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**Thiel's CS3.7 loudspeaker**

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# Thiel CS3.7

WES PHILLIPS

## LOUDSPEAKER



ERIC SWANSON

**DESCRIPTION** Three-way, floor-standing loudspeaker. Drive-units: 1" (25mm) aluminum-dome tweeter mounted coincidentally within 4.5" flat aluminum midrange driver, 10" (254mm) flat aluminum woofer, 10" (254mm) flat aluminum passive radiator. Crossover slopes: acoustic first-order. Frequency response: 33Hz–26kHz,  $\pm 2$ dB. Phase response:  $\pm 10^\circ$  minimum. Impedance: 4 ohms nominal, 2.8 ohms minimum. Sensitivity: 90 dB/2.83V/m. Recommended power: 100–600W.

**DIMENSIONS:** 44.9" (1140mm) H by 12.6" (320mm) W by 21.3" (540mm) D. Weight: 91 lbs (41.5kg).

**FINISHES** Walnut, Black Ash, Cherry, Oak, Maple; others available at higher cost.

**SERIAL NUMBERS OF UNITS REVIEWED** 659, 660.

**PRICE** \$12,900/pair. Approximate number of dealers: 110. Warranty: 10 years.

**MANUFACTURER** Thiel Audio Products, 1026 Nandino Boulevard, Lexington, KY 40511. Tel: (859) 254-9427. Fax: (859) 254-0075. Web: [www.thielaudio.com](http://www.thielaudio.com).

**O**ne might argue that Thiel Audio's 3-series loudspeakers are the audio equivalents of BMW's 3-series sports cars: relatively affordable, but 100% about performance. Thiel has made bigger, more expensive loudspeakers than the 3s, as well as smaller, less expensive models—but the iconic Thiels are the 3s.

I also suspect that they're Jim Thiel's favorites, although he'd probably never admit it. When he spoke to me about the new CS3.7 at the Consumer Electronics Show a few years ago, he almost choked up when he said, "I've wanted to revisit the 3s for a while now . . ." I could almost see him pondering *le temps perdu*. Of course, in the years since designing the CS3.6, he'd worked on the CS5.1, the CS7.2, the PowerPoints, and makeovers of the CS2.3 and CS1.5 (respectively, the CS2.4 and CS1.6), in addition to practically reinventing the category of subwoofers. It's not as if the man hasn't been busy.

On the other hand, Thiel says, he probably couldn't have built the CS3.7 much sooner. "We could have never built the '3.7s the 'old' way, buying drivers from OEM companies," he said. "We had to engineer them ourselves—in fact, we had to *design* them ourselves, and then master the engineering. And, having better drivers, we needed to make the cabinets more rigid."

In other words, you could say that it took a lifetime to build the CS3.7—the lifetime of Jim Thiel.

### If you want to be happy for the rest of your life

While the CS3.7 (\$12,900/pair) is different from its predecessors, Thiel didn't exactly start with a blank sheet of paper. "It had to be time and phase coherent, and it had to have a first-order crossover. Since it would replace the '3.6, I wanted it to be a three-way, so you could say that before I designed it, I knew a lot about it—everything except how to *do* it."

The CS3.7 is recognizably a Thiel. It has the raked-back baffle common to all floorstanding Thiels, but unlike its brethren, the '3.7 has a curved body constructed of 15 layers of laminated hardwood (not MDF) and capped by a cast-aluminum nacelle. The cap not only reinforces the cabinet's strength, it also optimizes diffraction. The front baffle is of machined aluminum.

The speaker's looks have been the source of some comment chez Wes. I look at them and see Daleks from *Dr. Who*, albeit Daleks without grating voices. My wife says they're elegant. She's got a good eye (he says smugly).

The CS3.7 is a three-way, despite looking like a two-way design. A coinciden-

tally arranged midrange-tweeter assembly is mounted above a 10" woofer, and a 10" passive radiator. All the drive-units were designed by Jim Thiel and all are manufactured to his specifications, but Thiel suggests that his biggest breakthrough is the 4.5" midrange driver, which is *not* a cone. Its aluminum diaphragm resembles a flattened, corrugated doughnut—the tweeter nests into the center, where the dustcap would go in a conventional design. On examination, the “corrugations” prove to be radial lobular indentations in the aluminum.

