

JOHN ATKINSON

Triangle Signature Delta

LOUDSPEAKER

The French do things differently. I first heard Triangle loudspeakers at the 1981 Festival du Son, in Paris. That was, of course, after I had obtained admission to the show, in a nonintuitive process in which members of the press obtained their credentials at a booth *inside* the show. But my experience of the Triangle speaker, a small, three-way floorstander, was positive: It sounded clean and uncolored, and nothing like the BBC-inspired speakers I preferred at that time. The Triangle wasn't as neutral as the English norm, but there was something appealing about its sound—something that, I later learned, *Stereophile's* founder, J. Gordon Holt, referred to as jump factor.

Triangle has since become one of France's top three hi-fi manufacturers, and *Stereophile* has reviewed several Triangle loudspeakers over the years. Sam Tellig has long been a fan of the company's designs; Paul Messenger reviewed Triangle's Magellan Concerto in March 2005;¹ and Art Dudley favorably reviewed the Esprit Comete Ex bookshelf model in April 2008.² "The Esprit Comete Ex is a

fine thing," he concluded, "a much better and more musical loudspeaker than one usually finds at this price and size, or from such a mainstream company."

But I had never lived with a pair of Triangle speakers. It was high time I did, so I agreed to review the second model from the top of Triangle's new Signature line, the Delta (\$8000/pair).

The Signature Delta...

... is an attractive tower standing 4' tall. Set into the top of the enclosure is a bullet-shaped, gloss-black module containing the TZ2550 tweeter, which operates above 2.7kHz. This is the same titanium-dome unit, acoustically loaded with a die-cast aluminum horn, that's used in Triangle's top Magellan line. It sits immediately above a large-diameter, treated-paper-cone midrange unit that covers almost a decade, from 280Hz to 2.7kHz, and is constructed on a 73" aluminum frame. The midrange's cone is terminated with a narrow, pleated, short-

¹ See www.stereophile.com/floorloudspeakers/305triangle/index.html.

² See www.stereophile.com/standloudspeakers/408tri/index.html.

SPECIFICATIONS

Description Three-way, four-driver, floorstanding loudspeaker with vented enclosure. Drive units: 1" (25.4mm) horn-loaded, titanium-dome tweeter; 7.3" (185mm) paper-cone midrange unit; two 7.3" (185mm) fiberglass-cone woofers. Crossover frequencies: 280Hz, 2.7kHz. Frequency response: 35Hz-20kHz, ±3dB. Sensitivity: 92dB/2.83V/m. Impedance: 8 ohms nominal, 3.2 ohms minimum. Power handling: 120W continuous, 240W repetitive peak power.

Dimensions 48.4" (1230mm) H (with plinth) by 9.2" (233mm) W

(with plinth, 14.6" [370mm]) by 14.7" (372mm) D. Weight: 72.6 lbs (33kg).

Finish Gloss-lacquered mahogany veneer, white, black.

Serial numbers of units reviewed 13TEC49ME0333 & 334.

Price \$8000/pair. Approximate number of dealers: 10.

Vertrieb:
Audio Tuning Vertriebs GmbH
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travel surround. Although it has a dustcap, this is profiled to resemble a phase plug.

The twin 7.3" woofers are mounted above and below a large, flared port halved by a horizontal divider. Each woofer has a fiberglass cone fitted with an aluminum dustcap and terminated with an inverted half-roll rubber suspension. The motor uses two ferrite magnets and a double-layered voice-coil. All four drive-units are manufactured in-house. Electrical connection is via two pairs of binding posts mounted on an inset copper-alloy panel on the cabinet's rear, and all the internal cabling is by Kimber Kable.

