MARTEN

Coltrane in Stereophile (USA) February-05

Michael Fremer, February, 2005

"So what kind of music do you listen to?" I heard myself asking Leif Mårten Olofsson, designer of the Coltrane, Coltrane Alto, Duke, Miles II, Mingus III, and Monk loudspeakers, before I could take it back. The small company, headquartered in Göteborg, Sweden, where Volvos are made, has been building and marketing loudspeakers for the past six years, though Olofsson confesses he's been building them for 30 years, ever since he was 12.

The Coltrane is the company's "statement" product, and at $50,000/pair, you expect more than a short riff improvised on a familiar theme. Olofsson went for top-of-the-line German Accuton drivers (known as Thiel and Partners elsewhere in the world, but not in the US because of Thiel Audio), including a custom version of Accuton's ultra-expensive, ?", diamond-diaphragm inverted-dome tweeter, similar to the one used in Avalon's Eidolon Diamond loudspeaker.

How expensive is "ultra-expensive"? For the diamond-tweeter option, Avalon adds $10,000 to the price of the standard Eidolon. Making the synthetic-diamond diaphragm requires a great deal of heat and pressure and a heap of engineering expertise. It's not easy to do, but the resulting stiffness, low mass, and ability to channel heat yield many measured benefits, not least of which is the raising of the tweeter's resonant frequency to well above the audioband.

As this review was being prepared, B&W announced its own diamond tweeter. Press-conference attendees were shown some impressive measurements demonstrating that, while the resonant frequency of B&W's previous best metal-dome tweeter was also out of the audible bandwidth, the rise to the inevitable peak began within it. With diamond offering a much higher-frequency dome resonance than metal, the new tweeter's response appeared to be remarkably flat to well beyond 20kHz; I trust Accuton's will show similarly good behavior. For around $10,000 at retail, it had better!

The Coltrane's midrange driver is a 4" concave ceramic cone made by Accuton to Mårten's specifications. Generating the bottom octaves are two off-the-shelf 9" ceramic cones, also by Accuton.

Adding to the Coltrane's expense is its enclosure, made of carbon fiber and honeycombed Kevlar laminate by a Swedish company that supplies composite structures to the aeronautical and marine industries, and whose owner is an audiophile. A one-piece mold containing two carbon-fiber shells sandwiching a 1"-thick insert of honeycombed Kevlar is baked at 300° in a vacuum oven to produce a curvaceous, lightweight, ultrarigid enclosure weighing about 22 lbs—Mårten goes for stiff and light as opposed to dense and damped. Internal

bracing and a downward-firing 4" port are also incorporated into the molding process. The speaker's integrated structure allows the front baffle—made of viscoelastic, constrained-layer-damped, 2"-thick hardwood and MDF—to be bolted securely to the enclosure in three places. The midrange driver is housed in a subenclosure attached to the front baffle but isolated from the composite structure, which is heavily damped with an asphalt-like material.

Given the enclosure's relatively low mass, I asked Leif Mårten Olofsson about its resonant frequency, which I suspected was in the midband. He confirmed that it was around 1kHz, but added that this was easily damped out by the Coltrane's extremely narrow Q factor. I'm as curious as you are to see what John Atkinson's accelerometer measurements show.

Crossover points at 300Hz and 4kHz ensure that fundamental frequencies generated by musical instruments and voices fall comfortably within the midrange driver's passband and away from the driver transition points. The crossover itself features point-to-point wiring, its components secured using a vibration-reducing viscoelastic adhesive. The crossover is inside the speaker, behind the port and close to the two sets of WBT binding posts, to which it is connected using internal cables by Jorma Design, also of Sweden. Mårten recommends biwiring the Coltranes with Jorma cables. A pair of heavy, polished steel crossbraces fitted with Black Diamond Racing cones support the enclosure and, with the addition of four Black Diamond Racing pucks, provide sufficient clearance for the port's optimal performance.

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Coltrane in Hifi+ (USA) no 35-04

In short, there's nothing mysterious going on here: just ultra-high-quality drivers and careful attention paid to enclosure construction, with an emphasis on rigidity and vibration control, plus computer-aided crossover design and execution. Like any other modern speaker designer who relies on computer programs such as DRA Labs' MLSSA, Olofsson's ears remain the final arbiters. The designer claims that the Coltrane's frequency response is 20Hz–100kHz, –3dB, with the port tuned to 23Hz, though the specs on the Mårten Design website claim ±2dB with the port tuned to 19Hz.

Coltrane Time

Despite its price and its promise of ultrahigh performance, the Coltrane is surprisingly compact—not much bigger than my reference Wilson Audio WATT/Puppy 7s—and lacks sex appeal when compared with, say, the stunning-looking Sonus Faber Stradivari Homage. But then, most speakers lose out in that comparison. With its grooved wooden front baffle (available in maple, cherry, oak, or walnut), the Coltrane has an appealingly Scandinavian look. Still, after first reminding me of a sauna door, the baffle's shape then brought a surfboard to mind. Many observers see a resemblance to the Kharma speaker line. Between the carbon-colored enclosure, the grooved baffle, the black-and-white ceramic drivers, and the aluminum cross braces, the Coltrane sends a mixed visual message that some visitors to my listening room found attractive and others didn't.

The Coltranes fit comfortably in my room, where I first placed them on the masking-tape outlines of the WATT/Puppy 7s' positions—not far from the masking-tape outlines used for the just-departed Sonus Faber Stradivaris and Krell Resolution 1s (reviewed in, respectively, the January 2005 and November 2004 issues of Stereophile). Initially, I toed-in the Mårtens so that their tweeter axes crossed just behind my listening position. A multiposition switch next to the speaker terminals allows ±2dB of adjustability, in 0.5dB increments, in the usual "room bump" (or dip) region of 40–80Hz.