“This allows us to use a very thin diaphragm that operates pistonically—very close to ideally,” said Thiel. “It’s linear up to around 20kHz, which is unheard of.” That’s not simply because of the driver’s complex shape, however. The diaphragm is driven by a massive 3" voice-coil and a powerful neodymium magnet, which give it “exceptional circumferential strength.”

The 1" aluminum-dome tweeter, too, is new. It has five neodymium magnets

(four magnetized radially, one axially), which, Thiel said, “exert enough brute force to raise sensitivity and reduce distortion.” He also pointed out that, mounted as it is inside an essentially flat driver rather than a shallow cone, the tweeter doesn’t suffer from the “shouty” coloration that plagues many coincidentally mounted tweeters.

The woofer is another essentially flat driver with radially mounted strengthening lobes. It, too, boasts a 3" voice-coil and a massive (5-lb) magnet. Like the midrange driver, it also employs Thiel’s long-gap, short-coil drive system, which keeps the coil within a uniform magnetic field throughout its entire range. Jim Thiel believes that “most” loudspeaker distortion is caused by the voice-coil experiencing fluctuations in the magnetic field as it gets farther from the magnetic gap. A short coil, a humongous magnet, and a copper “focusing” sleeve on the voice-coil former ameliorate the problem, he says.

As always, the crossover is first-order and complex. It’s a Thiel, after all.

**The queerest folks of all**

Setup was relatively simple—as simple as manipulating a slippery, asymmetrical, 45"-tall, 91-lb object can be. I sited the CS3.7s 5' from the front wall and 21" from the sidewalls. I sat 91" away, with my ears about 4" below the tweeter axis. (Thiel says the ideal position is “at least 2" below the tweeter’s axis.”) I then screwed in the CS3.7’s massive floor spikes. If you have small children or a large pet, Thiel offers “stabilizer” bars that outrig the spikes, giving the speakers a larger footprint. Even with the Chaos Kitties gamboling in the listening room, I never worried about the ’3.7s taking a fall, so I didn’t need the outriggers.

To use John Atkinson’s memorable phrase, the Thiel CS3.7 is a pig to drive. Wimpy amps need not apply—and by wimpy, I mean anything putting out less than 200Wpc. (Thiel recommends 100–600W.) Fortunately, I had the Ayre MX-R monoblocks (600W into a 4 ohms load) and the Musical Fidelity Nu-Vista 300 (480W into 4 ohms) on hand, so power was adequate.

**MEASUREMENTS**

The Thiel CS3.7’s voltage sensitivity is specified as 90dB/2.83V/m. My B-weighted estimate on its tweeter axis, assessed with DRA Labs’ MLSSA system, was slightly above that figure, at 90.7dB(B)/2.83V/m. This may well have been affected by the Thiel’s frequency response (see below). The sensitivity is usefully higher than average, which is a good thing considering that the CS3.7’s impedance remains between 2 and 3 ohms over much of the audioband (fig.1), and that there is a demanding combination of 3.8 ohms and  $-40^\circ$  capacitive phase angle at 60Hz. Thiel specifies the impedance being nominally 4 ohms, with a minimum of 2.8 ohms. I actually found the minimum impedance to be 2.4 ohms at 125Hz. The difference between 2.8 and 2.4 ohms is academic, either mandating use of an amplifier that has no problem delivering high currents.

