper and wider presentation with more breathing space between instruments and vocals. This was making the ambiance of the listening experience feel like you where being sucked into the recording that little bit more than usual, this is more evident especially with pseudo-live recordings.

The amplifier came across as quite relaxed with the Tyco, a certain improvement over my usual cable. Bass notes where taut without being unnatural or fluffy, a defined edge and form made the music flow, there was a little more depth to each note and my blues and funk compilation loved it. The top end came across as sparkling and shiny without any brashness or hardness becoming evident.

The supplied bundle of Titan cables certainly seeming to work very well together, the "In-House" synergy seems to be alive and well and complimenting my system and the music. John Martyn "Church With One Bell", Sade "Stronger Than Pride", Eva Cassidy "Nightbird" and Steely Dan "Gaucho" among some albums playing. Nothing of my usual fare seemed odd or out of tune using the Titan cables, just a level and natural lift of the enjoyment levels, with the sonics keeping your ears fixed to what the music was saying to your senses. As the hours of listening ticked by, the whole experience became more and more enjoyable, whether that was me getting used to the little nuances now audible or the set of cables bedding in further and further I can't comment.

One late night session, when all was chilled, relaxed and quiet, I came to a moment with my John Martyn recording, everything just clicked into place, the volume was set that tiny bit higher than normal, the music just opened up and he was there! The soundstage was wide and deep, I was inside the music, all the pain and emotion in his voice was quite evident, the instruments all doing their part to attend the needs of the recording. Quite a surreal moment when you know you have never heard a better sound from that album on your system, and yes it did make me swear out loud! Any number of variables may have gotten me to arrive at this point that night, but the Titan cables, used in their recommended formation really has to be the common denominator for my little epiphany.

## CONCLUSION

Titan Audio Cables have done a brilliant job in assembling a set of cables that for not a bank-breaking amount can lift and enhance your listening experience. Whatever methods and materials they have incorporated into their designs, this adds up to something that works for me. If you are just starting out looking at upgrading your power cable supplies, then the Styx will be my go-to recommendation. The

Styx Power Block again, is superb, as it doesn't seem to affect the sound any differently than if the equipment is plugged into the wall socket, which is exactly what you want. My Amplifier is quite sensitive to where it is plugged into, the sound can either shift leaner or heavier or tinnier and hard depending on its connection. There was no noticeable difference when it was connected to the Styx block with the Helios as its electric supply partner. This for me is a little holy grail and knowing there is a solution to connection issues if they arrive is a reassurance.

## AT A GLANCE

A well built set of cables that do exactly what you want. Competitively priced and should be on your audition list.

**Build Quality:** Excellent fit and finish and attention to detail.

**Sound Quality:** These Titan Audio cables in the formation recommended proved an enhancement to my system and thus listening experience. Very neutral and balanced, throwing nothing unusual or distasteful into the final sound, giving the equipment the clean feed of power it needed. That little lift to the sound we all appreciate.

**Value For Money:** Excellent value for money, the little extra brought to the game could and possibly would have cost a fair bit more if equipment swapping where to take place. Sometimes the simple things can reap great rewards.

**Pros:** Great sound, great value for money, and a good family sound that has synergy with its stablemates. The added "Lifetime Guarantee" gives peace of mind and customer commitment.

**Cons:** The larger diameter cables are a little stiff and unwieldy as all the heavy tube style cables are. My only real gripe is that the Styx Power Block connects it main power cable from above and not at the end laterally. This reduces the "length" of cable reach. It also makes the block tilt and fall depending on the thickness of cable your supplying power with.



# REVIEW

## GEKKO PURPLE HAZE INTERCONNECTS



David Robinson takes a listen to the new Gekko Cables Purple Haze interconnects that have a unique construction and cost £2499 for a one metre pair.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# GEKKO PURPLE HAZE INTERCONNECTS



Having watched Gekko Cables over the last few years grow, and having the pleasure to meet their creator and designer Boban Djurdjevic, I have also had several of his cables in for upgrade auditions on my equipment during a recent spate of upgrades. I am quite used to the standards of workmanship and sounds these cables provide. Here though today I will be reviewing and testing one of Gekko's top of range cables the Purple Haze in RCA form.

## CONSTRUCTION

The Purple Haze arrives in a smart Aluminium carry case, and within it sits in some secure foam liners. Purple in name and purple in colour the cable is encased in a woven cotton like jacket that is actually polypropylene, there are wooden collars on the cables themselves with the company logo imprinted into them, but for a first time for me the RCA's at each terminal end are also encased in wood, each held in place by a tiny screw. There are directional arrows imprinted into the wooden sheath to advise on which way round these cables should be inserted into the chain of electronics. The cables are very flexible and should offer no problems whatsoever fitting around equipment or another cabling.

There are two internal pure silver (99.99) AWG 26 cables insulated and laid down in a twisted and woven geometry style. Each wire is individually shielded in PTFE and then covered in a cotton dialectic outer then all is encased within its distinctive purple woven jacket.

Hmmmm nothing too special in that on first glance you may say. The very interesting part to these Gekko Purple Haze cables lies within the quite unique construction of their RCA's. Here is where Boban has worked some magic, and has a patent pending design on how your music arrives to the terminals on your equipment. Apart from the Silver wires there is no other conductive material involved in these RCA's. Gekko has made the inner part of the plug from a non-conductive plastic. Here you will see the raw silver cable, cleverly wound round the center pin of the RCA while at the edges there are

two other silver cables pinched to the side walls. The idea here is that no soldering, crimping or screw fittings are able to effect sound quality and only the bare wires make the electronic connections. This is as close to "Hotwiring" your hifi as you can get! Now I really like the idea of minimalist connections, the simpler the better for me. Although this design is anything but simple, the fact that the bare wires connect your equipment makes sense to me, and wondering why I've not seen this before? Having had a good look at these raw conductors I can say they are quite solid in their plugs, I was worried that maybe they would be easily dislodged, but it would take some heavy-handedness to mess them up.

The cables do feel quite different from standard RCA's when you insert them though, they feel quite soft n squidgy, but a good push n twizzle gets them in place. One end of the RCA's wooden shrouds have been shaved down to allow them to be used where the receiving RCA sockets are close together as the wood is quite thick. The cables are also marked for directionality, whether you believe in this or not it allows consistency when fitting.

## SOUND QUALITY

Having the Purple Haze running in the background for a few weeks while doing other reviews has them well and truly burnt or bedded in, although advice was a couple of days. So first impressions? Well I was expecting a bit of harshness that I have experienced before with silver and silver hybrid cabling. Not so here, a mellow and smooth outlook appearing between the speakers. Spinning a few of Keb' Mo's albums first, superbly recorded, vocals and guitar are the star of the show. My system errs on the side of warm and smooth and this cable sits in well and compliments the other members of the family system. Sounds and instruments are well separated, and sit in an inky black soundscape. This is a similar effect that fitting XLR cables has. A very quiet and soundless background presentation, thus providing an excellent opportunity to fill that clean space with extra details, or at



# GEKKO PURPLE HAZE INTERCONNECTS



least make those details more apparent. As much as I'm used to a 3D experience, the Gekko cables give instruments a slightly more space to express themselves in. The multi-dimensional feel gives to me what surmounts to a new level of listening pleasure. There are instruments now that although where always there, now have more of a purpose than being just an also-ran.

Vocally the Purple Haze has tonality and texture spot on, there is a good level of feeling and emotion conveyed through the detailed midrange, running some Corinne Bailey Rea and Joan Osbourne for the female side of the coin has the speakers dripping with soulful and rounded sounds of Rea, and yet keeps things from getting too hard and harsh with some of the tracks from Ms Osbourne, which I have found some silver cables can stray into when pushed with a bit of volume, not so here.

Bass is nice and full, an increase from my standard cabling and making it feel a bit deeper and there is a slight softening and bloating to the edges, not really smeared though, just rounded and fat. This only occurs at the lower registers as tight bass guitars are juicy and easily followed, as are the bass drum kicks that have a taut venom to the sound. The top end of the scale has percussion perceived with proper metal textures and feel, crisp and believable sounds are emitted and none of that soft shushy, mushy or indistinct sounds and the timbre and decay of notes are correct to my ears. The openness that the Purple Haze brings has those sounds sited very clear in the soundstage without being pushed too far forward to become out of joint with the rest of the music or other instruments, which is quite a nice experience to behold.

## CONCLUSION

For those who like the minimalist approach this could be your Valhalla. The Purple Haze has a unique build quality in the fact that the RCA holds the bare wires that carries the signals between your equipment. This approach delivers a clearer sonic picture and if silver

cabling suits your system and you want to hear the sound pure silver can deliver then this set of cables by Gekko may well be the final bit of icing on your cake.

## AT A GLANCE

**Build Quality:** Super hand-made build quality, first-rate workmanship and unique design.

**Sound Quality:** The Purple Haze has that quality where you know your missing nothing from the music and your hearing nothing added to the music, that extra level of depth and separation is an appreciated asset, although a technical step up, it's a simple concept that I believe holds nothing back from what goes through those silver wires. Although a slightly softer low-end sound than I'm used to.

**Value For Money:** Gekko Purple Haze is an innovative and new product, the research and development involved was never going to put this cable in the bargain bucket category, and its price tag will put it out of reach for the vast majority. This cable falls into the exotic box, only a lucky few will need to audition this cable, but if you're in the market to drain the last ounce of performance from your high-end system, this must be on your list of cables to try. It brings many qualities to the table and is in the running sonically with similarly priced kit.