So positioned, the Coltranes were a sonic slap in the face compared to the easy-fit, Dockers-like performance of the Stradivari or the Krell Resolution 1. If those speakers were about delivering big, velvety pictures or—to make an automotive analogy—soft, luxurious, shock-absorbing rides, the Coltranes were more forward and about detail, powers of ultra-resolution, and the exhilarating, tightly sprung, road-hugging, steering-wheel-communicating handling of a European sports car.

The Coltranes drew a tighter, more compact picture than either the Sonus Fabers or the Krells, but one with astonishingly sharp focus and weighty image solidity. While those two speakers sounded slightly warm and tended to cushion images in velvet, the Coltrane tended to carve away adjacent space, leaving images free to float in dramatic three-dimensional relief. The Coltrane's musical grip was firm and well-controlled from the midband up, and while it didn't sound etchy or bright, the presentation was revealing of every flaw that preceded it in the recording and reproducing chains. If there was tape hiss, the Coltrane let me know about it. That was fine with me, but the lack of midbass weight wasn't. It produced somewhat skeletal pictures of heads without bodies, orchestras sans venues.

Giant Steps

As originally set up, the Coltrane presented a lightweight picture exacerbated by the tweeter's near-infinite high-frequency extension. Getting the speaker to sound good was relatively easy, but getting it to sing for its $50,000 supper was another matter. That's not meant as criticism—any ultra-hi-rez, high-performance speaker will demand an equal amount of attention paid to precise placement and careful choice of associated gear.
Getting the Coltranes in proper tonal and spatial balance required a combination of tiny changes in the speakers' distances from the front and side walls, as well as tweaking their 40–80Hz switch positions. Toe-in was also critical in balancing the tweeters' contribution to the overall picture. While getting the bass locked in lessened the diamond tweeter's overbearing personality, I had to toe the speakers out more than usual (the tweeter axes now crossed farther behind my listening position) to both open the soundstage dimensions and create a smooth, sweet, but still wide-open high-frequency presentation.
One final change was necessary to lock in the Coltrane's sound: using Mårten's cable of choice, the Jorma Design #1. I've used Harmonic Technology's combination of Magic Woofer and Tweeter cables for all of my recent speaker reviews, and have found their performance to be basically "out of the way"; the Harmonic Techs properly expressed the relative warmth and opulence of both the Krell Resolution 1 and the Sonus Faber Stradivari.
Yet when I'd optimized the Coltranes to the best of my abilities, I still found the sound a bit bright and spotlit on top, slightly lean on bottom. The issue wasn't one of "personality"—every speaker's got one—but of balance. A speaker shouldn't impose an imprint on every piece of music it reproduces, or at least it shouldn't be noticeable over time.

Because both Olofsson and his US distributor, Sound Advice, pushed the Jorma Design cables on me and I'd refused the offer—wanna see a room's worth of cables?—I felt I owed it to them to at least try their recommendation, which anyway is what the speakers are wired with internally. The biwired pair of WBT spade lugs protruding from the Jorma Design #1's cylindrical termination housing are marked Highs and Lows; I don't know if some kind of filtering is taking place, but with the Jormas in place, the Coltranes, which had already sounded impressive if somewhat brittle on top and

lacking body below, cohered as they hadn't before. The top end, still ultra-extended and detailed, was now transparent and silky-smooth, the midbass more pronounced and fleshed-out, the bass fuller and more tactile. Given the Harmonic Tech cables' outstanding performance in all of the aforementioned parameters, their lack of synergy with the Coltranes remains a puzzle.

With the Jorma Design #1s in place, the overall balance was now satiny-smooth and close to ideal with all three power amplifiers I used. For $50,000/pair, that's the least you should expect! Getting the Coltrane there wasn't easy; when it wasn't there, the speaker was unforgiving in letting me know that something wasn't right.

Impressions

There's a brassy-sounding big-band album by Ella Fitzgerald, arranged and conducted by Bill Doggett, called Rhythm Is My Business (LP, Verve V6-4056)—a great title, and a perfect description of one of the Mårten Coltrane's strongest suits. Get it optimized and you have a speaker that's fast, tight, and bristles with transient energy and detail, yet one that takes enough time to let the harmonic overtones develop. Rhythm and pace are the Coltrane's businesses—hardly surprising, given the designer's swinging musical tastes.

The Fitzgerald album can sound congested, hollow, and watery if a system can't sort out from the actual sources the boxy reverb that bathes her voice and the brass. The Coltranes separated the threads brilliantly, delivering as focused and three-dimensional an Ella as I've heard from this record. She appeared with great solidity and three-dimensionality between the speakers, the biting brass well behind, while the reverb applied to both her voice and the brass section was presented clearly as a separate element that didn't interfere with the main vocal and instrumental events. That takes great powers of resolution and stop/start speed.

UMG recently issued a new set of hybrid SACDs. Some, such as Herbie Hancock's gorgeous-sounding Gershwin's World (Verve 80001379-36), have been remixed for surround sound, but the one I grabbed first was John Coltrane & Johnny Hartman (Impulse! 80001126-16), remastered by Rudy Van Gelder in mono and stereo on the SACD and CD layers. I'm very familiar with it, having many stereo vinyl pressings and the original Impulse! CD.

Van Gelder ran both full-track and two-track recorders for the original recording session, but the mono tape had gone missing until recently; as his new liner note points out, in the new age of stereo madness, those original mono mixes were often thrown out. There was plenty of tape hiss on the mono mix, and it sounded convincingly smooth—as analog tape hiss should—but below it was a perfectly rich, smooth, coherent, focused mix of Hartman's velvety voice, Coltrane's tenor sax, and the rest of the quartet, which includes McCoy Tyner on piano. Especially notable were both the extension and nimble control of Jimmy Garrison's bass and the effortlessness and appropriate sparkle of Elvin Jones' brushwork.

