A technical white paper on Infinity's new Omega Series

Introduction

Infinity's new OMEGA speaker system embodies a number of innovative engineering principles which makes this speaker distinctive and sets it apart from other quality, high-end speakers. This technical paper will present these principles in an easy-to-understand and informative manner, and it is our hope this information will give you closer insight into why we feel OMEGA is one of the best speakers Infinity has ever produced.
Since the introduction of the now legendary ServoStatik 1 electrostatic speaker all most 30 years ago, Infinity has been a staunch advocate of planar drivers for the reproduction of midrange and treble frequencies. Virtually every high-end Infinity speaker produced since the ServoStatik 1 has included planar drivers of one type or another in its efforts to achieve super-fast transient response combined with low distortion and extended, ultra-linear frequency response. Over the years, Infinity's planar drivers have been significantly refined to optimize all performance parameters making them more musical than most conventional drivers. Many years of research into new materials, structural integrity and production techniques resulted in a new generation of planar drivers which were used for the first time in the Infinity Epsilon and Sigma. These newly designed drivers are now employed in Infinity's latest generation of high quality speakers, the OMEGA, an extremely musical speaker that can rival and in some ways surpass the Epsilon and Sigma for total smoothness and musical integrity. These two planar drivers have been carefully matched to a newly developed dual voice coil Infinity/Watkins woofer which permits the system to extend its bandwidth a half octave below what could be achieved with a standard single voice coil woofer within the same enclosure size.

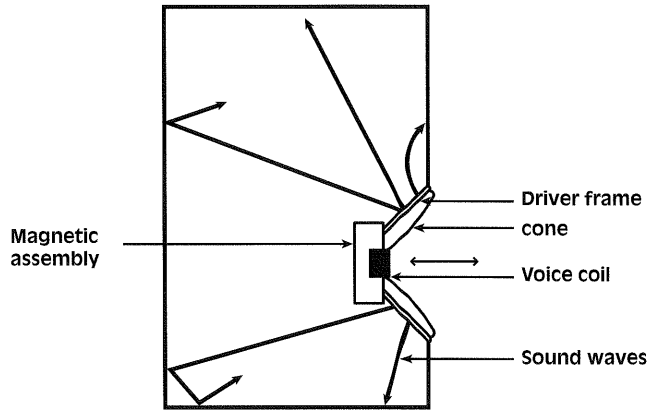
The enclosure:
It is more important to musical integrity than you may think

The prime directive for a speaker enclosure is that it must look good and blend easily with any type of room decor. But it does not stop there. The enclosure also plays an important role in how the speaker will ultimately sound, a role that is as important as the drivers, crossover network or any other part of the speaker system. The enclosure must be structurally rigid and inert so it does not flex or vibrate under the high pressure created by the bass and midbass drivers. A vibrating enclosure produces spurious resonances which, when combined with music and voice, results in a smearing of the sound which detracts from the musical experience. At times, these resonances may be minute, but even so, they blend with music and degrade harmonic structure and clarity.

There are two main sources of enclosure vibration:

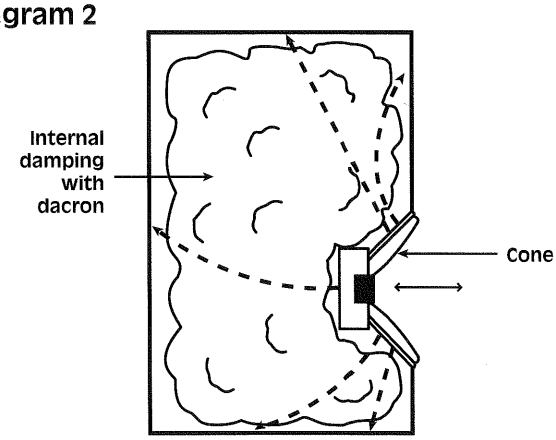
1. A reactive force is created by the movement of the driver's voice coil and cone mechanism working in response to an input signal. The vibrations created by the moving mechanism are transmitted directly to the driver's frame which in turn couples and transmits them to the enclosure to which the driver is fastened. Refer to diagram 1.