**Pros:** Build Quality, Extra depth and detail.

**Cons:** Unusual design. Bare wiring, may not sit well with some. Soft lower Bass sound.

**Price:** £2499



# REVIEW

## ISOACOUSTICS OREA PUCKS



Dan Worth takes a look at the IsoAcoustics Orea Pucks designed to help isolate your equipment from unwanted vibrations.

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[www.hifipig.com](http://www.hifipig.com)

# ISOACOUSTICS OREA PUCKS



IsoAcoustic's Orea Pucks are a range of two new devices from the Canadian brand which has gained great esteem here in the UK over the past year or two. The design is derived from last years Gaia speaker isolation feet - which again this year wowed many at the 2018 Bristol Sound and Vision Show and were also reviewed by myself shortly after the 2017 event. At the time of my review I was curious about the Gaia's effects on equipment but their design wasn't really intended for components and was very specific to the movement of speaker cabinets - being designed to combat lateral movements only.

The Orea however, as well as being entirely suitable for studio monitors, bookshelf speakers, and subwoofers are constructed to minimise vibrations and bi-lateral micro vibrations which are injected into our isolation racks by the equipment seated on them, as well as vibrations from speakers carried through floors and up into our racks.

The ISO-Pucks's and Oreas have polarized Isolators, the logo's should be turned towards the listening position when placed under speakers, subwoofer etc.

The primary difference is the Orea's are a stronger performer with a narrower performance curve, which accounts for the weaker performance when under-loaded (see later). The ISO-Puck when used for the Pro Audio market can be used under studio monitors, guitar & bass amps, stage monitors, mic stands etc.

## DESIGN

Like the Gaia, the Orea Pucks are a combination of high density polymers and stainless steel, constructed in layers with a carefully designed rigidity - coupled with a freedom of movement to compliment a wide range of applications. The Orea Pucks come in two weight designations per foot, allowing users to compliment system peripherals accordingly. Whether it be a set of three or four for overall weight management or a mix of the two supporting masses for

equipment which is heavier at one point than the other, the Oreas are sold separately to allow the end user complete freedom of implementation.

The two loads supported by the Orea Puck are as follows:

Orea Indigo Isolation Pucks support a maximum capacity of 7.2kg each.

Orea Bordeaux Isolation Pucks support a maximum capacity of 14.5kg each.

The fit and finish of the Oreas is very nice - with a fixed rubberised top for placement under the piece of equipment, the slightly concaved top creates suction to the underside of equipment, they are dressed in a nicely polished stainless steel main body, with a flexible yet ridged rubber bottom section mounted to an internal aluminium sub-chassis.

## SOUND QUALITY

My first review samples were the Orea Bordeaux, I primarily wanted to try them under my balanced AC/DC power supply which weighs around 47kgs and was due some form of isolation testing, so these came at the correct time for me as the unit has taken an age to obtain parts for and build and recent isolation footers that I have tried really haven't offered anything in terms of performance improvements.

Installing them was interesting, my system sits in an alcove, underneath a custom-made desk, leaving me not so much space between supply and underside of the desk and also getting in around the rear of the supply and attempting to lift the monster was a potential shoulder dislocating feat! Anyway, I managed to get four of the Orea Pucks under the supply with a few moans and groans.

Grabbing each side of the front of the unit I was able to rock it backward and forwards and side to side with a small amount of



# ISOACOUSTICS OREA PUCKS

resistance when seated on the Bordeaux' which was actually quite satisfying.

My first close look into the sound was primarily to ascertain what differences there were in bass response. I played London Grammar's 'Hey Now'; with this piece of music if you can quite clearly hear the rubber ball on the end of the mallet strike the skin and each note free of smear then you are onto a winner. My system already did this trick very well, to begin with but with the Oreas in place, I was instantaneously astounded by the improvements. The definition of the strike and natural texture to the bass had improved really quite significant. Extension seemed more realistic and less blurred on the extremes of the roll off with even more in room presence, as to interact with the room itself.

I went onto play 'The Blower's Daughter' by Damien Rice with the very same scenario being evident when the deep single bass note extended. What I was beginning to notice without any particular focus being given, was how much more clean and how much more natural the vocal sounded. Midrange and bass integration became more cohesive in its flow and tempo but had clearly more defined space and freedom to breath.

I went on to listen to a great deal more music for a couple days and also gained some opinions from visitors with and without the Bordeaux in situ - their comments fell in line with my own thoughts. A thought had occurred to me during the last time I took the feet out that maybe I should try just three instead of the four I had underneath the power supply for the past couple of days...bingo! Even further improvements were gained. Another small amount of plummy-ness was removed from the bass and now the top end began to breath more freely. I had previously noted a little more inner detail come through but there was nothing stand out so to speak.

Whilst listening to Chris Jones' 'Angel From Montgomery' the delicacies of fine details and off-axis nuances proved to me that the Oreas, when weighted just right were not just a one trick pony, they didn't just clean up the bass allowing the midrange to in turn become freer, they actually had a really positive effect on the entire frequency range.

I contacted the distributor and passed on a few of my findings whilst requesting some of the Indigo Oreas to try under my lighter power amp. Whilst I was waiting for these to arrive I decided to try the Bordeaux' underneath the Gamut. A quick retuning into no Oreas in the system and I placed just three under the power amp and repeated the same music as in my initial tests...what a disappointment and that's being generous! The lighter weight poweramp simply wasn't loading the Bordeaux Oreas enough and the result was a total loss of bass altogether and a collapsed soundstage culminating in a small window of music in the centre stage, could this be simply that I was fortunate enough to find great synergy with my power supply or due to my educated guess that they were just underloaded?

The following morning produced a set of Indigos ready to trial, again I had opted for a three-foot support configuration keeping the weight of the amp in mind. I played some music for a good half an hour or so after everything had warmed up nicely and then added the Indigos to the Gamut. Yes please, I said instantly! The findings from the Bordeaux' under the power supply had been replicated once again and added even more tightness and control which never even bordered on becoming too tight, dry or stale, I just got more attention to leading edges and extension in the bass as well as better descriptions of decays and spatial awareness. Along with bouncier rhythms.

For instance, where Hey Now had been more defined and better expressed I was now gaining additional rhythm and overall balance to the sound in a far more natural and effortless way. Things were certainly becoming more musical and less Hifi if I can get away with explaining things that way? This doesn't mean that I was obtaining a warmer and more pleasingly coloured presentation because I wasn't, I was obtaining a most satisfyingly natural sound with even more detail.

On the phone again, and this time I ordered another 9 Indigos and paid for them, along with the other two sets I already had here without any hesitation, "so you're getting on well with them then Dan?" the distributor said, "yeah, they're not bad" was my response.

So another whole day passes before they land on my doorstep (I do like efficiency!) and this time the idea was to try three under the Melco and my DiDiT DAC and also the two box Audio Music preamp. I firstly popped a set under the main body of the preamp, leaving the power supply to remain as is and again, the benefits were just so impressive. I was gaining smaller increases now in bass performance but the slight enhancement came more in spatial awareness and freedom in bass notes. Guitar bodies had more flavour and strings rattled clearly above and timed just so well with resonances in the acoustic chamber. This extra degree of freedom was more pronounced in the top-end and upper mid-range.

I had previously heard small improvements in these areas but with just the added set under the main preamp body another level of realism and dynamics was introduced. Bass was already impactful but to really feel the dynamic heft of a piece of music the overtones or crispness of leading edges needs to be inline for greater authority, and the simple addition of these three Indigos under the pre brought this to the forefront. I listened to a great range of music for the next hour or two, still eager to install another set under the pre's power supply, but at the same time, I've gained a clearer opinion of the improvements as they presented themselves in a more progressive manner.

'Seven Wonders' by Fleetwood Mac started with amazing shimmering details and a far more airier presentation, with the first bass note conveying far greater presence and control than normal, there was some real rhythmic flow and Stevie Nicks' vocal was just sublime, everything had more attention given to it, more focus and at the same time freedom and space but the cohesiveness and overall timing was bounds ahead of the zero Orea system.

Adding the Indigos now to the power supply of the preamp simply enhanced all of these advances in sound quality. The sheer effortlessness of the music was really now at a point where I am reconsidering overall rack design. These small shiny pucks have really made me sit up and consider an entirely new rack implementation and for the past few days I have been redesigning my stand in my head over and over with various materials and have also considered framed options that could integrate the Orea Pucks leaving me simply with a choice of materials for individual shelves supported by the Oreas on a custom frame.

Next up with the remaining three Indigos would be to try the Melco, I had a few doubts as the Melco weighs just less than the maximum supported weight of a single Indigo and my experience with the poweramp on the Bordeaux' was a disaster. To my surprise...I had a similar experience, unfortunately, now it wasn't as bad as the earlier issues with the Gamut but similarly, it was clear to observe that the Melco was under-loading even the lower weighted Oreas. The sound lost its rhythm and I lost any enthusiasm for listening instantly! I decided to place the Oreas underneath the Melco's bamboo isolation

# ISOACOUSTICS OREA PUCKS



shelf and the sound widened slightly but it still felt sluggish and lost all of its bounce and rhythm. Loading the Melco with another bamboo board on its top helped to load the Oreas slightly better but there was still a loss of that genius I had heard previously.

My DAC and also clock suffered miserably, the lowest supportive weights of the Indigos of 7.2kgs is simply way too high for any lightweight front-end gear and any time they are under-loaded they suck out bass, and just leave the sound without any interest or redeeming features. A single Indigo balanced nicely under the centre of my DAC offered instant detail improvements with a lot of cleanliness which although I'd say would be a preferential thing at best, still for me took away the body and rhythm of the music.

