

STAND YOUR GROUND

Blog

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[Audio](#)



For years, one of the best-kept secrets in hi-fi has been that the single most cost-effective upgrade you can make to any system (regardless of price or ambition) is to provide it with a dedicated AC supply equipped with a parallel, clean ground. Even after paying an electrician to do the work and deliver the hardware, the financial impact is negligible compared to even a budget box full of electronics, while the musical and sonic benefits are both substantial and fundamental in nature. That might seem like a bold statement but consider the issues for a moment and the logic is unassailable. Not only does the AC supply constitute the raw material from which your system is trying to recreate the musical performance (and as we've all experienced, a substantial part of a great meal is having quality ingredients), but it also provides the drain down which all spurious electrical noise is supposed to disappear – which leads us directly to the crucial question of noise floor...

Arguably the biggest challenge facing any audio system is matching the dynamic range of real life: not just the power and scale of real instruments, but also the micro dynamic subtleties, harmonics, and the immediacy of the energy they produce. Collectively these qualities define the system's ability to imbue the recording with a sense of musical presence, the impression of real instruments in the same space as the listener. You can add ever more power to your amplifiers

and buy increasingly efficient speakers to give the system greater headroom, but that's only half the battle (and financially and practically speaking, a losing battle at that). At the other end of the scale, banishing noise – making the system quieter – delivers equally if not more impressive gains and does so at a fraction of the price and domestic impact. The whole issue of dedicated supplies barely raises its head, with clean grounds an even rarer topic of conversation. Yet as I've already stated, both options deliver musically crucial benefits in terms of noise performance and musical integrity. Why aren't they automatic steps in establishing any audio system? Partly one suspects, because most of the dealers doing the advising and installing the systems would rather sell another box or a more expensive box than hand off the business to a third-party electrician. There again, it's not always possible to achieve a clean ground: It's all very well saying bury a ground post in the garden, but that doesn't help someone living in a third floor apartment (and let's also point out that your clean ground runs parallel to and isn't a substitute for the main AC ground – it's called a safety ground for a reason!).

But there are two things that we can say with absolute certainty: Given the ever-increasing amount of airborne and mains-borne pollution we suffer these days, any system will benefit from sensible attention paid to the quality of its AC supply and grounding arrangements: Secondly, irrespective of the steps you can (or can't) take to ensure AC and ground integrity, there's nothing to stop you extending the provision both within the system itself and beyond the electrical into the mechanical realm as well. The notion that electrical and mechanical grounding are directly equivalent might seem alien, but in reality they both act on the system's performance in exactly the same way, banishing spurious noise and lowering the noise floor. Just as the AC supply and equipment support are both crucial aspects of system infrastructure, helping define the operating conditions (and thus the potential performance of all those expensive boxes of electronics) so mechanical and electrical grounding act in concert. In issue 143, Alan Sircom discussed Nordost's Sort products, a range of components that offer mechanical grounding solutions across the complete system: it should come as no surprise that the various all-Sorts are designed to operate in tandem with and demonstrably deliver their best performance when used alongside the company's QRT AC distribution products. But these are only one example of a new understanding and a new category of infrastructure solutions, second generation grounding products designed to operate within the system itself to eliminate spurious noise and distortion. Let's look at three such products that promise to put a smile on the face of any system – and its owner.

The CAD Ground Control GC1 and GC3

CAD's Ground Control boxes are not the first of their type – that distinction belongs to Entreq, who have been offering their timber clad grounding boxes for some years. However, the CAD GC1 is smaller, considerably more attractive and also more effective than the agricultural-looking Entreq Silver Tellus. On paper, the svelte GC1 looks more expensive, but then just like its size, that is deceptive as it includes a ground cable in the price – a considerable extra cost when it comes to the Entreq products. Termination is user specified to suit, with options embracing everything from USB or BNC to XLR or 4mm plug. The box itself is a long, narrow acrylic case with a beautiful matte milled surface. Two 4mm sockets on the back are all the options it offers for connection, while its narrow footprint makes accommodating it within an existing rack a distinct possibility. Attractive, practical, and supremely effective: none of those qualities are an accident.