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The handsome enclosure is formed from seven layers of high-density fiberboard, each 3mm thick; the sidewalls are gently curved, and the top of the cabinet is beveled at an angle of 5°. The front baffle is barely wider than the midrange unit and woofers, to optimize horizontal dispersion, and the cabinet is raised a couple of inches from the floor by a black plinth. This plinth is 5" wider than the cabinet, but cut away at the front to allow an inverted conical foot to connect the enclosure to the floor. My review samples were finished in a beautiful mahogany veneer, brought to a high gloss with 10 coats of lacquer. Black frame grilles are supplied,



but the speaker looks stunning without them: a combination of high technology and seductive-looking furniture. With so many speakers these days manufactured in the Far East, I noted Triangle's statement that "the Signature range is made entirely in Soissons [France]."

Listening

I listened to the Signature Deltas without their grilles, and the speakers toed in to the listening position. However, when I sat in my usual chair, my ears were 10" below the tweeter axis, so I tilted up the backs of the speakers with pairs of original Tiptoes, which aimed the tweeters at my ears. After some experimentation, the Deltas ended up in almost the same spots as the Joseph Audio Perspectives, which I'd reviewed in July: the woofers were 34" from the LP cabinets and bookcases that form the sidewalls, and the front baffles were 86" from the wall behind them.

Dual-mono pink noise sounded hollow if I stood up, but had an even balance, with no obvious coloration, when my ears were on or below the tweeter axis. The central image was quite narrow and well defined, although slightly more presence-region energy was audible from the right-channel speaker (serial no.333) than from the left (no.334).

Listening with a stethoscope to the enclosure's walls as I rapped them with a knuckle, I could hear some low-level liveliness in the upper midrange, but also a slightly metallic, ringing overtone. Listening again with the stethoscope while I played the half-step-

MEASUREMENTS

I used DRA Labs' MLSSA system and a calibrated DPA 4006 microphone to measure the Triangle Signature Delta's frequency response in the farfield, and an Earthworks QTC-40 for the nearfield and spatially averaged room responses. My estimate of the

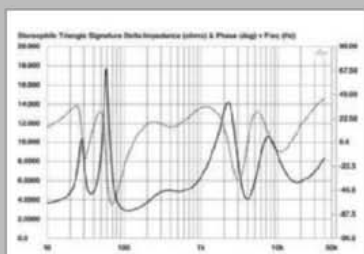


Fig.1 Triangle Signature Delta, electrical impedance (solid) and phase (dashed) (2 ohms/vertical div).

Signature Delta's voltage sensitivity was 91.8dB(B)/2.83V/m, which is both much higher than average and basically agrees with the manufacturer's specification of 92dB. The Triangle's electrical impedance and electrical phase angle are shown in fig.1 (solid and dashed traces, respectively). The Delta is a much kinder load than Triangle's Magellan Concerto, which was reviewed in March 2005 (see fig.1

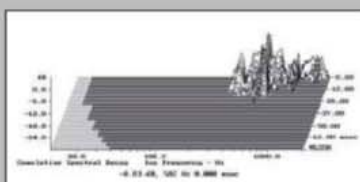


Fig.2 Triangle Signature Delta, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of side panel level with midrange unit (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

at www.stereophile.com/content/triangle-magellan-concerto-loudspeaker-measurements), with an impedance that stays above 6 ohms for much of the audioband. However, with a minimum value of 2.87 ohms at 115Hz and a combination of 3.8 ohms and -46° at 82Hz, a frequency where music

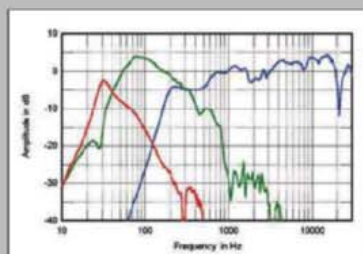


Fig.3 Triangle Signature Delta, a acoustic crossover on tweeter axis at 50', corrected for microphone response, with nearfield responses of midrange unit (blue), woofers (green), and port (red), respectively plotted below 500Hz, 350Hz, 490Hz.

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spaced toneburst track from my *Editor's Choice* (CD, Stereophile STPH016-2), the cabinet seemed to be most excited between 400Hz and 1kHz, but to be fair, this was at a low level.

