Dynamic Loudspeakers Done Right: The Thiel CS6

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Jim Thiel has been designing loudspeakers for about two decades, steadily learning how to chip away at the obstacles to better performance. His newest designs always incorporate his most recent discoveries. If he's designing to a lower price point, the compromises he makes will relate to bass extension and dynamic range; within those limitations, he'll give the speaker all he has learned. As a consequence, the latest loudspeaker from Thiel is likely to be his best, even if it isn't his biggest or most expensive.

Thiel's latest, the CS6, is the best he and his company have given the audio world so far. And I'll say more: the Thiel CS6 Loudspeaker is one of the all-time great ones, a benchmark, and an outstanding bargain (given the stratospheric pricing of many speakers and other components these days) at $7900 per pair.

Nevertheless, there will be some controversy about the CS6, as there always has been regarding Thiel's products. And that controversy will revolve around the fundamental question of what people want from their stereo systems. The roots of disagreement are found in Thiel's design philosophy, as set forth on page one of the CS6 Owner's Manual: "The CS6 is a precision instrument designed to translate, as accurately as possible, electronic information into musical sound. All our efforts have been directed toward achieving extremely faithful translation of all tonal, spatial and dynamic information supplied by the amplifier.

"The CS6 is not intended to mask or mitigate shortcomings of the recording or other components in the music playback system."

An unimpeachable statement, right? Mom, apple pie, the American flag, and accurate, neutral, truthful stereo. Surely, everybody agrees with that?

Wrong. While Thiel products have always aimed at neutrality (and steadily come closer to achieving that goal), some audiophiles have called Thiel's speakers boring, cold, and uninvolving. Now, I wouldn't claim that Thiel's speakers (or anyone else's) are perfect, but I would argue that, in voicing such complaints, these audiophiles are also saying that they do not *want* accuracy, neutrality, or truthfulness in their loudspeakers; they want warmth, excitement, prettiness—regardless of whether the source material or upstream componentry provides those things. In short, they want their speakers to editorialize—to decorate—the sound, and the Thiel approach does not provide the tools for that task.

In fairness, one must grant that a speaker *could be* boring— could be guilty of editorializing through subtraction. Instead of going wrong by adding euphony, it could go wrong by deleting natural sweetness, by reducing the completeness of the sensory experience. So we have to examine the question of whether, and to what extent, Thiel loudspeakers are guilty of this.

My experience is that they are not. More tellingly, a complaint which many have voiced about earlier Thiel designs suggests that the Thiels provided not too little information, but too much. Thiel believes in flat frequency response and delivery of it over a wide area—not just at the listening position. Where many designers look for flat treble on axis, one meter from the speaker, Thiel designs for flat treble response at about ten feet and well off-axis. Not surprisingly, some listeners found this kind of flat, wide-dispersion high frequency response anything but reductive; they found it bright. And while I-personally did not object to this trait as strongly as others did, I certainly heard what was being complained about.

Indeed, when I encountered no such problem in the CS6, I asked Jim Thiel if he had changed his flat-in-the-treble, wide-dispersion design philosophy. He replied that he had not. In fact, Jim never believed the problem was the quantity of treble energy his speakers provided, or their dispersion pattern, but the *quality* of that energy. The problem, in other words, was distortion; and the drivers then available simply made these distortions unavoidable in certain high frequency bands. True, if treble output were reduced these distortions, though still audible, would be lowered in amplitude, but undistorted treble information would also be reduced, destroying musical balance and introducing other problems. Better to live with the distortions, Thiel felt, as they were the lesser evil. Then, in 1989, with the flagship Tiel CS5, a redesign of the tweeter ameliorated the distortion problem, and another redesign, introduced in the CS6, resulted in further improvement.

All I know is that I find the treble of the CS6 to be detailed and extended, but natural, smooth (without significant frequency-specific distortions?), easy, and non-fatiguing. In sum, it is anything but bright. Even massed violins are sweet (if they have been recorded that way). The extension, accuracy, low distortion, and neutrality of Thiel's tweeter, and the midrange and low frequency drivers of the CS6, as well, result in a sense of timbral completeness—of the full, unexpurgated truth about instrumental and vocal fundamentals and overtones—that I've experienced from few other speakers, all of them far more costly and complex. Top to bottom, the CS6 is the most *coherent* dynamic loudspeaker I've lived with.

