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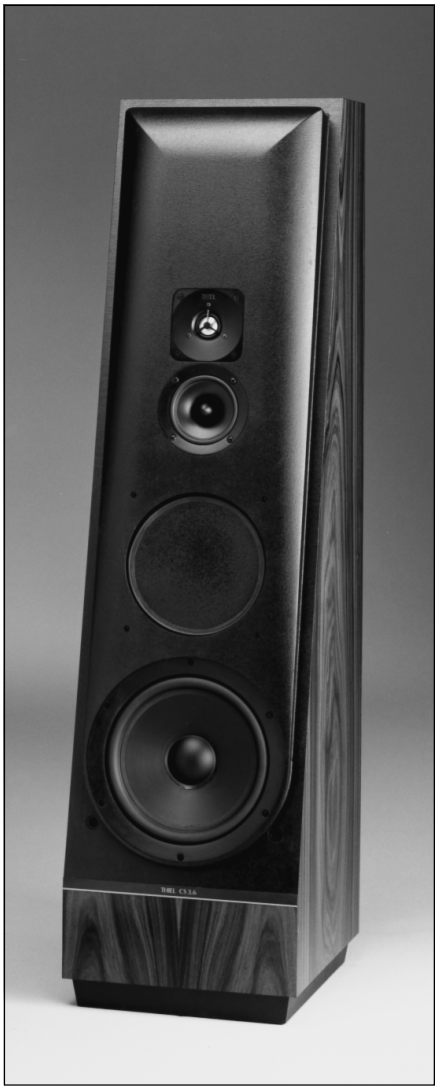
The Thiel CS3.6

Coherent Source Loudspeaker

A Breakthrough in Reference Quality Cost-Effectiveness?



IT MAY SEEM surprising to describe the Thiel CS3.6 as a "breakthrough." It is, after all, a three-way dynamic loudspeaker in a relatively conventional enclosure. There are no ribbons, no electrostatic panels, no planar drivers. There are no strange new shapes. You can drive it with a single stereo amplifier or a pair of mono amplifiers, and it does not really benefit from biwiring. It is even a relatively affordable $3900 a pair.

That said, this is one of the finest sounding loudspeakers I have heard at any price, and one that advances the state-of-the-art in the only area that really counts: reproducing music. With the right amplifier, it is quicker and more neutral in the midrange than any other dynamic speaker I have heard to date, and indeed, any electrostatic as well. It outperforms the far more expensive Thiel CS5 in many respects, and it outperforms more costly hybrid designs like the Infinity Beta.

To appreciate the Thiel CS3.6, however, you need an amplifier with plenty of wattage, current, and damping capability. You also have to be interested in accuracy. It is more like a laboratory reference than a speaker with "romance." It does not soften anything, and it does not make anything euphonic. There is no gentle rolloff in the treble, no touch of added warmth in the lower midrange, no midbass bloom. Nothing is larger than life. But, if you want full range accuracy and dynamics in a practical form at a practical price, this one comes close to breaking the mold.

Design Features and Technology

The success of the CS3.6 is best understood as the result of evolution, rather than the result of some sudden shift in design features and technology. Thiel has made good speakers since it first appeared as a brand name, and each new design has reflected an improvement in driver, crossover, and enclosure design. Each new Thiel design has also brought improvements in phase coherence, transparency, dynamic range, soundstage, and frequency response.

The Thiel CS5 and CS2.2 are the immediate avatars of the CS3.6. They, in turn, are logical refinements of past Thiel design concepts, although both indicated that Thiel was moving ahead from its often formidable competition. The Thiel CS3.6 also has a great deal in common with its immediate predecessor in the Thiel line, the Thiel CS3.5. The CS3.6 uses the same sloping baffle to achieve proper time alignment and uses a first order crossover to provide accurate phase response. It places the same emphasis on improved time, phase, and step response.

The CS3.6 is, however, very different from the 3.5 in other ways. To start with, the CS3.6 not only has an extremely well finished enclosure, it has an extremely heavy one, with many of the energy storage reduction features used in the CS5. It weighs 107 pounds per speaker as opposed to 77 pounds for the similarly sized CS3.5. The baffle is 3" thick to reduce vibration, and the walls of the enclosure use 1" thick fiberboard and extensive internal bracing.

A great deal of effort has been spent on reducing diffraction so that energy radiated along the edges of the font baffle will not encounter abrupt cabinet edges. This does a great deal to smooth out response in the critical region between 1000 and 6000 Hz. Built-in spikes anchor the CS3.6 to the floor.

