

# Triangle Esprit Titus EZ

LOUDSPEAKERS



If it weren't for the brand name on the front baffle, it would be very difficult to tell many small two-way loudspeakers apart, since a great many use exactly the same tweeters and bass/midrange drivers, purchased from some faceless manufacturer in China. That's not the case with France's Triangle ElectroAcoustique company, many of whose products are unmistakable due to the use of its proprietary titanium-domed chrome/gold horn-loaded tweeter, which handles the high frequencies in many of the company's designs. Triangle manufactures all the drivers used in its loudspeakers, and also manufactures drivers for sale to other manufacturers and to driver wholesalers. Until fairly recently all these drivers were made entirely in France, but recently the company established driver and cabinet manufacturing facilities in China so now it is only Triangle's premium lines, the Magellan and Signature ranges, that continue to be made entirely in France.

## THE EQUIPMENT

Over the 35 years Triangle has been building speakers in its factory in Soissons in Villeneuve-Saint-Germain, France (*'the cradle of the kings of France'* is the company's

proud boast for the region it calls home) it has been gradually improving its compression horn tweeters, such that the Esprit Titus EZ reviewed here sports the latest incarnation of one, the TZ2510. The horn of the TZ2510 has a new profile and an improved phase plug that improves dispersion at high frequencies. The magnet is still high-tech neodymium, and there's still an absorption chamber behind the 25mm titanium dome to prevent the propagation of sound from its rear reflecting and interfering with the dome's performance, à la B&W's Nautilus project, but the chamber has undergone a recent re-design as the result of research undertaken during Triangle's own Magellan project.

The bass/midrange driver in the Titus EZ is also a new design for Triangle. I measured the overall diameter of the bass/midrange driver at 153mm and the Thiele/Small diameter at 107mm, which put the Sd at 90cm<sup>2</sup>. The white cellulose pulp cone's profile has been changed to extend its frequency response further up into the treble, while to extend the response more deeply into the bass the company is now using a half-roll suspension made of a combination of foam and treated rubber, rather than the previously-used single-formula preparation.

The company's ability to improve its drivers is in part made possible by its use of laser measurement equipment developed by German Professor Wolfgang Klippel, combined with the ability to make custom one-off prototypes very rapidly by using its own in-house industrial 3D printer. (The company recently established a new research facility in Bordeaux to complement its facilities in Soissons and in China.)

Internal cabling from the crossover to the drivers is very heavy-duty Figure-8 cable branded with Triangle's own name. It is soldered at both the crossover network ends and to the drivers, though the wires attached to the rear of the terminal plate are attached using spade lugs. In addition to its essential filtering duties, the crossover network also includes a positive temperature co-efficient (PTC) resistor (a.k.a. a 'thermistor' or 'Protec, or PTC) to protect the tweeter against being overdriven. The process by which this protection operates is that if the electrical current passing through the high-pass section of the crossover (and thus going to the tweeter's voice-coil) gets too high, the temperature of the thermistor increases, which in turn increases its resistance and reduces the voltage



is made of plastic and has a flared exit, while the inner section is made of paper pulp and is press-fitted and glued around the plastic section, resulting in a small (2mm) step part-way along the port. The inner entrance of the port is not flared.

The cabinet of the Esprit Titus EZ's cabinet I was loaned for this review was finished in a stunning gloss white (applied over 19mm MDF) and measured 167mm wide, 257mm deep (add 35mm for the grille and the rear terminals) and 306mm high. This is one of Triangle's two premium finishes (the other is gloss black), both of which attract a \$300 premium over the standard finish, which is Walnut and retails for \$1,399 per pair in Australia. I've only ever seen photographs of the Walnut finish, but even so, I'd personally spring the extra dosh for the gloss white finish. (I confess to being not so keen on gloss black because of my lack of enthusiasm for house-cleaning... gloss black finishes are just too difficult to keep looking sparkling clean!)

The speaker grilles attach via magnetic force and use white cloth over an MDF frame. The only cosmetic anomaly I noted when I attached the grilles was that the cabinets are so stunningly white that they make the white cloth-covered grilles look a bit grey-ish by comparison. Still, given the superb appearance of the compression tweeter and the clean appearance of the front baffle without the grilles fitted, I reckon the speakers looked better without them, so I didn't use them at all.