Back at the listening chair, the lower-frequency tonebursts spoke very cleanly for a ported design, though the region below 64Hz seemed a little reticent. The low-frequency, 1/3-octave warble tones on *Editor's Choice* were reproduced with full weight down to the 50Hz band, with the 32Hz band given some help by the lowest-frequency mode in my room. The 40, 25, and 20Hz bands were less audible. Even so, a pipe-organ recording I recently made in Oregon, with the Ayre Acoustics QA-9 USB analog-to-digital converter, of Jonas Nordwall playing the famous Toccata from Widor's Organ Symphony 6 in Portland's First United Methodist Church (24-bit/88.2kHz AIFF file), had tremendous weight through the Deltas when the bass pedals descended to 32Hz and below, yet without boom or blurring.

The Signature Delta's low frequencies had excellent pace and force. Despite the sonic damage done to the low frequencies by the Dolby Digital encoding—why lossy compression should degrade the lows, I have no idea—Pino Palladino's driving bass guitar in "Every Day I Have the Blues," from the John Mayer Trio's *Where the Light Is: John Mayer Live in Los Angeles* (16/48 ALAC ripped from DVD-V, Sony 722727), reproduced by the Deltas, got me up from



the listening chair to do the "humpty dance," as Wes Phillips once described me doing. Palladino's bass lines in this track, of course, were aided by the drumming of the incomparable Steve Jordan.

I have mentioned before how much I appreciate Bruce Hornsby's practice of making his live concerts available for download. As I write these words, I'm listening to Bruce Hornsby & the Noisemakers' live 2009 recording of "Road Not Taken," from *Dagle's Choice Vol. 4* (16/44.1 ALAC transcoded from FLAC download, <http://tinyurl.com/krfesjl>). The Noisemakers, a superbly tight band, feature Captain Beefheart alum J.T. Thomas on keyboards, as well as bassist J.V. Collier, whose phat lines on five-string bass guitar in this track sounded propulsive through the Triangles. But the weight of the lows didn't obscure or interfere with the delicacy of the solo mandolin.

This propulsive way with well-recorded rock didn't mean that the Triangle Signature Deltas were less good at playing music with more sonic subtlety. One of my favorite baroque recordings is a free download from LessLoss Music that a reader recommended a few years back: J.S. Bach's Flute Sonatas, BWV 1034 and 1035, performed by Vytautas Sriubikis and accompanied by a bassoon and harpsichord bass continuo (24/96 ALAC file transcoded from WAV, <http://tinyurl.com/mdtsxd9>). The Deltas excelled at presenting this delicately scaled music with no coloration obscuring the slightly wheezy sound of a wooden baroque flute, and with

measurements, continued

typically has high energy, an amplifier capable of driving 4 ohms with aplomb is recommended.

When resonances of various kinds are present in a speaker's enclosure, these reveal their existence by giving rise to discontinuities in the traces in a plot of the speaker's impedance against frequency. (See "The Sound of Surprise," www.stereophile.com/features/806/index.html.) The Signature Delta's traces were almost entirely free from such discontinuities, but there is a very slight wrinkle near 600Hz. Using a simple plastic-tape accelerometer (similar to a piezoelectric acoustic-guitar pickup), I found a resonant mode at 582Hz on both the rear panel and the sidewalls (fig.2). Though I could hear the effect of this mode with a stethoscope while music was playing, it was low enough in level and high enough in frequency that it probably

will not affect the sound quality.

Fig.3 shows the individual responses of the tweeter and midrange unit (blue trace), the woofers (green), and the port (red). The low-frequency saddle centered on 37Hz in the impedance-magnitude trace suggests that this is the tuning frequency of the large,

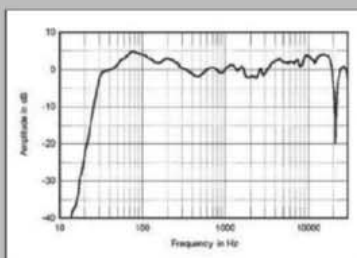


Fig.4 Triangle Signature Delta, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield responses plotted below 300Hz.

