CAD Ground Control-Reference grounding box

by Roy Gregory

When it comes to audio, it seems to be hard to get majority agreement on anything, but the one exception to that rule is the broad concept that less is (generally speaking) more. But even here you can run into trouble once you start drilling down as far as cause and effect. Just take system grounding as an example: less noise – definitely good: the proliferation of separate ground boxes? Suddenly, customers are not so sure – especially once they start to factor cost into the equation…

Not so long ago, system grounding was the brave new frontier, virgin territory for system improvement. Despite the established efficacy (and minimal cost) of a dedicated AC line and parallel clean ground to feed your audio system, remarkably few audiophiles, customers with many thousands of hard-earned pounds invested in hardware, had seriously trodden this path. It took the likes of Tripoint and Entreq to attract serious attention, something they achieved by producing large boxes of 'ground' with even larger price tags. If Entreq's homely, wooden crates looked expensive, they were an absolute bargain ▶

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compared to the $25K price-tag attached to Tripoint's Troy Signature, the starting point in a range that tops out at around twice that! Not surprisingly, given the extreme pricing but also clearly audible benefits, it wasn't long before more affordable, second generation ground boxes started to appear in the shape of the CAD Ground Controls and Nordost Q-Kores. In fairness to Entreq, they'd always produced smaller, more affordable units, but they never came close to the performance of their large, Tellus units – whereas the CAD and Nordost boxes did.

Given CAD's dedication to USB and network file replay, their natural fascination with things digital is understandable, the impact of their GC1 and larger GC3 on digital system performance entirely understandable. But even so, the arrival of the £20,500 Ground Control-Reference still came as quite a shock, a passive ground solution that costs considerably more than CAD's server and DAC put together! And that was before I tried to shift the thing… At 50kg the GC-R's doesn't just look solid, it might as well be solid. That weight is down to two things: the sandwich of man-made materials inside and the substantial resin-mineral casework. The internal sandwich features the same ingredients as the other GCs, but the precise proportions vary between the different models. What they all do is absorb serious quantities of noise, particularly high frequency noise, converting it to heat. Think the same stuff you'd find in the wings of a stealth fighter and you'll be somewhere close. The problem with the mixed materials is that they weigh a lot. The acrylic casework on the GC1 can just about cope, but it needs to be doubled up for the GC3 and, once you get enough to build a GC-R, that weight becomes a real problem – hence the substantial casework. Built from Krion, a product not unlike Corian, it is strong enough and non-metallic but also heavy, although in this case the added mass allows the GC-R to sink vibrational energy even more effectively than its acrylic-clad siblings. The cabinet material at least opens up a choice of colours, although you'll need to get a quote for that flip-flop purple you've always fancied. But there's no escaping the brutal reality that the end result leaves you with a serious logistical challenge to go with that peripheral mechanical advantage. All of which invites several questions – not the least of which is who in their right mind would drop this kind of dosh on a facility that theory suggests can be achieved with a bit of wire and a 13A plug?

The premise behind the GC-R (and all the other high-zoot grounding boxes) is that they provide a separate, clean

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ground for the system's signal bus, independent of and in addition to the (essential) AC ground – although they can also be connected to the star-ground of an AC distribution block. That they work is, frankly, beyond dispute if you actually bother to listen to them. How well they work will depend on the system and the situation. Given the £20K ticket on the GC-R it seems fair to assume that it will be used with equipment of commensurate cost and, in many cases that will include multi-box digital replay rigs. It will also include systems where the owner hasn't or can't institute a separate, parallel AC ground. So the real questions posed by the GC-R are not, "Does it work?" – it does, spectacularly well – but should it be viewed as an addition to a separate AC ground, a substitute for one – or both? And related to that, is it a partial or total system solution?

I was fortunate enough to have a complete suite of CH Precision electronics in-house when the GC-R arrived: fortunate not just because they afforded the necessary multi-box digital front-end and eye-watering system cost, but because each component also offers the ability to separate the analogue signal and digital control grounds. With star-grounded QB8 distribution blocks and a separate, parallel AC ground I was able to really ring the changes when it came to grounding arrangements – so much so that I'm going to skip the long and convoluted step-by-step analysis and cut straight to the conclusions. Along the way I compared (by stages) connecting just the digital, just the analogue or all of the system components to the GC-R: I rang the changes on the individual component grounding arrangements and I compared connecting the QB8s to the parallel AC ground, the GC-R and strapping all three together in every conceivable arrangement. Yep – it took a while… but the results are in and they're pretty unequivocal save the one big caveat I'll save for last.

The upshot of the component connection is pretty straightforward. Connecting the analogue units to the GC-R brought a worthwhile benefit in terms of lower noise floor, focus, dimensionality, stability and a more natural, communicative quality to performances. Connecting just the digital components was actually less successful. It reduced the grain and noise in the soundstage and improved the sense of order and focus, but it did little to help the sense of musical pace or purpose. However, connecting both digital *and* analogue components to the GC-R resulted in a really significant step up in performance, with gains not just in terms of detail, separation and focus, but more natural colours, greater presence and more immediate presentation. In terms of bringing performers and their performance into the room this was a huge step up.

