

Test Bench

BY Darryl Wilkinson

GoldenEar Technology SuperCinema 3D Array Soundbar System

PRICE: \$2,000 **AT A GLANCE:** 3D sonic-image optimization technology • Passive LCR design • Aerospace-grade extruded-aluminum cabinet



The Sound Bar Just Got Raised

Women. They're the problem. They're the ones who have ruined home theater for

all the manly men out there whose only vice was reclining in front of a set of towering speakers that dominated the room like a pair of long-faced Easter Island monoliths—speakers so masculine, they used testosterone instead of ferrofluid to cool the voice coils and were topped with skeleton-ugly horn tweeters so efficient Joshua could have used them to bring down the walls of Jericho the first day (before lunch!). For additional aural excitement, in a front corner of the room, openly begging for attention and not girlishly hiding behind a couch or doing double duty as a plant stand, would be a massive subwoofer with a magnet assembly so powerful that localized rooftop occurrences of the aurora borealis would happen from time to time. Techs from the local hospital would often bring patients to the house and use the subwoofer for testing when the lab's MRI machine needed repair. But no more. The man cave has been emasculated and replaced by the female grotto, complete with bowls of potpourri and seating geometries that would make Euclid weep with grief. The *coup de grâce*, however, the fatal blow to any home theater's manhood, is the now near-obligatory soundbar. Long and falsely

GoldenEar Technology SuperCinema 3D Array Soundbar System
PERFORMANCE ★★★★★
BUILD QUALITY ★★★★★
VALUE ★★★★★

phallic, it mocks the real men in the room as it preens itself under the flat-panel HDTV.

Hyperbole and blatant sexism aside, soundbars simply aren't the most macho-looking home theater speakers. Sadly, that's not their only claim to shame. The typical experience of buying a soundbar, taking it home, and then watching a movie is the home theater equivalent of going on a blind date with a woman who has the body of Charlize Theron—only to crushingly find out she has the voice of Roseanne Barr. Mind you, I'm not saying soundbars by definition have to sound like crap. Some of the latest—and most expensive—soundbars sound surprisingly good, which is quite heartening for those of us who believe sound is as important to a movie as the picture is. My point, though, is that the design of too many soundbars is driven by form (it has to be thin, fit under the TV, and match the cosmetics), while function (oh, it has to sound great, too?) gets to hitch a ride in the trunk.

When you think about it, considering all the obstacles the laws of physics put in the way, it's

amazing that any soundbar can even get within spitting distance of sounding good. After all, it's a daunting engineering task to work with a speaker cabinet that's at most 4 inches deep with left- and right-channel drivers mounted a paltry 36 inches (or less) apart—then the drivers for the center channel somehow have to get shoehorned in between. And that's just for an LCR soundbar. Up the difficulty rating substantially if you're designing a soundbar that offers a simulated 5.1- or (gasp!) 7.1-channel surround sound experience.

Breaking the Sound Bar Barrier

GoldenEar Technology's SuperCinema 3D Array is the young company's first LCR soundbar, although it already sells the flat-panel-friendly, on-wall SuperSat 50 (and SuperSat 50C horizontal center-channel) speaker. So far, just about every model GoldenEar has introduced has



• The ForceField 3 occupies only a little over 1 square foot of floor space.

• The SuperCinema 3D is both neutral and classy when mounted under a flat-panel HDTV.



SPECS

SPEAKER:	SUPERCINEMA 3D ARRAY	SUPERSAT 3
TYPE:	Soundbar	Monitor
TWEETER (SIZE IN INCHES, TYPE):	25/32x23/32, folded diaphragm (3)	25/32x23/32, folded diaphragm
WOOFER (SIZE IN INCHES, TYPE):	4.5, cone (6)	4.5, cone (2)
NOMINAL IMPEDANCE (OHMS):	8	8
RECOMMENDED AMP POWER (WATTS):	20-200	20-200
AVAILABLE FINISHES:	Gloss Black	Gloss Black
DIMENSIONS (W X H X D, INCHES):	49 x 4.75 x 2.75	12 x 4.75 x 2.75
WEIGHT (POUNDS):	20	5
PRICE:	\$1,000	\$250/each

earned rave reviews, especially the superlative Triton Two towers, as well as the smaller—but only slightly less stellar—Triton Three towers. The Tritons are two toweringly incredible tough acts to follow; and considering the overall track record so far, you could say that GoldenEar has definitely set the sound bar pretty darn high—maybe higher than a soundbar can reach.

