

THE MAJESTY OF LIVE MUSIC



Sigma

 Infinity

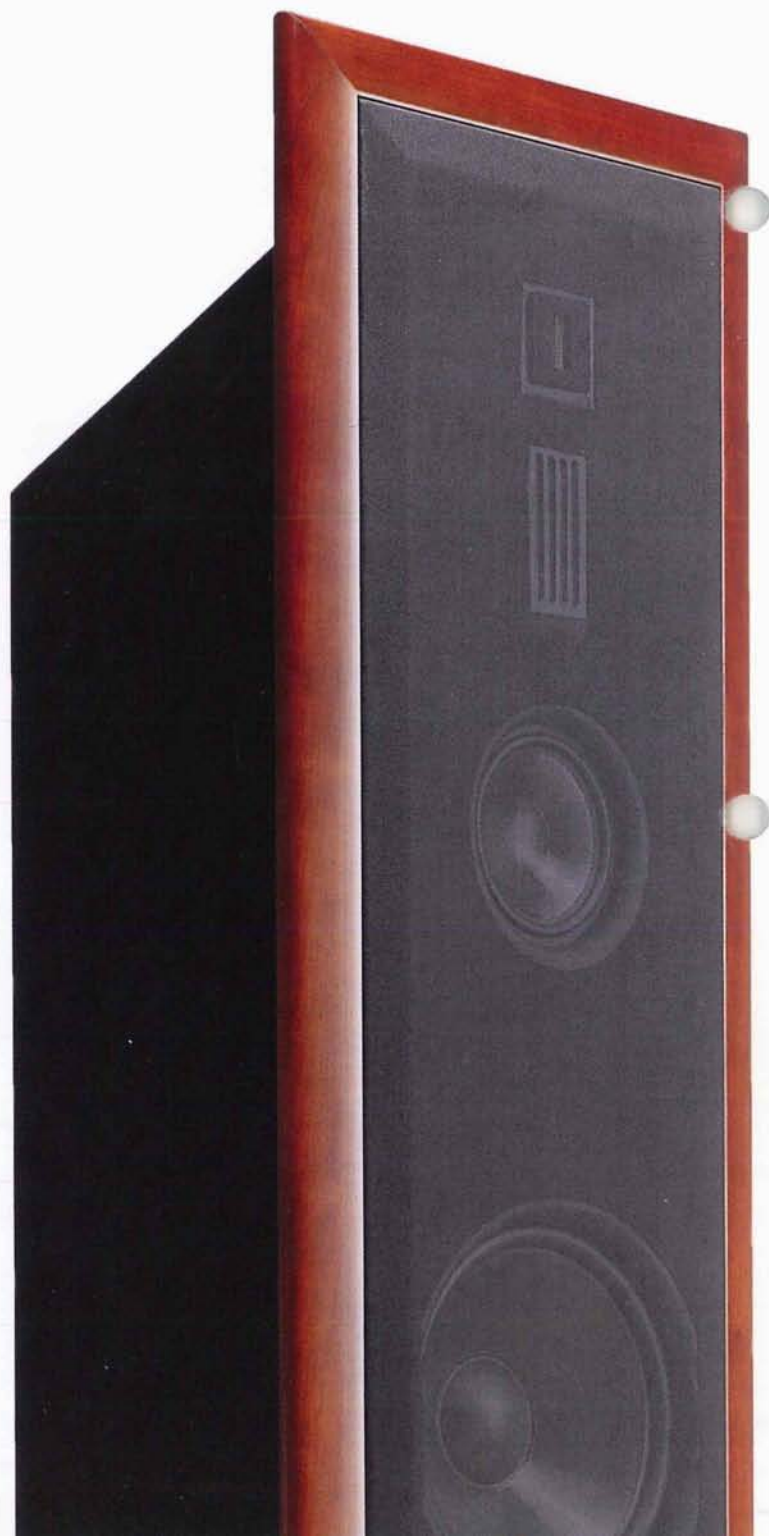
A SINGLE GOAL, A SINGLE-MINDED PURSUIT

Is it possible to reproduce recorded sound so perfectly that a critical listener will experience the sensory equivalent of a live musical performance?

