



# CASTLE ACOUSTICS RICHMOND ANNIVERSARY

LOUDSPEAKERS

**D**éjà vu. Castle's new Richmond Anniversary bookshelf speakers look so much like the company's Richmond Classic 3i model that when I unpacked the review samples, I thought Castle had simply 're-issued' the Classic 3i in an 'Anniversary' model, perhaps with some upgraded terminals and/or internal components. The resemblance was that uncanny. The cabinet had the same dimensions, and the 130mm bass/midrange driver looked identical, as did the 19mm tweeter.

But despite the myriad similarities, Castle obviously reckons there are sufficient technical and performance differences between the two that the 'Anniversary' deserves to be a model in its own right.

## THE EQUIPMENT

The Richmond Anniversary is a bass reflex design with a rear-firing bass reflex port that's 75mm long and 45mm in diameter.

The exit is flared, but the internal entrance to the port is not. The internal entrance is covered with a light-weight black fabric, presumably to prevent the ingress of small creatures (cockroaches, for example) that might like a comfy home near a warm driver magnet. (Don't laugh, you'd be amazed at how hot a loudspeaker magnet will get after you've been playing music for a few hours!)

Although Castle rates the Anniversary's bass/midrange as having a diameter of 130mm, it's a bit more complicated than this, because as you can see from the photograph, the frame of the driver is not a true circle, but is instead 'squared off'. So if you measure from side to side of the 'square', the external diameter is indeed 130mm. However, if you measure from corner to corner, that measurement is 150mm. If you use the distance between the mounting holes to specify driver size (the most

common method used by driver manufacturers), then that distance is 138mm. However, all that's really by-the-by, because the only truly important measurement is what's known as the 'Thiele/Small' diameter, from which the speaker's piston area ( $S_d$ ) is derived, which in turn is used to determine the volume of the cabinet and the dimensions of the bass reflex port, using the equations formulated by acousticians Neville Thiele (an Aussie) and Richard Small (a US citizen, but he was teaching at Sydney University when the equations were formulated, so we adopted him as an honorary Aussie).

Anyway, the Thiele/Small diameter is 109mm, which gives an  $S_d$  of 93cm<sup>2</sup>. The cone is formed from woven strands of carbon fibre and bonded to a rubber surround suspension. The bullet-shaped central dust cap is made from a hard polymer. As I have noted on many previous occasions in this magazine, this cone/surround construc-

tion is excellent for use in Australia because it's highly impervious to ultraviolet (UV) radiation (which quickly destroys surround suspensions made from foam) and it's also not hygroscopic, so the mass of the cone will not increase when the atmospheric humidity is high... as it so often is in this country.

Seeing that I am speaking of things Australian, you may also be interested that the Anniversary model has an Australian connection because of its veneer! In common with all Castle Acoustics loudspeakers, the Richmond Anniversary's veneer is real wood, and in this case, it's said to be 'real Lacewood'. The Australian connection is simply that true Lacewood is native to Australia. However the tree this wood comes from is called 'Queensland Silky Oak' in Australia to differentiate it from 'Southern Silky Oak' which comes from the Southern states (mainly NSW, Victoria and Tasmania). And despite the similarity in names, the trees are completely different. Queensland Silky Oak is genus *Cardwellia sublimis*, whereas Southern Silky Oak is the common *Grevillea robusta*. However, if you've tried to buy Queensland Silky Oak recently, you will have discovered it's all but impossible, so it seems more likely that the 'Lacewood' from which the Richmond Anniversary's veneer is made is actually *Roupala brasiliense* which, as you can probably guess from the 'brasil' contained within the name, hails from South America. This may seem like splitting hairs to you, but my feeling is that if the French Government can prevent Australian wine-makers from calling their sparkling wines 'Champagne', we should be able to prevent other countries from calling their *Grevillea robusta* or *Roupala brasiliense* veneers 'Lacewood'. But I digress, so let's get back to the review proper...