In mono, the presentation pulsed and floated transparently and effortlessly between the speakers. As Hartman moved up and down through his vocal range, the Coltranes delivered his voice consistently sized, coherent, and utterly believable (though the original recording quality is anything but ideal), while revealing the touch of reverb that subtly tracks his voice. If you want to know why there's a mono revival underway in the analog world, and why mono jazz albums from the 1950s fetch bigger bucks than their stereo counterparts, check out this disc. But buy it for the music: Hartman was a mesmerizing, honey-throated, refreshingly restrained vocalist; the backing band wasn't half bad either.

The Coltrane's rhythmic agility and transient snap had me pulling test discs out night after night. One impressive performance led to another, as it does with any great piece of audio gear. The 45rpm edition of Dave Brubeck's Time Out (Columbia/Classic) demonstrated the speaker's musical grip, its smooth, detailed high-frequency extension, and its spectacular yet effortless resolution of musical detail without added etch, grain, glare, or brightness. "Snap" did not come at the expense of body. While the speaker emphasized attack, it did not shortchange body, so cymbal strokes had nice stick pop, plus crackle, shimmer, sizzle, and chime. You'll like the way well-recorded cymbals sound through the Coltrane.

The Coltrane was not afraid of placing 3D instruments both forward of the baffle plane and, when appropriate, way behind. Joe Morello's cymbals on the Brubeck disc rang convincingly, yet never sounded hashy or splashy. This tweeter managed to be ultrafast, detailed, and extended, and at the same time supple and smooth. If a recording was brash or bright, the Coltrane let me know but didn't confuse extension and resolution with brittleness or edginess. Next to the tweeter in mbl's 101E Radialstrahler (reviewed in the October 2004 issue), Accuton's diamond dome could be the smoothest, fastest, most resolving, most extended tweeter you're likely to hear—yet it was never in my face, and never sizzled or beamed.

If the Sonus Faber Stradivari Homage is on the rich, velvety, voluptuous side of musical accuracy, the Coltrane was on the leaner, faster, more detailed side, with pinpoint three-dimensional imaging, holographic focus, and sensational though compact soundstaging. For instance, the Mårten's presentation of "Sweet Black Angel," from the German Electrola pressing of the Rolling Stones' Exile on Main Street, was nothing short

of amazing—the acoustic guitars had tremendous visceral presence, texture, and elasticity, while the woodblock "popped" with utmost round clarity well back in the soundstage. The marimba in that track can easily get buried, but through the Coltranes it was both clarified and appropriately woody-sounding and three-dimensional. The Mårtens managed to be ultrafast and full-bodied at the same time, though they were more about content than context.

The only area where the Coltranes were somewhat disappointing was in the lower octaves—but not so much in terms of extension as of control and, ultimately, believability. Bass was never sloppy or bloated. If that were the case, the speaker's tightly focused midband and highs would have meant that its overall presentation would have fallen apart. Rather, I occasionally heard generic "bass" instead of a clearly defined musical instrument—as if the speaker were slightly underdamped, or the thin, rigid enclosure's resonant frequency hadn't been sufficiently tamed. But if forking over $50,000 is on your musical horizon, take that observation with caution; this could have been a function of how the Coltranes coupled to my room.

My Favorite Things

What I liked best about the Coltrane was its effortlessness at all volumes, but most notably when I played the pair of them quietly. Then, they managed to delineate small-scale level changes with remarkable dynamic breadth. Cranked up really loud, they maintained their composure and transparency, the tweeters never registering any hard, edgy, or glassy objections, the woofers showing no signs of dynamic compression. What they did with Classic Records' edition of Muddy Waters' Folk Singer (Chess/Classic) was staggering—they delivered Waters' voice with believable body and perfectly drawn sibilants, and the acoustic guitar with rich body and attack—yet floating above was that old tape's hiss. I've heard other highly regarded speakers deliver the music spiked with brightness, yet missing the hiss!

Equally impressive were the Coltranes' macrodynamic scaling, holographic imaging, and vivid three-dimensionality. Play something like the three-LP box of Neil Young and Crazy Horse's all-analog Greendale (Vapor/Classic) and you'll hear a drum sound as close to live as you're likely to hear from a pair of speakers. Nor are you likely to get a more vivid sensation of hearing Neil Young singing in your listening room than you can through the Coltranes, which are more about bringing the event to you than about bringing you to the event.

Conclusions

Like Karl Rove, the Mårten Design Coltrane is about attack, attack, and more attack. Its ability to reproduce the piano's transient attack was among its most notable achievements, and it did so without producing a glassy or tinkly sonic aftertaste or shortchanging the instrument's rich harmonic structure. Its other strong suits are clarity, focus, transient snap, resolution of low-level detail, image three-dimensionality, and, especially, transparency.

Those who don't respond to the Coltrane's sound might find it a bit drab or lacking in richness, romance, and bloom. Maybe so, but it does give you the straight poop. It doesn't produce the most expansive soundstage $50k can buy, and some other speakers might offer greater dynamic slam and sheer sonic shock value, but the Coltrane's compact size makes it a great fit in a room of modest size.

Then there's the issue of bass. The Coltrane's bottom-end extension is formidable, but in my space at least, it was a bit loose; sometimes, there was a one-note rolling roundness that announced "bass" rather than the specific instrument producing it. That could be the way the speaker couples with my room, but it's something worth listening for, lest the impressive weight divert your attention until it's too late.

That caution aside, and taking into account the critical care with which you must choose associated components, including cables—and, of course, the speaker's high price—the Mårten Design Coltrane is the real McCoy. I have a Jones for it. If it didn't cost so much that I'd need a Garrison to guard me if I paid with cash, I'd consider buying a pair. Or a quartet, for that matter.