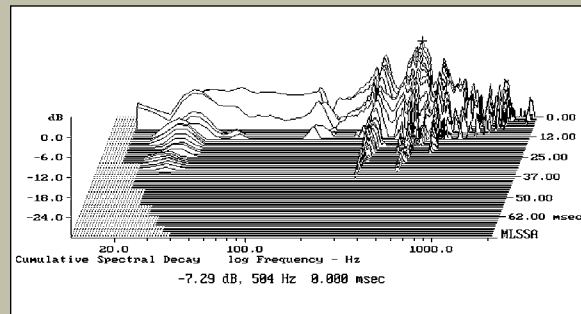


Fig.2 Thiel CS3.7, cumulative spectral-decay plot calculated from output of an accelerometer fastened to center of side panel 10" from top (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

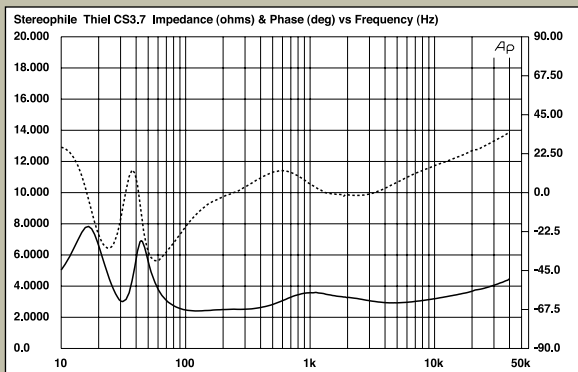


Fig.1 Thiel CS3.7, electrical impedance (solid) and phase (dashed). (2 ohms/vertical div.)

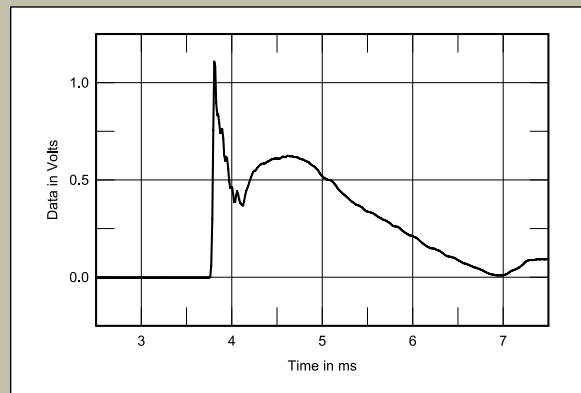


Fig.3 Thiel CS3.7, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

The '3.7s needed to be played hard—a lot—before they settled down. At first I found the sound opaque and borderline irritating, so before heading down to my office each day, I'd cue a CD, set the Ayre C-5xe universal player to Repeat, crank the preamp, and head off to work. By the following weekend, the improvement was remarkable.

### Marry or burn

It might be fair to say that Thiel loudspeakers share a common sound: They're articulate and consistent over their frequency response, but they also tend toward a hyperarticulation that a less charitable listener might call brightness. The CS3.7 does *not* share that family trait. Oh, it's articulate all right, but it sounds relaxed as well. That coincidental tweeter-midrange is a genuine breakthrough for Jim Thiel.

Listening to "Flor de Azalia," from guitarist Phil Manzanera's *The Manzanera Collection* (CD, Blue Plate/Caroline 1798), I drowned in the sultry purr of Tania Libertad's voice. How warm!

*¡Que dolor!* Nope, not even the teensiest bit too much brightness. Jes' right.

But as I swayed entranced by the inner rhythms of Zacarias Gómez Urquiza's lyrics, I had another epiphany: The CS3.7 was a wizard at conveying subtle rhythmic information that more uptight, gringo-hipped loudspeakers just bulldozed through.

Some speakers send me searching for my rockiest music; some demand gentler treatment. The Thiels had me seeking out masters of subtlety. In "Vague/E la nave va," from the Anouar Brahem Trio's *Le Voyage de Sahar* (CD, ECM 1915), oudist Brahem is joined by pianist François Couturier and accordionist Jean-Louis Matinier, which is not a combination that I would have come up with—but Brahem is a genius and I am not. The soundscape is sparse, but the Thiels allowed me to hear so deeply into it that I could *almost* hear the three musicians listening to one another.

As Couturier plays arpeggios that ebb and flow, Matinier plays simple chords—he exhales them, if you will. Brahem en-

ters on oud and Couturier echoes him, emphasizing some notes, merely following others. A conversation between oud and piano ensues. The song seems so simple, while also seeming profound—and the Thiels conveyed that passion and communication as well as I have ever heard it done.