So I found myself left with three Oreas after my testing. I had one spare Bordeaux from the initial set of four and two Indigos which remained after a single one was being played with under the DAC. What to do with them I thought...

Then an idea came to mind. I run active Focals in another system and sub. The front of the sub is the heaviest portion due to the large magnet on the driver, so why don't I try a Bordeaux in the front and two Indigos in the back. There is a few millimetres of difference in their heights but it's not noticeable in situ at all. The results were fantastic, I gained a better integration with the main speakers and the bass response as a whole was much more tuneful and playful. Deep extended notes at volume filled the room without interacting with the building's structure as much and again freed up the mid-range of the main speakers due to the cleaner and more articulated upper bass crossover point tuned into the sub. I really couldn't have asked for a better conclusion to my testing, because if I had never gone through the process in the main system in the way it unfolded my other system wouldn't have had this exact combination of Oreas which mated so well.

## CONCLUSION

The Oreas from Canadian isolation aficionados IsoAcoustics are a sublime creation. They offer fantastic isolation support and vibration control to a huge amount of equipment and applications at a price that is simply unheard of in this somewhat overpriced industry.

When used under electronics with a weight that is at least half of what they are specified to support and over they load well and work tremendously to improve the musicality of the system. Dynamics are freer, vocals are more natural and the entire detailed picture being reported from the loudspeakers has more ambiance, presence and shape.

Under-load them and you will run into problems...

It's clear from my testing that IsoAcoustics need to introduce a version that supports a maximum weight of 3.5kgs and I'd strongly push for one at around half of that again too. There are so many devices which are being neglected from the benefits of these little stars and testing has proven for me that there is a need for the other variations.

## AT A GLANCE

**Build Quality:** Very very nice indeed, a little bling in a classic style

**Sound Quality:** When correctly loaded very natural and rhythmic, with more openness and detail

**Value For Money:** Exceptional!

**Pros:** More body, detail and shape. Stronger and more effortless dynamics. More musical and less Hifi like. Exceptionally well made and great styling. Price is absolutely what we want to see...for a change.

# ISOACOUSTICS OREA PUCKS



**Cons:** Under loading the Oreas will constrict and restrict the sound. Two more models for lower weight equipment is a must - CEO Dave Morrison, has said – 'I am looking at making smaller and lighter weight pucks... as Dan suggests'

**Price:** Orea Indigo £59 per foot, Orea Bordeaux £79 per foot

Since original publication IsoAcoustics has introduced the OREA Bronze (RRP £49) with a weight capacity of 3.6kg which deal with the potential under-loading issue highlighted by Dan in this review.



# REVIEW

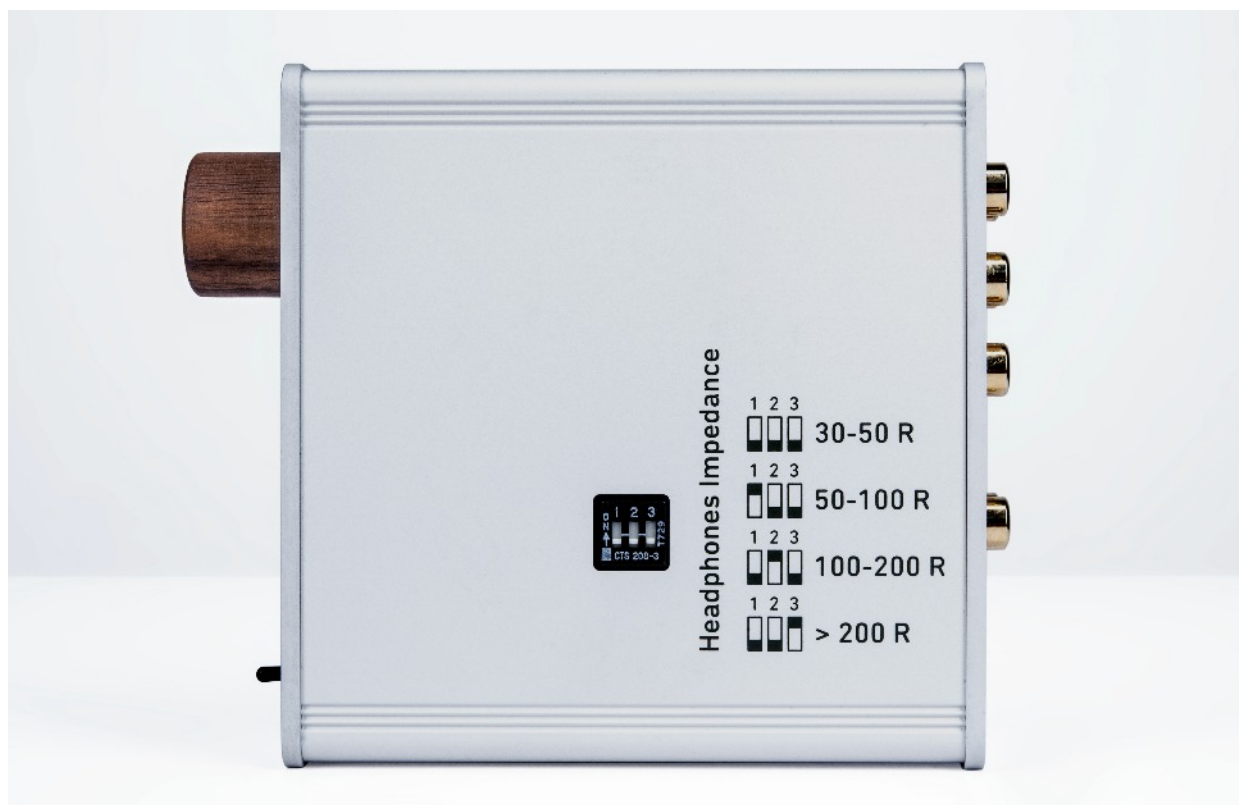
## LIMETREE HEADPHONE AMP



Limetree is the affordable branch of well known audio brand Lindeman. Here Ian Ringstead has a listen to their headphone amp costing £595.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# LIMETREE HEADPHONE AMP



Until recently the brand Limetree was a mystery to me and although I'd seen mention of it on the internet, I took no real notice until now. The brand is a less expensive offering from the highly regarded German company Lindemann which make high-quality audio components. They are celebrating 25 years in business and are based in Bavaria in southern Germany, a beautiful part of that country I am familiar with having had several holidays there in the past.

Lindemann's philosophy is like any high-quality audio manufacturers goals - music should be as natural as is possible and that a good Hifi system should be all about the music and not the equipment. Music should touch our souls and speak to our heart and mind as the composer or artist intended.

The Limetree series was introduced earlier this year and aims to offer cutting-edge technology at affordable prices (including a phono preamp, headphone amplifier, USB- DAC, network player and then some). I gather more is to follow.

To quote Lindemann "The careful optimisation of all circuit details and the targeted selection of top-grade components are the basis for each true high-end product. A lot of fine-tuning is required to understand all sonic influences and to optimise the result accordingly. True progress in sound quality on an ultimate level can only be achieved by a deep insight into the coherencies and their consistent realisation in the circuit design ".

## BUILD QUALITY

The Limetree components are all housed in very smart looking compact aluminium cases with the logo embellished on the top. This is a drawing of a lime tree leaf that was personally done by the owner Norbert Lindemann and I think is a lovely simple touch to identify the brand. The front panel is very simple with a single toggle switch on the left and power LED, a 3.5 mm headphone socket next to it, then a row of three LEDs for the analogue inputs and finally a volume control

made from American walnut which contrasts well with the aluminium finish. I asked why they hadn't used lime tree wood and they said they had tried it but due to its lighter colour it had not kept its finish and got dirty with repeated use from being touched. In any case, the American walnut looks great. On the rear panel are a DC power input, three pairs of RCA inputs and a pair of RCA outputs. Underneath the unit is a set of microswitches that allow you to alter the impedance to match your headphones and get the best sound from them. That's it, all very neat and simple.

The circuit of the amp is designed around the best available JFET-OP-AMPS by Burr-Brown with a high-quality analogue volume control and a high current so-called diamond buffer. This buffer works in class A mode and without negative feedback when used as a headphone amp. The circuit layout has been very carefully designed and laid out for the best possible performance. Resolution is stated as second to none. The noise and distortion figures are exceptional and on the limits of modern measuring equipment. The best components are used throughout from the studio grade volume potentiometer to the closely toleranced capacitors and resistors from Japan. The power supply is an external medical grade wall plug transformer which ensures very good isolation from line disturbances. Due to the elaborate onboard filtering and special voltage regulators, Lindemann was able to make an exceptionally low noise power supply with a ripple voltage below 10 microvolts.

In use, the Limetree headphone amp was simplicity itself. To switch on you just had to flick the toggle switch up and the yellow power LED lit up to indicate it was on. To change inputs, you held the toggle switch up for about 3 seconds and the unit would cycle through the inputs and you simply let the switch go when the desired input had been reached. The headphone socket is the standard 3.5 mm, understandably due to the unit's compactness. The insertion of a jack-plug automatically muted the audio output. Connections on the back were good quality RCA phono sockets. I loved the simplicity of the unit's design and it performed flawlessly. It isn't remote control but

# LIMETREE HEADPHONE AMP





# LIMETREE HEADPHONE AMP

that would be churlish of me to criticise as the exercise does me good to get off my chair and anyway the volume control is so tactile being wood and has a lovely smooth action.

