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Affordable High End!

TRITON REFERENCE

from GoldenEar Technology

GREAT NEW GEAR
at the Munich Show

TOTEM ACOUSTIC'S
Amazing Sky Speaker

SONY'S BEST
Headphones & Portable Player

PLUS

Music from Robin Trower,
Ry Cooder, MJQ, Beethoven
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GOLDENEAR TRITON REFERENCE LOUDSPEAKER

GoldenEar Technology brings its well-earned reputation for ultra-high value to the upscale Triton Reference.

Anthony H. Cordesman has the details.



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THE 2017 GOLDEN EAR AWARDS

Our writers pick their personal favorites.

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MUNICH HIGH END 2017

We report on the greatest new gear at the world's greatest audio show.

MAKING REFERENCE
QUALITY AFFORDABLE

GOLDENEAR TRITON REFERENCE LOUDSPEAKER

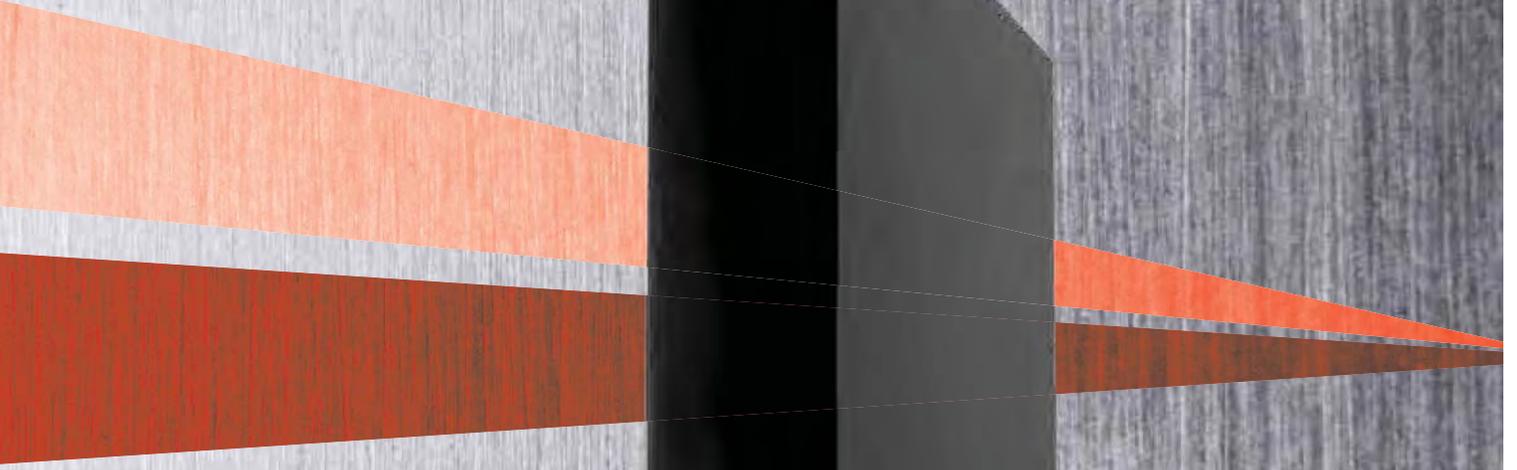
ANTHONY H. CORDESMAN
PHOTOGRAPHY BY JOEL SALCIDO

I suppose that in some ways it was inevitable that GoldenEar Technology could not rest on its laurels in producing the Triton One—a truly excellent speaker at its price of \$5000 a pair. GoldenEar’s corporate slogan may be “We make the high end affordable,” but almost all of the companies that produce high-end audio products are led by audiophiles. Even those that focus on the affordable side of the high end can rarely resist trying to introduce reference-quality products.

I had mixed feelings, however, when I started reading the product announcement for the new GoldenEar Reference. As I began to skim through it, I found a passage that mentioned potentially designing a speaker that would be an “all-out assault on the state of the art,” and “producing an all-out assault on the ultimate state of the art, producing a six-figure loudspeaker to do battle with the most esoteric and expensive loudspeakers on the planet.”