### IN USE AND LISTENING SESSIONS

When it came to placing the Esprit Titus EZs on my stands, I was a bit surprised to find that Triangle hadn't fitted screw fittings to the bases of the speakers, so you won't be able to use spikes to anchor them and will instead have to use the adhesive-backed rubber feet Triangle supplies or use Blu-tac. Since I actually prefer using Blu-tac over using spikes (for both sonic and sartorial reasons), this suited me just fine.

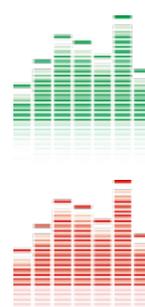
I placed the speakers on their stands so that the Titus EZ's horn-loaded tweeters were at ear level and angled the speakers so they converged at the listening position, rather than faced directly up the room. I personally find that all circular horn-loaded designs sound better to me with this alignment. If you don't do this, I find that the sound isn't quite so 'sweet.' It's not a loss of volume as such, just a subtle loss of high-frequency definition. The point here is that it really is a subtle effect, so try multi-speaker angles until you find the one that works best for you.

(And if you can't hear a difference in your room, I'd suggest the default position of lining up the backs of the speakers so they're parallel with the rear wall and 'fire' straight up the room.)

The very first CD I played through the Esprit Titus EZs had me excited from the outset. That CD is a favourite of mine at the moment, but it just sounded so fabulous through the Titus EZs. That CD is Frazey Ford's 'Indian Oceans' and it kicks off with *September Fields*, which is just a perfectly-paced, perfectly-spaced piece of music which has everything: B3 Hammond flourishes, *obligato* vocals, funky guitar... you name it. And underlying everything are the incredibly soulful tones of Canadian singer-songwriter Frazey Obadiah Ford (don't ask!) whose voice is so tailor-made for soul that I can't imagine

## TRIANGLE ESPRIT TITUS EZ LOUDSPEAKERS

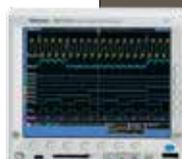
**Brand:** Triangle  
**Model:** Esprit Titus EZ  
**Category:** Standmount Loudspeakers  
**RRP:** \$1,399 (Walnut); \$1,699 (Gloss)  
**Warranty:** Five Years  
**Distributor:** Audio Marketing Pty Ltd  
**Address:** Unit 14L, 175 Lower Gibbes St  
 Chatswood NSW 2067  
 ☎ (02) 9882 3877  
 ☎ (02) 9882 3944  
 📧 [info@audiomarketing.com.au](mailto:info@audiomarketing.com.au)  
 🌐 [www.audiomarketing.com.au](http://www.audiomarketing.com.au)



- Fabulous midrange
- Superb imaging
- Fit n' finish
- No spike threads
- Single-wired
- Grille whiteness

## LAB REPORT

Readers interested in a full technical appraisal of the performance of the Triangle Esprit Titus EZ Loudspeakers should continue on and read the LABORATORY REPORT published on page 22. 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 22**

available at the tweeter, preventing it from being overdriven (though simultaneously reducing the output of the tweeter, resulting in a temporary reduction in high frequencies). Once the current is reduced to safe levels, the thermistor cools down, its resistance returns to normal, and the full voltage is restored to the input terminals of the tweeter.

I'd never seen the terminals used on the Titus EZ before, and it turns out that this was because they're made by Triangle itself, for use exclusively on its speakers. They have an aluminium-coloured exterior coating, but the underlying metal is high-quality copper alloy and the terminals are fixed to a section of aluminium alloy that's attached to the rear baffle—no plastic mouldings here! The two terminals are multi-way, accepting cable with a diameter of up to 5mm as well as banana plugs and spade lugs. Because there are only two terminals (so you can't independently access the individual drivers), and the terminals aren't recessed, there is plenty of room on the terminal plate and the terminals are easy to turn and tighten onto bare wire or onto spade lugs.

Above the terminal plate is a bass reflex port that's 45mm long and 38mm wide. It's a two-stage design, where the outer section

how she ever became one of the founding members of folk outfit The Be Good Tanyas. Listen to *September Fields* (or to any of the tracks on *Indian Oceans*, actually) and you'll be mesmerised by the clarity of the midrange sound, which is perfectly balanced—not forward, not recessed—and has a sonic that's almost ethereal, but overall a sound so natural you may not believe what you're hearing. No doubt some of this is due to the recording, which was apparently 'old school' using classic microphones and equipment, but I have to credit the Triangle Titus EZs as delivering exactly what was recorded in that studio. The stereo staging and imaging of the Triangles was outstanding, as was the depth of the image. In other words, real 'close your eyes and you're there' delivery, and the work of The Hi Rhythm Section (with Charles Hodges on organ, Leroy Hodges on bass, and the late Teenie Hodges on guitar) is seamless, as if they're the one person playing three different instruments simultaneously. Buy this album, but don't start listening to it until it's really late at night, and everything's quiet, and maybe you're feeling mellow. Put in on, lie back and prepare to have the musical experience of your life... even if you're not lucky enough to be listening to Triangle's Titus EZs at the time.