I connected the Limetree to my Temple Audio monoblocks as the Limetree is not only a headphone amp but also a pre-amp. I've had passive pre's in the past such as the Tisbury Audio which I reviewed previously and good as that was, especially for its bargain price, it was not a match for the Limetree sound-wise in my system. Now let's put that in context. Passives can be excellent and there are some models out there that are brilliant but cost thousands of pounds. I applaud these expensive designs, but their high price excludes my wallet and value for money is always a priority for me.

## SOUND QUALITY

Lindemann has gone all out I feel and achieved their aim of making a superb sounding product at an affordable price for the masses. The moment I switched the Limetree on and turned the volume up I thought "this is great". It's the same as when I go to any shows and walk into a manufacturers room and I am instantly impressed. You don't have to sit there for hours and ponder, thinking do I like it? It's a gut feeling I have acquired with over forty years' experience. I know Stuart and Linette are the same when they go to shows or review products. Trust your instincts.

As you can tell by now, I was smitten by the Limetree. It blended so well with my Temple Audio amps which are also super compact and drove my Audio Physic Avanti's like an F1 driver. Precision and power sprung to mind, along with great dexterity. The music flowed so easily and everything I played impressed with its fluidity and it was taut without being strangled. My Temple Audio amps played their part in this presentation of course, but having used them with other pre-amps they showed this quality but not to the extent as with the Limetree. The Limetree was the icing on the cake due in no small part to the synergy it showed with the amps.

I used my recently acquired Luxman D-05 SACD player and my Luxman PD 300 turntable with the superb Gold Note PH-10 phonostage and PSU-10 power supply. They both performed beautifully through the Limetree which highlighted their own qualities rather than forcing its own character on proceedings.

My musical tastes are varied, but we all have favourite genres and artists, so I played a lot of jazz and progressive rock interspersed with modern artists such as Christine and the Queens. The quality of the music production and engineering is important to me, so when an artist is well produced it really adds great pleasure to my listening experience. A case in point is Christine and the Queens' new album "Chris" which I love. She is a very talented singer with a quirkiness that to me is infectious and her songs are fresh and interesting. The bass on the latest album is prodigious but not overblown and blends well with her voice and other instrumentation. Some albums can sacrifice quality if overproduced but this album is very well executed. Supertramp is another favourite band of mine and every album they have made never fails to deliver in quality of sound or musicality. The Limetree was a window to the sound and I didn't feel it was getting in the way of the music delivery at all and giving an uncoloured portrayal of the music.

The headphone stage was just as good. I don't use headphones at home much unless my wife is watching the TV or not keen on my music selection, but I do use headphones most days when at work in my lunch break to relax. I use Sennheiser Momentum 2 over-ears because they are closed back to avoid disturbing anyone else and

because they sound fabulous for the money. At home I also have a pair of Sennheiser HD580's with upgraded silver leads that are also highly detailed and suit my ear very well. The impedance switching on the Limetree is a useful feature to match your headphones as different models can vary considerably in this aspect, and obviously, some people have several pairs of cans on hand. The Limetree had the same uncoloured clean and open detailed sound through both my Sennheisers and I could listen for long periods without any listener fatigue. Noise was incredibly low with no hum either through the jack socket or RCA outputs.

## CONCLUSION

As you can see, I was rather taken with the Limetree headphone amp. In fact, I liked it so much I bought one due to its perfect match in my current system. I only have two main source inputs, turntable and CD - I've yet to embrace streaming or downloading. The limited inputs were therefore not a restriction. Many people who buy this unit may primarily want it for the headphone stage and maybe use it in a second system or compact office/study environment. It's a testament to the Limetree's quality that I chose to use it in my main reference system because it's just so good. If funds were unlimited then yes, I may well spend more and Lindemann do some rather tasty high-end units costing several thousand that have been highly praised - one day possibly.

## AT A GLANCE

**Build Quality:** For the budget excellent with very high-quality parts and expert design. It should last for years

**Sound Quality:** Sublime

**Value for Money:** Exceptional given its performance and price

**Pros:** Simple, compact and truly excellent sound with an equally great headphone stage. A pre-amp and headphone stage in one unit that is cute as well.

**Cons:** Nothing unless you require more than two inputs and greater flexibility.

**Price:** £595



# REVIEW

## BURSON CONDUCTOR VIRTUOSO V2 HEADPHONE AMP/DAC



Australian manufacturer Burson's Conductor Virtuoso V2+ comes with a DAC, a headphone amp and doubles the output of the original version to 8W into 16 Ohms. Janine Elliot dons her cans and takes this £1590 unit for a test drive.

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# BURSON CONDUCTOR VIRTUOSO V2 HEADPHONE AMP/DAC



Burson and I have two things in common. The first one is that we both don't like op-amps. Op-amps might be great for pc's and equipment short of space but there are many drawbacks having individual "components" printed on a miniscule composite the size of a grain of rice using a process of photolithography. The technology might be breath-taking almost following the Moore's law in that the number of components in the space seems to get more and more every year, but this does mean that because they get smaller and closer together there is more likelihood of EMI noise and less tolerance to heat, let alone reduced specification. An op-amp could easily have as many as 50 inferior components squeezed onto it. Burson Audio do manufacture 8-pin op-amps such as the V6 Classic and Vivid, and whilst they still fit into conventional 8-pin DIP sockets what makes them different is that they contain discrete full-size components meaning that the 'box' they are in is significantly bigger in size.

Burson also share a dislike for Class-D amplification, though my preference for Class A is diminishing as the recent Class of 2017 and 18 have graduated. Burson is quite emphatic about how they feel;

"..class-D and class-T chips were created for the car audio industry and subsequently for mobile phones where power efficiency, size and budget are the driving design parameters so audio performance is secondary if that".

They believe Class-D circuitry is overtly complex and reduces the purity of the music. I have listened to both Class-D and A headphone amps, and my favourite is class A and presently use a Class-A/b portable headphone amp for my serious portable listening. That said I have recently reviewed some highly recommended Class-D products from around the globe.

Today's headphone amplifiers are becoming available more and more with the option for a built in DAC as we become more and more digitally minded. Even the latest top of the range Stax Energiser, the SRM-8000, comes with a blanked-off plate on the rear suggesting,

perhaps, that a DAC card might one day find its way inside that unit. Similarly, the Conductor V2+ is more than just a headphone amp. This is a three-in-one headphone amp, DAC and preamp. It comes as a refined replacement to the original V1 headphone pre-amplifier, and in the "+" model denoting the addition of a DAC. This is the third generation of Conductor, maintaining the looks of the original but with improved electronics. It keeps with Burson's philosophy of being fully discrete and uses their excellent V5 SS op-amp. As Alex from Burson proudly told me;

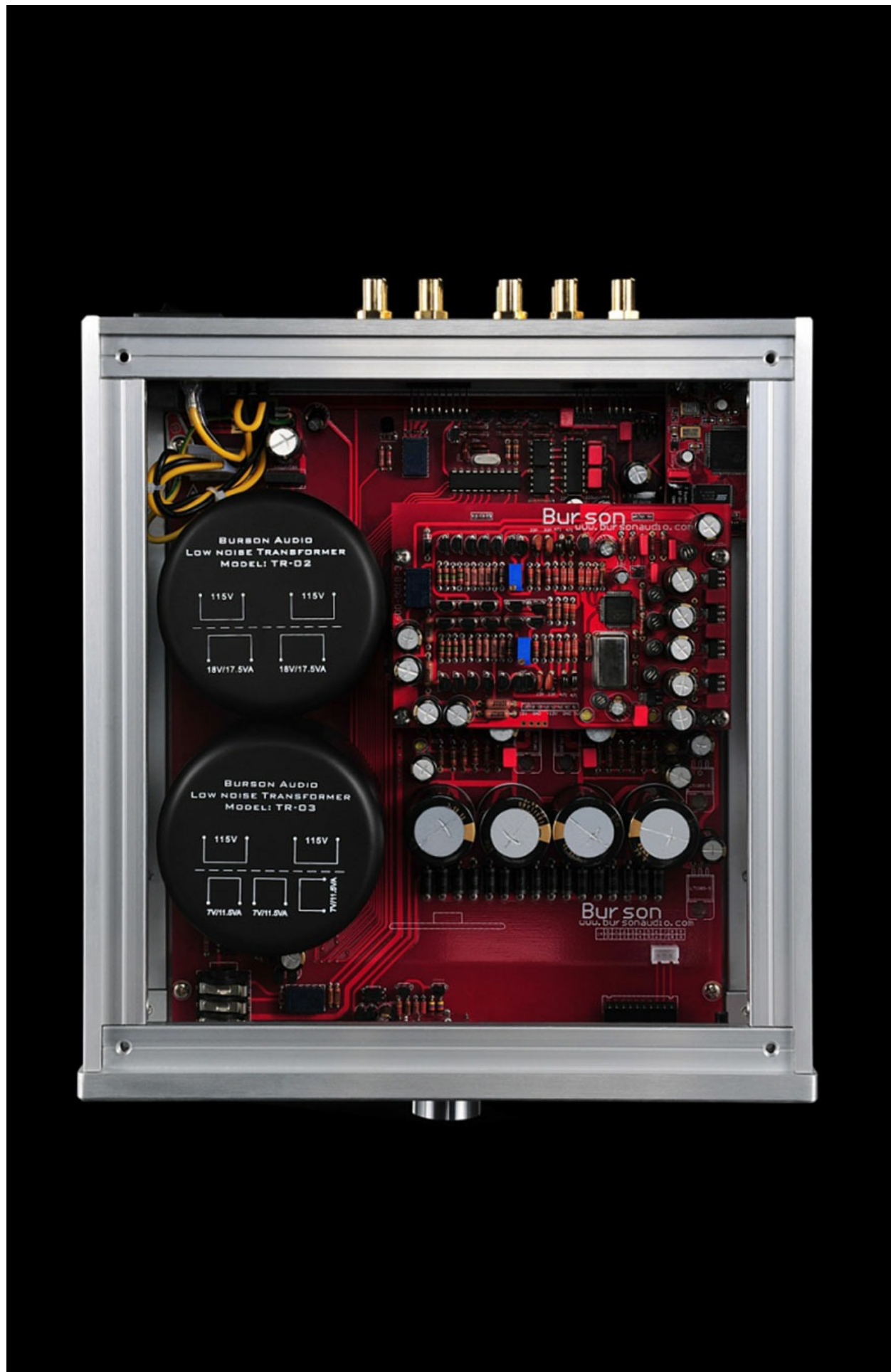
"The entire Conductor V2+ is pure Class A which means it is running at full capacity all the time. To us, using fully discrete, pure Class-A circuitry is the ideal design for audio amplification."