Fortunately for the vast majority of audiophiles, GoldenEar stayed true to its heritage. The announcement immediately went on to state a very different goal: To create “a loudspeaker destined to raise the bar and set a completely new performance standard for reasonably priced, affordable loudspeakers.” “Reasonably priced” also actually turned out to be reasonably priced—well, reasonably priced by high-end standards. The GoldenEar Reference costs \$4250 each, or \$8500 a pair.

When the review pair arrived, its sound sent a far more important message. The Triton Reference is a major improvement over the Triton One, and is a truly excellent speaker for the money. I’ll leave judgments about a “completely new performance standard” to GoldenEar’s marketers, but the Reference does everything exceptionally well for a speaker near its price range. It offers a remarkable amount of transparency, life, and soundstage detail along with some of the best-integrated powered subwoofer performance I’ve heard at anything like the price.



GOLDENEAR TRITON REFERENCE LOUDSPEAKER

GoldenEar's Explanation of Why It Developed the Triton Reference

Before I get to the sound and the music, however, I should mention the sidebar to this review. I normally try to provide a detailed technical description of any product I review, but in this case, I pushed Sandy Gross, the head of GoldenEar, into explaining the design rationale behind the speaker.

I also asked him to focus on the tradeoffs that he had to make relative to those six-figure super-references, and on the specifics of the improvements over the Triton One and the extent to which they involved any diminishing returns in value for money, and the fact that a pair of Triton References costs 70% more than a pair of Triton Ones.

Rather than simply do an interview, he took the time to provide a detailed response, and one that does a great job of describing the goals behind the new Triton Reference and its technical features. I'm still struggling with his nicknaming the speaker the "T Ref," and I can't quite shake the image of a new version of *Jurassic Park* where a "T Ref" starts eating the reviewers at an audio show. Nevertheless, his explanation of the speaker is objective enough to provide an exceptionally sound picture of the design rationale behind the Triton Reference, the changes in its components and technology, and the how these changes are intended to affect the music.

If anything, I think Sandy downplays the importance of one key aspect of the Triton Reference. The Triton One covered its body in fabric in order to deliver exceptional sound for the money. The Triton Reference has wood sides and a matching base that are finished in a glossy piano black. It is a substantially more attractive speaker, has no techno-geek visual features, and is 58" tall and 22 1/4" deep, but only 6 3/4" wide at the front and 13 1/2" at the back. Form follows function in a really attractive way, and in visual terms it's a speaker a wife or partner can easily live with.

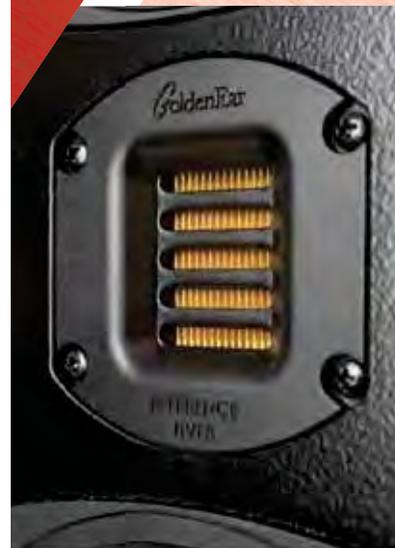
The Triton Reference and the Music

As Sandy's sidebar states, the Triton Reference is not some revolutionary advance over the Triton One, but it does make meaningful sonic advances in every respect and in ways that seem to more than justify its costs in comparison with other speakers in anything near its price range.

One of its most important features is to combine better performance—while also making the loudspeaker compatible with a wide range of electronics and cables—with a balance of sound qualities that make it a pleasure to listen to over extended periods of time. The "gee whiz" factor in the sound of a new speaker disappears when you realize that it involves added coloration and/or produces listening fatigue.

Like the Triton One, the Triton Reference has a very smooth overall timbre through its frequency range, with deeper bass, smoother midrange with more detail in the upper midband, and a cleaner treble with a great deal of air. This is particularly true if it is tilted so the tweeter is directed at the listener's ears in the primary listening position. It is a remarkably seamless speaker in timbre/frequency response, soundfield, and imaging for anything close to its cost.