divided port on the front panel. This is confirmed by the fact that the minimum-motion notch in the woofers' output occurs at the same frequency, though the port's output actually peaks a little higher in frequency. The port's upper-frequency response is commendably free from resonant peaks,

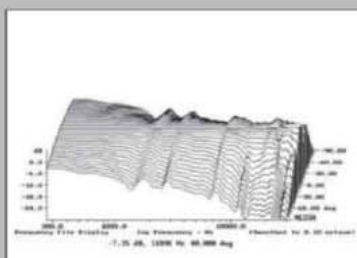


Fig.5 Triangle Signature Delta, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 90-5° off axis, reference response, differences in response 5-90° off axis.

the church acoustic delightfully tangible.

I wondered if the delicacy and detail in the Triangle's highs were due to an exaggeration in this region. But when I played "Autumn Leaves," from Cannonball Adderley's *Somethin' Else* (24/96 ALAC file ripped from DVD-V, Blue Note/Classic DAD1022), the subtle hint of the studio acoustic at the beginning, when Miles Davis's muted trumpet stabs out a staccato figure, sounded natural, and Art Blakey's ride cymbals had a deliciously appropriate swish'n'sizzle. The same was true for the relatively distantly miked drums and cymbals in "Ascension Day," from Talk Talk's *Laughing Stock* (ALAC file ripped from CD, Polydor 847 717-2). The Signature Deltas readily revealed that PS Audio's Perfect Wave DirectStream DAC (reviewed in this issue by AD) smooths the treble on this 1991 track compared with the Luxman DA-06, but the PSA's softer bass needed a speaker with even tighter lows overall.

The aspect of the Triangle Signature Delta that will stick in my memory was its resolution. Last December, in my review of Wilson Audio's Alexia, I mentioned the Irish band Moving Hearts. I had ripped their 1985 album, *The Storm* (LP, Tara 1304), to 24/192 AIFF files using Ayre's QA-9 A/D converter. This instrumental album mixes traditional Irish melodies and instruments with a rock rhythm section. Back in the 1970s, when I was working as a rock bass player by night and studying the treble recorder by day, I attended a master class in how to play traditional Irish music. This music's character stems from the uilleann pipes, which, powered by elbow-pumped bellows, play continuously at a constant volume. Melodic transients are simulated with ornaments and grace notes, while changes in an arrangement's dynamics are achieved by adding instruments like violin and whistle to double the melody played on the chanter, or

melody pipe.

Like the Alexias, the Triangles excelled at revealing the complexity of Moving Hearts' arrangements, yet without the spotlighting of detail, or the glare, that some other speakers suffer from when offering this aspect of performance. The

A pipe-organ recording had tremendous weight through the Deltas when the bass pedals descended to 32Hz and below, yet without boom or blurring.

Delta's clarity reminded me of the very first blind listening test I took part in, in 1977, organized by the late James Moir for *Hi-Fi News* magazine. One of the recordings Jimmy used was of someone shaking a bunch of keys. There were very large differences between the ways the speakers being tested reproduced this recording, but through only one model, later identified as a high-sensitivity Wharfedale E70, did it sound like *real* keys. With another speaker,

which we subsequently learned was the KEF R104aB, there was a *single* key! The Signature Delta's vitality and resolving power reminded me of the Wharfedale—which, perhaps not coincidentally, also had a horn-loaded tweeter.

It might seem a jarring segue to go from traditional Irish music to the alternative rock of the Smashing Pumpkins. However, when you listen to "Bullet with Butterfly Wings," from *Rotten Apples: The Smashing Pumpkins Greatest Hits* (256kbps MP3 download, Virgin), the heavy use of compression keeps the volume constant, just as with the uilleann

measurements, continued

though both its low-frequency rolloff and that of the woofers is closer to 18dB/octave than the usual 12dB. This suggests the presence of a large series capacitor in the woofer connection, to reduce the level of infrasonic spurious.