Diagram 1



2. Sound pressure waves within the enclosure are formed by the moving cone as it responds to input signals. These pressure waves can generally be damped by using dacron or a similar material inside the enclosure. The choice of the proper material and density of the material is of critical importance for the proper absorption of unwanted energy. Refer to diagram 2.

Diagram 2



The enclosure must be constructed so it is rigid and cannot respond to the pressure waves generated by the drivers. By use of special material and properly placed internal bracing, unwanted resonances and vibrations can be minimized so they will not interfere with the sound emanating from the drivers.
OMEGA's enclosure was carefully engineered to reduce and in many respects eliminate these unwanted vibrations. Internal bracing makes the enclosure rigid and well- damped which reduces spurious vibrations to virtually the vanishing point.

Another important element in speaker enclosure design is the reduction of ill effects created by diffraction, a form of distortion that occurs when higher frequencies reflect from structural discontinuities of the enclosure. These reflections tend to reach the listener at different time intervals than the directed sound from the drivers and this results in blurred, muddied sound. Spaciousness is diminished (at times substantially) and the harmonics of music and voice can be severely colored due to this time discontinuity.

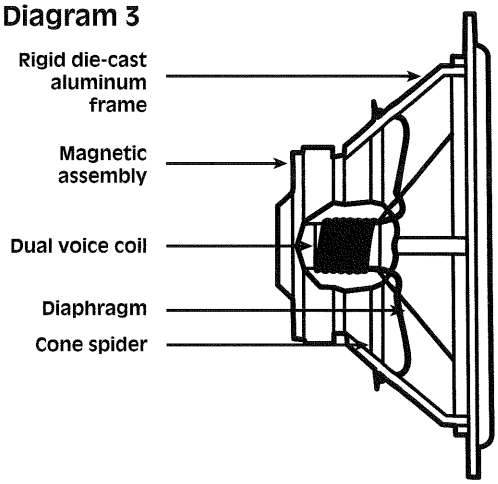
The Infinity OMEGA enclosure has been specifically designed to reduce time smearing (blurring of the sound) caused by diffraction. The front grille is on the same plane as the midrange and high frequency drivers resulting in a smooth, seamless transition between the drivers and grille. The front corners of the enclosure are slightly rounded and taper gently toward the rear of the cabinet. The front grille/driver mounting board is also rounded permitting a smooth joining to the enclosure. This permits higher frequencies to travel unimpeded to the rear of the cabinet where they are dissipated. By paying careful attention to all of these critical details, the energy radiating into the listening area is extremely coherent and transparent with clearly defined localization of soloists and instruments.

The OMEGA is mounted on four spiked feet which couple the speaker to the floor resulting in cleaner, more transparent sound across the entire audio frequency range.

The drivers

Drivers, as they presently exist, are reasonable and acceptable compromises in many operating areas. This is not to say, however, that virtually any of these areas cannot be improved upon by use of innovative and forward-thinking engineering concepts. What was considered acceptable only a few years ago may no longer satisfy the requirements of today's speaker systems and so, the search for improvements in transducer and system design continues. The ultimate goal for any acoustic engineer is the achievement of improved sonic quality and it is for this reason that numerous new and innovative techniques must be tried before these goals can be reached. Infinity has always pursued its own technological advances, at times drifting far away from what many considered as the "norm", to solve inherent problems in drivers, and it was necessary to do so again in the development of Omega. Infinity engineers examined existing driver technology with the goal of finding a way to achieve lower distortion, greater frequency response linearity combined with the higher sensitivity needed for today's market. Each driver employed in Omega underwent careful laboratory scrutiny to determine if the advanced electrical and mechanical modifications employed really raised sonic performance to a new level of refinement.