My initial reaction was that the Reference did have a slightly "soft" or warm voicing, but a combination of break-in and better adjustment of its subwoofer level made it clear that the Triton Reference had excellent upper midrange and treble detail but without



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any of the touch of hardness that can occur with some dome tweeters or with speakers that are voiced to emphasize detail by adding energy in the upper midrange.

It was apparent that the Reference did have the all warmth it should have, and that its reproduction of the lower midrange and upper bass was exceptionally well balanced. This is a speaker that minimizes listening fatigue even when the music is miked too closely, but does not mask upper midrange detail. It also measurably reproduces highs up into the supertweeter region.

GoldenEar's technical literature claims the Triton Reference has substantially improved crossovers with upgrades to better-sounding components, such as film capacitors, that may help explain its improved coherence. At the same time, the speaker's pleasing sonic qualities may also reflect the use of new drivers—including a new ribbon and upper-bass/midrange—in a redesigned array.

What is equally important is that the Triton Reference has a remarkably coherent set of dispersion characteristics and a wider, more stable, and exceptionally detailed soundstage. In fact, if you audition this speaker, I would suggest bringing recordings with truly demanding and natural soundstages, so you could hear how well reproduced they are. *Jazz at the Pawnshop* is one classic example that most audiophiles possess, but a really good natural recording of a symphony can be even more revealing.

I have a 96kHz/24-bit version of a Tauno Hannikainen and Tossy Spivakovsky recording of Sibelius' Violin Concerto that was originally captured on 35mm tape back in 1960; in both the digital and LP versions it's a classic. A properly set up pair of Triton References (widely spaced with carefully adjusted toe-in, good spacing from the sidewalls, and enough space from the rear wall to get smooth, deep bass) playing back this source file revealed a wide range of subtle aspects of this recording's imaging with excellent soundstage width and full centerfill. The tape hiss on this recording is a minor distraction, but the Reference's ability to float such a detailed and natural soundstage still made this concerto a true pleasure even nearly 60 years later.

As for nuance, the Reference is again better than the already very good Triton One. I get a lot of pleasure from cello music and one of my favorite pieces is J.S. Bach's Cello Suite No. 1 in G major [BMV 1007]. I already own seven recordings, and now have access to a long additional list from Tidal. If you want to judge a speaker's ability to deliver detail, work your way through the opening passages of the first movement from a Casals recording in the 1930s to one of today's best performances, and see just how many subtleties—even from a solo instrument—a really good transducer like the Triton Reference can reveal.

The Reference was equally revealing of the nuances in female voice. Brass and woodwinds were very clean and natural, and the Reference handled difficult-to-record instruments such as the recorder and harpsichord as well as my recordings permit. As for strings, it did a superb job of reproducing the subtleties in the performance and the character of the Stradivarius instruments used in a L'Archibudelli, Smithsonian Chamber Players recording of Mendelssohn and Gade's Octet for Strings [Vivarte 1992].

Unlike many speakers, the Triton Reference did not have some particular listening level that seemed to bring out its best characteristics. The best listening level was always the one that best suited the music, rather than the one that best suited the speaker. No loudspeaker can alter the changing frequency sensitivity of the human ear to bass and treble as the sound level rises, but the Reference did not introduce any clear coloration at low or high levels.

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Thanks in part to its integrated subwoofer, which is powered via an 1800-watt, DSP-controlled switching amp, when it comes to its more saurian sound character, the “T Ref” proved to be one of the few speakers that can actually reproduce very-low-frequency organ, bass guitar, and synthesizer bass down to subwoofer levels—provided that it is properly set up and placed, and that the room allows deep bass reproduction.

The Triton Reference did an excellent job with the demanding bass in the Reference Recordings version of Copland’s *Fanfare for the Common Man* performed by Eiji Oue and the Minnesota Orchestra. It had very clean bass drum transients as well as sustained musical power.

The Reference outperformed some very expensive competition in handling the extraordinary deep bass notes and dynamics on bands 2, 13, and 14 of Jean Guillou’s performance of Mussorgsky’s *Pictures at an Exhibition*. It also did as much as possible to reproduce the complex mix of deep lower frequencies, massive orchestral power, and soundstage imaging in my recording of the last movement of Saint-Saëns Symphony No. 3. Like Mahler’s “Symphony of a Thousand,” there are some pieces of music that are simply too massive to accurately reproduce in the home.

