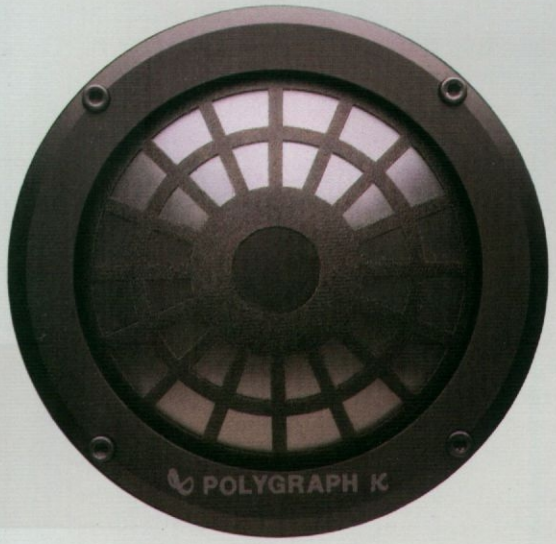
INFINITY

Kappa Series

KAPPA

KAPPA *IS A CONCEPT AND A GROUP OF PRODUCTS. FIVE UNIQUE DRIVERS AND FOUR LOUDSPEAKERS THAT INCORPORATE THEM.* ***KAPPA*** *SPEAKERS DIFFER RADICALLY FROM CONVENTIONAL SPEAKERS IN APPEARANCE, UNDERLYING DESIGN PHILOSOPHY, AND CERTAINLY IN PERFORMANCE.*

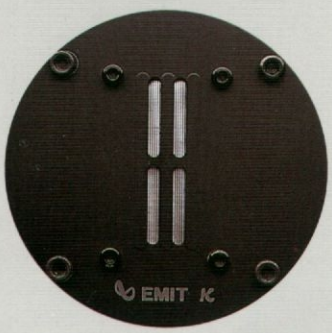
A newly developed composite polypropylene/ graphite fiber injection molded cone enables *Kappa* woofers to produce powerful, taut bass.



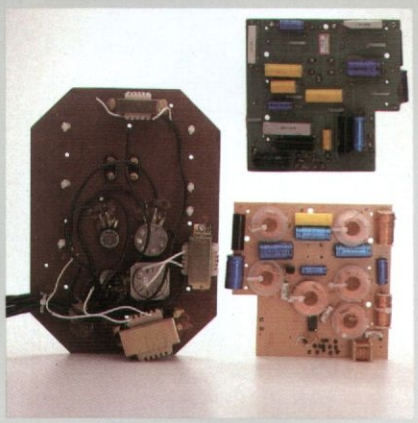
Super-fast transient response in the critical 80-800 hertz range is provided by the composite polypropylene / graphite 5″ diaphragm of the Polygraph *k*.

Utilizing a 3″ edgewound voice coil and a powerful magnetic structure, the new Polydome *k* midrange driver delivers low distortion, exceptional linearity and fast transient response.

The SEMIT *k* supertweeter, which is specially designed for optimum dispersion of frequencies above 10kHz, creates a spacious and natural soundstage.



New neodymium magnets and a special ultralight diaphragm extend the EMIT *k* tweeter's bandwith to beyond 44kHz. The result is incredibly fast transients within the audible frequency range.



Kappa crossovers are computer designed, then carefully hand-tuned during critical listening sessions. Components are chosen for their electrical excellence and musicality.

Both the 8 and 9 *Kappa* are designed with rear-firing EMIT *k* tweeters. These, plus a dipole midrange in the 9*k* , provide enhanced spatial characteristics and imaging.


EMIT K
POLYDOME K
infinity


EMIT K
POLYDOME K
POLYGRAPH K

THE TECHNOLOGY STORY

In our nearly twenty years of existence, Infinity Systems has served as a laboratory for the loudspeaker industry. We pioneered in the development of electrostatic elements, planar electromagnetic induction drivers, polypropylene domes and cones, anti-diffractive grills and cabinetry, and servo-controlled woofer systems. And to the delight of hundreds of thousands of consumers, we brought much of our exotic loudspeaker technology to popularly priced products.