Powered by two large 70W high density (lots of windings) transformers, twice the size of the original model, tuned to operate in pure Class A using Field Effect Transistors, the V2 doubles the output of the original model attaining no less than 8W in 16 ohm per channel to more than satisfy even the most inefficient planar cans. Do remember that for thirsty 300 ohm Sennheiser HD650's that does reduce it all to 500mW, though that is still more than adequate. All this power does mean that it creates a lot of heat, and therefore the cabinet is carefully sculptured on 6mm thick aluminium around its body so that heat is dissipated uniformly around the whole casing. The case is effectively a giant heat sink.

Of course, no ground-breaking DAC for 2018 could appear without the iconic ESS Sabre DAC, in this case, the ESS9018S chip, though it is important to stress that the whole of any DAC is greater than the sum of its individual parts. The housekeeping around the DAC is equally as important. I have reviewed some lesser DACs that actually sound mightily impressive due to how the whole decoding, filtering and amplification stages work in tandem. This should also include the power supply connected to it. As Alex from Burson informed me;



# BURSON CONDUCTOR VIRTUOSO V2 HEADPHONE AMP/DAC



# BURSON CONDUCTOR VIRTUOSO V2 HEADPHONE AMP/DAC

"The Digital section of the Conductor V2+ is powered by its own separate transformer and fully discrete power supply network".

The V2+ 9018 DAC board - one of several boards all beautifully laid out inside the unit - pushes the SABRE32 to its limits and employs 20 carefully-selected and matched components. The V2+ also employs the PGA2310 flagship 100 step volume control chip offered by Texas Instruments. Allowing a fine control of 0.5dB steps and dynamic range of 120dB and 0.0004% THD, this is a welcome addition to the circuitry. Whilst the trained human ear can pick up changes in volume as little as 0.5dB, this is generally only seen in the pro audio environment. Burson cleverly set the PGA2310's op-amp output stage to unity gain so it essentially acts as a purely resistive volume control. When running digital audio the ESS Sabre DAC handles all of the volume itself, meaning it does not need to go through a separate analogue volume control. The Sabre controls the volume level for the DAC output sockets at the rear, meaning that the digital output is variable rather than fixed, as can usually be the case. Therefore the listener has the choice of how the volume levels are set; pre-out stage uses the Texas Instruments 120dB volume control, whereas the DAC output uses the volume control through the DSP in the DAC chip. I tried both, interestingly preferring latter, but there is the choice so you can decide your own favourite.

The unit has a classy yet sparse front panel with a distinctive rotary control centre point and a button to toggle between two analogue (via RCA sockets) and three digital sources including S/PDif, Toslink and USB connectors. The volume control levels magically appear in blue dots behind the satin black or silver front panel left of the control. No need to look for pin holes on that front unit as there aren't any. On/off toggle switch is from the rear of the unit. The unit has analogue and digital outputs meaning it can be used as a variety of applications, and as a basic preamplifier worked surprisingly competently during my review. The unit comes with a cute aluminium remote to match the Conductor, and equally minimalist.

## SUPPORT

The V2+ supports all major formats with coax/Toslink inputs up to 24bit 192kHz. Via the Win, Mac, IOS and Android compatible USB socket deploying the excellent XMOS 6-core chip it supports PCM up to 386kHz 16/24/32 bit, native DSD 64/128/256, and DSD over PCM (DoP) 64/128/256.

## THE COMPANY

Burson Audio was founded by a small team of audio engineers founded in 1996, based in Melbourne, Australia, creating building blocks such as hybrid Op-Amps as well as complete audio products including a Class A power-amp mono-block, headphone amps, DACs and cables. Their philosophy is simple; have components that don't interfere with the audio signal. Their philosophy is that if the equipment is designed well and transparent enough then the pace, rhythm, timing, dynamics, and tonality will become a natural expression of the music, and they feel this cannot be achieved with standard circuit building blocks like IC chip op-amps, IC regulators, or standard transformers. Instead, they research and develop their own discrete circuits so that every component in the signal path can perform at its peak.

## MUSIC

The Queen Symphony from 1962 London born Tolga Kashif is not only a beautiful work based on Freddy Mercury's iconic songs, but it is also extremely well recorded and performed by the Royal

Philharmonic Orchestra with vocal intervention from London Voices and London Oratory Boys' choir. Kashif spent two years composing the Queen Symphony. He conducted the Royal Philharmonic Orchestra at its debut concert on Wednesday 6 November 2002 at the Royal Festival Hall, attended by Freddie's mother Jer Bulsara, drummer Roger Taylor and guitarist Brian May, who all apparently found it very moving. After this, it was recorded at Abbey Road Studios later in the year. This is indeed a very moving performance, though the complexity of the melodic lines and continuing pushing of famous idioms in the busy soundstage can make for a tiring listening. It necessitates playback through equipment with wide dynamic range, speed and clarity for it not to get saturated. The Burson succeeds on all these fronts. Where Queen's musical style relied on a certain amount of outrageousness, Tolga continues this in his orchestration, something that takes decent decoding and amplification as well as excellent headphones to pull off successfully. Sennheiser's new HD660S headphones replace the HD650 which has been around for many years and were my reference cans for many years, the new version having lower impedance making them more useable with lower-powered amplifiers, though that is not an issue here. I love these well-priced cans because they can pick out individual phrases with engagement and detail that makes listening through headphone such fun, and the new version pulls it off to a whole new level with a fullness and detail that justifies their use in broadcasting and recording studios around the world.

Shostakovich Piano Concerto no. 1 starts with a very decisive intro before the fun begins on the piano, trumpet, and strings (Martha Argerich & Guy Touvron & Württembergisches Kammerorchester, Deutsche Grammophon). This work is as emotional and similarly stuffed full with beautiful idioms as is the Queen, though they are not quite so tonally measured. Occasionally a simple tonal melody, such as on the muted trumpet, does allow you to breathe again and take in the scenery before heading off into another direction. The Burson seems to understand the music and its clarity, force, and musicality to show there is indeed harmony between the individual musical components, just as there is between the components in the circuitry. This is a great performance from the orchestra, soloists, and electronics.

Neil Young Crazy Horse 'Live Rust' album and the track "My My, Hey Hey" is an excellently recorded live album and the Conductor handled both the mid-range voice and the acoustic guitars with panache and sensitivity. If I had to criticise the DAC at all it would be the tight and detailed top-end can sound a little too bright at times. The close mic'ing of the bass is particularly vibrant, and the reverb from the almost 'Supertramp-esque' solo mouth organ is allowed to decay with no sense of digital noise. My home choice Class-A headphone amplifier, whilst losing some of that detail, is slightly easier on the ears. My AT W1000 closed back cans were able to offer a more refined performance with a greater sound-stage that was hard to put down.

The Modern Jazz Quartet 'Blues on Bach' is a brilliantly performed album, with a very open and detailed soundstage that tests headphones, DACs, and amplifiers in one simple go, especially with the over-modulated audio in certain places. This is the same album I used in reviewing the Wyred 4 Sound DAC; a Class D headphone-amp-come-DAC. That unit similarly has an ESS Sabre DAC, though in that case the ES9028PRO chip is employed configured in quad differential mode so that with four D-A converters per channel they could achieve improved S/N ratio and output drive. The Burson, however, has chosen to use the ESS9018S chip and this time only using two channels of the 8, which with the other components on the board provides for them the best sound.

The bell “ding-dings” at the start of the track “Blues in A-Minor”, sounding like the London No9 Routemaster bus being sent on its way to the Royal Albert Hall, have weight and detail providing a surprisingly powerful bass for such a small sundry instrument. Add to that the vibraphone played by Milt Jackson traveling between the ears combined with piano and double bass and percussion, this is a memorable performance captured with finesse, power, and detail. The V2+ at level 42 out of its 99 range is more than adequate for my ears on the HD650's. Lower harmonies from the harpsichord in “Don't Stop this Train” combined with the vibraphone and bass melodic lines all work in harmony with control and weight and resolution. Only that the sound could be slightly too brash for the ultimate in Class-A sound, left me slightly wanting, though the shimmer and decay from cymbals was highly infectious. But at £1590 for such a well built and good looking product, this is still a worthy contender for your hi-fi rack. Even the analogue input is impressively musical and fast. This could easily be the basis for a complete hi-fi outfit, just requiring a power-amp and speakers.