For more than twenty-five years, a dedicated group of audio engineers has been working to demonstrate that the answer is, "Absolutely." And with each new Infinity loudspeaker system introduced over the years, with each Infinity innovation – the refinements as well as the breakthroughs – more and more serious listeners have come to agree.

Unlike manufacturers who create loudspeakers to neatly accommodate competitive forces in the marketplace, Infinity creates loudspeakers to indulge the senses fully.

It is a single-minded design philosophy that doesn't accommodate compromise. But then, compromise has never been high on the Infinity owners' wish list.



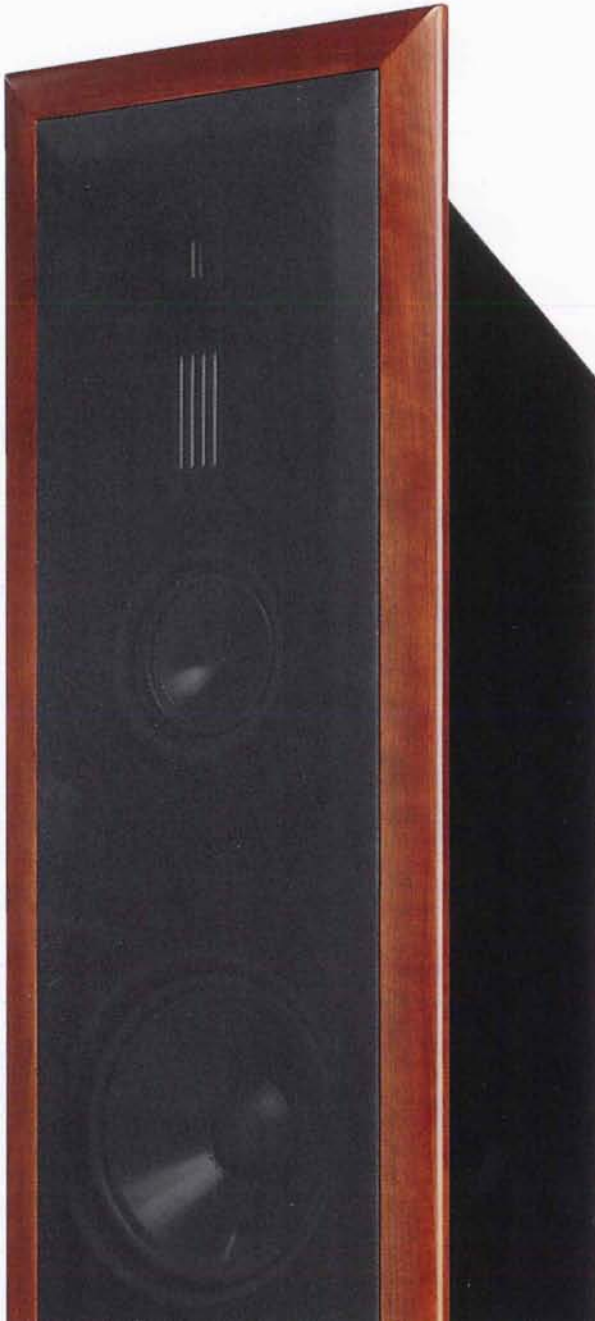
THE DIMENSIONS OF THE IRS SIGMA SOUND

The IRS Epsilon began an audio revolution, bringing Infinity an important step closer to its pursuit of re-creating the sensation of a live performance accurately, and IRS Sigma continues the revolution brilliantly.

Yet for all their ability to respond instantaneously, for all the enormity of the sound they manage to produce, Sigma speakers are visually striking, but hardly imposing. They're designed to fill your listening environment sonically, not physically.

The elegant towers – less than five feet high and just eighteen inches wide – offer individual level controls for the bass, midrange and high-frequency drivers, so they can be precisely tuned to the acoustic demands of any room. And because the enclosure's driver configuration produces controlled dipole radiation, you get maximum flexibility of room placement.


As the most important component of a serious music system – or the basis of a powerful home-theater installation – Sigma is designed to be very accommodating.



“IF AT FIRST YOU SUCCEED BRILLIANTLY, TRY EVEN HARDER”

At Infinity, success is a moving target. Every advancement becomes a point of departure. Every achievement becomes a benchmark for the future.