The two woofers have the same response (fig.3, green trace) and cover a relatively narrow bandpass, between 55 and 190Hz. Though some breakup behavior is visible between 500Hz and 4kHz, this is well suppressed by the crossover. The midrange unit (fig.3,

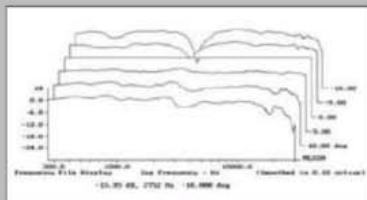


Fig.6 Triangle Signature Delta, vertical response family at 50°, normalized to response on tweeter axis, from back to front: differences in response 10–5° above axis, reference response, differences in response 5–15° below axis.

blue trace) rolls off steeply below 200Hz, and its output rises gently toward its handoff to the tweeter. The tweeter itself appears to be balanced a couple of dB too high in level, and there is a sharply defined notch in its output just above 20kHz. Both characteristics persist in the plot of the Signature Delta's response averaged across a 30° horizontal window centered on the tweeter axis (fig.4). The apparent rise

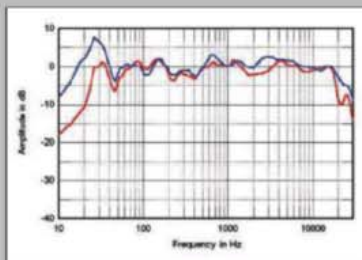


Fig.7 Triangle Signature Delta, spatially averaged, 1/6-octave response in JA's listening room (red); and of Joseph Audio Perspective (blue).

in the upper bass is almost entirely due to the nearfield measurement technique; the low bass rolls off very quickly below 30Hz. While the midrange and treble have many small dips and peaks, the overall trend is very even.

You can't predict a speaker's tonal balance from its anechoic or quasi-anechoic behavior on the tweeter axis, as that will also depend on the dispersion. Fig.5 shows the Triangle's horizontal dispersion, normalized to the tweeter-axis response. Other than some small off-axis irregularities, the radiation pattern is superb, with evenly spaced contour lines and a progressive rolloff of the top two octaves of the speaker's sides. In a typically sized room with the usual furnishings, this dispersion will compensate for the "hot" on-axis tweeter level to give a well-balanced treble, as I found in my listening. In the vertical plane (fig.6), a severe suckout develops above the tweeter axis at the upper crossover frequency (shown by the cursor position to be very close

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pipes. Despite Pure Music's dynamic-range meter stubbornly sticking at "12" during this song, guitarist-songwriter Billy Corgan has used a complex layering of different-character guitar tracks to achieve the effect of changes in volume, despite the loudness not actually changing. At an appropriately loud level, the result through the Signature Deltas was nothing short of magnificent, the speakers' clarity allowing me to appreciate the tonal color of the cymbals, even when all guitar hell was breaking out in the mix.

This is what a great speaker should do: communicate the how and why of what the music makers have done, so that you can understand and appreciate that music on its own terms.

Conclusion

A great speaker? With my brain still flooded with endorphins from listening to the Smashing Pumpkins at 100dB, I am indeed tempted to use that word for this \$8000/pair design. But there is strong competition in the category of mid-priced tower speakers. The Revel Performa3 F208 (\$5000), which Erick Lichte reviewed in July; the Vandersteen Treo (\$6490), which I reviewed in March 2013; the Monitor Audio Platinum PL200 (\$9000), reviewed by Robert Deutsch in April 2010; the PSB Synchrony One (\$5500), which I reviewed in April 2008—all are superb-sounding speakers, as is the Joseph Audio Perspective (\$13,000), reviewed by me in July. But none of them equals the Triangle Signature Delta in jump factor, and the fact that the Delta achieves this without compromising neutrality—something that almost-40-year-old Wharfedale couldn't do—is indeed commendable. Unless you like your music tame and uninvolved, this is a speaker well worth an audition. The French do, indeed, do things differently. ■

ASSOCIATED EQUIPMENT

Analog Sources Linn Sondek LP12 turntable with Lingo power supply, Linn Ekos tonearm, Linn Arkiv B cartridge.