Audeze's LCD-X is a very efficient planar design which worked extremely well in the V2+. The slightly bass forward design allowed the punchy 'Learning to Fly' (Pink Floyd Momentary Lapse of Reason) to take off and sound authoritative with clear ride cymbal strokes, and with the vox-pop under the guitar riffs equally clear and meaningful.

The wafer-thin diaphragms and double-sided magnet array ensures a near zero distortion and uniform sound across the entire diaphragm, an ideal partner for this 3-in-one Melbourne-made kit, and this enabled a tight, and detailed sound. Unfortunately, I had to give back the headphones so continued with the closed-back AT W1000's I know so well. These are very efficient cans, and the most comfortable ones I have, but I have to admit the best sound I heard was from the less comfortable Sennheiser and Audeze.

## CONCLUSION

This is a very detailed, powerful and quick sounding unit covering all frequencies and all types of music play with musicality and sensitivity. For a three-in-one box, the V2+ is a very able and well thought-out product that also looks A+. That magical display and overall build well belies its price point, and the choice and design of components make it highly desirable. The amount of detail and power available per pound should make it highly desirable, particularly for inefficient planar headphones. Its sensitivity towards inefficient planar headphones is perhaps only slightly let down by the lack of sensitivity in some of the music I played, sounding a tad too clinical in the higher regions, but at this price, I really won't be complaining.

## AT A GLANCE

**Build Quality:** Excellent bullet-proof build with that magical display of volume level through the silver or black facia. Internally well-presented using top end components, including ESS Sabre DAC.

**Sound Quality:** Impeccable resolution with an open yet tight and detailed presentation. Sound might be a little too bright for some.

**Value For Money:** At £1590 for a DAC, preamplifier and headphone amplifier this is a very competitively priced unit.

**Pros:** Very detailed and tight performance at all frequencies, particularly bass. Will easily drive the most inefficient Planar designs. Excellent build. Three units in one. Love the magical volume display

**Cons:** Top end can be a little brittle at high frequencies with some music

**Price:** £1590





# REVIEW

## FLARE JET 1 & JET 2 IN-EARS



FLARE JET 1 and JET 2 in-ear headphones are £49 and £69 respectively, much less than the company's very well received previous models. Janine Elliot checks them out.

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# FLARE JET 1 & JET 2 IN-EARS



This was always going to be a tough review for me to do. After all, when one has already listened to one of the best IEM's out there, in the form of the £349 Flare PRO (and the even-better GOLD at £999 is yet to be reviewed), how can you possibly take a vastly cheaper product from the same firm with equal gravity. At £49 and £69 for the JET 1 and JET 2 respectively, these were none the less just as exciting and for me a complete surprise from this company. As Davies Roberts, CEO of Flare Audio, developed his consumer business from the fledgling R1 headphone, he has built up an understanding of sound pressure build-up in the ears at lower frequencies, and created IEMs that allow you to enjoy the full detail of the music without the pressure to mask detail of the music. From their beginnings I could see, as a reviewer, that Flare would become a major player in personal audio, well before T3, paper-based hi-fi magazines or anyone else got their hands on review samples, and that Davies is a beacon to all those who have great ideas and perhaps not the patience to pull it all through. From their early days of crowd funding his projects he has progressed a portfolio that any giant IEM company could be proud of, from IEM's and loudspeakers to ear protection for those noisy drummers and guitarists wanting to still hear in '10 years' time. His earliest headphone, whilst not the best quality, was a very clever idea and the basis for all subsequent designs. A spiraling vortex system around both sides of the 40mm dynamic headphone drivers was designed to remove all Enclosed Residual Pressure Interference (ERPI). Then came their R2 IEM. Wow, this was a game changer, especially the R2PRO with its Titanium body-shell. Whilst it was impossible to fit a vortex system either side of the driver in such a small space, in order that there was equal pressure both sides of the driver he created a spring effect system at the front to match that caused naturally on the rear of the driver. This model also convinced me that the housing material would play an important role in the final audio quality; titanium being much better than steel or aluminium bullets. The £349 PRO followed, taking the sound to new heights. So, to create a pair of significantly cheaper units that might match his previous models was going to be a difficult task to perform.

## PACKAGING

Their PRO was beautifully packaged (see review at HiFi Pig), so the much cheaper £49/69 JET was going to be impossible to compete. Whilst not winning any prizes for reclaimable packaging it is nonetheless simple, containing a tear-open small plastic bag with the IEM packaged in bubble wrap and a small lined leatherette bag to transport them safely, plus 3 pairs of ear-pieces of different sizes. For the JET these are traditional silicone buds. The IEM shell itself is significantly larger than in earlier models from the company. However, this actually made them easier to wear.

## CONSTRUCTION

The clue to how these IEMs work lies in the name "Jet"; this technology balances the pressure across all frequencies in your ear by creating a jet of sound into your ears, maximising the front output of the earphone. As Davies explained to me;

"Think of our patent-pending Jet tech as a pressure control valve that enables us to tune and perfect our sound without the normal chamber resonance that the traditional technologies suffer from".

Where traditional earphones, headphones, and speakers rely on a chamber or chambers to isolate one side of the driver from the other, Davies was quick to realise that this creates resonance. With Jet - tech there is apparently no effect from a chamber and they use precise jet sizes in order to produce mirror image sound.

What is therefore very apparent in all their IEMs is a minimisation of distortion – resonances – giving you a perfect account of the music with nothing added or taken away. Distortion in loudspeakers has been discussed in forums and reviews for many years, and manufacturers spend many sleepless nights trying to absorb or defuse energies that would otherwise interfere with the audio. The Jet

# FLARE JET 1 & JET 2 IN-EARS



1 and 2 are made from high tensile polymer or aerospace aluminium. As mentioned earlier, that choice of housing material is paramount on all Flare designs, and there was a definite improvement in sound from the more expensive aluminium. Their very new FLARE GOLD is made from 24-carat gold plating to give the acoustic lens at the front a flawless and highly polished finish. What the new Gold and earlier Pro and R2 IEMs have in common is a very small (5.5mm) driver. The Jet almost doubles that to 10mm;

"In Flares Pro we use very specialised Beryllium drivers which are expensive...With Flares Jet we wanted to increase the sound level, produce more bass and deliver a powerful sound that the mass consumers are looking for".

That sound from the Jet is certainly more suited to consumers at the lower end of the audiophile market, being more 'punchy' and with greater bass depth of sound, though some of the ideas of the higher end models are still employed, making them very acceptable for hi-quality listening of your FLAC and DSD files.

The JET comes with 3.5mm gold plated jack connector and microphone and controller on the clearly indicated right IEM cable. Where earlier Flare's were not easy to determine L or R, especially with failing eyesight; these models have blue and red plastic indication on the earpieces themselves. Much appreciated. The cable consists of an OFC copper internal with a Kevlar weave inside in order to increase strength.

## THE COMPANY

Davies started Flare in 2010 after realising that his passion was in sound. "I had the goal of producing loudspeakers that would deliver sound as honest to the original material as possible." He used his own unique and patented technologies, though this became very expensive, both in the manufacturing and the cost of the patent, let alone the time it took experimenting with technologies. The pro

market was, however, only a small market, so he needed to diversify to make enough money to fund his ideas. "It became clear fairly early on that the live sound industry would be a very tough nut to crack and we were forced to diversify, and I realised then that I could scale our patented technologies into any sound emitting device". Only lack of funds made that very hard to achieve, even to the stage of putting his house on the line. Their R2 was the first launched on Kickstarter in the Summer of 2015. It was a great success and well received and attracted two wonderful investors. Their next launch was the Isolate Ear Protectors which raised over £2 million pounds in crowdfunding and is now ship to over 140 countries. The success of the Isolates has enabled them to focus on a range of earphones covering all price points, with the GOLD at the top of the range. Their IEMs are now drawing praise from a number of major music industry personalities such as the David Bowie producer Tony Visconti ("These are the best earphones ever"), Gary Langan (engineer of Queen, Yes, ABC and Spandau Ballet), Led Zeppelin's Jimmy Page, Jarvis Cocker, Richard Hawley, Bella Sarris and post-punk and alternative rock record producer and audio engineer 'Flood'. The company mission is to minimize all types of distortion, and produce the closest sound to the real thing, developing patent-pending technologies to create pure audio from any sound-producing device.

## SOUND QUALITY

There was a distinct difference between both Jets; the aluminium had a greater depth and extended bass to the polymer-based Jet. In both units that bigger driver allowed for a more pronounced bass end, and therefore by employing silicone earpieces rather than Comply type FLARE EARFOAMS that bass wouldn't be too pronounced; EARFOAMS tend to create a greater sound isolation resulting in a deeper and more pronounced bass end, and those type of ear-pieces are luckily not included or needed in the JET. How on earth did we ever manage all those years ago with outer-earphones with their lack of isolation and no bass end worth shouting over! Personal ear



# FLARE JET 1 & JET 2 IN-EARS

monitors have improved so much since I was in my teens! Where some might feel earlier FLAREs lacking bass simply because there is no pressure, the JET will bring them a certain amount of satisfaction, though these IEMs are definitely no Beats! Firstly, they are more efficient than earlier models, so I had to be very careful that in terms of volume I reviewed like-for-like. The bass is very clear, and the top end is detailed though not as extended as in the more expensive PRO. Only the mid-range is just slightly accentuated, though that "warmth" of sound in the important vocal and violin area made them highly enjoyable. They were also easier to fit in my ears than the much smaller models.