The SuperCinema 3D Array is a passive LCR soundbar, which means it requires an A/V receiver for the audio processing and

amplification—and it reproduces only the information from the front three channels. There’s no additional drivers built in to assimilate and throw the surround channels in some way to create the impression of having discrete surround speakers. Passive LCR soundbars aren’t quite as rare as finding a Sasquatch enjoying the free Wi-Fi at Panera while reading *The National Enquirer* online and drinking a pumpkin spice latte, but the general trend is now toward soundbars with built-in amplification, multichannel processing, and wireless subs—the type of soundbar ideally suited for someone who hates wires, cables, and components yet wants something that sounds better than the crappy little desiccated pieces

of partridge droppings that masquerade as speakers in just about every flat-panel TV in the known universe. If you’re looking for an all-in-one, plug-and-play, instant-TV-

upgrade soundbar (of which there are a couple of good ones just hitting the market), this isn’t it. To finish out a 5.1-channel system built around the \$1,000 SuperCinema 3D Array, GoldenEar Technology shipped a \$500 pair of the company’s smallest monitor speaker, the SuperSat 3, along with the soundbar. As with any slim, hang-on-the-wall speaker, the SuperCinema 3D absolutely needs a subwoofer; and, in this case, GoldenEar sent the smaller of the company’s two subwoofers, the \$500 ForceField 3. All told, the speaker system costs just under \$2,000, which is a bit pricey when it comes to most of the self-contained surround soundbars. But it’s quite reasonable as far as respectable home theater speaker packages go.

Cosmetically, the tightly woven black cloth grille and graceful curves of the SuperCinema 3D’s 49-inch-long, extruded-aluminum, piano-black-gloss cabinet match the rest of the speakers in the GoldenEar line, especially the SuperSat 3s. Helped by its minimal height (4.75 inches) and depth (2.75 inches), the SuperCinema 3D is simultaneously both neutral and classy when mounted under almost any—thick or thin—flat-panel HDTV. The svelte SuperSat 3s look like 12-inch-tall vertical versions of the SuperCinema 3D and become mostly inconspicuous when wall-mounted (using the speakers’ keyhole slots). While the relatively small ForceField 3 subwoofer doesn’t come with a cloak of

invisibility, it occupies only a little over 1 square foot of floor space wherever you decide to put it. For a more in-depth look at the GoldenEar monitors and sub, read Mark Fleischmann’s November 2011 review of the SuperCinema 3 system he took for a spin. (Spoiler alert: Overall, with a caveat or two, Mark thought it was “an awe-inspiringly great-sounding system.”)

Remove the black cloth grille from the front of the SuperCinema 3D, and you’ll find six of GoldenEar’s 4.5-inch drivers employing cast spider-leg baskets and multi-vented phase plugs spaced along the front baffle. There are also three of the company’s fantastic High-Velocity Folded Ribbon (HVFR) tweeters. These tweeters, if you’re not familiar with them, use multi-folded planar magnetic diaphragms that squeeze together and pull apart much like the sides of an accordion—although to a much smaller degree. One of the touted benefits of the design is phenomenal transient response; and, in my opinion, it’s one of the primary reasons why so many of the other GoldenEar speakers I’ve heard sound so spectacular.

A Passive-Aggressive Approach

At first glance, the driver configuration looks fairly standard, with each of the three channels (left, center, right) having its own HVFR tweeter flanked by a 4.5-inch woofer on each side. Closer inspection, though, reveals that the outermost woofers for the left and right channels sit about an eighth of an inch closer to that channel’s HVFR tweeter than do the inner-mounted midbass drivers. The reason for this is that those outer drivers aren’t there to add to the sound of what would appear to be their respective channels. They’re there to *cancel* sound from the opposite channels.

Although the GoldenEar SuperCinema 3D has no active circuitry to create surround sound, there is a bit of passive technology in the soundbar that’s meant to aggressively cancel out what’s known as interaural crosstalk. You might think “interaural crosstalk” is the garbled sound you make when the dentist invariably asks you a question right after he’s shoved



● The svelte SuperSat 3 is inconspicuous when wall-mounted.