With Epsilon, Infinity introduced revolutionary – and critically acclaimed – technology to the rarefied world of reference speakers, offering for the first time the unfettered clarity and low-frequency response of exotic, multi-enclosure systems in a brilliantly compact design. Now, Infinity builds on the Epsilon success with Sigma.



Close your eyes for a moment and listen. Listen to the dynamics, the imaging, the responsiveness. Sigma has the power to process complex musical passages that would surely surpass conventional loudspeakers of comparable size. And although Sigma employs the same planar drivers introduced in Epsilon, Sigma places fewer demands on your electronics. (Of course, if you have the output, Sigma knows what to do with it.)

Now open your eyes and connect the size of the sound to the size of the hand-rubbed, hardwood cabinets that are producing it. This is when the scope of the Sigma achievement becomes as clear as the Sigma sound itself.

ANATOMY OF THE SIGMA SOUND

At the high end of the frequency spectrum, two EMIT™ tweeters for outstanding musical detail. In the midrange, a high-energy EMIM™ driver and responsive 6-1/2" IMG™ midbass coupler for superb resolution and imaging. And a 12" long-throw IMG woofer for deep, muscular bass.

This proven, award-winning technology, configured in a high-output, controlled-dipole design, forms the basis of the Sigma sound. But even the passive components, selected and matched for their sonic characteristics, contribute. The solid, heavily braced HDF enclosure and 3"-thick front baffle eliminate unwanted resonances for improved transparency. High-quality passive crossovers ensure maximum sonic performance.

And the Sigma design is as thoughtful as it is innovative. Individual level controls on each unit allow you to precisely tune the high, midrange and bass output to the requirements of your listening area. And super-heavy-duty binding posts, plated in gold, permit single- and bi-wire (or bi-amplifier) connections.

Sigma. Highly accurate sound for highly critical listeners, in the technological tradition of the benchmark Infinity IRS V and Epsilon. And an important step closer to the majesty of live music at home.



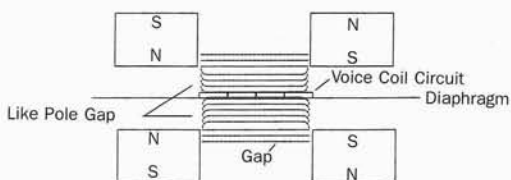
SIGMA TECHNOLOGIES AND DESIGN GOALS

Sigma's design packs substantial technological development into an elegant exterior. It is a four-way loudspeaker that employs new Infinity planar drivers designed to reproduce music and voice with amazing clarity and harmonic precision. From the top down, each Sigma contains: a pair of Electro Magnetic Induction Tweeters (EMIT-B), one facing the front and one facing the rear; an Infinity Electro Magnetic Induction Midrange (EMIM); a 6-1/2" Injection-Molded Graphite (IMG) midbass coupler and an Injection-Molded Graphite (IMG) 12" woofer. Controls for the fine adjustments of the planar drivers are located on Sigma's rear panel.



SIGMA'S DESIGN GOAL: MORE DETAILED SOUND QUALITY AND HIGHER OUTPUT IN THE MIDRANGE AND TREBLE

The starting point for Sigma development was Infinity's outstanding planar drivers. Though widely acknowledged as among the world's best, Infinity drivers have now achieved an even higher level of performance from this remarkable technology.



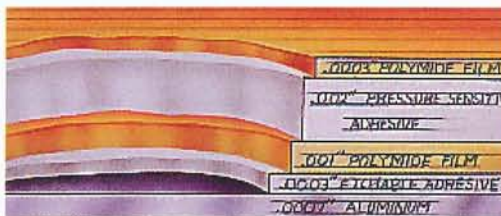
In Infinity's planar driver, opposing magnet arrays generate a powerful, uniform magnetic field. The result is high efficiency, low distortion and wide dynamic range for effortless reproduction at any playing level.

MAGNETIC SYSTEM

Infinity's breakthrough planar magnetic system places opposing arrays of powerful bar magnets on each side of the diaphragm. Their opposing "like" magnetic poles repel, which compresses, linearizes and strengthens the magnetic fields, and produces higher linear diaphragm motion. The result is high efficiency, high output, wide dynamic range, flat frequency response, and exceedingly low distortion.