De Profundis for Choir and orchestra and the track "Laudate Nomen Domini" (taken from Psalm 134/135 and performed by the Russian National Orchestra with Moscow Synodal Choir) gave great clarity in the solo tenor; with the lower mid-range of the JET coming to perfection. This is a lovely work and the IEMs gave both speed and breath to the music, sounding quite open and pleasing. Squarepusher's 2012 album "Ufabulum (2012)" is everything that the De Profundis isn't; extended synthesiser bass lines and punchy cymbals. Whilst this type of music isn't my cup of tea it gave me a chance to test out that bass and top-end of the IEM, with a distortion-free and very energetic account of the music. Turning to The Enid Aerie Faerie Nonsense and track "Childe Roland" those Roland synths and pushy piano rhythms were more efficient on the JET Aluminium than the Polymer, extending that bass with more authority. If only they would bring out a Titanium version. At 93dB/1mW these are weighty models giving me the detail of sound that I only expect from a few manufacturers out there but at less wonga. These are very good value for money. Only the extreme top-end didn't extend quite as much as the more expensive PRO (and probably the GOLD, too, which I have yet to review). The almost 'Mike Oldfield' glockenspiel lines at 4'42" in Fand 1 weren't quite as crisp and extended on the Jet as I had heard on the Pro, but the detail was still excellent and the sound more energetic, involving and fun. Bear in mind the Pro is another £300! The more expensive PRO and GOLD might be wonderful for the record producer or hyper-audiophile, but on the street – and this is where I tested it much of the time – this was much more gripping and music more penetrable than it as on the PRO. Mike Valentine's excellent live Vivaldi in Venice album gave the harpsichord and strings a chance to show just how good the JET could be, and I was more surprised than ever. The punchy performance by Interpreti Veneziani gave me smiles from ear to ear. The double bass lines were particularly exciting, fitting in perfectly with all other instruments. Nothing to criticise and track 1-3 of disc 1 (Violin Concerto in B minor RV.386), being one of my favourites from Vivaldi, was brilliantly performed by both the musicians and the IEMs. Finally, to "The Wall" (Pink Floyd) opening track "In the Flesh" this begins with a very quiet scene-setting opening before letting rip with Guitars and Drums and Hammond Organ. The PRO could, of course, carry this out with more detail and often amaze me with sounds I had never heard before, but the JET simply gave it more oomph and meaning; I guess in loudspeaker terms the JET is a 3-way floor stander and the PRO is electrostatic.

## CONCLUSION

FLARE's motto is "Long Live Ears", and whilst that might well relate to their range of ear protectors, the JET made me realise just how valuable my own hearing is and that, despite my aging years, I can still appreciate the finer art of music more so that I ever thought I would. These cheap-end IEMs can make music sound exciting, detailed and fun. The JET 2 might be the better option, but both are

excellent choices. Detail from bass to highs was excellent and I could hear elements in my music I had not heard before. Long live my ears.

## AT A GLANCE

**Build Quality:** Both plastic and aluminium models are well constructed and lightweight. Packaging is basic, though novel.

**Sound Quality:** Good bass and clarity in the top end. Only mid-range doesn't match their top end and more expensive IEMs. Even so its musicality warrants "highly Recommended".

**Value for Money:** For entry into FLARE's world this is an excellent price. Recommended for those with cheaper-end DAPs or those with expensive machines but want to save some of their hard-earned pounds.

**Pros:** Excellent bass end and clarity at top frequencies, with the JET 2 being the better model, though pound for pound the JET 1 is perhaps better value, if that is important. Lightweight. Good quality non-tangling cabling

**Cons:** Midrange and detail not on par with their £349 PRO.

**Price:** £49 and £69



# REVIEW

## MEZE 11 NEO IN-EAR HEADPHONES



The market for sub £100 in-ear monitors is very competitive meaning that there is plenty of choices when it comes to choosing a pair of IEMs to use as your daily driver. So for £49, do the Meze 11 Neo do enough to differentiate themselves from the crowd? Harry Smith finds out.

**Hifi Pig**  
[www.hifipig.com](http://www.hifipig.com)

# MEZE 11 NEO IN-EAR HEADPHONES



Meze Audio is a Romanian company founded in 2009 and offer a range of IEMs and headphones ranging from the 11 Neo at £49 to their more high-end Empyrean headphones costing over £2500. They are endorsed by many different artists including CHVRCHES, Igor Presnyakov, and Rabea Massaad and distributed in the UK by SCV.

Their philosophy is to not follow trends and let their products do the talking. They focus on sound quality when it comes to their products "Style must always be a by-product of high functionality and ergonomics"

## UNBOXING

The unboxing experience was pleasant, all the cardboard used in the packaging is robust and doesn't at all feel flimsy. You are greeted to the earphones neatly set in foam packaging along with their pocket-friendly carrying case inside which you will find a range of ear tips to fit most sizes. Also included are a pair of Comply memory foam tips that I decided to use.

## CONSTRUCTION

The Neo 11 are very well built and feel robust. Their aluminium body, rubber coated copper cable and clicky pause/play/skip button all feel high quality. They are very light and stay well seated once in your ear.

The Gunmetal finish looks good and the Meze logo isn't too "in your face". All in all the Neo 11 look understated and built for a purpose. You could argue that they look a bit boring or generic but up close you can see and feel the excellent build quality of these earphones.

Meze definitely took the industrial design approach rather than over-complicating things.

## SOUND QUALITY

For the purpose of this review, I used the earphones with a variety of devices including a Sony XZ1 smartphone, laptop, and Nintendo Switch games console. When it came to audio, I decided to use a combination of Spotify premium (downloaded files at the highest MP3 quality) and FLAC audio files for specific songs.

The 11 Neo are definitely tuned with bass in mind. They offer rich mids and warm bass but are slightly lacking when it comes the higher frequencies.

They are excellent for hip hop tracks and shone on the 2017 Gorillaz album Humanz. The song Moments (feat. De La Soul) sounded fantastic, the constant thumping drums and bass impressed, while the deep rich vocals were still able to punch through to take centre stage. To be fair the whole album sounded brilliant through the earphones.

When it came to more electronic music the 11 Neo was best on the more bassy tracks. The Prime Time of Your Life by Daft Punk was a highlight. The highly distorted guitar and robotic vocals sounded fantastic and definitely was emphasised as the tempo got faster and faster.

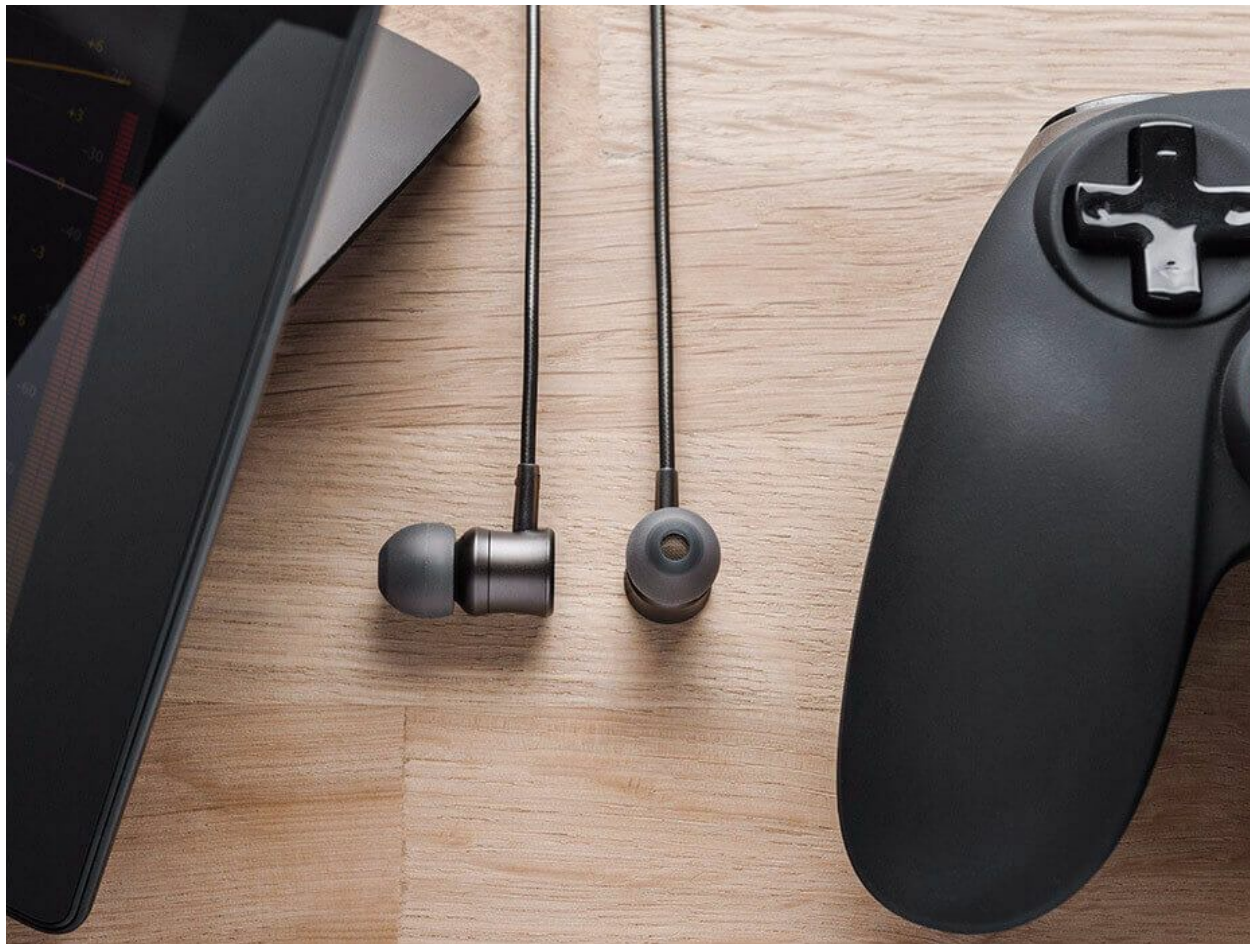
However, they were not ideal for folk songs with acoustic guitars. For example, on tracks like Out On The Weekend by Neil Young the acoustic guitar and harmonica felt slightly overshadowed by the drums. Young's iconic high-pitch vocals also failed to take centre stage.