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Coltrane in Hifi+ (USA) no 35-04

Sidebar 1: Specifications
Description: Three-way, reflex-loaded floorstanding loudspeaker. Drive-units: ?" inverted diamond-dome tweeter, 3.5" ceramic-cone midrange unit, two 9" ceramic-cone woofers. Crossover frequencies: 300Hz, 4kHz. Frequency response: 20Hz–100kHz, ±2dB. Sensitivity: 89dB/W/m. Nominal impedance: 4 ohms. Supplied accessories: polished-steel stands with Black Diamond Racing cones and pucks.

Dimensions: 44.5" (1130mm) H by 12.3" (313mm) W by 24" (610mm) D. Weight: 104 lbs (47kg).

Finishes: High-gloss black with wood front panel in maple, cherry, oak, or walnut.

Serial numbers of units reviewed: 5403261H, 540326V.

Price: $50,000/pair. Approximate number of dealers: 5.

Manufacturer: Mårten Design, Götabergsgatan 18, SE-411 34 Göteborg, Sweden. Tel: (46) (0)31 20 72 00. Fax: (46) (0)31 20 72 70. Web: www.martendesign.com. US distributor: Sound Advice, 1087 E. Ridgewood Street, Long Beach, CA 90807. Tel: (562) 422-4747. Web: www.ear-usa.com.

Sidebar 2: Associated Equipment
Analog Sources: Simon Yorke S7, T+A G10 turntables; Immedia RPM-2, Graham 2.2, SME M2 tonearms; Lyra Titan & Helikon mono, Shelter 301, 501, 901 & 90x, T+A C 10 cartridges.

Digital Sources: Musical Fidelity Tri-Vista, Krell SACD Standard SACD players; Alesis Masterlink CD recorder.

Preamplification: Manley Steelhead, BAT VK-P10SE phono preamplifiers; Musical Fidelity kWP preamplifiers.

Power Amplifiers: Musical Fidelity kW, Yamaha MX-D1, Music Reference RM-200.

Loudspeakers: Wilson Audio WATT/Puppy 7, Sonus Faber Stradivari Homage, Krell Resolution 1.

Cables: Interconnect: AudioQuest Cheetah & Sky, Harmonic Technology CyberLight LAM Photon Transducer. Speaker: Harmonic Technology Magic Woofer & Tweeter, Jorma Designs #1. AC: Shunyata Research, JPS.

Accessories: Sounds of Silence Vibraplane active isolation platform, Shun Mook Audio LP Record Clamp, Locus DampClamp, Audiodharma Cable Cooker, Finite Elemente Pagode equipment stands, Walker Audio Precision Isolated Power Motor Drive, Shunyata Research Hydra 2 & Hydra 8 AC conditioner, ASC Tube Traps, RPG BAD & Abffusor panels.—Michael Fremer

Sidebar 3: Measurements

I measured the Mårten Design Coltrane with the speaker biwired with the supplied Jorma cables and supported by the Black Diamond Racing cones and pucks, to allow its reflex port to be raised sufficiently high above the floor. Because of the speaker's bulk, it was not possible to raise it several feet from the floor for the acoustic measurements, as is my normal practice. I therefore had to window the time-domain data more aggressively than usual, to eliminate the effect of a strong floor reflection. This reduces the resolution of the farfield measurements in the midrange, but was unavoidable.

The Coltrane was slightly less sensitive than specified, at an estimated 87dB(B)/2.83V/m. This is average—87dB is the average sensitivity of the 575 loudspeakers I have measured over the past 15 years—but the Coltrane's impedance plot (fig.1) reveals it to be quite a demanding load. The impedance magnitude remained below 5 ohms throughout the bass, regardless of the setting of the rear-panel rotary switch. This switch affects the relative heights of the two reflex impedance peaks. With the switch set to its maximum position, the upper peak is at its highest, the lower peak at its lowest; set to its lowest position, the opposite is the case, though in that case the impedance drops to an amplifier-punishing 1.9 ohms at 43Hz. With the switch set to its central position, which is how Michael Fremer auditioned the Coltranes, the impedance remained between 2.5 and 3 ohms from 20 to 100Hz.