DIAPHRAGM CONSTRUCTION

A planar diaphragm must be under tension to return to a stable, central resting point. However, even soft, pliable substances become resonant under tension. Resonances generate unpleasant sound qualities such as "shrillness" and "harshness." The diaphragm assembly must be damped to suppress resonances, and yet low mass is required for high efficiency and accurate transient response. Like high-performance cars, treble reproducers need a large power-to-weight ratio.



EMIM drivers employ an ultrathin, strong, highly-damped diaphragm assembly to deliver high output and accurate transient response. This laminated construction also is used in the EMIT, but made less than half as thick.

A light, strong, ultrastable polyimide film forms the base for each planar diaphragm. A full-surface aluminum film is bonded to the base film, and then the aluminum and bonding adhesive are partially etched away to create an intricate voice-coil trace.

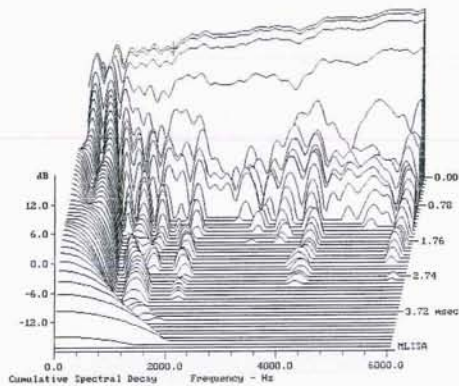
A unique low-mass, high-loss isothermic damping material is layered between the polyimide base film and a second, much thinner polyimide outer film that provides additional strength. A complete EMIM assembly is 110µm thick, only 1.5 times thicker than a human hair.

SIGMA'S DESIGN GOAL: DEEP BASS FROM A COMPACT WOOFER ENCLOSURE

The EMIT tweeter diaphragm, though having the same type of material and construction, is only $46\mu\text{m}$ thick, less than half the thickness and mass of the EMIM diaphragm. Its low mass and powerful motor system give the EMIT on-axis frequency response to 45kHz. Coupled with outstanding dispersion to well beyond 20kHz, this exceptional bandwidth makes EMIT possibly the world's finest tweeter.

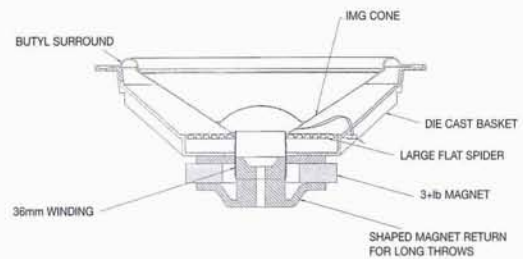
Together with improvements in the magnetic circuit, Infinity's new planar diaphragms increase dynamic range by more than 12dB, and offer smoother response and wider bandwidth. The advanced design of Sigma's planar drivers eliminates the audible ill effects of unwanted resonances: harshness, loss of detail, "smearing," and "ringing." The result is astonishingly clean, clear, detailed sound across the full frequency range.

Design Goal Achieved.



This EMIM driver "waterfall" response plot shows its output through time, after the driving signal stops. The uppermost trace corresponds to a steady state frequency response plot. The large empty spaces and absence of "peaks" between successive traces down the waterfall show remarkable freedom from unwanted resonances. As a result, the new EMIM and EMIT drivers sound sweet, clean and clear at all playing levels.

Sigma's woofer enclosure is constructed from extremely dense, nonresonant fiberboard with walls 25mm thick. The enclosure is heavily braced throughout and is tapered toward the rear to eliminate parallel walls. This design helps reduce internal reflections that cause smearing of bass frequencies. The enclosure's front baffle is 75mm thick and its thickness and high mass further reduce unwanted vibrations that add coloration to the sound.



The Sigma woofer is designed for long, accurate excursion and very high power handling. Its large centering "spider", butyl rubber outer surround, long voice coil, and deep-well magnet design work together to deliver extremely powerful bass output.

The woofer enclosure is filled with specially selected sound-absorbing material that converts the acoustic energy of the woofer's rear wave into heat, which then dissipates within the enclosure. This transformation of energy makes the volume of the enclosure appear larger to the woofer, essentially extending bass response. The filler also prevents the acoustic energy, particularly at frequencies above 150Hz, from reflecting off the interior of the enclosure and passing through the woofer cone and into the listening area as unwanted distortion. The resulting high-mass, high-stiffness, high-absorptive enclosure produces no audible box sound, adding to the preciseness and harmonious quality of the system.