My listening session then transferred from one Canadian singer-songwriter to another, because next up was Joni Mitchell's 'Blue' (I didn't play it because of Ford—I'd pulled out all Mitchell's albums when I read in the newspaper that she'd had an aneurism, and had been working my way through all of them.) I've had a love/hate relationship with Ms Mitchell for decades, because sometimes she speaks directly to me ('Both Sides Now') yet at other times I don't even understand what she's saying ('Hissing of Summer Lawns'), though I have always found her an unusual and outstanding talent—proved by her albums 'Blue', 'Heijira', 'Mingus', 'Court and Spark', 'For the Roses', 'Clouds' and, well... pretty much all of them!

Although she's now completely lost her voice (years of smoking will do that to you!) her voice still sounds particularly clean and powerful on 'Blue' and the piano sound is so natural (there's that 'natural' again... the Triangle Titus EZs are so good at realising an instrument's natural sound), plus there are the unmistakable sonic contributions from James Taylor (their breakup is said to have inspired the album), not to mention those from Stephen Stills and Sneaky Pete Kleinow Luper, but above all from Mitchell herself on guitar, piano and dulcimer (just listen to it on this early version of *A Case of You*, one of the greatest songs ever written and, yes, that's Taylor on backing guitar... he has such a signature sound). Mitchell is also the only person I have ever heard who could sell her



song *The Last Time I Saw Richard*... just listen to her amazing phrasing and intonation.

I realised I was favouring the 49th parallel when Leonard Cohen became the third musician whose music issued forth from the Titus EZs, and these little Triangles again surprised me by nailing his deep, gravelly voice to perfection, yet also maintained a sense of there being additional bass power in reserve, so I was never on tenterhooks thinking that perhaps there'd be moments when they couldn't keep up. And it wasn't just the voices of Ford, Mitchell and Cohen that the Triangles made sound so realistic: their performance with all the vocalists I tried was so good that I even reincarnated Minnie Riperton's most famous hit, *Loving You*, (from her album 'Perfect Angel') with that incredibly high vocal. (Yes, I know Maria Carey sings higher notes on her current albums, but I prefer listening to Riperton, particularly her debut album, 'Come to my Garden', which is the one you should buy if you want to hear her at her best. It was recorded only nine years before her tragically early death, at age 31. And if you think the CD sounds like vinyl, you'd be right: the master tapes were lost, so all the CDs were made by playing vinyl.)

It was only when I started playing my all-time favourite version of Beethoven's 5<sup>th</sup> symphony (Carlos Kleiber and the Vienna Philharmonic on DG) at what I'd say was a fairly realistic (i.e. LOUD!) volume that I identified a chink in the Titus EZ's armour: a softening of the high-frequencies when playing at very high volume levels for extended periods of time. Self-evidently, this was the thermistor doing its thing to protect the tweeter.

Although this wasn't unexpected, I was still surprised that the audible effect was not nearly as much as I'd imagined: unless you were intimately familiar with the work, you might not realise that the highs had been rolled off. Backing off on the volume control allowed the thermistor to cool off and restored the balance of the high frequencies. Intrigued, I tried to trigger the protection playing the Rolling Stones' 'Forty Licks' compilation album (a favourite because it contains most of my favourite Stones tracks) and found it didn't trigger when playing at the same loudness levels I'd used when played the 5th. So it appears that whether the protection triggers at all depends not only how loudly you play the system, and how long you play at loud levels, but also on what's actually playing.

It transpired that this was the sole chink in the Triangle's Titus EZ's armour (if you don't count the elephant in the room, being that because they're such a small speakers, the deepest bass levels are rather subdued) because I otherwise couldn't fault their sound.