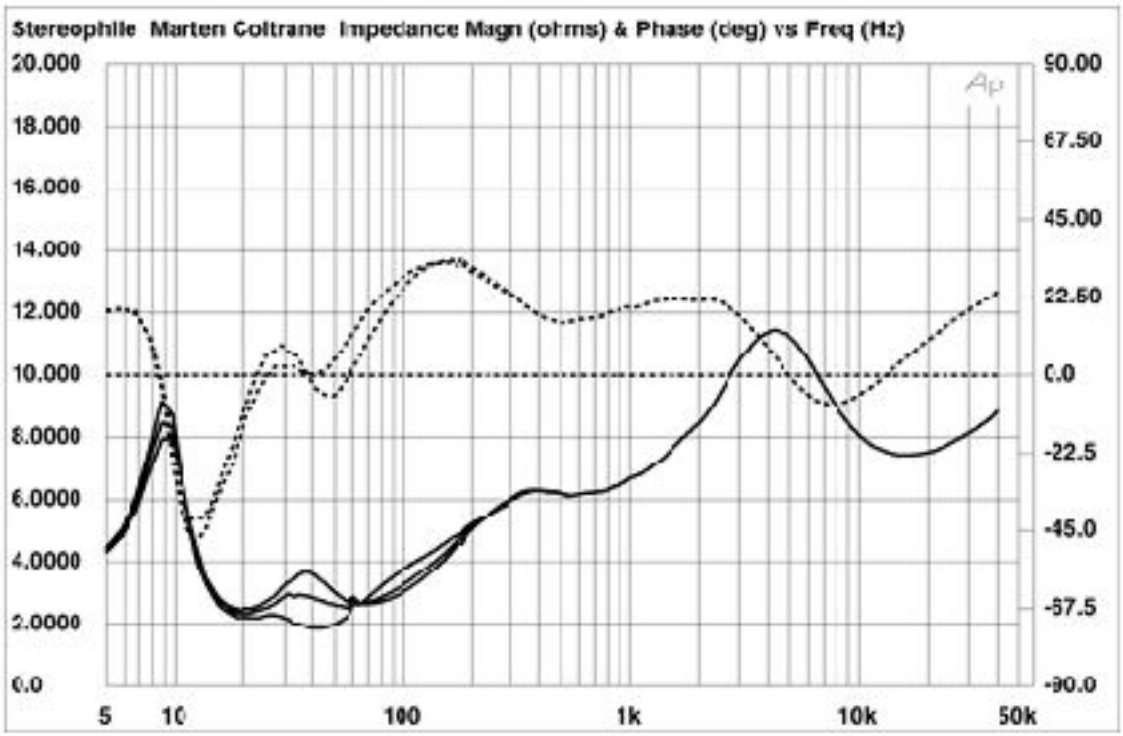
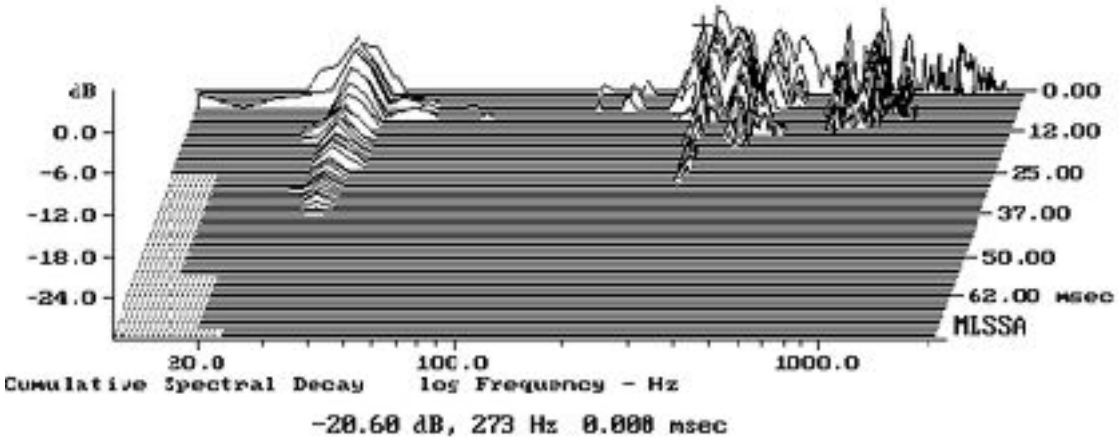


Fig.1 Mårten Design Coltrane, electrical impedance (solid) and phase (dashed) with rear-panel switch set to (from top to bottom at 40Hz): "5," "3," "0" (2 ohms/vertical div.).

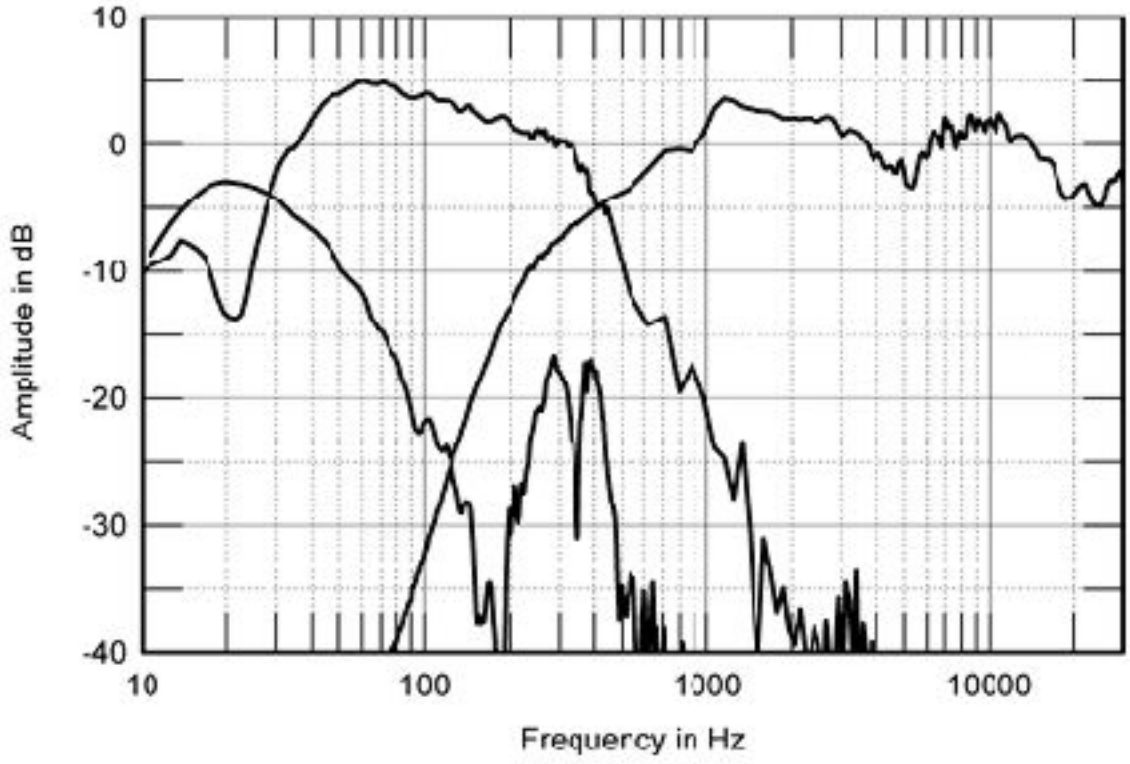
The generally higher magnitude of the Coltrane's impedance in the upper midrange and treble will mean that the speaker will sound a little tilted-up when used with tube amplifiers that have a higher-than-normal output impedance. However, the fact that the reflex "saddle" in the magnitude trace occurs at a very low 20Hz suggests excellent bass extension. However, the shape of the impedance trace implies a rather underdamped alignment, as Mikey noted in his auditioning.