For many years our most advanced technology has been embodied in our limited production Infinity Reference Standard, and many of the innovations featured in *Kappa* derived from this ultimate system.

More is More

Conventional engineering wisdom has it that a single element loudspeaker is theoretically ideal. Theoretically, yes; practically, no. Our extensive research has convinced us that an array of purposely bandwidth-limited drivers, when properly crossed over, yields superior results.

All *Kappa* loudspeakers are multi-driver systems and all incorporate radically new transducers in specific frequency bands. By limiting the bandwidth of these drivers, each can perform optimally in its own frequency band. Our top-of-the-line Reference Standard 9 *Kappa* is one of the very few five-way systems in existence. And for all its complexity, the 9*k* sounds far more coherent than most two-way systems where, by necessity, both drivers operate at the edge of (and often beyond) their most linear regions.

A New Generation Of High Accuracy Technology

The *Kappa* woofer has a highly innovative cone that is injection molded from a mixture of graphite fiber and polypropylene. The advantages of these two materials — graphite for its stiffness and polypropylene for its inertness — compliment each other. During the high pressure injection molding process, graphite fibers are forced into the polypropylene in a radial pattern. This composite structure exhibits extreme stiffness and pistonic operation up to nearly 1kHz (even at maximum excursion), low mass, fast acceleration and very high self damping. The result is taut, precise bass reproduction at all volume levels, with sufficient bandwidth to permit very smooth transitions to midrange drivers. We use the same composite cone (and the rigid cast frame of the heavier 12" *Kappa* woofer) in our no-compromise Infinity Reference Standard, Series V and we believe that it is the most accurate cone made — at any price.

Our revolutionary Polygraph *k*™ superwoofer handles the critical mid-bass and lower midrange frequencies. The spectrum of 80Hz to 800Hz is where half of all musical energy appears (including all vocal fundamentals) and where most speakers are at their weakest. This new 5" dome-shaped driver operates throughout this range and delivers a seamless, coherent performance. All but the lowest notes are kept out of the woofer, allowing voices and instrumental textures to emerge with an airiness and clarity that is musically convincing.

Diaphragm construction on the Polygraph *k* (which has a patent pending) is more akin to that of a grand prix car than a loudspeaker. It is a composite structure, made from unusually thin polypropylene supported by an extremely stiff lattice of graphite fiber. These two materials provide an unprecedented combination of stiffness, low mass and damping. The Polygraph's transient response and resistance to breakup rivals that of the most expensive planar drivers. Its power handling and dynamic range surpass them.

The equally important upper midrange frequencies are covered by another new dome design. Our 3" Polydome *k* uses an edgewound voice coil for high electrical efficiency and a new formulation of soft polypropylene for a combination of excellent self damping and speed. Our research paid off in a driver of exceptionally low coloration. This dome mates beautifully with the potent Polygraph *k* and, because of its size, can go low enough to meet the 10" and 12" *Kappa* woofers in our more affordable 3-way systems.

The higher frequencies still belong to our famous EMIT electromagnetic induction planar tweeters. Now, however, there are two of them, and both feature evolutionary improvements first used in our IRS, Series V.

Compared to its predecessor, the *Kappa* EMIT has a kapton diaphragm of approximately half the mass, a lighter, thinner aluminum trace (analogous to the voice coil on conventional cones and domes) and new ultra-linear, ultrahigh gauss rare neodymium magnets. High frequency response has been extended to 44kHz, and though you won't hear fundamentals up there, you'll find that kind of bandwidth makes a difference in reproducing transients and instrumental attacks. In our more expensive 8*k* and 9*k* loudspeakers,two of these EMIT *k*'s are used–one in front and one in the rear — for true dipolar dispersion and superior imaging.

Our SEMIT *k* (super-electromagnetic induction planar tweeter) is a smaller version of the EMIT *k*. Used only for the top octave in the 9*k*, its smaller aperture provides optimum vertical and horizontal dispersion above 10kHz. The SEMIT *k* features the same diaphragm and magnet refinements as its brother.