## CONCLUSION

Triangle's Titus EZs are superb-sounding speakers. They'll perform best on speaker stands, which will add a few bucks to the asking price unless you already own a suitably-sized pair, but even if you use them on a bookshelf or wall-mount them, they'll still outperform any other similarly-priced small speakers I've ever heard, which also makes them outstanding value for money into the bargain.  Jutta Dziwnik

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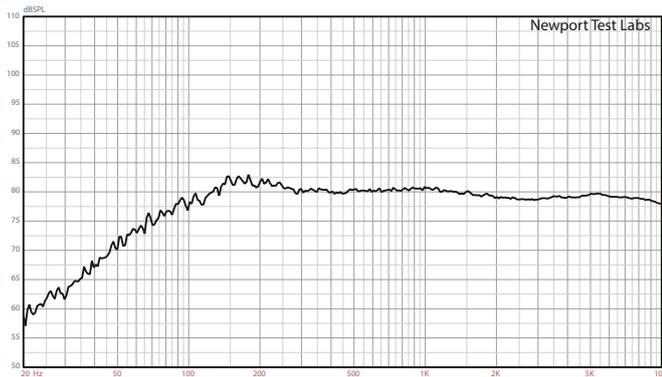
**LABORATORY TEST REPORT**

The first of the graphs measured by *Newport Test Labs* shows the response of the Triangle Titus EZ when driven by a pink noise stimulus, and you can see that it's very flat, particularly between 200Hz and 10kHz (which is the upper graphing limit for this particular graph: to see the EZ's frequency response above 10kHz, refer to Graph 2 and/or to Graph 6). Indeed between 300Hz and 10kHz the response is within  $\pm 1$ dB. Also, and very importantly, even within this small dB variance there's no 'tilt' on the trace that would

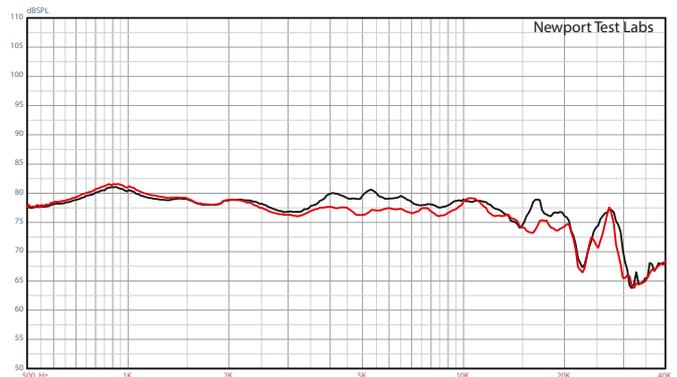
show emphasis in the low or high frequencies. There is a very small ( $-1$ dB) but broad suck-out between 1.5kHz and 5kHz, and a similarly-slight high-frequency roll-off (1dB down at 10kHz) but that's it. Low-frequency roll-off starts at around 150Hz (without boundary loading, about which see Graph 6) but true anechoic low-frequency performance is shown in Graph 3.

High-frequency output of the Titus EZ design is shown in detail in Graph 2, with *Newport Test Labs* employing a classic gated sinus measuring technique to deliver the

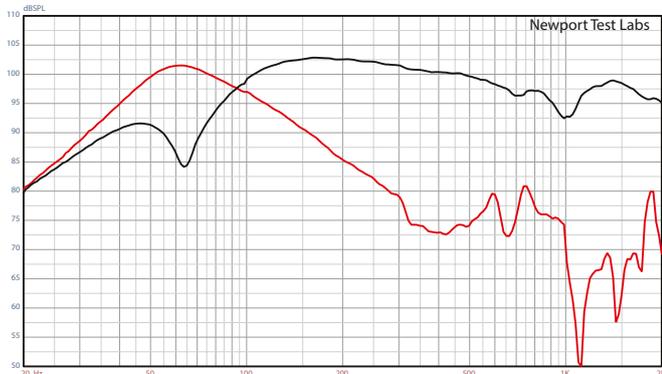
same response that would be measured in an anechoic chamber, with the black trace showing the response without the grille and the red trace the response with the grille fitted. You can see that using the grille reduces the level of the high frequencies by about 2.5dB between 4kHz and 7kHz and by the same amount between 15kHz and 20kHz. It reduces the level by 1dB between 7kHz and 10kHz. The difference in level, over such a wide bandwidth is highly likely to be audible to careful listeners, so if you want best performance, I'd recommend listening without the grilles.