There are a couple of small glitches in the impedance traces, at 60 and 190Hz, but I couldn't find any panel resonances that would have led to this behavior. In fact, the light, stiff construction of the Coltrane's enclosure proved remarkably free of resonances, as revealed by fig.2, a waterfall plot calculated from the output of an accelerometer fastened to the curved sidewall 12" from the base. As Celestion showed 20 years ago, this kind of construction is very effective at eliminating cabinet resonances in the critical midrange. What resonances are present tend to be much higher in frequency than usual, and because the low mass of the panels doesn't store much energy, they decay very quickly.



fastened to the cabinet's side panel 12" from base (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

From right to left, fig.3 shows the individual outputs of the midrange/tweeter section on the tweeter axis, the two woofers (which behave identically), and the port. The latter is the broad peak centered on the 15–30Hz octave, but the absolute level is a little low to deliver the full extension promised by the port tuning frequency. A couple of lower-midrange resonant peaks are evident, but these are relatively low in level; their audibility will be ameliorated by the fact that the port faces the floor.



the nearfield midrange, woofers, and port responses plotted below 350Hz, 440Hz, and 900Hz, respectively.

The woofers broadly peak between 30 and 300Hz (though the height of this peak will be exaggerated somewhat by the nearfield measurement technique), and cross over to the midrange unit higher than the specified 300Hz. The rollout slope of the woofers is free from breakup modes. The high-pass slope of the midrange unit's rollout is initially quite slow, but steepens to what appears to be a third-order slope below 250Hz. There is a lack of energy in the octave between 3 and 6kHz, and while the tweeter output is shelved down a little above 16kHz, its response extends smoothly above the 30kHz limit of this graph.

Fig.4 shows the Coltrane's overall response on the tweeter axis, spliced to the complex sum of the nearfield midrange, woofer, and port responses, taking into account acoustic phase and the distance of each sound source from the nominal farfield point. Note the excellent bass extension evident in this graph. The overall balance is flat, though it can be seen from this graph that the upper midrange is a little suppressed, the presence region a little boosted, and the mid-treble a little recessed. Which of these characteristics becomes dominant subjectively—ie, whether the speaker will sound forward and detailed or laid-back and perhaps a bit recessed—will depend to a large extent on the music being played. However, I note that even after Mikey had optimized the Coltranes' setup, he still found the speaker "a bit bright and spotlit on top, slightly lean on bottom."

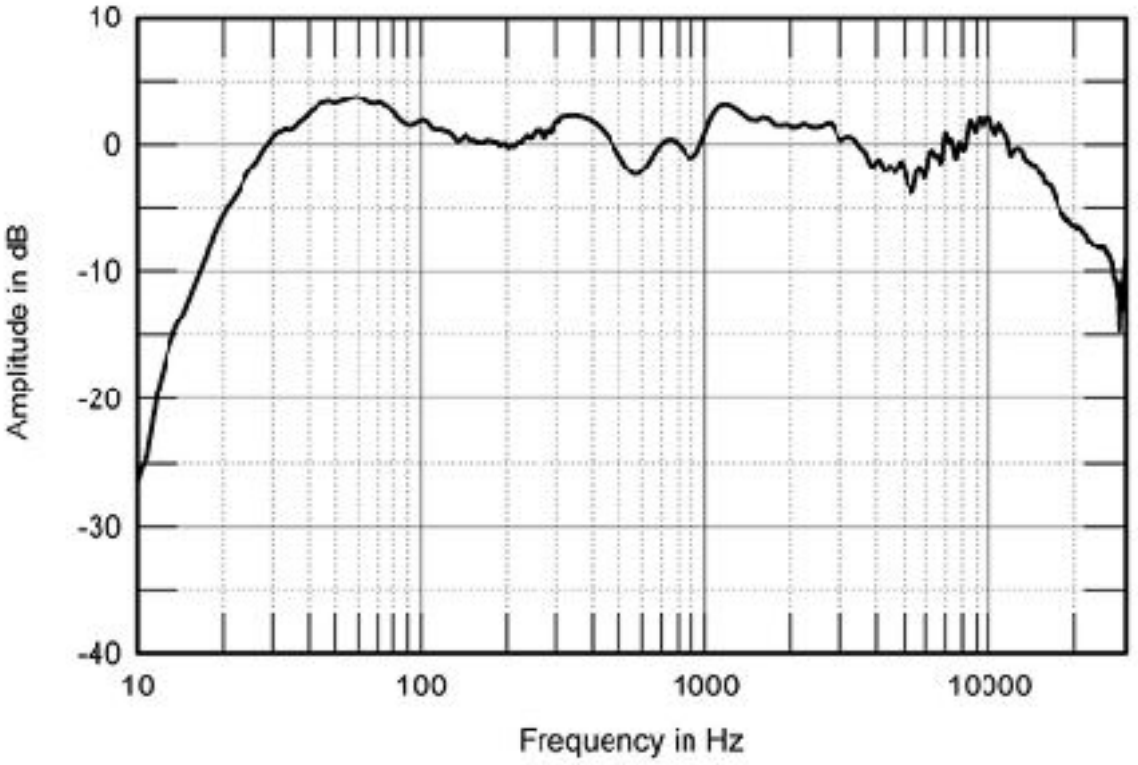
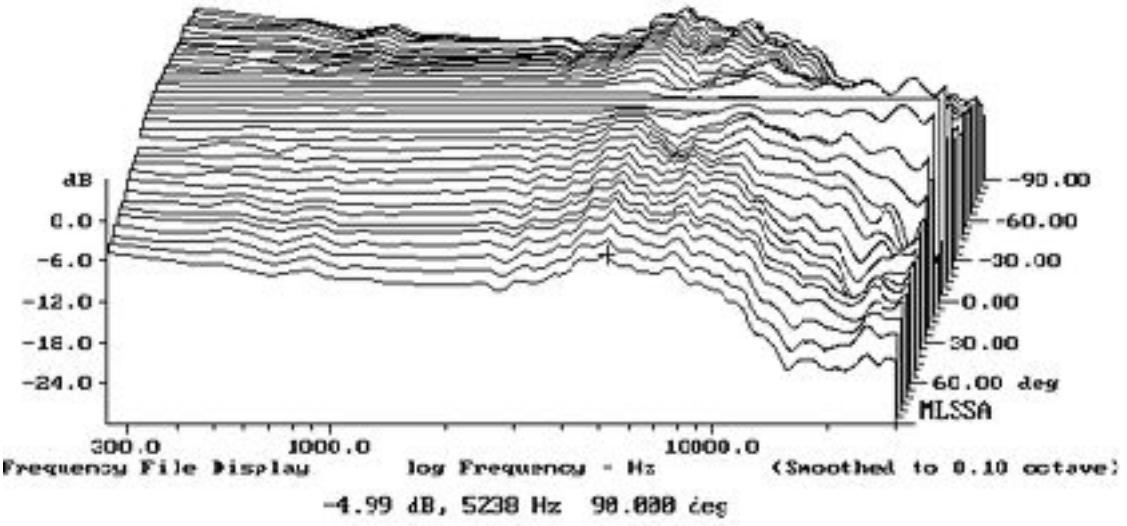