Before we get back to these issues in more detail, some discussion of break-in and set-up is appropriate. The CS6 Owner's Manual suggests that one-hundred hours of break-in will do the job. Wishful thinking, I'm afraid. Three hundred hours is more like it. Since speakers are a long-term purchase, substantial break-in time should not be a big issue for a buyer, but I wonder if dealers are displaying speakers that have been fully broken in. If not, the CS6s will sound dry and tight; the sound won't bloom into the room as it should.

Choice of amplification requires careful consideration, too, though I didn't find the question of what to drive the CS6s with as troublesome as others have with different Thiel designs, especially the larger CS7 and CS5 or the out-of-date CS3.5, with its electronic bass equalizer. Still, the CS6 Owner's Manual, which includes a good essay on power, room size, and listening habits, can at first glance mislead by indicating that 100 watts may be sufficient power. That may be true of high quality solid-state amps: if they're spec'd at 100 watts per channel into 8 ohms, they probably provide 200 watts into 4 ohms. But it certainly isn't true of tube amps, whose power output does not double as impedance is halved. What the CS6 really requires (for listeners with average rooms and average, not extreme, amplitude preferences) is *at least* 200 watts into the 3-4 ohm impedance which the speaker presents. Give 'em that kind of power, and they sing; give 'em anything much short of same, and they most certainly don't.

Provided they have the requisite voltage into a 4 ohm load and adequate damping to control the bass, tube amps can and do sound great with the CS6 loudspeakers. The Sonic Frontiers Power 3 monoblocks (reviewed in this issue by Dick Olsher), which, like the Thiels, are smooth, extended, highly detailed, and extraordinarily revealing of textures, made for one of the very best amp-speaker combinations I've ever heard. Needless to say, the speakers also loved being coupled to big solid-state jobs—like Krell, Levinson, Classé, and Bryston.

In addition to proper break-in and the right amplification, precise set-up is crucial to the sound of the CS6. Once again, the Owner's Manual provides a very instructive discussion of placement issues and, of course, the usual rules apply: get both the speakers and the listener reasonably far from the walls behind them; same for the side walls but be sure that the distance to the side walls is not the same as the distance to the walls behind; give due regard to symmetrical placement; and avoid too much toe-in, which is probably more problematic than none at all (unless the speakers are close to very live side walls). In my room, the best results came with the rear of the speakers 6' 4" from the back walls, 9' apart, and 5' from the side walls (measuring to the center of the tweeters), the listener sitting 10' 2" from the tweeters, and the CS6s toed-in quite moderately, with plenty of the inner sides of the cabinets visible from the listening position.

That set-up was close to the positions I intuitively chose at the outset. But my first set-up gave me a sound that was a bit vague and "swimmy," something like having the speakers out of phase, though not as severe as that. I just couldn't get the sound or the images to snap into focus and stay locked in. So, after break-in, Mike

Grellman and I measured speaker-to-wall distances as carefully as we could, and found that one speaker was 3/8" farther out from the rear wall than the other was. We painstakingly repositioned the speakers until that measurement difference was reduced to 1/32" or less, taking care to make certain that the toe-in angles were also identical.

The result of all that finicky effort was imaging so realistic it was spooky. Everything was firmly in place, whether it was a front-and-center soloist or a sound effect way to the rear and outside the outer edges of the speakers. And those images stayed put regardless of volume level; they did not crawl back to the drivers at extremely low or high amplitudes, as is the case with so many speakers. More remarkably, the good imaging was not all that dependent on staying in a single sweet spot. As my turntable and other gear are placed between, but well behind the speakers (a situation that is about to change), it's necessary to walk between the speakers to switch recordings or make adjustments. Well, the CS6s' images stayed put even when I went to a spot behind the speakers! The soundfield was so "solid," I almost felt I had to say "Excuse Me" and take care not to bump into a performers or music stands as I walked around. Weird. And wonderful. The best imaging I've ever heard from any speaker.