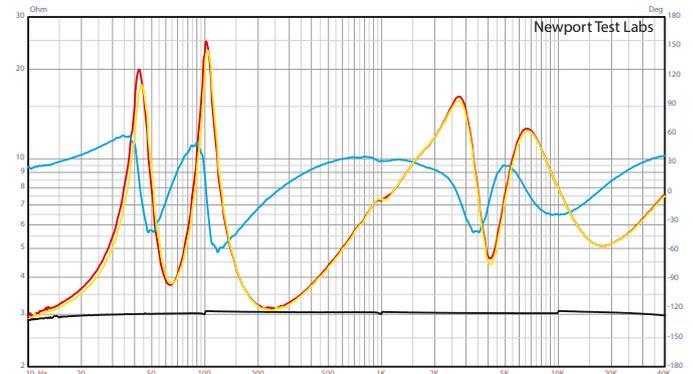
Graph 1. Frequency response. Trace is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. [Triangle Esprit Titus EZ Loudspeakers]



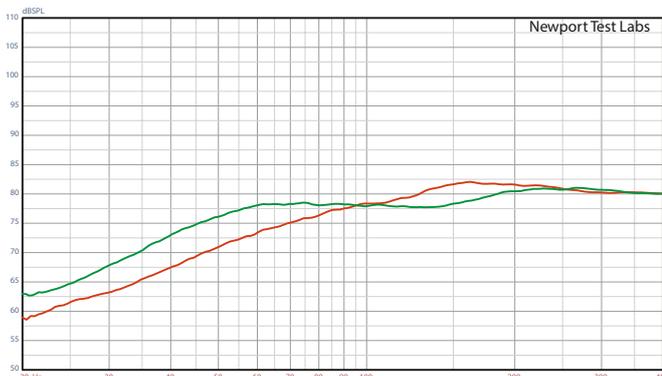
Graph 2. High-frequency response, expanded view, grille off (black trace) vs grille on (red trace). Test stimulus gated sinus. Microphone placed at three metres on-axis with dome tweeter. Lower measurement limit 500Hz. [Triangle Esprit Titus EZ Loudspeakers]



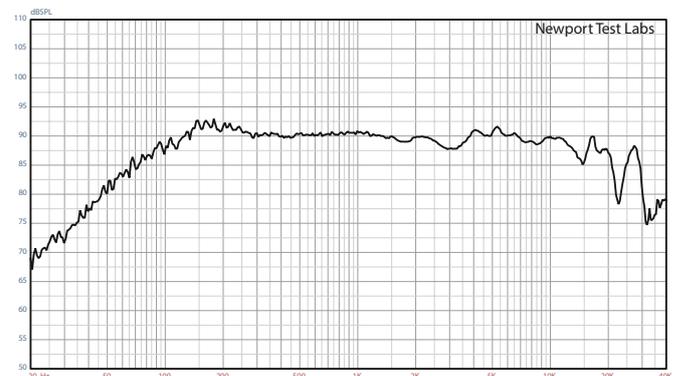
Graph 3. Low frequency response of rear-firing bass reflex port (red trace) and bass/midrange driver. Nearfield acquisition. Port/woofer levels are not compensated for differences in radiating areas. [Triangle Esprit Titus EZ Loudspeakers]



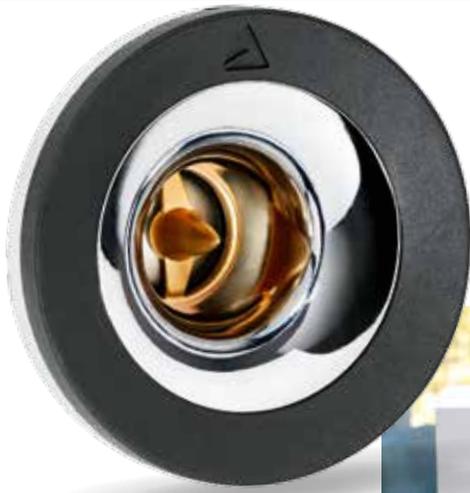
Graph 4. Impedance modulus of left (red trace) and right (yellow trace) speakers plus phase (blue trace). Black trace under is reference 3 ohm precision calibration resistor. [Triangle Esprit Titus EZ Loudspeakers]



Graph 5. Low frequency response free-field (red trace) vs. boundary-loaded to rear wall (green trace) using pink noise stimulus, 1/3rd octave smoothed. [Triangle Esprit Titus EZ]



Graph 6. Frequency response. Trace below 1.5kHz 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. [Triangle Esprit Titus EZ Loudspeakers]



■ **The Triangle Esprit Titus EZ is a very well-designed loudspeaker system that returned exceptionally high levels of performance across all the tests conducted by Newport Test Labs...**

As a more general observation, the high-frequency response essentially extends from 500Hz (the lower graphing limit) up to 15kHz  $\pm 3$ dB no matter whether the grille is fitted or not but without the grille, the high-frequency response extends from 500Hz to 22kHz  $\pm 3$ dB.