Fig.4 Mårten Design Coltrane, anechoic response on tweeter axis at 50", averaged across 30 degrees horizontal window and corrected for microphone response, with the complex sum of the nearfield midrange, woofer, and port responses, taking into account acoustic phase and distance from the nominal farfield point, plotted below 300Hz.

A loudspeaker's balance depends not only on its on-axis response, but also, to a large extent, on the room's reverberant field, which in turn will depend on the speaker's dispersion. The Coltrane's horizontal radiation pattern, normalized to the tweeter-axis response, is shown in fig.5. The tweeter has limited dispersion above 10kHz, which is why the averaged response shown in fig.4 is more rolled-off in the top audio octave than that in fig.3. There is also an off-axis flare at the bottom of the tweeter passband that will compensate for the lack of on-axis energy in the same region. Both these factors will contribute to the sensitivity to toe-in that Mikey mentioned in his auditioning notes. But note how even the contour lines appear below 10kHz in this graph, which correlates with stable stereo imaging. In the vertical plane (fig.6), the speaker's output doesn't change much as long as you sit on or below the tweeter axis. However, sit with your ears level with or higher than the top of the cabinet and the top octaves shelve up a little, and a suckout eventually develops at the upper crossover frequency.



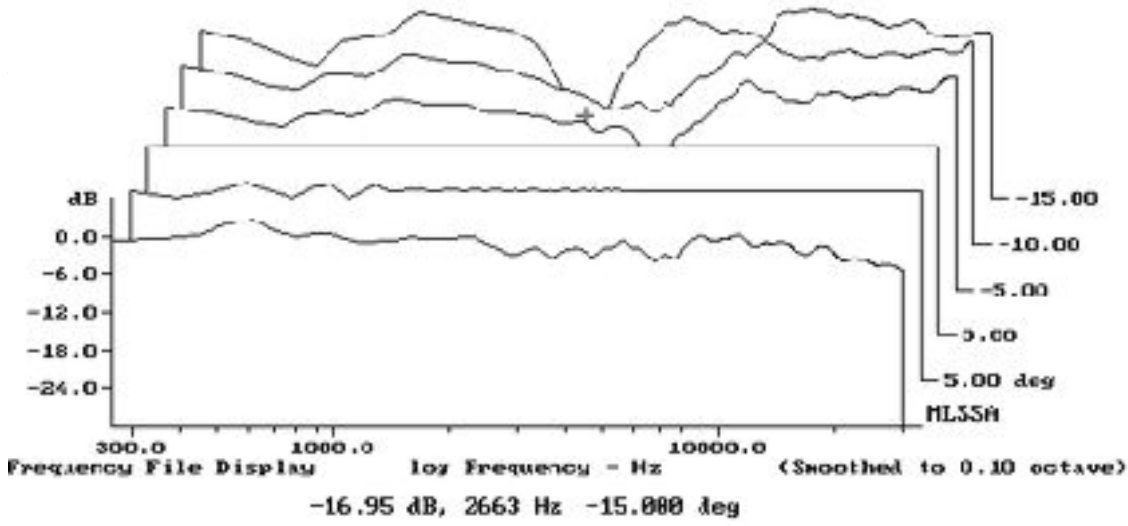


Fig.6 Mårten Design Coltrane, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 15 degrees–5 degrees above axis, reference response, differences in response 5 degrees–10 degrees below axis.