The persnickety attention to set-up details which the CS6 requires and rewards does serve to bring up two of my biggest complaints about the speaker, both of which are ergonomic rather than sonic. The first and more serious relates to the spikes provided by Thiel. We all know spiking of speakers is necessary and Thiel's do the job. But they're a real hassle to use: an adjustable wrench was required to thread them into their sockets, as neither fingers nor pliers sufficed. This is no fun when precision placement is required and one guy has to tilt the speaker enough to enable the other to work with a wrench. And I would guess it is nearly impossible if you're trying to do it yourself.

The second complaint pertains to the the binding posts. The posts themselves are good enough and their placement—in a small recess at the bottom rear of the speaker—makes for a clean and tidy-looking installation, but that bottom-of-the-speaker location creates some difficulty getting the job done. If your cables have large, long spade connectors, with the wrong elbow angle (or none), you may find them tough to connect, especially if the cables themselves are big and stiff. A little more space to work with would be helpful.

Returning to matters sonic rather than ergonomic, and having just discussed imaging, I suppose I should mention its kissing cousin, soundstaging—not the placement of players and the sense that they are round, corporeal bodies, but the nature (size, shape, construction materials, humidity, air pressure, etc.) of the place where they played. In this respect I'd say the Thiel CS6 is among the best of the forward-firing, dynamic driver loudspeakers, but is bettered by some dynamic speaker designs that have rearward or upward firing tweeters, and more decisively beaten by dipolar, bipolar, and omnidirectional designs I've heard. Those do more to make your room disappear by recreating the acoustic of the recording venue than the Thiels and similar designs will. But they have other trade-offs and I've not (yet) heard any I prefer overall.

The Thiel CS6 is a fantastic loudspeaker—the best, I think, that the considerable talents of Jim Thiel and his company have produced so far. And one of the best that anybody has produced.

Earlier I mentioned the Thiel's greatest strength, one that counts for even more than its stellar imaging. The speaker is phenomenally coherent. Everything is cut from a single sonic cloth. Coherence has always been an important Thiel design goal and a key attribute of the performance of Thiel loudspeakers. The "CS" in the model designations refers, after all, to "coherent source." The vertical array (and close spacing) of drivers, the sloping, carefully shaped, non-diffractive front baffles, the low resonance cabinets, the accurate phase response of crossovers and drivers, and other factors have long contributed to the success of the Thiel approach.

But the CS6 takes that approach further. First, beginning with the CS7 a few years ago Thiel has used a coaxial tweeter/midrange configuration. Careful choice of driver materials and clever design enabled Thiel to largely overcome problems with coax drivers. Still, the CS7 employed separate magnets for the mid-range and tweeter, and since the tweeter was (and is) mounted in the midrange cone, that limited the size—and hence the power—of the tweeter magnet. In the CS6, Thiel has achieved something that no other modern design has—both the tweeter and the midrange are powered by a *single*, large magnet. Each driver has its own voice coil and its own magnetic gap, but both are powered by the one magnet. Clearly, that solves the power limitation problem for the tweeter. But I wonder (and I'll note for the record that Jim Thiel, a low-key engineer, did not join me in unverifiable speculation) if it doesn't accomplish more.

While magnets could be virtually identical in all their characteristics under static or test bench conditions, and, I suppose, the other elements of a driver could also be manufactured to close tolerances, it seems to me that the inevitable and unavoidable variability of all these parts, and the reaction of each and all of them to the complexity of musical signals, could result in discontinuities in magnetic behavior. Certainly, the voice coil of a speaker, which receives current from an amp, induces an electromagnetic reaction in the magnet just as the magnet acts on it. With all the variables running through the system, a certain amount of unpredicted and unpredictable chaotic behavior must result at some low level (and we all know that

everything matters). To me, it stands to reason that one set of variables is eliminated where one magnet can be successfully employed to do the work of two. And elimination of variables should result in greater coherence.

I don't know whether my theory has anything to do with the performance of the CS6. But I know what I and others heard. Whether you're considering flatness of response over a wide frequency range, dispersion of energy into a room, imaging solidity, dynamics, timing, or any other phenomena that could point differences in the way a speaker's drivers, cabinet, and crossover react to stimuli at different points in the audio spectrum, the Thiels present a remarkable seamlessness.