The GC1 was developed specifically to partner CAD's DAC and source components. The simple truth is that the vast majority of network elements and NAS drives emanate from the computer industry, a market in which noise is far less of an issue and most products are prepared to dump the sonic equivalent of raw sewage straight back into the AC ground – where it promptly pollutes the feed to and performance of not just the associated DAC, but any analogue electronics connected too. The GC1 was developed to act as a super effective sonic sponge, soaking up that noise before it got to degrade the performance of the CAD DAC. It was housed in the same chassis material as the parent product and designed to sit alongside it or on a shelf cluttered with the multiple smaller units so common in computer audio set ups. What makes it so effective? Inside is a wad of high-tech composite sandwich material that converts noise on the system ground to heat, before it can do any damage; an arrangement that helps explain the dramatic increase in efficiency (and thus the smaller size) when compared to Entreq's 'box of ground' approach.

Connect a GC1 to a digital output of your CD player or DAC, or a USB socket on your server, and what should you expect? No prizes for suggesting a substantial drop in noise floor – but what does that actually mean in musical terms. The most immediately obvious difference is that the background gets way blacker with separation and clarity both improving, along with instrumental texture, colour, and character. There's a dramatic reduction in grain and a new sense of crispness and focus to events, along with increased dynamic range, the ability of the music to

jump in level, and the speed with which the instruments respond to input. So far so good, but the really important stuff is lurking behind the obvious, cosmetic changes. That increase in precision and clarity, colour, and harmonic accuracy brings with it an increased sense of rhythmic precision and articulation in the playing. You can simply hear more clearly and accurately where each note starts (and stops) and how it relates to the other notes around it. Phrasing becomes more explicit, there's greater dramatic contrast in the performance and a greater sense of ensemble, the band playing together. In broad musical terms, the performance gains presence and immediacy, emotional and dramatic impact. It sounds more like people and they sound like better musicians. Which is all pretty impressive stuff. But it gets better...



Where the Ground Control really comes into its own is once you hook it up to the central ground point of the system as a whole – in my case the ground terminal on the QRT QB8. That produces an even bigger difference – and it does it for all sources. Now, if you are wondering why there are two sockets on the back of the GC1, it's so that you can daisy chain them together for greater

capacity – something that's definitely needed with the main system ground. Fortunately, CAD learnt from their experience and produced a larger GC3 – more than three times the composite material in one, standard chassis box for around twice the price of a GC1. If you thought the GC1 was impressive on your digital equipment then wait until you hear the GC3 on the main system ground!

The difference the Ground Controls make is so profound in my system – a system that already has a fully realized, dedicated AC supply and two parallel clean grounds – that they have become indispensable. I now run three GC1s (CD player, phono stage and preamp) and a GC3. Expensive overkill? Expensive certainly – but worth every penny. The really shocking thing is that I've heard just how big a step up I get by using a second GC3 on the pre-amp in place of the GC1. Four figures per box might seem like a lot when those boxes glory in delivering nothing – but then it's a nothing that really matters to your system. Hearing what the Ground Controls can do doesn't make them any more affordable, but it will definitely make you wonder how you can scrape the necessary cash together! Simple and stunningly effective, both the GC1 and GC3 get the highest possible recommendation.

Getting Physical... with Neodio and HRS

The beneficial impact of simple cones or spikes under equipment isn't exactly news. What is new is that we've finally started to figure out about how these things work and how they fit into the overall scheme of things. By referring to racks and equipment supports as 'isolation', we have been missing the point. Isolating equipment from structure-borne energy is certainly beneficial – but it's only half the story. What we actually may be working on isolating is the signal, not the equipment. The boxes (and cables) that generate, transfer, or amplify that signal are subject to the impact of airborne energy, especially if they are in the same room as the loudspeakers. At the same time, the operation of the circuits and their power supplies generates its own vibration, admittedly low-level, but right where the signal is and in an environment that's often poorly suited to dealing with mechanical interference. In this situation, the rubber feet fitted to electronics, far from protecting the delicate signal, actually make matters worse by trapping energy within the chassis – which is why bypassing those feet with an effective exit path can have such a profound impact on system performance.