To my considerable surprise, the grille on the CS3.6 is also so well integrated into the speaker that it actually improves performance. This is one speaker where you can keep the grille on (and keep the peace with non-audiophile roommates). The CS3.6 also helps keep the peace through a fine amberwood (or gloss black) finish, a relatively narrow, sloped front and curved edges, finished back, and speaker connectors mounted on the bottom instead of the back. It is not a small speaker (12 ½" wide x 17" deep x 48 ½" high). The CS3.6 blends in well with most room decors, although the latest Apogees, Magneplanars, and Martin-Logans outclass them as sculptural elements integrated into room decor.

Like previous Thiels, a great deal of effort went into the design of the crossover. The CS3.6 uses a 25 element crossover with 38 (high quality) components, including large value polypropylene and custom made polystyrene capacitors; all inductors are air core types using low oxygen copper. The design goal of the crossover is to provide phase accurate transitions between the three drivers to preserve spatial information while shaping an exceptionally flat frequency response. Thiel states that the response of the CS3.6 only varies by ± 1.5 dB from 29-20,000 Hz.

The driver complement consists of a 10" woofer, 10" passive bass radiator, 4" midrange, and 1" dome tweeter. The crossover frequencies are 500 Hz and 3000 Hz. This is scarcely an unusual mix of drivers and crossover frequencies for a three-way loudspeaker. The drivers are, however, exceptionally advanced.

The woofer uses a very long coil, about 13mm longer than the magnetic gap. This requires a much larger magnet than usual, but can produce an output up to twice as high as that of conventional long coil woofers, due to the increased excursion this design allows. The woofer magnet system employs methods to make the magnetic field more constant. These are features that Thiel first used in the CS5.

The CS3.6 has the first Thiel woofer to employ a metal diaphragm. Thiel finds the anodized aluminum material it uses provides a much higher stiffness and compressive strength than conventional diaphragm materials. This puts the woofer's resonant frequency at 2000 Hz, about two octaves above its crossover frequency, to avoid energy storage and ringing below 2000 Hz. A notch frequency is also incorporated into the crossover to reduce the effects of the 2000 Hz resonant frequency, and improve its time-domain response. (Long-standing readers may remember HP's, PHD's, and John Nork's unpleasant adventures with woofers that acted as midrange drivers.)

I criticized the bass quality of the earlier CS3.5; it lost detail and suffered from frequency response anomalies because the signal had to pass through the 3.5's electronic bass equalizer. I have never been entirely happy with any speaker that has used one. The CS3.6 does not use such an equalizer. Thiel says a suitable one would have cost at least $1000. Instead, the internal volume of the CS3.6 has been increased to 79 liters versus 39 liters for the CS3.5. At the same time, the midrange sensitivity has been reduced nearly 50 percent, and the -3 dB bass limit has been raised from 20 Hz to 27 Hz.

This change in design may sacrifice a half-octave in theory, but the real world result raises deep bass output substantially, and makes it sound far more realistic and controlled. This bass is further enhanced by the use of a passive radiator, which eliminates the "organ pipe" resonance noise of a port. Where the bass of the CS3.5 tested better than it sounded, the bass of the CS3.6 is dynamic and alive.

The 4" midrange driver is a two-layer air-core diaphragm with a long gap/short coil motor system. Its new double diaphragm extends its rolloff frequency from around 7000 Hz to around 9500 Hz, and produces notably smoother frequency response over the range between 1000 Hz and 5000 Hz.

I cannot validate these technical specs on the bench, but there is less ringing or "smear" in the midrange in the CS3.6 than in any "conventional" speaker I have heard to date. In fact, the start and stop in musical transients on midrange notes in the CS3.6 seem notably quicker than with an excellent electrostatic like the Quad ESL-63 or any planar I have heard to date. Only the very best midrange ribbon speakers I have heard rival or surpass it.

The 1" dome tweeter begins to cross over nearly 4000 Hz below the point where the midrange loses flat response. The tweeter has an unusually wide surround and, as in the midrange driver, a short coil/long gap magnetic system, with a linear excursion of ±1.5mm.

Dynamic driver technology is evolving at least as quickly as ribbon and electrostatic technology, and is at least as complex. I can say that the upper octaves of the CS3.6 were extraordinarily flat and clean, and more so than those of any electrostatic I have heard to date! The width of treble radiation was excellent by dynamic tweeter standards and superior to that of any electrostatic or planar with which I am familiar.