The bass/midrange driver is cast from aluminium—and supports a fairly substantial drive magnet (75×15mm), as well as a secondary flux-cancelling magnet (70×12mm) bonded to the rear of the main drive magnet. This flux-cancelling magnet, in turn, has a copper label bonded to it that proclaims 'Richmond Anniversary'. The copper-coated aluminium wire voice coil is wound on a Kapton former and vented via a small hole in the rear of the magnet, then into a very large opening in the centre of the flux-cancelling magnet. The bass/midrange driver is fastened to the front baffle by four hex-head bolts that screw into cap-

tive threads. Other than the copper label, the driver appeared to be identical in all respects to the one used in the Classic 3i.

The tweeter has a 19mm diameter soft polyamide dome that is located at the centre of a circular plate that's 95mm in diameter and has a 'relief' version of Castle's logo moulded into it. The tweeter is secured by three Philips-head particle-board screws, which are long enough to penetrate the 15mm thick baffle. Although I was half-expecting to see a neodymium magnet behind the tweeter, I was encouraged by the fact that Castle in fact uses a conventional—and substantially large!—ferrite magnet, so you won't have to worry about the tweeter overheating and losing efficiency as a result. Again, this tweeter also appeared to be identical to the one fitted to the 3i.

The crossover network inside the Anniversary is certainly completely different to the one in the 3i... in fact it seems that Castle has gone overboard with the Anniversary model's crossover network, which uses several HUGE state-of-the-art low-loss polypropylene capacitors made specifically for Castle, both iron-cored and air-cored inductors (cross-mounted to ensure zero interaction between them) and standard ceramic resistors in a classic Linkwitz-Riley filter implementation. All internal wiring is Monster Cable XP which is hard-wired to the crossover network, but spade-connected at the driver ends. The inside of the enclosure is almost completely filled with synthetic acoustic wool, and there's much more cross-bracing than I remember seeing inside the Classic 3i. However, there was no evidence of the 'bitumen damping pads' the Anniversary is advertised as containing.

The engineers have also gone all-out on the speaker terminals on the rear panel, which are massive, gold-plated affairs that will accept bare wires, spade lugs, pins or 4mm plugs allowing your preference of speaker cable connections. There are two pairs, so you can bi-wire or bi-amp. If you choose to do neither, you can have complete confidence that the buss-bars that Castle provides will satisfactorily electrically link the upper and lower sections of the crossover network, because rather than the usual flimsy pieces of metal, the ones Castle provides each measure 47×22×1mm and weigh 1gm. The rear terminal plate carries the words 'Limited Edition' but in fact production is not limited in any way, either to this Anniversary year, or to the total number

## CASTLE ACOUSTICS RICHMOND ANNIVERSARY LOUDSPEAKERS

**Brand:** Castle  
**Model:** Anniversary  
**Category:** Bookshelf Speakers  
**RRP:** \$1,199  
**Warranty:** Five Years  
**Distributor:** Audio Dynamics Pty Ltd  
**Address:** 167 Camberwell Road  
East Hawthorn VIC 3123  
**T:** (03) 9882 0372  
**F:** (03) 9882 9878  
**E:** info@audiodynamics.com.au  
**W:** www.audiodynamics.com.au



Tiny cabinets  
Glorious veneer  
Monitor-like midrange



Deep bass  
Volume levels

of models that will be manufactured.

The speaker grille frame on the Anniversary uses two different types of wood, which Castle says not only gives added rigidity but also minimises grille resonances. It fits to the front baffle via the usual plastic pin and rubber grommet arrangement. As for the cabinets themselves, they're 280×165×235mm (HWD) and each one weighs 5.1kg.

## IN USE AND LISTENING SESSIONS

Maybe I move in the wrong socio-economic circles, but I don't know anyone who still uses a conventional CRT monitor whose image could be affected by a speaker's magnetic field, so I am not sure why Castle Acoustics bothers to 'magnetically shield' its Anniversary model, not least because the asking price would seem to indicate that anyone who purchases a pair (or three pairs, for use in a 6.1-channel surround system!) would no doubt own either a large flat-panel monitor or a projection system.