In short, the Triton Reference is one of the few loudspeakers I’ve encountered that can actually produce truly low musical bass and warble test tones down to the lowest subwoofer depths and do so in ways that are properly integrated into the overall response of the speaker. It really does bring out the deepest notes a recording allows with tight detail and without exaggeration. It is not room-placement-proof. Care is needed to keep the subwoofer level restrained to natural music levels, and proper spiking can help, but only a few far more expensive speakers—normally with digital room compensation—have performed better in my system.

And just to be clear, I’d add the same praise for its ability to handle rock ‘n’ roll such as the Stones, and jazz such as the MJQ, which is just about as contemporary as I want to get.

Summary Judgment

Highly recommended. Well worth auditioning and fully competitive with some substantially more expensive speakers.



Specs & Pricing

Frequency response:

12Hz–35kHz

Sensitivity:

93.25dB

Nominal impedance:

8 ohms

Recommended amplifier power:

20–750 watts

Drivers:

Three 6" x 10"

long-throw quadratic sub-

bass drivers, coupled to

four inertially balanced

10 ¼" x 9 ½" planar

infrasonic radiators; two 6"

high-definition cast-basket

MVPP mid/bass drivers; one

neodymium High Velocity

Folded Ribbon (HFVR)

tweeter

Integral woofer amplifier:

1800-watt Force-Field

DSP-controlled switching

amplifier

Dimensions:

6 ¾" (front) x

9 ¼" (rear) x 58" x 18 ¾"

Weight:

108 lbs.

Price:

\$8500

GOLDENEAR

TECHNOLOGY

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goldenear.com

GOLDENEAR TRITON REFERENCE LOUDSPEAKER

MUSINGS ON THE TRITON REFERENCE GOALS AND DEVELOPMENT PROCESS

SANDY GROSS

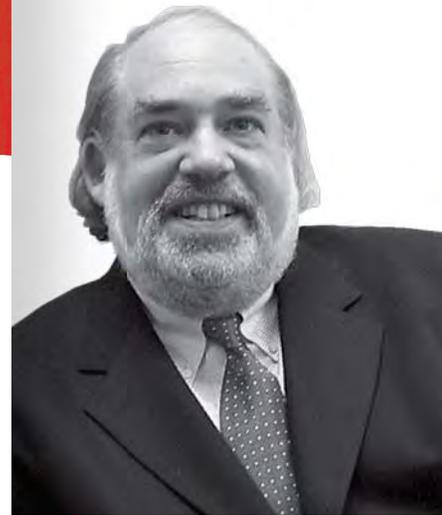
We introduced the Triton One with the goal of producing an attractive, affordable, easy-to-drive loudspeaker that delivered audiophile performance and that could be compared with loudspeakers that sell for many times its price. We think we succeeded. Then the question comes up: Why the Triton Reference? What were the goals and what were the means to accomplish these goals?

No loudspeaker is perfect, and as with any product, even \$100,000+ ones, there are always compromises. In developing the T Ref, we wanted to go beyond what we had achieved with the Triton One. We had, as an overall goal, to create a still-affordable loudspeaker, which would be able to deliver even greater dynamic range and more powerful, deeper, tighter, faster bass than the Triton One, with a higher level of refinement and higher resolution. In fact, we had our eyes and ears focused on creating a speaker that could play with the authority of the large and very expensive superspeakers from manufacturers like Wilson, Magico, YG, etc., with the same kind of expansive but detailed and focused imaging, which is so important to us.

The development process was long and arduous, actually almost two years from defining the concept until the final production prototype. With my team of Bob Johnston and Don Givogue, we prototyped and evaluated each component or concept both by precise measurements, made in our full-size anechoic chamber, and by critical listening. First, we developed all-new drivers for the Reference. The upper-bass/midrange units are basically 6" drivers arranged in a D'Appolito array around our tweeter. They use the same cast basket as the driver in the Triton Five, but the similarity ends there. While the Triton One incorporates 5.25" upper-bass/midrange drivers, we felt that going to larger 6" drivers in the Reference, would give us greater dynamic range and lower distortion. At the same time, the 6" drivers would still give us excellent dispersion and a wide enough frequency response to enable them to match nicely with our tweeter. Additionally, we felt that they would do a better job of allowing us to cross-over lower to our built-in powered subwoofer/bass section.