The joy of listening we derive from such coherent performance is not merely theoretical. It simply makes listening easier, less work, more believable, and more natural. For example, imagine something that is very hard for a stereo system to sort out (and that few could sort out just a decade ago)—a multitude of different instruments, say a trombone, a baritone sax, a piano, a tuned drum, a plucked bass, and a bowed cello, all playing the same note. They sound different because each starts the making of its sound in a different mechanical way (tapped drum skin, plucked string, hammered string, blown reed, etc.) and because each has a different overtone structure, which fades at different rates and has different phase characteristics relative to the fundamental. To sort out those sounds without forcing the listener to do a lot of work, a speaker has to track the rise and fall of the mechanical transients, the sounded notes at all frequencies (not just the fundamental, but the overtones, too), and it has to accurately replicate the subtle timbral content, as these notes modulate each other over time. A big, tough job, and one the Thiel CS6 does superbly, allowing the listener to just relax and "get it" effortlessly, much as a listener does at a live event.

So, having said all that, what could be made better still? Well, the bass could go deeper (and probably will in a larger Thiel design like a revised CS7 or CS5). Still, it provided usable music response down to the upper 20s in my room, as well as substantial subterranean clues ranging from grinding subways to deep rumble in recordings (from the record company equipment, not mine). And maybe the bass could be a little freer, giving us more of the feel of the sound, in addition to the notes themselves, although my problem here was largely eliminated by an update to Thiel's passive radiator and removal (per Thiel's instructions) of a bit of the stuffing inside the speaker. That change took the bass from overdamped to very close to right.

I think, too, that there could be a very slight improvement to the dynamic range of the speaker. Though it could play a lot louder than I normally care to listen these days, I could detect just a little congestion, a slight "crowding," on some dynamic peaks. And at the pianissimo end of the spectrum there was a tiny loss of detail on the very smallest of sounds. Perhaps the cabinet could be even heavier or use one more brace, or crossover work could be done, to bring the noise floor down even lower. But I'm really picking nits here.

Finally, while the Thiel CS6 is very fast, a few speakers—electrostatics and a few dynamics—are faster still. Many of those, though, have a sort of skeletal sound, lots of bone but not enough flesh. The Thiels are one of the fastest speakers that reproduces the meat as well as the bones. And covers the full range with reasonable authority.

Overall the Thiel CS6 is a fantastic loudspeaker—the best, I think, that the considerable talents of Jim Thiel and his company have produced so far. And one of the best that anybody has produced. Anyone considering the purchase of speakers at or near this price—or at any higher (right up to the most stratospheric) price point—would be well served by a careful listen to the Thiel CS6 before he or she leaps at anything else. If, as some are saying, we've entered a second "Golden Age" of audio, the CS6 is one of the largest and purest nuggets.

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DESIGNER

Jim Thiel

Price: $8200
Warranty: Ten Years

DRIVER COMPLEMENT

Woofer

10" diameter (8.2" radiating area) with one layer anodized aluminum cone, cast frame, 2" diameter voice coil. Underhung coil (short coil/long gap) motor system. Linear travel 5/8" peak-to-peak, 36 cubic inch linear displacement. 10 lb. magnet, 20 lb. total magnet structure. Copper pole sleeve, copper magnet ring. Made by Theil.

Passive Radiator

12" nominal diameter (10" radiating area)

Midrange

5" diameter (4.1" radiating area) with three-layer anodized aluminum/polystyrene/ aluminum diaphragm, cast frame, 1.5" diameter voice coil. Underhung coil (short coil/long gap) motor system. Linear travel 1/8" peak-to-peak. Single magnet (from two stacked pieces) with total weight of 5 lb. power midrange and tweeter. Copper pole sleeve. Made by Theil.

Tweeter

1" diameter (1.2" radiating area) with anodized aluminum dome. Underhung coil (short coil/long gap) motor system. Linear travel 3/16" peak-to-peak. Copper pole sleeve. Ferrofluid. Made by Theil.

SPECIFICATIONS

Bandwidth (-3 dB): 27 Hz - 34 kHz
Amplitude Response: 29 Hz - 18 kHz ±2 dB
Phase Response: Minimum ±10°
Sensitivity: 86 dB @2.8 v-1m
Impedance: 4Ω, 2.4Ω minimum
Recommended Power: 100-500 watts
Size: 13" W x 18.5" D x 50" H
Weight: 175 lbs.