



Gallo Nucleus Reference 3 Loudspeaker

by Roy Gregory

When it comes to unusual (even bizarre) products then tonearms rule the hi-fi roost. Weird, wonderful and invariably expensive structures abound, exotic materials and manufacturing techniques rubbing shoulders with the frankly homespun. But loudspeakers run them a close second. The fact that even quite sophisticated drivers are readily available off the shelf combined with the hobbyist's natural spirit of enquiry and adventure creates a volatile mix. Factor in the sheer variety of driver technologies and options when it comes to bass loading and the possibilities appear something close to infinite. However, as so often, appearances are deceptive. The nature of speaker design means that, under the vastly different exteriors, many of these designs represent no more than variations on established themes. Unfortunately, the plethora of alternative "visions" serves only to obscure the few that are truly original.

Whilst many companies have played with spherical enclosures over the years, as far as I'm aware, Gallo were the first to actually use this approach in a commercially available design. Those original models featured largish mid-bass spheres coupled with the Linaeum DCT tweeter to produce stand-mounted designs of stunning appearance (and dispersion). And lest you think that these speakers were a mere novelty, their sonic performance was good enough to warrant UK distribution by no lesser a party than Absolute Sounds.

Of course, more recently, Gallo have carved themselves an enviable

reputation for their tiny, spherical satellite speakers and cylindrical sub-woofers. But there, lurking between the twin balls of their top satellite model the Due, you'll find lurking the familiar form of the CDT high-frequency driver. So, whilst the dimensions and overall concept might have changed, the execution and ingredients have remained very much the same. Until now...

Gallo have just launched their first floorstander in the shape of the Nucleus Reference 3. And shape is the word.

Rarely have I seen a speaker with such striking looks, no matter what angle you approach it from. But once you get over the visual impact and actually study the speaker it quickly becomes apparent that in reality it represents a modular unit, tied together by the mechanical spine. Just don't assume that any of the individual elements are the same as the satellite and sub units they appear to resemble.

The central core of the Reference 3 is a massive aluminium casting, constructed in two, mirror-imaged sides and securely welded together. Spacing bars ensure correct positioning of the rear slot as well as bracing the sides. Remove the rear panel, held in

place by no fewer than 20 substantial allen bolts, and you reveal the hollow interior, stuffed full of acoustic damping material. The crossover is mounted on the rear panel, the latter covered across its entire length by a rubber damping sheet. This is an extremely solid and rigid structure, to which the various drive unit enclosures are secured, decoupled by rubber

interface mats designed to prevent rattles or mechanical non-linearities.



The carbon-fibre coned, 100mm chassis-diameter midrange drivers are mounted in the front of 120mm stainless steel globes. Gallo employ a patented approach dubbed "Roundsound S2" to decouple the rear-wave of the drivers from the enclosed air-mass, although they offer no details as to how this is done and the drivers themselves are not easily removed for examination. In an arrangement reminiscent of the Due, the two stainless steel balls flank the central tweeter, however, in this case the balls are bigger than those in the satellite design which

► necessitates shifting the high-frequency unit back a little to maintain correct time alignment.

CDT stands for Curved Diaphragm Tweeter, which is literal enough without really telling you anything. A silver plated plastic sheet is curved in tension between magnets so that it pulses, or breathes, when the signal is passed through its conductive surface. Closest in concept to a tethered ribbon of the type seen in the Eben speakers reviewed recently, Gallo also claim a -3dB point for the DCT at 50kHz , delivering more than enough extension to render super-tweeters superfluous. In common with many other American speakers, the Reference 3s offers the user a rear mounted, tweeter-level control. The three position switch is simply annotated +, 0 and – and you set it by ear.

But it's the bass where things start to get really interesting. Positionally of course, it's weird enough – perched up there, sideways on the speaker's leading edge and almost devoid of baffle area. The ten-inch, pulp coned drive-unit is contained in its own compact, stainless steel cylindrical drum, not much deeper than the driver's basket and motor. It's an elegant arrangement and certainly visually striking, but not an ideal way, you might conclude, to maximise low-frequency output. But, there are a few tricks up the Gallo's sleeve.