Diagram 3



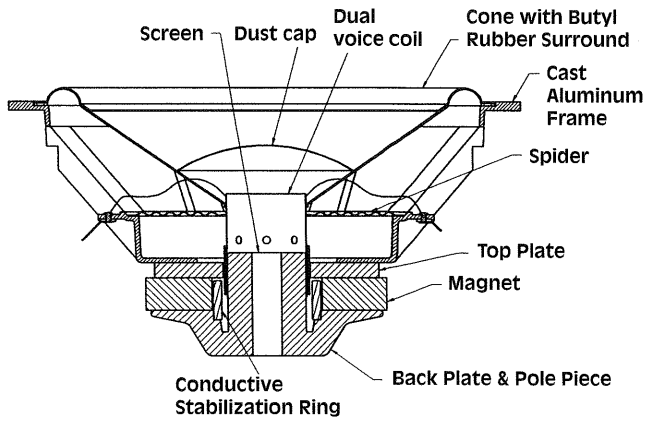
The low frequency and midbass transducers

Omega's 12" Watkins woofer and 6 1/2" midbass coupler are comprised of the following main elements:

1. Magnet and magnet assembly.
2. Dual voice coil (single voice coil for the midbass driver).
3. Diaphragm (cone).
4. Flexible suspension system.
5. Frame.

It is interesting to note that of all of these elements constituting a transducer, only the voice coil assembly is electrical in nature. The other parts are either mechanical or magnetic.

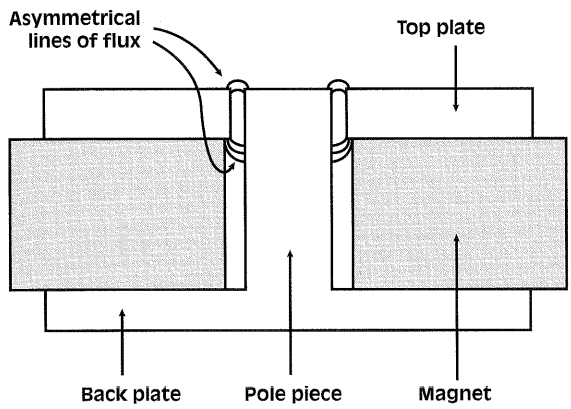
The magnet is essentially the heart of the entire magnetic structure and produces magnetic energy that is measured in gauss of flux. The magnet is encased within a magnetic return housing which forms the structural support for the entire magnetic assembly. This structure must be expremely rigid in order to maintain the critical tolerances of the entire assembly.



The Omega Series woofer is the best performing Watkins-woofer Infinity has ever made. Without being able to rely on the very costly Servo Feed-back systems found in more expensive Infinity loudspeakers, the Omega woofer, takes serveral novel approaches to Low-Distortion Low-Frequency Response.

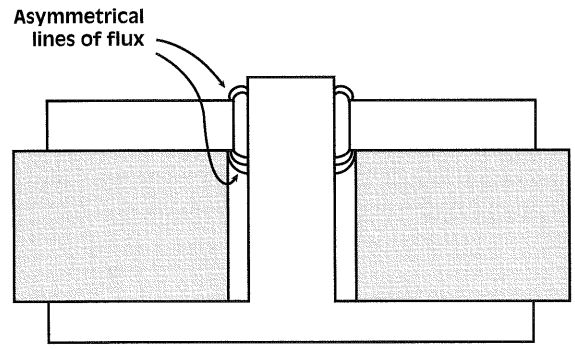
The magnetic assembly employed in Omega's Watkins woofer and midbass coupler is carefully designed and constructed with a symmetrical magnetic field gap which assures equal magnetic energy throughout the gap. If magnetic intensity is unequal, the voice coil, and subsequently the cone, will not move with precise linearity, thereby creating audible distortion. Many of today's drivers employ magnetic structures that develop uneven lines of flux below and above the top plate as shown in Figure 1.

Figure 1



The uneven lines shown in Figure 1. create an asymmetrical magnetic flux field which results in higher distortion. Both the Infinity/Watkins dual voice coil woofer and midbass coupler utilize an extended pole piece which creates symmetrical lines of flux in the magnetic gap as shown in Figure 2. This significantly lowers distortion.