At one point in "Vague," they scared the crap out of me. I was intently listening to the call and response between Brahem and Couturier when Matinier re-entered on accordion. I jumped and cursed—it was like having a stranger materialize in my living room.

Francis Bebey's "O Bia," from John Williams' *Magic Box* (SACD, Sony 89483), also illustrated the Thiels' way with subtle rhythms! It starts out as a shambling trio: guitar, bass, and a box. (I can never figure out—not even through the Thiels—if the drummer is slapping the box or rattling sand in it.) After laying out the theme, Williams puts the magic into the magic box *he's* playing, pushing some tempos, stretching out others. Jeff Buckley once told me that,

### measurements, continued

The traces in fig.1 are smooth, but I did find a couple of resonant modes in the cabinet's walls. Fig.2, for example, is a cumulative spectral-decay plot calculated from the output of an accelerometer fastened to the sidewall below the cast-aluminum dome 10" from the top. The modes are both low in level and high in frequency, both of which will minimize any audible effects they might have.

With a speaker such as the CS3.7, which has a sloped baffle and first-order crossover filters, it is important to measure its frequency response on the optimal axis, which is where the outputs of the multiple drive-units arrive at the ear or microphone at the same time. I use a speaker's step response to investigate this aspect of a speaker's operation; fig.3, for example, shows the CS3.7's step response at a distance of 50" on its tweeter axis. The sharply defined, positive-going attack at 3.8ms is the output of the coaxial tweeter and midrange unit, but

its output is rapidly dropping back toward the time axis by the time the output from the woofer arrives at the mike (the slower-rising, rounded peak between 4.2 and 5ms). This axis, which is 40" from the floor, is too high for the drive-unit outputs to integrate properly. Moving the microphone down by 6" gives the step response shown in fig.4—though there is still a touch of overshoot evident on this axis, the outputs of all three drive-units arrive at the microphone at the same time, resulting in an excellent, time-coincident, right-triangle shape to the step response. Moving the microphone down even farther eliminates the overshoot, but slows the rise of the step's leading edge, due to the woofer's output now arriving a little earlier (not shown). I therefore used the axis 34" from the floor, where the speaker's output is time-coincident, for all subsequent measurements. This height is also close to the average listener ear height, which was investigated

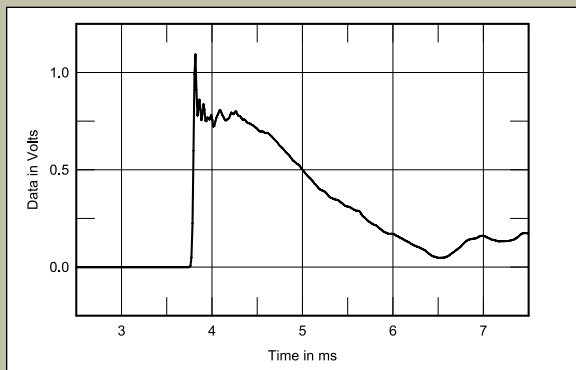


Fig.4 Thiel CS3.7, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

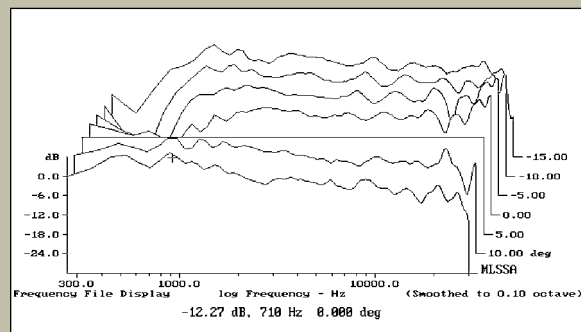


Fig.5 Thiel CS3.7, vertical response family at 50", normalized to response on listening axis (6" below tweeter), from back to front: differences in response 20–5° above axis, reference response, differences in response 5–10° below axis.

with a guitar, you have an entire orchestra in your hands. Not I, perhaps, but Williams certainly does.

While the CS3.7 *did* swing “O Bia,” it also revealed the speaker’s one small shortcoming: the acoustic bass didn’t have quite the impact it should have, especially in its bottom octave. Lightweight the CS3.7 isn’t, but by the time you get down to 30Hz there’s not a lot there.