We incorporated a new magnet structure—we call it "Focused Field"—which has a somewhat conical backplate that better focuses the magnetic flux into the voice coil gap. This gives us better control and higher efficiency. Because the driver is not being used for long-throw bass excursions, we were able to go with a shorter, lighter voice coil, which gives us better transient response, higher resolution, and higher sensitivity.

There is much discussion about cone materials. No material is perfect, and there are always trade-offs. We use a newly designed polypropylene cone, which we feel gives us a nice balance between speed of sonic transmission within the cone (Young's Modulus) and good internal damping. One of the final details to be optimized on this driver was the glue bond between the cone and the butyl rubber surround. This required many iterations of the prototype, actually delaying the project, but we finally achieved what we were looking for: a lighter, but still strong



glue bond that improved transient response, while maintaining good wave termination at the cone edge.

Next, we focused on the tweeter. We really love the AMT folded-ribbon tweeter technology. We find that it gives us very extended frequency response, tremendous dynamic range, superb transient performance with very low distortion and none of the breakup and ringing so common with most dome designs. How to improve it, was the question. Our engineering

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team came up with the idea of increasing the strength of the magnetic field that the diaphragm sits in. Although it utilizes the same diaphragm as our other tweeters, the Reference tweeter incorporates 50% more rare earth neodymium magnet material. This gives us even better control of the diaphragm's motion, along with higher efficiency, improved resolution, and, of course, greater dynamic range. And because we did not increase the size of the diaphragm, we preserved the tweeter's excellent dispersion.

Next came the subwoofer and active bass drivers. Clearly, with the Reference, we wanted to improve on the already-excellent bass performance of the Triton One. Since we had a somewhat wider cabinet to accommodate the larger 6" drivers, we were able to design an all-new, larger, active bass driver for the Reference. With 40% more surface area than the active driver we previously used, and a much larger "Focused Field" magnet structure and larger-diameter voice coil, it allowed us to achieve dramatically better bass performance: deeper, faster, more dynamic and effortless, with lower distortion.

As we all know, the cabinet is a key component of a loudspeaker system. In order to achieve a solid, non-resonant structure, we spent a lot of time working with cabinet damping and bracing, making precise measurements with very sensitive accelerometers. Also, there was the expensive decision we made to do the Reference in a beautiful hand-rubbed piano-black lacquer finish.

Some of the other improvements we made, relative to the One, related to the specific internal speaker wire we chose and getting the precise twist between

AND, OF COURSE, IN THE END, THE FINAL KEY IS THE VOICING OF THE SPEAKER.

the two wires correct; utilizing a mix of Dacron and long-fiber lamb's wool for damping in the upper-bass/midrange chamber (lamb's wool has some uniquely effective damping characteristics, as does Dacron, and the combination achieves an effective synergy); and using steel spikes instead of brass ones.

We incorporated a 3/32"-thick steel plate in the base for added rigidity, which results in tighter bass with better detail and improved resolution. And then there were the capacitors in the high-pass section of the passive crossover, feeding the upper-bass/midrange drivers. As this crossover is very low, it required very large capacitors. If we were to use pure film capacitors for this, it would have been excruciatingly expensive. Instead, we put a small value high-quality film cap across the electrolytics in order to come very close to what we would achieve with pure film.

And, of course, in the end, the final key was the voicing of the speaker. This is really the artistry that combines with the science in order to achieve the desired final result. At GoldenEar, we have a full size anechoic chamber within our engineering facility, which is a duplicate of the famous one at the NRC in Ottawa. The chamber allows us to get really precise measurements throughout the development process—to get our designs into the ballpark, as well as to understand and confirm changes that we make during listening/voicing. Voicing is a long process, and we have many tools, developed over many years, that we bring into play. For instance: We have a recording of two wooden blocks being struck against one another, which has proven to be very useful. One of the most difficult to achieve goals in a complex multi-driver loudspeaker design like T Ref, is to get the drivers to all blend into a coherent whole, and speak with one voice. This is a major focus of our voicing process. **tas**



I think that the greatest challenge facing the high end is exposing new listeners to the possibilities, and creating exceptional gear that offers real value along with performance.