Graph 3 shows the low-frequency performance of the Triangle Titus EZ measured using a nearfield technique, to simulate the response that would be measured if it were positioned in an anechoic chamber. You can see that the output of the bass/midrange driver rolls off below 150Hz to a minima at 64Hz. The loss in output is compensated for by the output of the rear-firing port, whose output peaks at 61Hz, showing that Triangle's engineers are sneaking in a little extra low-frequency output by deliberately tuning the port a little below the textbook target. The port produces useful output from about 40Hz to 120Hz and is well-behaved, though there's some very minor high-frequency leakages at 600Hz, 750Hz and 1.8kHz.

Triangle doesn't appear to specify a nominal impedance for the Titus EZ design, preferring instead to quote a minimum impedance of 3.8 $\Omega$ . As you can see from Graph 4, *Newport Test Labs* measured the minimum impedance as being rather lower than that, with the relevant traces (red and yellow) showing a minimum of 3.2 $\Omega$  at 245Hz. Although low, this impedance would still permit Triangle to rate the Titus EZ as being 'nominally' a 4 $\Omega$  speaker under IEC guidelines, particularly since the impedance is mostly 5 $\Omega$  or higher elsewhere over the audio band, and Triangle's engineers have also adopted excellent design practise by ensuring the impedance rises (and continues to rise) at frequencies above 20kHz. The left/right pair matching is excellent, as you can see from the way the yellow and red traces track each other, indicating excellent quality control at Triangle's factories. There's also no sign of any cabinet resonances, though given the small size of the cabinet,



I would not normally expect to see any. (The glitches on the trace at 100Hz, 1kHz and 10kHz are not resonances, they're range-switching artefacts in the test equipment, so should be ignored.) Phase (blue trace) is very well-controlled, swinging less than  $\pm 60^\circ$  between 10Hz and 40kHz.

Graph 5 shows how low frequency response (extension as well as linearity) is affected by a loudspeaker cabinet's proximity to boundaries, in this case a rear wall. The red trace shows the low-frequency response of the Esprit Titus EZ when it's in a free-field environment, well away from any boundary (walls, floor, ceiling). This is a magnified view of the same response that's shown in Graphs 1 and 6. You can see the response is flat down to 300Hz, rises slightly to 160Hz, then rolls off fairly steadily at 6dB per octave. Move the speaker so its back is close to a wall (anywhere from 2cm to 20cm away) and you'll get a response similar to that shown by the green trace. You can see the response now stays almost flat down to 180Hz, after which it steps down a few dB to around 140Hz, where it shelves until 60Hz before rolling off, but this time more steeply, at around 12dB per octave.

The Triangle Esprit's overall *freefield* frequency response is shown in Graph 6, where the pink noise freefield low frequency response (from Graph 1) has been manually spliced (at 1.5kHz) to the gated high-frequency response (from Graph 2). It's an excellent response for a small two-way design.

Since the small dip at 2.5kHz is likely to coincide with the crossover frequency (which Triangle doesn't state) it's more likely to be the result of interference effects caused by time differences in the arrival time at the test microphone caused by both drivers operating together, so can largely be ignored. The peaky response above 12kHz is due to the same mechanism, though this time it's caused by the horn-loading. So when the speaker is operated close to a rear boundary, it will deliver a frequency response of 55Hz to 22kHz  $\pm 3$ dB, exactly as claimed by Triangle.

The sensitivity of the Triangle Esprit Titus EZ, measured using *Newport Test Lab's* methodology, was 87.5dB, which is a little higher than I expected from a 153mm-diameter driver operating from a cabinet volume of around seven litres. Triangle claims 90dB SPL but doesn't say how it's measured. Given that *Newport Test Labs'* testing technique is pretty stringent, it's probably a little lower than the sensitivity a standard industry test would give, but I'd say 87.5dB SPL would be closer to that mark than 90dB SPL. Either way, the Titus EZ's sensitivity actually a good deal higher than most other loudspeaker of its size, which will mean your amplifier won't have to work as hard to deliver high listening levels. My conclusion? The Triangle Esprit Titus EZ is a very well-designed loudspeaker system, equipped with high-quality drivers, and as a direct result of this it was able to return exceptionally high level of performance in all the tests conducted by *Newport Test Labs*.  Steve Holding