HT Labs Measures

GOLDENEAR TECHNOLOGY SUPERCINEMA 3D ARRAY SOUNDBAR SYSTEM

L/R Sensitivity:
88.5 dB from 500 Hz to 2 kHz

Center Sensitivity:
90 dB from 500 Hz to 2 kHz

Surround Sensitivity:
90 dB from 500 Hz to 2 kHz

This graph shows the quasi-anechoic (employing close-miking of all woofers) frequency response of the SuperCinema 3D Array L/R (purple trace), SuperCinema 3D Array center channel (green trace), SuperSat 3 surround (red trace), and ForceField 3 subwoofer (blue trace). All passive loudspeakers were measured with grilles at a distance of 1 meter with a 2.83-volt input and scaled for display purposes.

The SuperCinema 3D Array's left channel listening-window response (a five-point average of axial and +/-15-degree horizontal and vertical responses) measures +2.00/-4.06 decibels from 200 hertz to 10

kilohertz. The -3-dB point is at 147 Hz, and the -6-dB point is at 125 Hz. Impedance reaches a minimum of 4.78 ohms at 3.8 kHz and a phase angle of -30.19 degrees at 197 Hz.

The SuperCinema 3D Array's center channel listening-window response measures +1.11/-4.39 dB from 200 Hz to 10 kHz. An average of axial and +/-15-degree horizontal responses measures +1.19/-5.84 dB from 200 Hz to 10 kHz. The -3-dB point is at 168 Hz, and the -6-dB point is at 144 Hz. Impedance reaches a minimum of 6.25 ohms at 6.8 kHz and a phase angle of -31.09 degrees at 216 Hz.

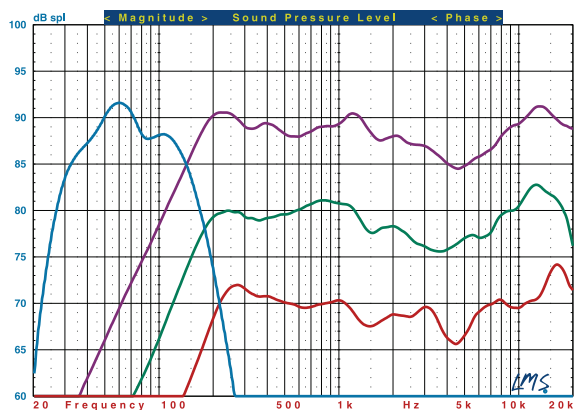
The SuperSat 3's listening-window response measures +3.35/-3.01 dB from 200 Hz to 10 kHz. The -3-dB point is at 177 Hz, and the -6-dB point is at 155 Hz. Impedance reaches a minimum of 4.72 ohms at 370 Hz and a phase angle of -40.27 degrees at 252 Hz.

The ForceField 3's close-miked response, normalized to the level at 80 Hz, indicates that the lower -3-dB point is at 33 Hz and the -6-dB point is at 28 Hz. The upper -3-dB point is at 140 Hz with the Lowpass Crossover control set to maximum.—MJP

Visit our Website for a detailed explanation of our testing regimen, plus a list of our reference gear.

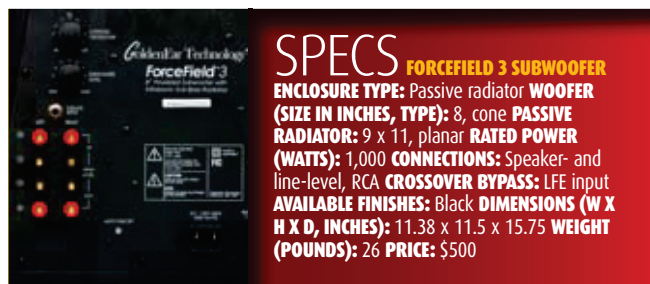
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GOLDENEAR TECHNOLOGY SUPERCINEMA 3D ARRAY SOUNDBAR SYSTEM



several fingers and a couple of dental tools into your mouth, but it's a term for what happens when sound from the right speaker crosses over your nose and finds its way into your left ear—and vice versa with the left channel. This crosstalk can take a beautifully marbled rib eye steak of a

great recording—with all of its juicy tenderness, subtle flavors, and amazing width and depth—and grind all those carefully dry-aged acoustic spatial cues into a lump of cheap, hormone- and antibiotic-laden hamburger that's already past its sell-by date. Interaural crosstalk becomes



SPECS **FORCEFIELD 3 SUBWOOFER**
ENCLOSURE TYPE: Passive radiator **WOOFER**
(SIZE IN INCHES, TYPE): 8, cone **PASSIVE RADIATOR**: 9 x 11, planar **RATED POWER**
(WATTS): 1,000 **CONNECTIONS**: Speaker- and line-level, RCA **CROSSOVER BYPASS**: LFE input **AVAILABLE FINISHES**: Black **DIMENSIONS (W X H X D, INCHES)**: 11.38 x 11.5 x 15.75 **WEIGHT (POUNDS)**: 26 **PRICE**: \$500

GoldenEar Technology ForceField 3 Subwoofer

PERFORMANCE ★★★★★
FEATURES ★★★★★
BUILD QUALITY ★★★★★
VALUE ★★★★★

especially problematic when the main left and right speakers are placed fairly close together, which is exactly the situation in any soundbar less than 10 feet in width (in other words, virtually all of them).