Kappa System Engineering

To fulfill the promise of *Kappa* drivers, we undertook a major engineering project in crossover design. Four and five-way crossovers are enormously difficult to design and truly linear response in them is almost impossible to achieve. Fortunately we've been designing with computers since the late seventies and the most advanced CAD (computer aided design) and IQS programs (using fast Fourier transforms for frequency and time domain studies) helped us in our quest. But as useful as computers are, the final tweaking and balancing is done by ear. That is the real art in loudspeaker design.

Kappa drivers are themselves so sonically revealing that seemingly minute differences in the behavior of capacitors and inductors become greatly magnified. We literally spent weeks choosing among brands of capacitors and assembling our own inductors amidst exhaustive and exhausting listening sessions. When we made our choices and added up the parts costs for the crossover networks alone, they exceeded the retail price of some of our smaller speakers.

Nevertheless, we decided that *Kappa* drivers demand nothing less than the finest polypropylene capacitors, optimized Q inductors, gold 5-way binding posts, 12-gauge high purity copper wire, low-noise wirewound potentiometers, and hard-soldered contact points for all connections. And all *Kappa* loudspeakers feature level controls for every driver (except the woofer), allowing for fine tuning of the speakers tonal balance to suit various room conditions.

In addition, the low frequency crossovers for the 8*k* and 9*k* feature L / C tuning, a sophisticated network of inductors and capacitors, which minimizes the systems impedance rise at resonance. With L / C tuning, the amplifier can deliver full power to the woofer right at the point of minimum mechanical control, significantly tightening bass performance. And response is extended by about a half octave — important in enclosures of modest dimensions.

For the ultimate in performance, we included a provision in the 8k and 9k for separate amplification of the woofers, with frequency division being achieved through the speakers' own internal crossover network rather than an external electronic crossover. In this arrangement, a full-range signal is sent to each amplifier, but because of the impedance of the crossover network, current amplification occurs only within a limited bandpass. Most of the advantages of true bi-amplification are achieved — namely increased dynamic range and reduced intermodulation distortion. And of course the disadvantages of bi-amplification (the expense of the electronic crossover and the substantial signal degradation entailed in it) are avoided.

We have also found that *Kappa* drivers are extraordinarily sensitive to the cabinetry enclosing them. Diffraction, or boundary reflection, occurs when sound from the drivers bounces off the front of the cabinet. And when these reflections mix with the direct waves, the soundstage is distorted. *Kappa* cabinets minimize diffraction in three ways — curved cabinet edges move the diffracted sound back and to the sides; special thin grills stand off from the cabinet and have smooth inside edges; and baffles are completely covered with special carpet-like absorptive treatments.

Handsome oak solids and veneers, along with the high density particle board are used throughout the solidly braced enclosures. The finish is furniture grade lacquer.

A Means To An End

The sum of all this innovation is a notably more accurate recreation of the musical event. By assigning our special *Kappa* drivers to specific frequency ranges, resolution of musical information rivals that of the finest planar loudspeakers. Bass reproduction is unequivocably the best achieved in any non-servo system.

But perhaps most remarkable is the ability of *Kappa* loudspeakers to depict a *soundstage*. Because these systems act as a point source at any given frequency, instruments and voices are precisely positioned. One can aurally and literally discuss the musical images in terms of height, width and depth — not just in a line between speakers. *Kappa* can convincingly recreate the environment of a live performance.

The Final Test

When we evaluate speakers, we conduct all the usual tests — and some that are quite unusual. The most telling is a listening comparison between the speaker in question and our own highly acclaimed Infinity Reference Standard (Series V in an ongoing research and development project). This 7.5 foot tall, four piece system includes twelve 12" servo-controlled woofers powered by 3300 watts RMS, 24 EMIM planar midranges and 72 EMIT planar tweeters and in 1991 sells for $60,000. Typical source material consists of second generation master tapes. And with most speakers the disparity is so great that it's embarrassing.

The fact that *Kappa* fared so well in our comparison didn't surprise us. That was our goal. No, they're not as ultimately revealing as our Reference Standard. Nor are they as large and costly. But be assured that they are musically accurate. And whether your tastes lie with Mahler, Coltrane or Streisand, we know you'll find *Kappa* provides the definitive performance.