As to the connections themselves (the GC-R offers eight ground points as standard, although the number of ground points and the necessary ground cables can be specified to suit a given system and are included in the price) I found that connecting to a single digital input on the DAC – the USB proved best – was better than multiple connections to the transport and various inputs. The dual-mono line-stages and the power amps each required a signal-ground wire and in all cases I left the signal and digital control grounds tied together with the units' jumpers. Which brings me to the second counter-intuitive result (the first being the superiority of combining as opposed to separating the grounding of digital and analogue components): on the face of it, having separate ground paths for the digital control circuitry looks like a heaven sent opportunity to reduce system noise, but in practice, pulling the jumpers and running separate ground wires to the GC-R was a case of slightly different rather than better, while running those ground wires to a separate GC3 was definitely worse. The two exceptions to the findings so far, both involve the C1 DAC. This was the one instance where separating the digital ground proved beneficial, improving the sense of musical flow and phrasing, delivering more natural diction and greater expressive range. The other (slightly odd) connection that proved worthwhile was grounding the USB Firmware Upgrade port. I have no idea why that would be, but repeat comparisons left me with a firm preference and the ground cable in place.

Finally, there was one other external component that really benefited from additional grounding – and it's not even an audio device. Anybody relying on network replay (or network control in this instance) will likely be using a network switch. Although audiophile grade switches with linear power supplies are becoming more common, most people will be using generic, computer industry items – in my case a stock Netgear unit. Grounding one of the vacant ports to the GC-R

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removed a persistent glaze from the soundstage that had been lightening the blacks and filling the intra-instrumental space. Although I intuitively knew that the switch would be noisy, I wasn't ready for the scale of the improvement and in any file replay system this is clearly a place to start, not just with grounding but the choice of switch (and its PSU) in the first place.

But the biggest surprise still lay in wait, only emerging when I started to play with the QB8s and the parallel AC ground connection. Tying the distribution blocks, GC-R and AC ground together proved a big no-no, with a splashy and disjointed musical result. The AC ground alone was impressively dynamic, planted and weighty, but connecting the QB8s to the GC-R delivered almost all of the weight from the AC ground but with much better low-frequency definition, texture and articulation. More importantly, there was a vast improvement in the sense of rhythmic and musical coherence, producing an immediately more engaging and communicative performance. Where I'd hoped the GC-R might offer an alternative to a parallel AC ground for those who can't access one, it actually trumped the AC-based alternative (at least in my situation) offering cleaner, more natural and more enjoyable system performance – and by no small margin and across all musical genres. This is no sonically subtle shift, no "bit more air" or "slightly crisper drum beats" change. This is fundamental to the structure, sense, intelligibility and enjoyment of the musical event. Since it arrived, the GC-R has been an ever present in the ever-changing system in my main listening room – and given my druthers ever present is what it would remain. If you still think that passive grounding solutions are so much hokum, then you should hear the GC-R in action. It's musical benefits are kind of hard to ignore!

Yet there's one huge caveat that applies to all of this. These results involve one system and more importantly, one situation. The AC ground on my incoming supply is not the quietest, given that it arrives by the aerial route (hence the parallel grounds) – unlike my previous room, which was first on the line, 50 yards from the sub-station and near perfect in performance. There, none of the separate ground solutions superseded the parallel connection, but always delivered their best results in conjunction with it, along with a separate solution for the signal grounds. The increased potential for improvement with my current AC supply, along with the increased capacity of the GC-R has totally altered that equation – and that's really the point. What you hear, how big the differences are and what value you place on them is going to depend on your specific system and circumstances. £20K is a lot of anybody's money, but in the context of the review system (around £400K plus cables) the GC-R's contribution was so far beyond cost efficiency as to make it a no-brainer. Different system, different equation but, with products to suit most systems and most pockets, it should be possible to start with a Ground Control option that doesn't demand a five-figure leap of faith. Whether you need or can justify a GC-R, a far more affordable GC3 or the smaller and even more affordable GC1 will be a decision for individual listener and specific circumstances, but if you are serious about the performance of your system, it's worth making sure that it IS a decision and not just a theoretical assumption. No – I'm not saying that you need to start saving the coin to drop the wrong side of £20K on a large, heavy and essentially inert box. I am saying that optimising your grounding arrangements is fundamental to hearing what your system is capable of – and getting the benefit you've already paid for. Just be aware that investigating grounding boxes is a little like cracking open Pandora's box; you are never quite sure where or how far it might lead… +

TECHNICAL SPECIFICATIONS

Type: Passive grounding box
Ground Points: 8 as standard, but can be user specified
Connections: 4mm banana plugs
Grounding Cables:User specified terminations
Dimensions (W×H×D): 469 × 400 × 231mm
Weight: 50kg
Finish: Dark gray (other finishes to order)
Price: £20,500

Manufactured by: Computer Audio Design
URL: computeraudiodesign.com
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