My first “real” loudspeakers were Quad ESL-57s, so at a gut level, 30Hz still seems pretty low to me; I can be cavalier about missing bottom end that might be a deal-breaker for many listeners. That’s why nothing beats auditioning speakers with an assortment of music that matters to *you*.

### Choose not alone a mate

I briefly auditioned the Thiels while the Avalon Indras that I reviewed in October

1 One of the crimes of the CD era is that Bebey’s wonderful music doesn’t seem to be available. It’s weird, wonderful, accessible, life-affirming stuff, and we deserve access to it.

were still here. The two speakers were essentially cut from the same cloth—both had startling clarity and detail without the in-your-face quality usually implied by “detail.” Like the Thiels, the Indras lack a sock-’em bottom end. Of course, the difference in price could buy the Thiels a pretty good subwoofer system. But shipping schedules kept the Indra/Thiel comparison brief, so I trotted out the trusty Wilson Audio WATT/Puppy 8 system, because it’s such a known reference point for a compact high-quality monitor.

The title track of the Dave Holland Quartet’s *Conference of the Birds* (CD, ECM 1027) perfectly illustrated one of the W/P8’s greatest strengths: The speaker propels music forward through its bottom-end impact. With Holland’s big acoustic bass setting the pace, the piece loped along splendidly, with Sam Rivers and Anthony Braxton chattering away on flutes and soprano saxophones (switching from one to the other as required), while Barry Altschul supplemented the sound as needed with trap

set, chimes, gongs, and marimba. The Thiels did a good job of delivering all that harmonic complexity, but the Wilsons had the nod in the slam department—which also means they had better pace.

“A Chromatic Love Affair,” from Duke Ellington’s *The Jaywalker* (FLAC download, HDTracks), proved that low bass is important in establishing a sonic identity. It wasn’t so much the acoustic bass that the Thiels scanted, it was also Paul Gonsalves’ tenor-sax presence. The Thiels shrank Gonsalves a tad, robbing him of the stature he deserves. On the other hand, they did a superb job—every bit as good as the Wilsons—at resolving the inner voices of the woodwinds.

While the Wilsons did give François Couturier’s piano in Brahms’s “Vague/E la nave va” a slightly more vivid presence, I felt the Thiels did a better job of seeing into the heart of the music. What does that mean? It wasn’t a matter of sound-staging or holographic imaging—both speakers were champs at that—but the Thiels had a quality I can describe only

## measurements, continued

by *Home Theater’s* senior editor Tom Norton when he worked for *Stereophile* in the mid-1990s. (Remarkably, he found that both tall and short people have their ears within a couple of inches of 36" from the floor when sitting in typical lounge chairs.)

Fig.5 shows how the speaker’s response changes above and below this axis. Basically, the higher you sit, the more you’ll be bothered by a lack of energy in the crossover region between the woofer and midrange; the more you slouch below 34" from the floor, the more the speaker’s balance will favor the lower mids rather than the treble.

The black trace above 300Hz in fig.6 is the CS3.7’s farfield response on this optimal axis, averaged across a

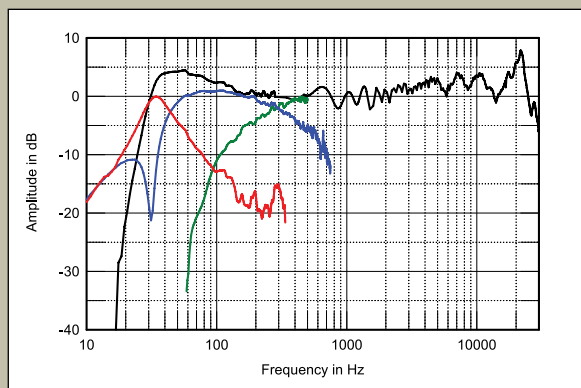


Fig.6 Thiel CS3.7, anechoic response on listening axis at 50" without grille (black), averaged across 30° horizontal window and corrected for microphone response, with the nearfield responses of midrange unit (green), woofer (blue), and passive radiator (red), plotted in the ratios of the square roots of their radiating areas below 500Hz, 750Hz, and 350Hz, respectively, and the complex sum of nearfield responses plotted below 300Hz (black).