What ignited your interest in the high end? Did it come from the music side or the electronics side?

I would say it came from both. I became interested in audio because of my interest in music—which began in the late 60s with rock 'n' roll, and then developed into a passion for jazz—and then I got more and more interested in high-end audio due to my basic gear-head tendencies as well as, more importantly, my desire and craving to bring myself closer to the music.

What gear made up your first high-end system?

I would say my first high-end system was a pair of KLH 9s, Futterman H3aa amplifiers, a Marantz 7C preamp, and a Transcriptor Hydraulic Reference turntable with a Decca 'arm and cartridge.

When did audio develop from a hobby to a career?

When I graduated from college I got together with Matt Polk and George Klopfer, who also graduated from Johns Hopkins, and we started Polk Audio in the proverbial garage. I suppose you could say that this led to my life's work: 45 years of creating loudspeakers, first with Polk, then with Definitive, and now with GoldenEar. Some call me a serial entrepreneur. To me I'm just a kid from Brooklyn who has been able to pursue his dreams.

How did GoldenEar come into existence?

I left Definitive in the spring of 2009. My wife thought we were retiring, but that was not to be. I suppose that I just had more speakers that I wanted to create, and to take them to another level. I convinced my partner from GoldenEar, Don Givogue, to come out of retirement, as it wouldn't have been possible without him. Don and I went to visit with Kathy (Gornik) at Thiel to discuss possibly buying Thiel—much as we had done with Dahlquist before starting Definitive—but decided that we were best off starting new and fresh. I remember, after meeting with Kathy, driving around the beautiful Kentucky horse country, discussing our concept for the Triton Two. We showed a mockup at CES 2010, and then demonstrated a prototype at CEDIA the following autumn.

What interesting fact or aspect about GoldenEar might surprise audiophiles?

I think that the fact that we have eight real engineers and a full-sized anechoic chamber might surprise some. Our extremely talented head of engineering, Bob Johnston, is quite rigorous in his



approach to designing loudspeakers, both from a measurement as well as from a critical listening and voicing perspective and feels that an anechoic chamber is absolutely critical to his work.

How do you define the difference between hi-fi and high-end audio?

I think hi-fi is a rather general term, sort of like stereo, while high-end connotes a more serious approach to reproducing lifelike sound with great accuracy (theoretically). Some think it refers to expensive, but we consider it more of a reference to quality, and hopefully have shown that high end, while never cheap, does not have to be extraordinarily expensive.

In your view, has digital audio finally equaled or surpassed analog?

What I would say is that digital audio has finally achieved a level of quality that makes it acceptable to me. Initially, despite claims of perfect reproduction, it drilled holes in your head. Now, it has really matured into a very satisfying medium for music enjoyment. And with advances like MQA and Edgar Choueiri's digital acoustic crosstalk cancellation device, it is really cooking! However analog, which works with the original waveforms, is still something very special.

Looking towards the future, how will high-end systems change in the next ten years or so?

There are many developments that will impact high-end audio systems. Of course streaming seems to be replacing hard media across the board. I still enjoy my silver discs and vinyl, however I am quickly finding myself in the minority. I think that the work that Dr. Choueiri is doing, based on what I heard in Munich, is something quite revelatory and a real breakthrough. Interestingly, Matt and I pioneered an acoustic interaural crosstalk cancellation system back in the 80s, and GoldenEar has a patented system in our high-end soundbars, but the acoustic implementation is a lot simpler. I expect that many really cutting-edge systems may well find Choueiri's system *de rigueur*.

Going forward, what are the greatest challenges confronting the high end?

I think that the greatest challenge facing the high end is exposing new listeners to the possibilities, and creating exceptional gear that offers real value along with performance.

Outside of audio, what do you do for fun?

Anne and I listen to a lot of live music. In addition, we are art fanatics and really enjoy collecting. **tas**