Firstly, despite its apparently exposed position, the Reference 3 places its bass driver much closer to the floor than the vast majority of modern floorstanders, and that brings bass-reinforcement benefits. I believe that there's also a port that vents from the driver's drum into the speaker's spine, thus increasing the available volume of air, loading the driver in a complex infinite baffle arrangement. "I believe" because, short of stripping all the damping material out of the upright it's impossible to be certain. Interestingly, the tapered and

mechanically separate nature of the spine's internal volume should help prevent standing waves and acoustic energy hitting the back of the driver's cone and causing intermodulation distortion of the type that smudges bass timing and detail.

Secondly, the mirror image nature of the speakers means that they can be placed drivers in or drivers out, firing into the soundstage or into the room's corners, thus allowing some control over stage-width and room interfacing at low frequencies. It makes set-up a slightly more experimental process than with a conventional box, but it's hardly rocket science and you should always have the help of your dealer, who will, presumably, have used the Reference 3s in a variety of different rooms.



Thirdly, and least obvious of all, is the second set of speaker terminals, located at the bottom rear of the spine. Easy to assume that they're for the standard bi-wiring/bi-amping arrangement which is virtually standard on current speaker designs.

Not so. Look at the label next to the sockets and you'll see that it says "Sub In". That's because it connects directly to a second voice coil wound on the motor's former. This is designed for direct connection to the Gallo BAM (Bass Augmentation Box)

a rack width chassis containing an adjustable active filter and amplifier to extend the Reference 3's low-frequencies. The BAM is an optional extra that will cost in the region of £800 in the UK, however, it is only an option and we reviewed the speakers in their standard form, in which guise they reach down to an impressive claimed -3dB point of 34Hz . Active reinforcement takes that further still, down to 22Hz ! Both figures become even more impressive when you take the speaker's compact dimensions into account. The Reference 3 is a lot smaller in the flesh than it appears in photographs, while its extraordinarily slim frontal area further reduces its visual bulk. In fact, at only 89cm tall in total, the tweeter sits a mere 69cm off the floor. Gallo supply a set of chunky floor-coupling cones that also serve to tilt the speaker back, designed to bring the tweeter's horizontal axis up to seated ear height.

Which brings us, I guess, to the rest of the numbers. We've looked at the speaker's diminutive dimensions and surprising bandwidth of 34Hz to 50kHz ($\pm 3\text{dB}$). Now add in an impedance of 8 Ohms , an efficiency of 88dB and a continuous power

▶ handling of 350 Watts and on paper you're looking at a potent and extremely well balanced package. Okay, so the sensitivity is a little on the low side, but the ease of drive and prodigious power handling certainly help to compensate. Now, and most important of all, the price. The Gallo Nucleus Reference 3 retails for £2400. Not exactly chicken feed, but it's an awful lot of speaker for that sort of money in every respect except its physical presence – and that, of course, can be a positive advantage.

One issue confronting any speaker that makes such a strong visual statement is the acceptability (or otherwise) of its appearance. Normally, I'd leave that one to the eye of the individual beholder, however in this case, a few additional observations are necessary. The Reference 3 is one of those products that looks a lot more attractive in the flesh than it does in most photographs. That's partly down to the solidity of its construction and the quality of its finish. But it also reflects the essential visual harmony of its various shapes and the way in which they combine. It's a package that has attracted universally positive comment from all those who've seen it – male and female. And that's with the high contrast silver on black finish option. Gallo know a thing or two about domestic harmony, and they've applied everything they know to the Reference 3. Such as? Well, the driver enclosures come in the brushed stainless finish shown, or a more discrete satin black. The speaker's foot is also available in cherry or a blond maple veneer for a slightly more organic, less monolithic feel. But the real trump card is the skeletal grille that completely encloses the spine and drive units if you so choose. Subtly curved in profile, the space-frame construction keeps the fabric well clear of the drivers and offers minimal acoustic interference. It simply drops over the speaker and is then

clamped securely in place by three, knurled allen bolts that screw, top to bottom, into threaded bosses welded to the spine's back plate. Positively located by the step around the foot, it creates a structure that's stiff and strong enough to pick the whole speaker up by – although I wouldn't actually recommend that.