Mechanical grounds can be as simple as the Cardas maple blocks or basic aluminium 'tip-toes'. But as more sophisticated solutions have appeared their impact has become more and more impressive, with the Neodio Origine B1 and HRS Vortex being the latest and most effective I've come across. But to get the best out of them you need to use them properly – and that means prioritizing their application to the noisiest components. Presented with a set of feet, most people tend to reach straight for their CD player – not a bad call considering there's a transport whirring and rattling about inside. But actually, there may well be even more effective applications than that. Power transformers and power supply capacitors are two of the biggest noise problems in audio electronics, transformers because they vibrate at mains frequency (as well as being directly connected to the grid, itself a major source of mechanical energy) and capacitors because they are physically large and vibrate in time with the music! In fact, when it comes to deploying mechanical grounds, a really good guiding principle is to 'follow the power', a strategy that often leads to treating not just your power amp first, but even before that, the AC distribution block.



What does mechanical grounding deliver? The results are similar and complementary to cleaning up the electrical ground. But where a clean electrical ground is most readily apparent in the blackness of the background, the richness of instrumental colours and the absence of grain, mechanical grounding leans more on the concentration of energy, generating a dramatic increase in presence, impact, and musical purpose; at least if it's done properly – and that depends to some extent on the equipment involved. The HRS Vortex is the perfect case in point. Specifically developed to deal with the extremely stiff, slab to slab or milled from solid chassis found on so many high-end products, a specially formulated, large area polymer interface grabs high-frequency noise from the chassis, routing it into the stainless steel body. The polymer's behaviour is frequency dependent, 'hard' at higher frequencies while delivering some damping lower down. An internal labyrinth disperses much of that first wave, while the spiked body feeds the rest into the supporting surface – so yes, what you sit these things on does have a significant effect as we'll see. The Vortex is also unusual in coming as a set of four, with one having an adjustable dome in place of the fixed cones of the others. That ensures that you can achieve level and stable support while more surface contact area makes for a more effective drain. And yes, four sound noticeably better than three. Used under the VTL electronics or the Wadia or Wadax digital front-ends, the Vortex is transformational, injecting such life and immediacy into the performance that it becomes dramatically more vivid and engaging.

But what of other products that employ a less rigid chassis construction?



HRS offer their simpler and more affordable Nimbus couplers for this application, with a softer polymer interface top and bottom that increases the chassis damping quotient. But the Nimbus doesn't match the leap in performance achieved by the Vortex. For that, you need Neodio's Origine B1 (price yet to be fixed but very much in the same ball-park as the Vortex). Under ARC electronics or the Berning amplifiers, the B1 feet really shine. Another design that incorporates a dispersive labyrinth, the Neodio supports don't match the dynamic range of the Vortex, but they excel when it comes to instilling a sense of musical organization, flow, and phrasing – preventing the stored energy in a chassis from cluttering and impeding rhythmic articulation. Unlike the Vortex, the B1 also offers a screw thread interface, meaning that it can be used with speakers, another realm in which they shine. One tip to bear in mind with the B1 – they seem to prefer a lossy supporting surface, like wood or bamboo, as opposed to hard interfaces such as granite or marble. But carefully sited beneath the greatest sources of mechanical energy, three or four Origine B1 feet under the likes of Audio Research's Reference CD9 or Reference 10 line stage have a really quite remarkable impact on the system's temporal articulation, phrasing, and forward momentum.

When it comes to maximising system performance, grounding is the latest area for exploration. We've always known about supplying a clean ground for the system's AC supply, but taking the principle within the system and embracing mechanical as well as electrical grounding can deliver startling benefits from even well-established set ups. The CAD GCs banish noise and bring life, space, and colour in its place while the carefully considered application of mechanical grounds adds presence, energy, and timing. I'd happily recommend the GCs in any situation, while the Vortex, Nimbus and Neodio Origine B1 supports require a little more understanding/experimentation. Really rigid cases will love the Vortex, while a more flexible chassis may well prefer the Origine or Nimbus, the supporting surface playing its own part. But one thing's for certain: any one of these support solutions properly applied will deliver a seriously impressive (and cost effective) result – and yes, putting a set of grounding feet under the CAD GCs further improves things, demonstrating that CAD units deliver both an electrical AND a mechanical ground. But, even if both mechanical and electrical grounding deliver obvious benefits in isolation, it underlines that you really don't get the Full Monty until you implement both together. That's when you get another of those, "I never realised just how good my system already was" moments!



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