Specifications and Technical Data

I have seen many speaker specifications that did not come close to describing the sound of the product they were applied to. I have seen many complex test results that only the late Richard Heyser could ever have fully appreciated. Nevertheless, I would strongly encourage you to read the technical information brochure on the Thiel CS3.6. First, it is a model of the kind of literature that I believe should be available on any High End speaker. Second, it describes design concepts and tests that correlate directly to what I hear.

For example, Thiel states that the average on-axis octave response is flat to ±0.5 dB from 36 Hz to 20,000 Hz. I have no idea of the conditions under which such measurements were made (they don't say), but this is certainly one of the flattest sounding speakers I have heard. Properly set up and spiked, and moved away from room boundaries, it is extraordinary. Not only is the midrange very smooth, but there are no apparent resonances, rolloffs, or anomalies.

I don't know how the time delay measurements compare with those of electrostatics and ribbons, but the result here is a seamless sense of integration and driver-to-driver coherence. I have heard pure ribbon designs that sound equally well integrated, and electrostatics that were able to provide equal integration between the upper bass and upper midrange. This is the first time I've heard these sonic qualities using dynamic drivers. This coherence also exists over a fairly wide range of possible listening areas, although you need to be at least seven feet away from the speaker, seated, and listening under conditions where room boundaries are at least several feet away from the speaker and listening position (which is true of *all* speakers).

The CS3.6 came very close to equaling the Apogee Divas in their ability to reproduce transient detail, avoid time smear, and reproduce musically realistic detail. They clearly outperformed the best pair of modified Quad ESL-63s I have ever heard (a pair far superior to the stock product).

No step response from any speaker is perfect. The measurement data on the CS3.6's step response, however, are exceptionally good, and their importance seems to be justified by the CS3.6's ability to precisely define harmonics and transients without cutting off or smearing details, and without adding ringing, resonance, or other colorations. The energy storage graphs are also exceptional, which may help explain why the CS3.6 has the clarity we normally associate with electrostatics and ribbons.

The Sound

Before I discuss the sound of this speaker, I would offer two caveats. First, like many speakers with a lot of bass energy, you need to experiment with distance from room boundaries. The greater the distance from rear and side walls, the better this speaker will sound. More importantly, you have to experiment with moving the speaker away from the rear wall until you get the flattest bass response. The 3.6s are capable of tremendous deep bass power and it can easily excite room resonances and alter the apparent timbre.

Second, the CS3.6 has a somewhat more forgiving impedance curve than the CS5. It averages 5 ohms below 50 Hz versus 2 ohms for the CS5. However, the CS3.6 averages only about 2.7 ohms above 100 Hz versus the CS5's 3.5 ohms above 200 Hz. In theory, most modern amplifiers should be able to deal quite well with these loads. In practice, many low powered tube amplifiers, most transistor amplifiers below 100 watts, and many higher power transistor amplifiers whose specifications disguise

a lack of real "legs" cannot produce the best from either the CS3.6 or CS5s.

For example, the new Classé One Thousand and the Krell M-300s performed superbly. Performance of an Adcom 555-II was merely good. The performance of a custom-built 75 watt tube amplifier and the Mobile Fidelity UltrAmp Line Amplifier was only mediocre, while the performance of an Onkyo TX-XV70Pro receiver (which performs surprisingly well with less demanding speakers) was clearly not in the same league.

You have to be equally careful about speaker cable selection. The Wireworld and Straight Wire Maestro cables both performed very well. The Symo and Tara Labs RSC speaker cables slightly warmed the bass, but were sweeter in the upper midrange. The Ocos was acceptable, but did not produce the kind of bass energy the CS3.6 is capable of.

I do not want to exaggerate such interface problems, since they are typical of most modern speakers. I do want to warn you, however, that you will need to experiment with amplifiers and cables to get the best out of the CS3.6. I can easily see an audiophile, using a moderately powered amp with good, but not excellent, drive capability into complex low impedance loads, wondering why I thought it was so good. The same would be true of an audiophile using a speaker cable with "roughness" or a poorly chosen turnover point in the upper midrange.

With proper attention to these room placement and interface problems, you get a speaker with the midrange clarity of the best electrostatics, excellent bass, excellent treble, plus outstanding radiation characteristics that create a wide stable listening area up through the limits of human hearing.

In terms of specific sound characteristics, the CS3.6 performed as follows:

• **Overall Timbre:** Very flat but many audiophiles should be warned that flat does *not* mean the upper midrange and treble rolloff common in many speakers.