Figure 2



The voice coil operates in the magnetic field generated between the top plate and pole piece, and a symmetrical flux field translates the voice coil's current into an up and down motion that is a close replica of the speaker's input signal. Obviously, closer adherence to the original signal results in less audible distortion which is readily identifiable in a high quality, totally transparent speaker.
In addition to the symmetrical magnetic flux field design, both cone drivers employ a special flux stabilization device which is located in the lower portion of the field. This stabilizes the magnetic field which further reduces distortion by as much as 10dB.
The woofer's dual winding voice coil is a refinement from former Watkins designs. The dual windings are wound on a fiberglass former (Quitex) which can handle a tremendous amount of current (heat) without deforming or charring. Both dual winding coils are now of the same length (32mm) which means they will not ride out of the gap even under long excursions of the cone. Voice coil length of the 6 1/2" midbass driver is 19 mm and both voice coils have a diameter of 51 mm which ensures high power handling and ruggedness.
The specific amount of overhang of the voice coil above and below of the pole piece of both drivers has been carefully determined to yield high sensitivity combined with lowest distortion. These performance elements must be adjusted optimally because there is a complex relationship between them. The wire used in both voice coils is copper which combines high electrical conductivity and relatively low mass.

The cone and its suspension

Several important design factors must be considered when formulating the shape and type of material of a cone. The cone must be sufficiently light so as not to compromise the driver's sensitivity. It must also be stiff enough to maintain its shape especially when travelling through large excursions. It must also be well- damped to minimize superfluous motion. Omega's cones were originally computer-engineered, then tested in real-time to determine their actual performance and sonic characteristics.
The cone material of Omega's two cone drivers is a kevlar and paper composite utilizing optimally selected pulp length. The material is manufactared under extremely high heat and pressure to maintain tight tolerances which are essential for high speed and proper damping.
Omega's Watkins dual voice coil woofer is a totally new design from its specially formulated cone to its frame. It was the opinion of Infinity's transducer engineers that design changes were required in every important performance parameter in order to achieve a major advance in sonic quality over former Watkins designs. To begin with, the frame is an aluminum die-casting rather than stamped steel and will, therefore, hold its precise structural integrity indefinitely. Aluminum does not absorb magnetic flux which directly influences the overall sensitivity of the driver which can be as much as 2dB higher than with a steel frame. Furthermore, since the die-cast frame is more inert than steel, ringing, a phenomenon caused by vibration, is diminished. This leads to cleaner, more articulate sound.
The flexible suspension system which supports the cone ensures high mechanical stability and accurate axial

movement; the spider compliance connects to the voice coil and the other end of the spider to the frame. the outer surround is R-35 butyl rubber which damps standing waves in the cone. The resistance of this material is carefully chosen because it directly influences frequency response, sensitivity, transient response as well as the suppression of self-resonance. Further damping material has been added to the outer surface of the cone to make it stiffer and less susceptible to cone breakup.

Infinity's exclusive Watkins woofer

Reproducing low frequencies at high sound levels requires moving an enormous amount of air, far more than most planar designs can deliver without breaking up. This means that a high output bass driver must employ a radical design. A standard shape for a low frequency driver diaphragm is a cone which is mechanically stable, strong and which can move more like a perfect piston even under long excursions. However, not all low frequency drivers (woofers) are alike. Having a huge magnetic structure does not necessarily mean that the woofer will perform properly within a given enclosure and it is for this reason that Infinity developed a special woofer which could attain efficiency and excellent low frequency characteristics within a moderately sized enclosure. The result was the radically simple, yet technologically advanced Watkins woofer.