I listened to just a single pair of Richmond Anniversaries, placed on stands that put the tweeters exactly at my seated ear level. At the insistence of Castle Acoustics' Australian distributor, Philippe Luder, I used Transparent (a brand for which Philippe is also the official Australian distributor) 'The Wave' speaker cables to connect the

Richmonds to the various solid-state and valved amplifiers I used for auditioning the Richmonds, and Transparent's 'The Link' interconnect between the various source components (except the turntable!) and the various amplifiers they were driving. Philippe also very kindly supplied a Transparent demo disc with tracks from 'Glory Bound' (Martin Sexton), 'S'Wonderful' (Diana Krall) and the soundtrack to 'When Harry Met Sally' (Harry Connick Jr).

Once the speakers were perched on their stands and moved out into the listening position, it was fairly evident that I would not be hearing too much bass from them... or overly much volume. The small drivers and the tiny small cabinet put physical limits on the extent of both. However, it's important to point out that the size of the room in which you're listening to the speakers is incredibly important. The popularity of small speakers in England is in no small part due to the fact that British homes, although often quite large overall, have relatively small rooms which, more often than not, have masonry walls. In this kind of acoustic environment even very small speakers can perform impressively well, thanks to bass reinforcement caused by the proximity of the walls and the reflectivity of the surfaces. The point I'd like to make here is that increasingly, Australians are now also listening to their hi-fi and home theatre systems in similar environments, thanks to the dramatic increase in the number of home units and townhouses being built... particularly in Sydney. And in such environments, making too much noise is frowned on by the neighbours (and legislated against by bodies corporate, as well as State laws), so that the other advantage larger speakers have over smaller ones (that they can produce higher sound pressure levels) is also effectively negated.

However, it was in the bass region that I noted that Castle (or more accurately, its acoustic designer, Peter Comeau) has not played the same acoustic 'trick' that was played with the Classic 3i: that of delivering a mid-bass peak in order to give the impression of there being more bass than there is. The Richmond Anniversary model is still very slightly forward in the upper bass region, but the overall bass/midrange balance is far more impressively neutral. The chestiness of the Classic 3i has been replaced by a bass authority that hints at a deeper authenticity without over-emphasising the upper bass. Overall, I'd say that the sound of the Rich-



mond Anniversary is more 'monitor-like', particularly across the midrange.

It was easy to guess that the Anniversary design is not very efficient merely from the fact that I did not have to alter volume levels when A-B'ing the Richmonds against several other pairs of small two-way speakers whose sensitivity I already knew. As a result I expected the Anniversaries would test at around 86dB SPL, and was not surprised when the laboratory test results came back from *Newport Test Labs* and confirmed my guess. (Though in fact, I'd guessed a little too high: the exact figure was 85.6dB-SPL.) I also discovered very quickly that if I turned the volume level up too high the midrange thickened and the highs became a bit brittle. However, in smaller rooms, the overall level of the sound in the room became overpoweringly loud before either of these traits manifested, so they're not really an issue.

High-frequency performance is very good: clean-sounding and transparent, delivering a lovely-sounding treble 'fill' without glare. There was also no trace of the HF 'zing' that you hear from almost all metal-dome tweeters: the Anniversaries' tweeters were unflinchingly sweet and pure.

If you're buying small speakers for visual and/or space reasons, I'd always recommend you consider adding a small subwoofer to handle the bass, on the basis that with even a modicum of ingenuity you will

be able to hide such a sub completely out of sight. Also, by crossing over from the sub at around 150Hz, you'll improve the sound of the Anniversaries by relieving them of the duties of having to reproduce bass, which will improve their power-handling ability, their dynamic range and the maximum SPLs. Adding a subwoofer would of course be a given in a home theatre set-up, but even if you're using the Anniversaries as a stereo pair, I'd still recommend you consider adding a subwoofer.

Like all small speakers, Castle Acoustics' Richmond Anniversary speakers will deliver their best performance when placed on stands, and Castle has designed some specifically for the Anniversary Series speakers. They sell for \$299 per pair.