An Injection-Molded Graphite cone midbass coupler inserted acoustically between the woofer and

midrange gives speed and spaciousness to the sound because of its lightness and smaller cone area. This driver had to be developed so it could match the power and low frequencies of the woofer while simultaneously combining with the extremely high speed of the EMIM midrange. This driver is an important link between the massy woofer cone and the super-light, super-fast planar midrange driver.

Sigma's woofer employs a powerful 1.4kg ceramic magnet that is sandwiched between grain-oriented steel pole pieces to maximize the magnetic field in the voice-coil gap. The ultrapure copper voice coil is wound on a strong phosphor-bronze coil former to handle high power. Cone material consists of a combination of polypropylene and carbon-graphite fibers. The strong graphite fibers give the cone great stiffness, while the polypropylene provides excellent damping to prevent resonances. The IMG woofer's 200mm-diameter voice-coil-centering spider is actually twice the size of those generally found in high-performance woofers. Its strong, flexible rubber outer surround provides accurate centering for the rim of the cone. Together, these suspension elements provide more than 25mm of cone travel with precise voice-coil alignment.

Sigma's IMG woofer refinements — long-excursion suspension, high-power voice coil and linear magnetic system design — deliver thunderous output. This ability to move huge volumes of air is critical to Sigma's mission of powerful, accurate, deep bass reproduction.

Design Goal Achieved.

SIGMA'S DESIGN GOAL: AN ENCLOSURE THAT WORKS WITH THE PLANAR DRIVERS TO DELIVER SMOOTH, UNIFORM RESPONSE OVER THE ENTIRE LISTENING AREA

Sigma's planar drivers, the EMIM and EMIT-B, place constraints on enclosure design. Planar drivers usually are operated as dipole panels that are free to radiate equally from front and rear. In order to prevent out-of-phase interference and cancellations, these panels often are quite large, acting as their own baffles at upper midrange and tweeter frequencies. Since dipole speakers freely radiate equal energy from both sides of their diaphragms, they generate a great deal of acoustic energy that is not directed at the listener, but which instead indirectly radiates from room surfaces and often interferes with the direct sound.

Even more significant are the cancellation effects that occur in the near field of the loudspeaker. These near-field cancellations, the result of baffle cutoff effects and of reflections and diffraction, have a powerful negative effect on the quality of the direct sound reaching the listener.

Ideally, we would like to absorb completely the rear wave of the planar drivers. Unfortunately, the low-mass diaphragms of these planar designs, though of enormous benefit in generating accurate sound, also create difficulties.

These ultrathin, light diaphragms are essentially transparent to acoustic energy, which passes right through them. This means that any sound waves reflected from the rear of the enclosure, even through the damping material, may pass through the planar diaphragm and enter the listening area as a source of phase distortion that will create a "smearing" of the sound.

Rather than suffering the ill effects of uncontrolled dipole radiation, or trying unsuccessfully to absorb completely the rear wave, Infinity experimented with reducing and controlling the rear-wave energy.

The first thing that was done was to adopt a slightly rounded baffle front surface, into which the planar drivers fit flush, in cutouts. This baffle design makes the grille material and its frame integral parts of the driver's mounting frame, which then smoothly joins with the baffle opening. Furthermore, the frames and solid-face surfaces of the drivers are covered with acoustic felt to prevent reflections that cause response anomalies in the upper midrange and high end. The smooth transition from driver to gently rounded baffle ensures the projection of uniform wavefronts at all radiated frequencies, free from "foldback" cancellation effects caused by the diffraction that occurs at abrupt edges of any kind. The baffle's width gives the lower-frequency drivers sufficient area to ensure smooth waveform launch.

As mentioned, Infinity decided to experiment with partial absorption of the rear wave. We found that by carefully sculpting special long-fingered foam into a shape that narrows in width and depth behind the progressively smaller drivers, the dipole cancellations could be nearly eliminated. At the same time, the front hemisphere response significantly improved in smoothness and breadth, indicating improved acoustic power response. This wide, smooth power response of Sigma is a key to its open, smooth quality at nearly any listening position.