The Coltrane's step response on the tweeter axis (fig.7) is marred at the 7.8ms mark by the floor reflection mentioned earlier. But looking at fig.7 more closely, the first, positive-going spike is the tweeter, followed by the negative-going midrange unit, the output of which lies very slightly behind the tweeter's negative-going overshoot. The slow, positive-going output at the 4.5ms mark comprises the overshoot of the midrange unit's output, which overlays the slower positive-going rise of the woofers. Not apparent in this graph are some small reflections of the tweeter's

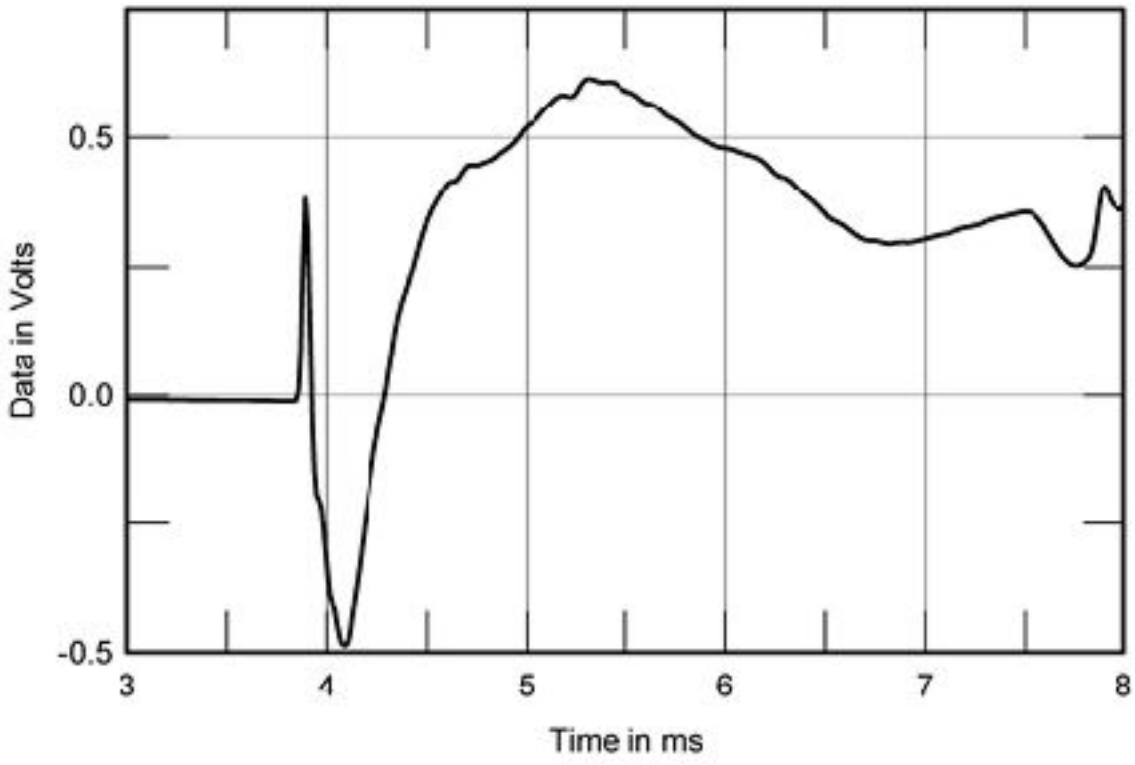


Fig.7 Mårten Design Coltrane, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

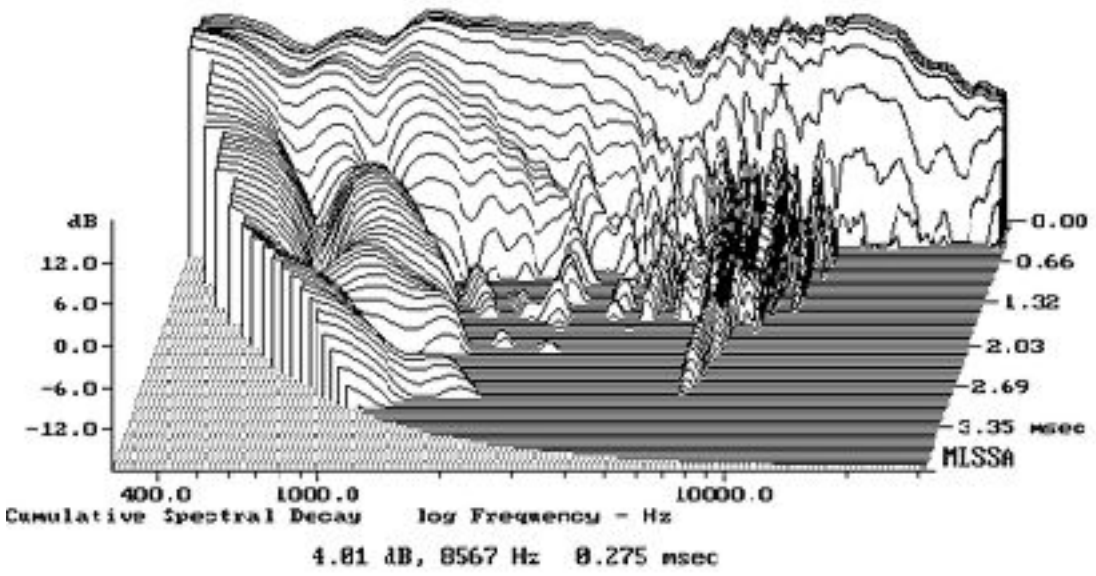


Fig.8 Mårten Design Coltrane, cumulative spectral-decay plot at 50" (0.15ms risetime).

Overall, the Mårten Design Coltrane offers pretty good measured performance. However, that low impedance in the bass region mandates use with an amplifier both capable of sourcing serious current and keeping those woofers under control. We almost never comment on packaging, but I must compliment Mårten Design on that for the Coltrane, which made handling it easier than I had anticipated for such a large, bulky speaker.—John Atkinson