Seeing that this will be almost my last chance to have a last word, I should mention before concluding that, in the end, Shakespeare was right, (a rose by any other name, etc), and so no matter whether these Richmond Anniversaries are clothed in *Cardwellia Sublimis*, *Grevillea Robusta* or *Roupala Brasiliense* they look absolutely superb.

## CONCLUSION

If you're after a very small speaker that offers 'that little bit extra' by way of good looks, high sound quality and also 'brand cachet', I can recommend Castle Acoustics' Richmond 'Anniversary' model. 

greg borrowman



Readers interested in a full technical appraisal of the performance of the Castle Acoustics Richmond Anniversary

Loudspeakers should continue on and read the LABORATORY REPORT published on page 72. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

LAB REPORT ON PAGE 72 ►

## STOP PRESS:

Just as we were checking the proofs, we had advice from Frances of IAG Macao Commercial (IAG owns Castle Acoustics) that the 'Lace Wood' veneer on the Richmond Anniversary speakers "should be *Cardwellia sublimis*." G.B.

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**TEST RESULTS**

The frequency response graphs measured by *Newport Test Labs* show that the low-frequency response of the Richmond Anniversary speakers is not extended, and that the high-frequency response, although smooth, rolls off slowly but steadily from about 3kHz to 20kHz and above 20kHz, quite quickly. Across the important mid-range, however, the response is commendably linear. Graph 1 shows the averaged frequency response using a pink noise test stimulus with capture unsmoothed (red trace) and smoothed to one-third octave (blue trace), both traces being the averaged results of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. (For this graph, the upper measurement limit has been restricted to 10kHz.) You can see on this graph that the overall response is 100Hz to 10kHz  $\pm 3$ dB, however across the midrange it's a far tighter 150Hz to 2.5kHz  $\pm 1$ dB. Importantly, too, you can see that whereas most designers try to artificially 'extend' the response of small loudspeakers by over-boosting the response in the 100–200Hz region, Castle has not done this with the Anniversary, preferring a smooth, controlled roll-off below 200Hz.



Graph 2 shows the high-frequency performance of the Anniversary both with the grille on (green trace) and with it off (black trace). You can see that mostly there's not too much difference, though the average 3dB difference in level between 4.5kHz and 8.5kHz would seem to indicate that for the most accurate response, you should listen to these speakers with the grilles removed.

Low frequency performance is graphed in *Figure 3* and you can see that the bass driver starts rolling off a little below 200Hz, to a minimum at 62Hz, pretty much coinciding with the port's peak output at 60Hz. The size of the port—and the size of the cabinet—mean there's quite a bit of energy issuing from the port up between 500Hz and 1.5kHz, so if the rear of the speaker is close to a hard, acoustically reflective wall, I'd expect some audible effects.

The impedance of the Castle Acoustics Richmond is controlled, averaging around 8 $\Omega$  for the most part, though it dips down below 6 $\Omega$  at 240Hz and below 5 $\Omega$  at 10kHz, meaning that the 'nominal' impedance is 6 $\Omega$  according to IEC standards. I couldn't find Castle's specification for the Richmond Anniversary's impedance on its website so I don't know whether this is in accord with its claims or not. The phase angle swings quite a bit for such a small speaker, from around +45° at 25Hz to -58° at 3kHz. The pair matching is not ideal, as you can see from the differences between the traces for the left and right speakers. There are no cabinet resonance effects visible on the traces, but that disturbance at 1.3kHz would seem to indicate that both

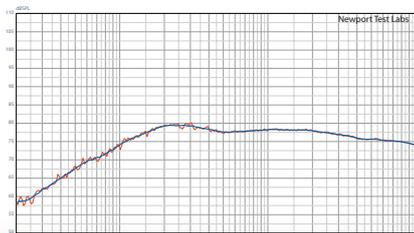
the port and the crossover network have their parts to play in it.

*Newport Test Labs* has included a composite graph, where several traces have been manually 'spliced' together to give an overall picture of performance, over which the near-field low-frequency response has been overlaid to show integration. From this trace, you can see how *Newport Test Labs* concluded that according to its measurements, the overall frequency response of the Castle Acoustics Richmond Anniversary extends from 75Hz to 20kHz  $\pm 4$ dB.