30° horizontal window. The response smoothly and gently slopes up between the midrange and the top octave. Not only will this boost the measured sensitivity a little (see Keith Howard’s article on assessing loudspeaker sensitivity in *Hi-Fi News*, October 2008), but all things being equal, I would have thought it correlated with WP’s observation that Thiel speakers tend toward “a hyperarticulation that a less charitable listener might call brightness.” Except that he found that the CS3.7 *didn’t* conform to that generalization. The black trace below 300Hz in fig.6 is the complex sum of the nearfield responses of the midrange unit (green trace), woofer (blue), and passive radiator (red). The peak in the midbass will be almost entirely due to the “2 $\pi$ ” boost that results from the nearfield measurement technique; the CS3.7 will be flat anechoically down to 35Hz or so, lower than I had anticipated from WP’s

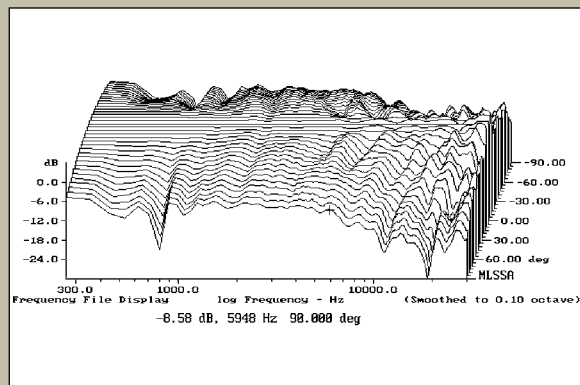


Fig.7 Thiel CS3.7, lateral response family at 50", normalized to response on listening axis, from back to front: differences in response 90–5° off axis, reference response, differences in response 5–90° off axis.

as grace. Grace is like a soap bubble: Try to dissect it and it's gone. Perhaps a better way of putting it would be that the Thiels got out of their own way, which is what a high-end speaker is supposed to do.

On Phil Manzanera's "Flor de Azalea," the Thiels flat-out seduced me. Tania Libertad's voice was so warm, so caressing, so fully fleshed—I melted. If you're a fan of the voice—any voice, but especially the female voice—you have *got* to hear these speakers:

*Como espuma que inerte lleva el caudalo  
so río*

*Flor de Azalea la vida en su avalancha  
te arrastró*

*pero al salvarte hallar pudiste protección y  
abrigo*

*donde curar tu corazón herido por el dolor*

Oh my. Sighhhhh . . .

### Marry in haste, repent at leisure

In our "Conclusions," we reviewers generally tend to natter, listing pluses and minuses and the price/value ratio, and basically saying that if you like this kind of thing, this is the thing you're going to

## ASSOCIATED EQUIPMENT

**DIGITAL SOURCE** Ayre C-5xe universal player.

**PREAMPLIFIERS** Ayre KX-R, Conrad-Johnson ACT2 Series 2.

**POWER AMPLIFIERS** Ayre MX-R monoblocks, Musical Fidelity Nu-Vista 300.

**LOUDSPEAKERS** Avalon Indra, Wilson Audio Systems WATT/Puppy 8.

**CABLES** Interconnect: Shunyata Research Aries & Antares, Stealth Indra & Nanofiber. Speaker: Shunyata Research Anaconda & Orion, Stealth Dream.

**ACCESSORIES** Ayre L-5xe AC filter, Furutech eTP-609 distribution box; OSAR equipment stand; Furutech RDP panels, RealTraps Mini & Mondo Traps.

—Wes Phillips

like. I can't do that this time.

I loved, loved, *loved* the Thiel CS3.7. It's not perfect, but its major flaw is subtractive: not enough deep bass for many

listeners. Well, that's easily fixed with a high-quality subwoofer, and Thiel makes some awfully good ones you could afford with what you save buying the Thiels instead of speakers costing two to three times as much—which is what I'd have to compare them with. That's not to say that \$12,900 is cheap or a bargain. It's just to say that to find a speaker as good as the Thiel CS3.7, you'd have to spend more, and sometimes a lot more.