The end result is compact and discrete enough for any environment, whilst retaining enough shape to remain innately stylish. Doesn't it rather defeat the object?

Well, no. You see, Gallo have been really clever in choosing a lightweight,



open weave fabric. Sonically superior, it also gives owners the option of back-lighting the speakers with something like a small halogen placed on the floor behind them. It's a stunning effect, illuminating the grilles from within, revealing the speaker's silhouette and offering subtle highlights off of the curved surfaces. Stylish? In spades and in any language you choose.

Setting up the Gallos, as I hinted earlier, is slightly more involved than with some speakers, however, it's mainly a case of different rather than

any more difficult. Start by spiking the speakers and placing them pointing straight out from the rear wall and maybe 18" clear of the boundary with the tweeter switches in the zero position. In most cases I'd start with the bass-drivers pointing outwards. Choose a record or disc with nice, clear bass that covers a decent range – upright bass works pretty well in most cases. Move the speakers forward or back (using a tape measure to ensure symmetry of all adjustments) for the best combination of bass weight and pitch definition. Next, take a recording with a good central vocal and work on toe-in. If the soundstage sounds congested look to spread the speakers laterally. If the voice sounds insubstantial and lacking body, now is the time to consider swapping the speakers so that the bass drivers point into the soundstage. Just remember to mark their positions before you shift them. If you do swap them you'll have to readjust for bass weight, but the previous placing will serve as a good starting point.

Once you've got the lateral spacing right (and it'll probably be slightly wider than you expect) it's time to fine-tune the vertical angle of the speakers. Start by getting them absolutely vertical using a spirit level across the front edge of the foot. Then, sitting in the listening position slowly rock your head forward and back through 18 inches or so.

Listen for best focus, dimensionality and coherence. That will indicate when you're on the tweeter axis, and be aware that what you are listening to is really the mid-band rather than the high-frequencies. If that point is ahead of your normal seated position, use the spikes to tilt the speaker slightly towards you, or vice versa. Once you are happy measure the angle of the speakers along the side of the foot ▶

▶ and ensure that they are identical. Make sure the feet are totally stable on the floor and use a spanner to tighten the lock nuts on the cones. Now go back to your bass track and ensure that everything is as it should be. Now is also the time to check the tweeter level. Pay attention to its effect on bass speed, integration and definition. I ended up with it flat, but play with this, because it makes a real difference. I found that I needed to push the speakers back about an inch to compensate for the toe-in, necessitating readjusting the tweeter axis, but it really is worth taking this much care.

It might sound complicated but basically, what you are trying to do is balance the bass reinforcement from the side and rear walls against the super-tweeter level, to get the best soundstage dimensionality and musical coherence. Once you hear what the tweeter control does to the midrange and bass, you'll soon get the hang of it. Once again, in most cases it'll probably end up flat, but this and the in/out option on the bass drivers actually makes it possible to achieve this speaker's considerable potential in a wide range of different rooms – and that's before you consider the BAM.

I used the Reference 3s on the end of the Wadia 861 (with and without the Reimyo DAP-777) feeding the Hovland HP200/RADIA via the Nordost Valhalla signal and mains cables. Vinyl front-end was the Clearaudio Master Reference record player, while the excellent Burmester CD Player 001 also made an appearance. The bi-wired Valhalla speaker cables were doubled up by clamping one plug behind the speaker's binding-post and putting the other into its 4mm socket – better than a single run, but hardly ideal: Far better to get a set of high quality single-wires made up by your dealer.