• **Deep Bass and Bass:** The CS3.6 does not equal the CS5 or other speakers and subwoofers that reach down to the 20 Hz level in bass performance, and this is not a matter of frequency extension per se. Perhaps because of phase or other problems, speakers that really do reach down to the bottom of the lowest octave always seem to deliver more real bass power even in the 30-50 Hz range. That said, the CS3.6 has very good bass indeed, with excellent bass definition and transient performance and far more apparent bass power than many speakers with the same frequency response specs.

I also greatly prefer the deep bass and bass of an integrated enclosure like the CS3.6 to any system using a separately placed subwoofer or woofer enclosure, except for the IRS. The bass of the CS3.6 is fully integrated in time, space, and timbre into the overall sound of the speaker. This is far more important to musical integrity than bass power or extension.

• **Upper Bass and Midrange:** Excellent in virtually every respect. A few minor tonal variations not present in top quality speakers like the Apogee Divas or CS5s, but extremely accurate in detail, transparency, and overall harmonic integrity. My only other reservation is that most modern recordings benefit from a slight touch of warmth in the lower midrange, and you should be aware that this speaker does not have such a coloration.

• **Upper Midrange:** As excellent as the midrange. However, very flat and extended. No forgiving downward tilt in apparent frequency response.

Excellent and generally superior to even the best ribbon designs in flat power response and radiating characteristics. Passed the "daughter test" in delivering very high frequencies without residual roughness or irritations. Be warned, however, that you will hear everything present on the recording and all of the high frequency performance of the rest of your system. This is fine with the best cartridges and records, and with the latest CDs and best processors, but too much accuracy can be mercilessly unforgiving with less outstanding source material and equipment.

• **Dynamics:** Very good to excellent, and far better than the previous CS3.5. The CS3.6 can handle large scale dynamics and low-level dynamics with excellent definition all the way from deep bass through the treble, without any shifts in sound character and timbre. Few High End speakers at any price can do this.

• **Transient Response:** Like the dynamics, the CS3.6 does a very good to excellent job of resolving transient response at all the frequencies in its range, at low to high loudness levels, and without shifts in sound character. The ability to reproduce the full transient capabilities of the best recordings, moving coil cartridges, and digital signal processors (such as the Mark Levinson Model 30) was outstanding. It was the first dynamic speaker system I have heard that outperforms electrostatics in this regard, although the best ribbon speakers still do better within their optimal frequency range.

• **Transparency, Harmonic Naturalness, and Detail:** One of the real surprises occurred while I was comparing the Mark Levinson Model 30, new Krell 64X, Wadia 6, and Theta Balanced DSPro Generation III. I had been using the CS5, a custom-built set of small dynamic monitors, the Apogee Diva, and a friend's setup with Quad ESL-63 US Monitors. I also was working my way through some of the latest Chesky, Dorian, Telarc, Reference Recordings, and Wilson CDs, with comparisons to analogue.

I had not intended to make the CS3.6 part of this comparison, but casual listening quickly showed that it did a much better job of resolving harmonic detail and low-level musical transparency than the Quad ESL, and a somewhat better job than the CS5! Notes came out of silence at the proper time with proper duration, and with harmonic warmth and life.

My listening to the CS3.6 also confirmed my impression that this is an area where every bit of resolving power really counts. There are really only two ways to go with the added upper midrange and treble energy of today's close miking and digital recording: Seek a system that will euphonically soften (and somewhat smear) the results or go for every last bit of accuracy you can.

I believe accuracy is the only alternative, and if you want to hear the difference that an accurate speaker can make, listen to the Thiels with any of the latest CDs mentioned above. If you want to see how far the digital recording process has come in the direction of accuracy, compare the original Columbia CD of The Dave Brubeck *Time Out* [CK40585] or Miles Davis's *Kind of Blue* [CK40579] with the excerpts of the new digitally remastered versions using 20-bit Super Bit Mapping on the Columbia CSK 4757 demo CD. Things really are getting one hell of a lot better!

• **Soundstage Width, Height, and Depth:** The soundstage was stable over a wide listening area although, as is the case with all High End speakers, the proper listening area was limited to a seated position at the apex of an equilateral triangle in front of the speakers. Soundstage width and depth were then very faithful to what I associate as being an accurate reproduction of my reference recordings, with no surprises, shifts, contractions, or exaggerations. Height was neutral in the seated position. A taller speaker like the CS5 or a line source will provide a more stable apparent soundstage, but also involve reflections off the ceiling. As might be expected from a forward radiating apparent point source, the CS3.6 did not equal the apparent openness of the Apogee Divas or Magneplanars, although it had more air and openness than a Quad ESL-63.