For years, going back to his early days as a founder of Polk Audio, Sandy Gross (who, along with engineering mastermind Don Givogue, founded GoldenEar Technology in 2010) has worked on addressing the problems related to interaural crosstalk. Results from a recent 3D audio research project conducted by Dr. Edgar Choueiri at Princeton University spurred Gross to adapt and update earlier methods of canceling interaural crosstalk between the right and left channels and make the technology an integral part of the new SuperCinema 3D Array. That's the reason for those slightly separated 4.5-inch drivers located

at the ends of the SuperCinema 3D. They are not, as I originally thought, additional bass drivers for the left and right channels. Instead, the driver farthest from the left end of the SuperCinema 3D plays a specially crossed-over, out-of-phase signal intended to cancel out sound from the right channel's drivers that might be sneaking its way into your left ear. Likewise, the right-hand 4.5-inch driver helps to eliminate crosstalk from the left channel. In theory, getting rid of this crosstalk allows a non-absinthe-infused brain to properly interpret the spatial cues present in the recording, resulting in a front soundstage that's exceptionally wide and deep.

A Lot of Night Music

Dave Kakenmaster, GoldenEar Technology's western sales manager, made the long trek to my house to help set up the system and make sure everything was working properly since this was one of the first SuperCinema 3Ds off the production line. The soundbar uses keyhole slots for mounting on the wall. There's also a stand that props the soundbar at the right angle if you're using it on

• The ForceField 3 blended smoothly with the SuperCinema 3D soundbar.





• The SuperCinema 3D uses six cast-basket midbass drivers.

a shelf. The binding posts for the three channels are recessed into the back of the SuperCinema 3D's cabinet, allowing the soundbar to be mounted flat against the wall. However, those binding posts are extremely close together, making it somewhat challenging to sneak bare speaker wire in between and tighten them down. If the SuperCinema 3D is custom installed with wiring in the wall, having the binding posts close together makes it easy to finish out, especially if you use banana plugs on the end of the speaker cables. On the other hand, if the speaker is mounted on the wall with surface-mounted speaker wire running to it (hidden with paintable wire molding, for example), you'll need a couple of spacers between the back of the SuperCinema 3D and the wall to provide enough room for even the most slender speaker wire to slip in from underneath. Obviously, this isn't an issue if you use the foot stand.

I mentioned Kakenmaster's visit because he's extremely into music and can always be counted on to bring awesome demo material with him. So, naturally, once everything was in place, we decided to listen to a brief musical interlude before moving on to what is the soundbar's *raison d'être*—playing movie soundtracks. Four hours later, when it was well past time to leave for dinner at the unique “we'll shoot it if you'll eat it” restaurant half a dozen miles from my house, Kakenmaster and I had still not put a Blu-ray movie in the PS3. Remarkably, we had spent the entire time listening to two-channel music *playing through a flippin' soundbar!* The width and openness of the soundstage was absolutely incredible, stretching farther across the front of the

room than what some freestanding speakers can produce. All with imaging that was Gibraltar-stable rock solid. Sandy Gross calls the impressive musical performance the result of “special 3D image optimization technology” in the SuperCinema 3D. I'd call it simply spectacular.

There are so many exceptional two-channel examples I could give (after all, it was hard not to listen—and then listen some more—to music on the SuperCinema 3D). Ha Ha Tonka's a cappella version of “Hangman” (*Buckle in the Bible Belt*) absolutely filled the entirety of the front soundstage, while the echoes of lead singer Brian Roberts' voice at times seemed to reverberate from the rear of the room. The upper registers of Oscar Peterson's piano in “Body and Soul” (from a high-res download of *Oscar Peterson: Unmistakable—Zenph Re-performance* I found on iTrax) were crisp and light without any harshness—a sound quality very reminiscent of a fine electrostatic speaker. Pearl Jam's “Thin Air” (*Binaural*) begins with an isolated guitar solo dead center; but as the vocals, drums, and other instruments come in, the soundstage explodes across the front of the room, stretching almost to the sides. Another iTrax download, John Gorka's “Writing in the Margins,” also presented a dramatically wide soundstage with Gorka's voice totally focused in the center and pulled slightly forward. This track, as well as the one from Pearl Jam, also demonstrated how smoothly the ForceField 3 subwoofer blended with the SuperCinema 3D.