Newton's third law, familiar to all beginning physics students, states that "F = M x A", or more simply put, Force equals Mass times Acceleration. This can be elaborated in speaker terms as follows: high frequencies require very rapid movement of the air in which the air molecules move very short distances. Low frequencies require slow movement of the air molecules, in which the molecules move long distances. High frequencies have shorter wavelengths than lower frequencies. Therefore, the high pitched whine of a mosquito requires infinitesimal power usage to vibrate the insect's tiny wings at high speed for very small distances. However, the tremendous "thrump" of a great steamship's propellers requires several hundred horsepower to move the giant blades. Similarly, in the ancient, hand-pumped cathedral organs, the rippling runs of high notes through the narrow, short pipes of the upper keyboard required only an occasional swing of the choirboy's arm to replenish the belows. But the ponderous swells of Bach's pedal C's through 32 foot pipes of huge diameter called for several boys to pump air with holy zeal.

Similarly, in an acoustic suspension speaker system (sealed box), increased base response (requiring more power to drive the woofer) has always been a corollary of decreased efficiency. Traditionally, in speaker design, if more effiency is desired in a system of given cabinet volume, bass response must be sacrificed. Conversely, to obtain more bass, it has always been necessary to sacrifice efficiency.

With the concept and realization of Infinity's dual voice coil Watkins woofer, it becomes possible for the first time to obtain high sound pressure levels of essentially flat low frequency response along with extension of bass combined with high efficiency. Furthermore, the Watkins design effectively reduces the reproduction of the undesirable enclosure resonant peak with its distorting effect upon bass response.

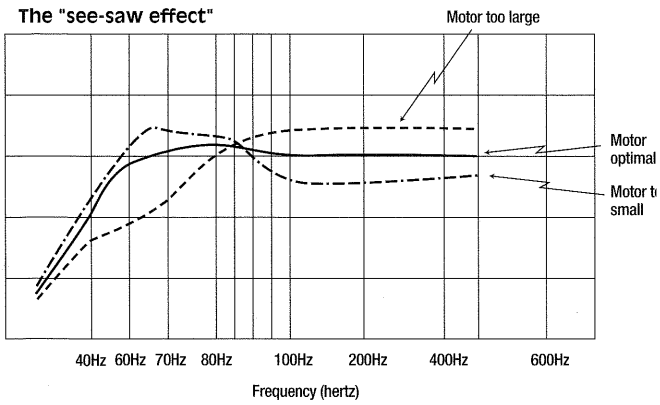
Low frequency response and Hoffman's Iron Law

For the past thirty or more years, such advances as acoustic suspension woofers, transmission lines, bass relex designs and a variety of new materials and processes have steadily improved power handling capabilities and midbass smoothness. Low bass frequency response, impulse response and distortion have not been significantly improved except with the use of accelerometer servo systems. Infinity was a pioneer in servo designs and developed a number of extremely successful speakers with this high technology system; however, servos are extremely expensive and therefore unfeasible in a moderately priced speaker system. Altering the geometry of the enclosure in a conventional, closed box system is not a workable solution either. "Hoffman's Iron Law" states that above 150 hertz the efficiency of a bass system, "E", is equal to the system's resonant frequency (fr) cubed and multiplied by the enclosure volume. Thus, $E = (F_R)^3 x$ enclosure volume. The relationship implies that to raise efficiency (lessen power demand) and still maintain flat frequency response, it is necessary either to raise the resonant frequency or to increase the enclosure's volume. Obviously, there are severe practical limits as to the size of the enclosure that most persons are willing to tolerate, and so this route is not acceptable in speakers for home use.

The other approach, increasing the flux density of the magnetic field to brute force response does not work, either, as shown in Figure 4.