Digital Sources Ayre Acoustics C-5xe^{MP} universal player; Apple 2.7GHz i7 Mac mini running OS10.9.3, iTunes 11, Pure Music 1.89 & 2.0, Audirvana Plus 1.5.10; Logitech Transporter media server; Auralic Vega, Luxman DA-06, PS Audio PerfectWave DirectStream D/A processors; dCS Vivaldi upsampling D/A system; Ayre Acoustics QA-9 USB A/D converter.

Preamplification Channel D Seta L phono preamplifier; Pass Labs XP-30, Ayre Acoustics KX-R20 line preamplifiers.

Power Amplifiers MBL Corona C15, Pass Labs XA60.5 (both monoblocks).

Loudspeakers Joseph Audio Perspective, Rogers BBC LS3/5A.

Cables Digital: AudioQuest Coffee, Belkin Gold USB, Kubala-Sosna Elation! AES/EBU, Transparent USB (with dCS Vivaldi). FireWire: AudioQuest FireWire 400 (prototype). Interconnect (balanced): AudioQuest Wild Blue, Kubala-Sosna Elation!. Speaker: Kubala-Sosna Elation! AC: Kubala-Sosna Elation!, manufacturers' own.

Accessories Target TT-5 equipment racks; Ayre Acoustics Myrtle Blocks; ASC Tube Traps, RPG Abffusor panels; Shunyata Research Dark Field cable elevators; APC S-15, Audio Power Industries T16 Mk.II & PE-1 AC line conditioners (hard drive, computers). AC power comes from two dedicated 20A circuits, each just 6' from breaker box.

—John Atkinson

measurements, continued

to the specified 2.7kHz), but as this axis lies a high 47" from the floor, this will not be a problem. The response changes only slightly up to 15° below the tweeter axis, which is a good thing, given that average ear height of a seated listener is about 36".

I measured the Triangle speakers' spatially averaged response at the listening position. (I average 20 1/6-octave-smoothed spectra, taken for the left and right speakers individually using SMUGSoftware's FuzzMeasure 3.0 program and a 96kHz sample rate, in a rectangular grid 36" wide by 18" high and centered on the positions of my ears.) The result is shown as the red trace in fig.7; also shown, for reference, is the response of the Joseph Audio Perspective tower speaker (blue). The two speakers offer similar behavior in the high treble and midrange, though the Triangle's low-frequency behavior suits my room acoustic significantly better than the Joseph's, whose bass would be better balanced in a room

larger than mine. The other difference is in the presence region: the Joseph has a bit too much energy in-room between 2 and 6kHz, which made it a tad fussy about system matching. By contrast, the Triangle has a slight depression visible between 1.5 and 3kHz.

Turning to the time domain, fig.8 shows the Triangle's step response on its tweeter axis. The tweeter and midrange drive-units are connected in inverted acoustic polarity, the woof-

ers in positive polarity. Importantly, the decay of each unit's step blends smoothly with the start of that of the next lower in frequency, implying optimal crossover design. The cumulative spectral-decay or waterfall plot on the tweeter axis (fig.9) is impressively clean throughout the treble, though a couple of low-level ridges of delayed energy are visible in the low treble.

Overall, its measured performance suggests that Triangle's Signature Delta is a well-engineered, well-optimized loudspeaker.—John Atkinson

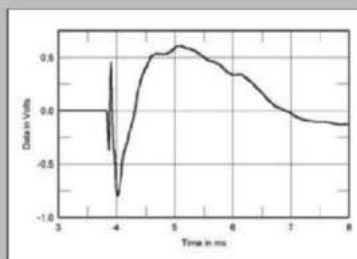


Fig.8 Triangle Signature Delta, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

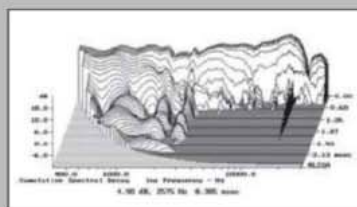


Fig.9 Triangle Signature Delta, cumulative spectral-decay plot on tweeter axis at 50" (0.15ms risetime).