On the face of it, that system might seem like overkill for a speaker at the Gallo's relatively modest price. In practice however, the Reference 3s

are perfectly comfortable in this kind of company. As soon as you play them you notice their speed and open presentation, their focus and quick dynamics. So much so that they easily eclipse their conventional price peers. Most of the speakers I run at home slot into the £4000 to £8000 bracket, and the Gallos beg comparison with those products in the sense that they challenge their strengths and its really only in that context that their weaknesses become apparent. So, with that in mind I'm going to do something a little dangerous: I'm going to measure the Gallos against the standards set by the best of the competition at between twice and three times their price. It means they'll come in for criticism, but what you have to remember is the context of that criticism.

Perhaps not surprisingly, the real strength of the Reference 3 lies in the absence of the normal, boxy colourations. The equal and opposite energy generated by the frenetic movement of driver diaphragms has to go somewhere. Secure them to a rectangular, wooden structure and the panels that make it up will start to shake at their various resonant frequencies, taking the broadband energy they receive and re-transmitting it as spikes of energy within discrete bands. Some of that energy goes straight out into the room, some of it goes back through the speaker's structure and the driver's basket into the diaphragm itself. The net effect of this intrusive energy is to blur and confuse the information generated by the drive unit. Because it happens at specific frequencies, dictated by the dimensions and structure of the cabinet, these distortions take on an equally specific and recognisable character.

Of course, manufacturers who produce speakers in conventional wooden cabinets go to great lengths to minimise these effects. Witness the rash of boat-backed cabinets or the

enormous care that a company like Avalon puts into its enclosures. Material choice and mix, bracing and shape all have a significant part to play. But the also cost a lot of money to execute. Combine that fact with the unfortunate reality that the bigger the cabinet the bigger the problem, and that the cabinet is the most expensive part of a loudspeaker, even before you start doing anything fancy with it, and you begin to appreciate why the bass response of most sub-£1000 floorstanders is about as clear as mud.

By adopting such an unconventional approach to the cabinet for the Reference 3, Gallo have killed two birds with one stone. The cast and welded aluminium spine, with its complex shape and multiple braces is far more rigid as well as being cheaper to execute and finish than a wooden box. It's at the heart of both the Reference 3's sound and its price. Combine it with the technology already developed for their satellite speakers (and subs) and they're onto a winner.

So far so good: The problem is that, in banishing box colouration, that most obvious of speaker artifacts, you risk exposing flaws that are otherwise obscured. It's rather like electrostatic speakers. What people think they are hearing is their lack of box colourations. But other panel speakers lack boxes, yet they don't have the characteristic "electrostatic sound" that characterises that sort of drive units. There again, ribbon and planar magnetic drivers use different structures and materials to most electrostatics. What you hear when you listen to an electrostatic is not the absence of box colouration: Rather it's the absence of box colouration allowing you to hear drive-unit colouration. The loudspeaker as Hydra – banish one problem and another rears its ugly head.

In the case of the Reference 3, you are actually faced with a slightly different scenario. The average

▶ electrostatic uses a single driver to cover the majority of the range. This delivers both a coherent presentation and consistent colouration! But we all know about trying to integrate moving-coil woofers with electrostatic panels, and just how hard it is. The Gallo faces the issue of trying to integrate three different driver materials and two different driver types. What this means in real terms is that the crossover engineering becomes critical, with the slightest discontinuity ruthlessly revealed. In truth, the designers have done an excellent job, but it isn't flawless. Whether it's the shift in dispersion angles between the midrange drivers and the tweeter, or the change in materials (probably a combination of both) there is a change in tonal character as you ascend the frequency range. The treble has a hint of the plastic-y hollowness that I hear from a lot of electrostatics, which contrasts with the rich warmth and substance of the broad mid-band.

What does this mean in terms of music? As I've noted, pace, dynamics and musical structure are all first rate making the Gallos engaging and enjoyable to listen to. There's a rewarding sense of weight and impact from the bass that provides a firm foundation for the focussed substance of the midrange. Vocals are beautifully solid and separate, with a nice sense of space behind them and shape to the words. That open presentation, uncluttered or muddled makes music and its meaning immediately accessible. Combine that with the impressive timing and rhythmic fluidity and integrity and you are ensured of a communicative experience. So, musically the

Reference 3s are definitely all there. Just listen to the way they sail through the rhythmic minefield that represents Jackie Leven's stunning and complex cover of 'You've Lost That Loving Feeling', or the emotional sleights of hand that represent the pain and loss of 'Single Father'. No shortage of agility or expressive musical insight then: That's what raises the Gallos well above the expected performance level.