Summing Up

I obviously feel that this is a key speaker for any audiophile trying to create a real-world home system of reference quality. It does not make me reject my Apogee Divas, which remain a superb, if more expensive alternative. It *does* make me rethink the potential of dynamic speakers, and I can hardly wait to hear the results as Thiel goes on to larger and more expensive speaker systems based on the advanced driver technology embodied in the CS3.6.

Like all of the finest speaker designs currently available, its success is very room, amplifier, and speaker cable sensitive. At the same time, it requires only one stereo (or two mono) amplifiers and one pair of speaker cable, and is integrated into one attractive enclosure. If you compare the cost of a typical reference quality setup (often involving two sets of amplifiers, an external crossover, and two sets of interconnects and speaker cables) to that of the CS3.6, the end result can easily outperform amplifier/cable/speaker combinations costing three to five times as much. The CS3.6 is a landmark in the effort to provide outstanding High End speaker performance at a real-world price.

—AHC

The Thiel CS3.6 versus the CS5:
Travels with My Son

One of the more pleasant surprises in life is having your children share your hobby, and both my daughter and two sons have become interested in the High End. I cannot say we all share the same taste in music—my daughter prefers esoteric British rock, my older son is into metal, and my younger son enjoys pop-rock (less rap). This occasionally forces me to listen to something a bit more avant garde than Beethoven, but it still is interesting to have three additional pairs of ears in the house.

This became quite clear when my son helped me pack the Thiel CS3.6s and put the Thiel CS5s back into place in one of my two reference systems.[1] He welcomed the change back to the CS5s far more than I did, and his reasons make an interesting postscript to my review of the Thiel CS3.6.

Our dialogue went something like this:

Justin: I still like the bass in the CS5 a lot more.

AHC: But the added bass is only apparent on a relatively few records and CDs, and it isn't quite as well defined.

Justin: True, but the CS5 still seems more musical in both the bass and the lower midrange, and I'd rather have it sound musical than provide more detail. All of your speakers with really deep bass seem to perform better at much higher bass frequencies as well.

AHC: You're right in one respect. Speakers with deep bass usually have far less distortion in the bass, and do not have the kind of rise in the midbass that colors the sound. The 3.6s, however, don't have such a peak or high distortion. You may be hearing the fact that the CS5s have lower phase shift in the midbass.

Justin: I also like the midrange more.

AHC: Didn't you get more musical information out of the midrange of the CS3.6?

Justin: Yes, but the midrange of the CS5 just sounds smoother. I like the smoothness, rather than the detail. The CS5 also has more air and is more open, I think.

AHC: What about the superior imaging and low-level detail the CS3.6s provided?

Justin: Those matter a lot more with your music: with classics and natural acoustic recordings. Smoothness, power, and bass matter more with rock.

AHC: Didn't you hear more soundstage information with the CS3.6?

Justin: Okay, but the fact is that the CS3.6 is shorter and seems to be more closed in by the room. You also didn't point out in your review that you removed the marble coffee table from in front of the CS3.6 when you reviewed it to get the best sound, and that you keep the table in place when you listen to the CS5. A taller speaker like the CS5, or a dipole line source like the Apogee Divas just sounds more realistic.[2]

AHC: Yes, but you haven't pointed out that a lot of your praise for the CS5 depends on the fact that we are listening to it being driven by the Classé M-1000 power amplifiers. We didn't get sound this good from the CS5s with any amplifier with lower power. In fact, the M-1000 is even slightly better than the Krell M-300s at handling the low impedance of the CS5s.

Justin: Well, we are listening to the M-1000s! You're the one who has to keep changing things. You want to review things, I just want to listen to music.

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The moral of this dialogue, if you need one, is that if you let your kids grow up, you had better learn to live with getting valid differences of opinion! ■

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[1] *The first system uses a van den Hul Grasshopper cartridge, Wheaton Triplanar pickup arm, and TNT II turntable; a Proceed CD transport and Mark Levinson Model 30 digital signal processor; and a Theta Data and Theta Balanced DSPro Generation III. This system also uses a Classé DR-6 preamp, and M-1000 amplifiers; Thiel CS5 speakers; and Wireworld Eclipse cables.*

The second system uses a Krell MD-10 CD transport, a Krell Reference 64 digital signal processor, a Krell KXP preamplifier, Krell M-300 amplifiers, Apogee Diva speakers, and Magnan and Symo cables.

[2] *I'm not putting words in his mouth. A kid who can assemble and modify his own 486 clone, and service my Macs, does indeed learn High End jargon.*

Manufacturer:
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1026 Nandino Blvd.
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