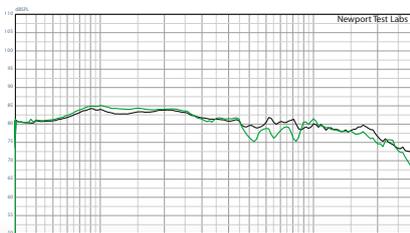
Measured using *Newport Test Labs'* usual stringent test methodology, the Richmond Anniversary returned a sensitivity figure of 85.6dB SPL at one metre for 2.83V (eq). This is less than I expected and short of Castle's figure of 88dB SPL. However, since Castle doesn't specify the input voltage or distance, I can't comment other than to say 86dB SPL is a ballpark figure for this design.

Given the similarities between the Anniversary and the Classic, I thought it would be interesting to compare the two responses—at least as measured by *Newport Test Labs*. The red trace in Graph 6 is that of a Classic 3i (albeit an older model, manufactured in 2009), while the green trace is that of the Anniversary. There's a significant difference in extension, due to the Classic 3i having a 'kick' in the response between 80–500Hz, peaking at 150Hz. However, what the Anniversary loses in extension, it more than gains in midrange linearity, with the response from 150Hz to 3kHz being far flatter than that for the Classic 3i.

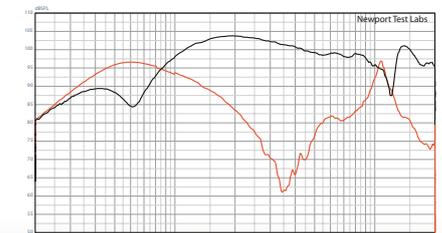
Steve Holding



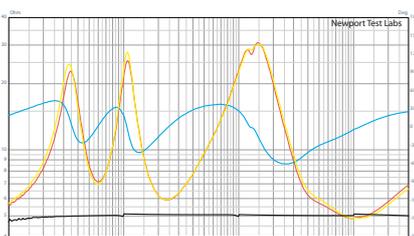
Graph 1. Averaged frequency response using pink noise test stimulus with capture unsmoothed (red trace) and smoothed to one-third octave (blue trace). Both traces are the averaged results of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. [Castle Richmond Anniversary Loudspeaker]



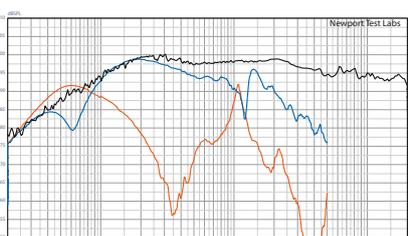
Graph 2. High-frequency response, expanded view, showing effect of loudspeaker grille on (green trace) vs off (black trace). Test stimulus gated sine. Mic: three metres on-axis with dome tweeter. Lower measurement limit 400Hz. [Castle Richmond Anniversary Loudspeaker]



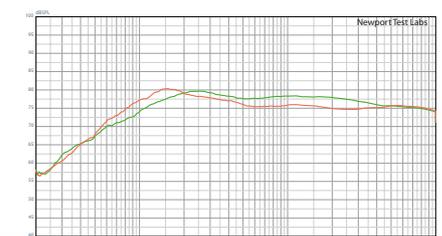
Graph 3. Low frequency response of front-firing bass reflex port (red trace) and woofer: Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas. [Castle Anniv.]



Graph 4. Impedance modulus of left (red trace) and right (yellow trace) speakers plus phase (blue trace); black trace under is reference 5-ohm precision calibration resistor. [Castle Anniv.]



Graph 5. Composite response plot. Red trace is output of bass reflex port. Dark blue trace is anechoic response of bass driver; black trace below 1kHz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced (at 1.5kHz) to the gated high-frequency response, an expanded view of which is shown in Graph 2. [Castle Richmond Anniversary Loudspeaker]



Graph 6. Comparison of Richmond Classic 3i (red trace) and the Richmond Anniversary (green trace) using pink noise test stimuli that have been averaged, and smoothed to one-third octave (blue trace). Both traces are the averaged results of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. [Classic vs Anniversary]