Where the Gallos have failings is, as I've suggested, tonally at the top-end. Even then, they're neither intrusive nor destructive. There's not a hint of spit or edge to irritate or subliminally annoy. Indeed, if anything it's a shade too smooth. Jackie's voice

loses some of its complexity, taking on a homogeneity and sweetness that anybody who's heard him live would certainly question. The XRCD re-issue of Britten conducting his *Young Person's Guide...* reveals both the Reference 3's strengths and weaknesses. There's an impressive weight, power and texture to the orchestral depths, with excellent

spread and placement of the individual instruments within the sound-field.

Imagery is specific, fastening on instruments at the expense of the acoustic boundaries, which is much more in the style of a mini-monitor than a di-pole. The timps are wonderfully resonant, while the carefully layered structure of the piece is beautifully rendered.

On the downside, the piccolo has an exaggerated, piping quality, the triangle and other high percussion has a hollowness and lack of body. Cymbals are all frizz and no fundamental.

Most troublesome are massed violins that take on a smoothness and gloss that robs them of edge, texture and bite.

Likewise Martzy who comes across as rather too polite, and Camilla Wicks who suffers a similar

infusion of grace and manners, robbing both these powerful performers of some of their poise ▶

▶ and impact. The violin, more than any other instrument, suffers from the mid to treble discontinuity. That first swooping theme that opens the Wicks' Sibelius concerto loses some of its haunting quality, the solo instrument some of its command, integrity and tension.

So, here we have a conundrum: A speaker that performs superbly in terms of its musical and structural (in every sense of the word) integrity, but one that exhibits a single real flaw. The advantage of course, is that with such a specific issue it is relatively easy to take ameliorative measures. The combination of the stark neutrality of the RADIA and the high frequency energy levels of the Valhallas represent a worst case scenario. Why then concentrate so heavily on this set-up? Precisely because the Reference 3 is so good in other respects that it becomes important to understand the limits

of its performance – and place those limits in a proper context. Which is what I'll attempt now.

Were I going to live with the Reference 3s (a proposition that I find really quite appealing) then I'd run them on the end of a different system. My first choice would be the Rogue Audio M150s (or the stereo 90 if it had enough guts) with the Chord Signature cabling, a combination that would make the most of the speaker's musical

the high-frequency body and balance. But I fully intend to follow this strand further. It's just that I'm way over word count already.

As it stands, the Gallo Nucleus Reference 3 is a fascinating speaker that will bear comparison with competitors at far higher prices. Only then, and only when driven by the most critical electronics, does its musical integrity begin to suffer, its flaws begin to reveal themselves. But, those flaws are relatively minor in scale, and more importantly, are rarely musically destructive.

It may lack the overall coherence of the KEF Reference 207 or Avalon Ascendant, but that you can compare it at all is impressive given the price differential. Compared to designs that sell closer to the retail price of the Reference 3s? No contest I'm afraid.



enthusiasm and dynamic capabilities without accentuating the issue of tweeter integration. Having had these units in the house recently you might well wonder why I didn't do exactly that? Unfortunately the Rogues had to go before I had the chance. Then there's the whole issue of extending the bass and the effect it'll have on

TECHNICAL SPECIFICATIONS	
Type:	Three-way infinite baffle loudspeaker
Drive Units:	1x CDT tweeter 2x 100mm carbon fibre midrange 1x 250mm pulp cone bass
Bandwidth:	34Hz – 50kHz (±3dB) 22Hz with active bass module
Sensitivity:	88dB
Power Handling:	350 Watts continuous
Nominal Impedance:	8 Ohms
Dimensions (WxHxD):	203 x 889 x 406mm
Weight:	21.3kg
Finishes:	See text
Price:	£2400
UK Distributor:	
Anthony Gallo Acoustics	
Tel. (44)(0)870 350 1348	
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