SIGMA'S DESIGN GOAL: OPEN, SPACIOUS TREBLE SOUND QUALITY

An open, spacious sound quality in the extreme treble requires nearly omnidirectional radiation. Although the EMIT tweeter offers unusually wide, smooth response throughout its range, no single tweeter can provide this "omni" characteristic.

To broaden the top two octaves of Sigma's response, a second EMIT is placed in the rear of the baffle, unobstructed by the foam rear housing. In the extreme treble range of the rear EMIT, cancellation effects are random and inaudible. The two tweeters together deliver wide overall response that gives a pair of Sigmas an exceptional quality of spaciousness and "air".



**SIGMA'S DESIGN GOAL:
HIGH-QUALITY PASSIVE CROSSOVERS
THAT PRESERVE SIGNAL QUALITY**

Each planar drive section — EMIT and EMIM — has its own individual crossover located in the woofer enclosure. The crossovers are widely separated to eliminate unwanted interactions among the component parts. Very high-quality components are mounted on glass-epoxy circuit boards with heavy copper tracers. These premium components — low-loss polypropylene capacitors, precision resistors, high-Q inductors, low-loss cables, and gold-plated connectors — maintain the highest degree of sonic integrity.

Design Goal Achieved.

**SIGMA'S DESIGN GOAL:
PRECISE CONTROL OF TONAL BALANCE**

Loudspeakers often have controls that let you adjust the relative level of the midrange and/or tweeter. While these controls may provide compensation for room acoustics, often they are too coarse to do the job.

Switches on Sigma's rear panel provide small, but highly significant, adjustments of the relative level of each planar driver and woofer section. The various steps amount to less than one dB each, yet their aggregate effect can fully compensate for many different listening-room conditions. The smoother and flatter the response of a loudspeaker, the more significant small level changes become.

Design Goal Achieved.

**SIGMA'S DESIGN GOAL:
APPEARANCE AND CRAFTSMANSHIP THAT
MATCH AND COMPLEMENT PERFORMANCE**

A loudspeaker's outward appearance is important. When people describe a speaker, they usually don't describe the actual reproducers of sound — the drivers. Rather, they describe the enclosure: its size, its shape, the wood or other material it is made from, its finish, how it looks and feels. While few readily admit it, many loudspeakers, like cars, are purchased on the basis of first impression — with sound quality and engineering details secondary factors that only become significant over time.

Sigma is a superior loudspeaker that looks like a superior loudspeaker. Music lovers and audiophiles who care very much about sound quality also care about appearance and construction quality. Sigma offers both state-of-the-art performance and great physical appeal, with superior craftsmanship that always elicits appreciation and pleasure.

Design Goal Achieved.

SPECIFICATIONS



- Uses the latest EMIT tweeters and EMIM midranges for the ultimate in musical resolution, speed and detail
- Large (12") IMG woofer with extremely long-throw design for a solid bass foundation
- High output capability allows the Sigma to reproduce the majesty, power and dynamics of a live musical event
- Controlled dipole radiation provides performance that is superior to conventional bipoles and dipoles, as well as enhancing placement flexibility
- Solid, 1"-thick HDF enclosure with 3"-thick front panel eliminates unwanted resonances for better transparency
- Only highest quality passive parts used throughout for exceptional musicality
- Heavy-duty binding posts allow either single- or bi-wiring
- Bass, midrange and high-frequency level controls for easy integration into any room
- Hand-rubbed, hard wood, furniture-quality finish enhances any decor

For Ultrahigh Performance Audio Systems

Frequency response 30Hz–42kHz ±2dB
Sensitivity 87dB spl @ 1m/2.83V_{rms}
Crossover frequencies 160Hz, 600Hz, 3.8kHz
Impedance nominal 4 ohms

For Ultimate Home Theater Systems

Amplifier power 100 – 500 watts RMS per channel
Drivers (1) 12" IMG woofer
(1) 6-1/2" IMG™ midbass coupler
(1) high-energy EMIM midrange
(2) EMIT tweeters
Dimensions 58-1/4" H x 18-1/2"W x 16-1/4" D*
(1422 x 457 x 406mm)
Shipping weight 195 lbs (88.6 kg)

*Dimensions: height includes spikes.



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