Also note: If your current receiver or amplifier puts out less than . . . oh, let's be generous and say 150Wpc, you won't hear what the CS3.7 can do. It won't end well.

A *Stereophile* reader recently chided me for saying that "I could live with" a speaker. He observed that with speakers, like wives, the question isn't whether you can live with 'em, but whether you could live without 'em. If not, he said, ink the deal and live happily ever after.

I don't know how you'll answer that question, but I'm thinking I can't live without the Thiel CS3.7. It might be the speaker of my lifetime, too. ■

## measurements, continued

auditioning notes. The crossover from the midrange to the woofer occurs around 300Hz, though the use of first-order filters results in a large amount of overlap, of course. The passive radiator is tuned to the frequency of the woofer's minimum-motion notch at 31Hz, with a well-defined bandpass output.

A speaker's horizontal dispersion will also affect its perceived balance. The CS3.7's dispersion, shown in fig.7, is remarkably even between 800Hz and 10kHz, something that always correlates with stable, accurate stereo imaging. But it also means that the Thiel is putting out a lot of treble energy into the room; acoustically well-damped rooms will work better than live ones. WP's room is fairly large, with quite a lot of absorption at high frequencies. The Thiels' spatially averaged response in his room (fig.8) gently rolls off above 7kHz, due to the increasing absorption of the furnishings in this region, but is superbly smooth and

even between 200Hz and 7kHz. The depression between 100 and 200Hz and the peak between 60 and 100Hz are room-acoustics effects that have not been eliminated by the spatial averaging, and the speakers roll off a little earlier in the low frequencies than I had expected from the quasi-anechoic measurement, confirming WP's feeling that the speaker falls a little short in the low bass.

Finally, the CS3.7's farfield cumulative spectral-decay plot (fig.9) reveals a superbly clean, fast initial decay, though with some low-level hash visible in the treble.

Speakers using first-order crossover filters have very often had some frequency-domain problems to put against their ability to present a time-coincident wavefront over a wide bandwidth. But the Thiel CS3.7 manages to offer the best of both worlds, and offers its owner some excellent speaker engineering in a beautifully finished package.—John Atkinson

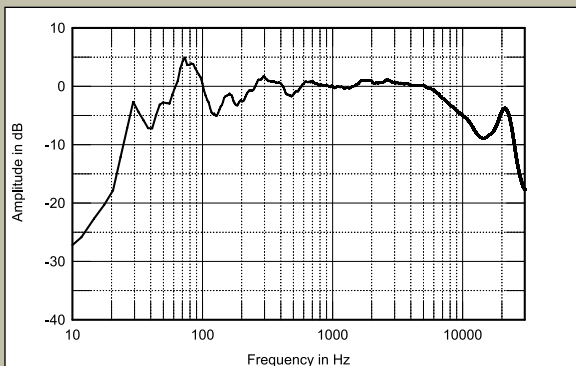


Fig.8 Thiel CS3.7, spatially averaged, 1/3-octave response in WP's listening room.

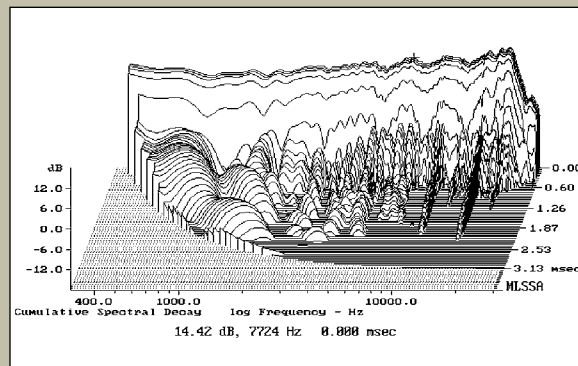


Fig.9 Thiel CS3.7, cumulative spectral-decay plot on tweeter axis at 50° (0.15ms risetime).