Wow, It Does Movies, Too!

Regarding the blend of the ForceField 3 with the SuperCinema 3D, I played around quite a bit with the crossover points before I was totally satisfied. Originally, as was suggested, I set the crossover for the SuperCinema 3D at 120 hertz. For most of the time, that setting worked quite well. But since the ForceField 3 was placed a couple of feet to the left of the SuperCinema 3D, there were instances when there was a noticeable smearing or stretching to the left of drums and other low-frequency instruments. That's because the higher the frequency you cross

over a subwoofer, the more localizable it becomes. Resetting the crossover point at 100 Hz eliminated the problem, although I eventually settled on 90 Hz because I felt that at that frequency, voices in the center channel gained important heft and authority.

Speaking of movies, in the extended version of *Sucker Punch*, during the mission to steal secret plans from German steampunk automatons, the wide and expansive front soundstage seemed to stretch and melt into the SuperSat 3s in the rear. Shots fired from the back to the front (and vice versa) traveled through the room so realistically, it almost made me duck. Echoes from machine guns were everywhere, and it was very eerie to hear the steam rushing out of a dead soldier move from the front to the back of the soundfield. The subwoofer created an ominous, theatrical, and very effective low underpinning to the soundtrack as a red-eyed German appears onscreen before entering the bunker with the plans. Finally, as the bunker begins to collapse, the reverberations surround the room as one continuous whole. (I had no idea what the rest of the movie was about, but it definitely made me want to watch more.) In *The Hunger Games*, a movie filled to the brim with both effects and music in the surrounds, as Katniss gets too close to the edge of the simulation, the fireballs that are thrown at her fly directly overhead to the rear as the sounds of her frantic scrambling through the forest fill the front soundstage. The ForceField 3 subwoofer is extremely convincing, reproducing both the ever-present bass rumble and the explosions of the fireballs. Finally, early in *Safe House*, there's a car chase during which two cars go from rear to front on each side of the room around the viewer. The smoothness of the transition came from both the use of HVFR tweeters in the SuperSat 3s and the SuperCinema 3D, as well as the SuperCinema 3D's exceptionally wide soundstage. Not much later, the ability to create such astounding width is especially noticeable as Matt and Tobin exit the small confines of the car and begin walking in the open expanse filled with people outside the stadium.

On a lark (I have several lying around), just prior to packing up the system, I disconnected the SuperSat 3s being used as discrete surrounds and configured my Anthem AVM 50v's speaker settings to No Surrounds. With the surround information down-mixed into the front left and right channels, the extremely wide soundstage produced by the SuperCinema 3D expanded even farther, to the point of wrapping down the sides of the room to almost just past my head. Watching a bit of *Transformers: Dark of the Moon* (I thought it was a movie about Pink Floyd), I was amazed at how good the simulated surround effect was—making the SuperCinema 3D one of the better simulated-surround soundbars I've heard, although part of the success does go to the downmixing in the preamp.

Instant Classic

There's no doubt about it. The GoldenEar Technology SuperCinema 3D Array is a stunningly ear-catching accomplishment that redefines the very notion of what an LCR soundbar can achieve. Of course, that doesn't mean it's perfect for everyone; and with its required accompaniment, it's certainly not the solution for the person who dislikes traditional home theater gear. On the other end of the spectrum, I wouldn't trade out a pair of GoldenEar Triton Three towers for the SuperCinema 3D, either. As good as the SuperCinema 3D is, it can't create the amount of mind-bending front-to-back depth in the soundstage that a great pair of freestanding speakers can. But, if a standard soundbar is what you need or want, for your main system or perhaps in a bedroom or secondary theater system, the GoldenEar Technology SuperCinema 3D Array is a must-listen-to, top-of-the-shopping-list, soundbar-to-beat contender that's destined to become a classic in the annals of home theater speakers (if such annals ever get written). In other words, when it comes to soundbars, *awesome* just got redefined. 🍷

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