Probably the best sounding track was Come together by The Beatles. The iconic bass riff has never sounded better on a pair of entry-level IEMs.

One small complaint is that the cable is very sensitive so any knocks while walking or running are very loud and detract from the overall experience.



# MEZE 11 NEO IN-EAR HEADPHONES



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Noise isolation is also lacking so I wouldn't recommend these to anyone who commutes a lot on public transport.

When it came to consuming other media such as movies and games, the 11 Neo did an excellent job and I ended up using them every day in all of my media devices.

## CONCLUSION

If you're looking for a pair of IEMs and are on a very tight budget, it's easy to recommend the Meze 11 Neo as they offer great value for money considering the excellent build quality. Although not perfect when it comes to sound quality they are first in class when it comes to bang for your buck. I would recommend these to someone wanting to upgrade from their basic in-ears that came with their phone and enter the world of HiFi.

## AT A GLANCE

**Build quality:** Lightweight without feeling cheap. The packaging and included accessories match the build quality

**Sound Quality:** Brilliant bass and mids, however, falls short when it comes to higher frequencies. Offers a very pleasurable listening experience overall

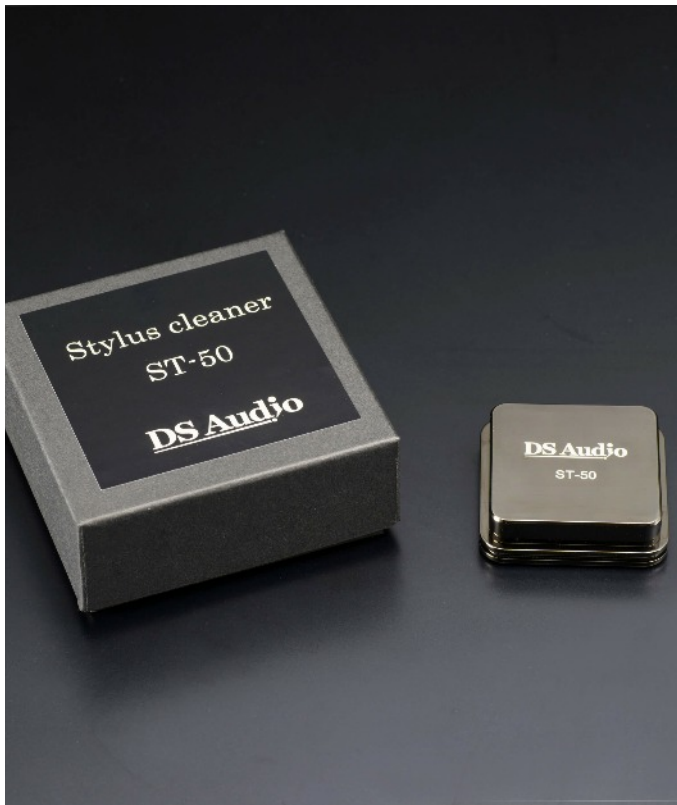
**Value for money:** Considering the build quality and the fact that I personally love bassy music, I think they offer excellent value for money

**Pros:** Great build quality teamed with brilliant bass and mids. Excellent value for money with plenty of useful accessories.

**Cons:** Falls short when it comes to higher frequencies and fail to isolate noise.

Price £49





## DS ST-50 STYLUS CLEANER

The ST-50 is a stylus cleaner that uses a urethane resin (sort of squidgy gel) inside an Aluminium box measuring 42mm x 42mm and 13mm high. The case is made from a solid block which is then buffed and then Nickel-plated and underneath is a leather cushion that stops the box sliding about on your turntable (I would much prefer cork or other non-animal sourced pad). The gel itself is reusable and you simply rinse it under a tap, let it dry for half an hour and it's back to as new condition. The lid ensures that the gel doesn't get contaminated with airborne dust and particles.

Using the ST-50 is simplicity itself; Lower your stylus onto the middle of the gel, lift it off, repeat a few times and the urethane gel catches all the visible dust that had previously been festooning your stylus. It's not a new idea by any stretch but what DS Audio have done is take the concept and put it in a beautifully finished package that feels very high-end. Of course, this kind of packaging and finish costs and in comparison to the competition out there many will find it to be

expensive for what it is at £75. Others will feel that the luxury element of the ST-50 makes the expenditure worthwhile.

Does it work? Yep, it works a treat and I've been using it before playing every record - the stylus is visibly cleaner for sure.

### CONCLUSION

The DS Audio ST-50 certainly works in getting visible dust and gunk off your stylus, even when looked at through a loup. Yes, it is more expensive than the cheap and cheerful competition but it certainly does tick all the luxury boxes.

**Price:** £75



## PRO-JECT SWEEP-IT E BRUSH

The unboxing experience is very simple but effective. You are presented with all the parts laid out in front of you and it is easy and obvious to assemble, 3 pieces that fit into each other, no need for instructions.

The cleaning arm itself is very well built, made from high-quality aluminium and it looks sleek in its black livery and wouldn't be out of place on a high-end turntable.

Using the Pro-Ject Sweep-It E is as easy as the assembly. Place the brush on the record when the record starts and that's it! The arm moves along towards the centre as the record plays.

It didn't affect the stability of my record player at all, something that I was worried about given the weight of its stand and I recognised no effect on speed. Likewise, I couldn't hear the brush through the stylus at all.

The Sweep-It E does a brilliant job of cleaning and all the relatively dusty records I used came out spotless.

When you've finished the brush rests on a small mount similar to a traditional tonearm.

The only inconvenience I found was that with my particular turntable (Pro-Ject Primary) was that I couldn't close the lid while having the Sweep-It E on, meaning that it had to live next to my turntable.

### CONCLUSION

It offers rudimentary cleaning of records a doodle, a factor that I believe stops many younger people from getting into vinyl. Other products of a similar design are available and this tad on the expensive side, but on the flipside, it is very well built and leaves records visibly cleaner and dust free.

**Price:** £55







## INTEGRITY HIFI TRU-LIFT AUTOMATIC TONEARM LIFTER

Ever fallen asleep whilst listening to records and woke up hours later with your precious cartridge playing the run-out groove? Tru-Lift Automatic Tonearm Lifter (US\$259 as reviewed) could well be the answer to your dreams...

You know that situation when you've been listening to records, had a glass of wine too many and then nodded off halfway through the second side of Dark Side Of The Moon and wake up a few hours later with thousands of pounds-worth of cartridge/stylus playing the run-out groove ad-infinitum. No? Well, I have lots of times – I've even gone to bed with the platter still spinning and the run-out playing. All this adds time to your cartridge and effectively reduces its useful lifespan.

There are lots of products out there, both within the Hifi world and without, that have been created for problems that have been made up in order to sell a specific product – not so the Tru-Lift; It addresses a problem that is very real.

The Tru-Lift Deluxe Package costs US\$259 and comes with one Mechanical Lift (the bit that does the actual lifting of your tonearm and four interchangeable sleeves so you can vary the height of the Lift depending on the turntable you are using. This Deluxe pack is aimed more at dealers and reviewers who set up and use different spinners. A variety of sizes are available as well as Tru-Lifts designed for specific turntables. The standard one size packs are US\$209. They are machined very nicely, and engineering-wise are brilliantly done, with everything being made of stainless steel.

The Mechanical Lift part of the set has a little antenna to it whose sensitivity can be changed, plus a small bar which is the bit that catches your tonearm. Basically, you set the Tru-Lift on your turntable plinth in accordance with the helpful setup videos on the Canadian company's website, push the arm-catch bar into the body of the Tru-Lift and play your record. Once the record reaches the end, the tonearm hits the antenna and the arm-catch bar gently lifts your

tonearm off the record – and there it stays until you wake up. Simple but effective.

Set up takes a few minutes and a few goes to get right with regards to positioning of the unit and its exact height, but I didn't need to change the antenna sensitivity, and once it's done it's done. And it works effortlessly once you get into the routine of pushing down the arm-lift bar whenever you play a record.

## CONCLUSION

There's not much to add to the above, to be honest. The Tru-Lift is truly one of those products that just does what it is supposed to do. It is well built and beautifully engineered, doesn't affect the sound of your vinyl spinner in any way and adds to the lifespan of your cartridge – what's not to like. Some will balk at the price, it's not cheap, but then you pay for a product that is built well and to tight tolerances and I reckon the Tru-Lift is well worth the asking price and pretty much an essential bit of kit if you have spent a decent sum on your cartridge. Indeed, if like me you are want to fall asleep late in the evening whilst listening to your tunes, I'd probably say that in the long run the Tru-Lift will actually end up saving you money on re-tips/new cartridges.