Figure 4 shows what has been refered to as the "see-saw effect". If the motor is too small for a given speaker enclosure volume, efficiency is low and there is a bump in the bass frequency response. Conversely, if the motor is too large, efficiency is gained but bass response is reduced. This also points up the fallacy of assuming that a larger magnet will necessarily improve bass response in a speaker. As can be seen, desired efficiency and bass response are achieved only with a motor which balances the two opposing see-saw characteristics. Figure 4 shows that efficiency and bass frequency response are

Figure 4



clearly predetermined for a given size box and motor efficiency is dictated by this parameter. In other words, if more efficiency is desired, bass response must be sacrificed. Conversely, to obtain more bass, it is necessary to sacrifice efficiency. This fact is well known and understood and all high efficiency systems (other than horns employed in the bass range) have limited bass response, while those speakers with extended bass are of very low efficiency. This is an immutable law of physics. It will be seen by examining Figure 4 that for optimum bass response with none of the limitations imposed by "Hoffman's Iron Law", one needs varying motor strength. For good efficiency above resonance a large motor is required and for good bass efficiency a smaller motor is necessary. Must we repeal the laws of physics to accomplish this?

William Watkins faced this enigma in a brilliantly ingenious fashion. He realized that motor strength was equal to the product of the magnetic field strength of the magnet and the length of the coil contained within the magnetic field; that is:

Motor Strength = Bl, where

B = magnetic field strength

l = length of the coil in the magnetic field.

He then began to look at the Bl product in a different way. He reasoned that suppose l could be, in effect, varied with frequency in such a manner that a lower value Bl i one frequency range would not affect a higher value of Bl in another range and vice-versa. At this point, Watkins began to see clearly how to solve this enduring problem and how to embody it in a speaker system.

The Infinity/Watkins Dual- Drive Woofer

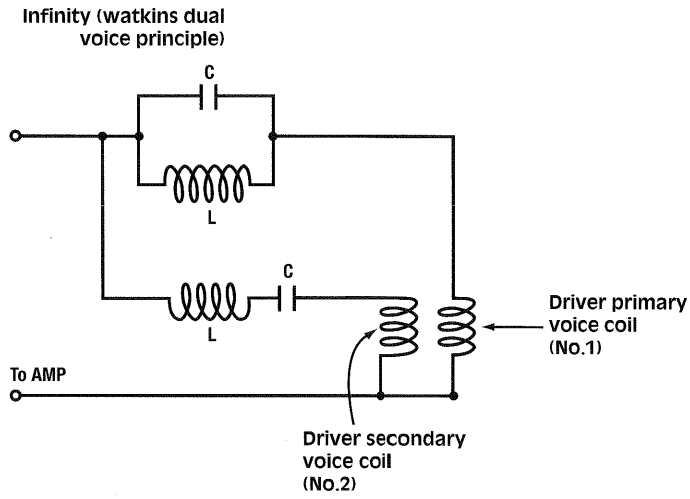
The actual mechanization of this principle is quite basic. A second voice coil is wound over the conventional voice coil and is driven by a series inductance-resistance-capacitance (LRC) resonant circuit which is adjusted to resonate at the fundamental resonant frequency of the woofer in the enclosure. In addition, it can be shown that if the main voice coil can be disconnected at resonance, a further increase in acoustic output occurs. This can be accomplished with a parallel LRC resonant circuit in series with the main voice coil.

The conclusion, then, is simple. With proper design of inductor L and capacitor C, the LRC circuit presents almost zero impedance one octave either side of resonance to remove effectively the secondary voice coil from the current. Furthermore, the parallel LRC circuit in series with the conventional voice coil removes it from the circuit at resonance. Therefore, instead of the usual large increase in impedance at resonance, the impedance will remain virtually constant throughout the entire bass region.

This unique woofer design simply uses the wattage that was present all of the time in a particular power amplifier, but was never being used in the bass range because the impedance barrier at resonance prevented it from being accepted. Refer to Figure 5.

What has been embodied in the Infinity/Watkins woofer is a revolutionary, yet simple, solution to the problem of

Figure 5



extracting bass frequencies from a box. The extraordinarily wide and linear frequency response, the almost perfect impulse response and the relatively high efficiency are truly remarkable. The listening experience takes on a new dimensional quality, a relaxed ease of overpowering low frequency energy, like live music itself.

Planar drivers: Superp transient response, low distortion, amazing clarity

Planar drivers are attractive to speaker designers because they potentially offer the closest approach to the theoretical ideal of a perfect acoustical piston. The practical difficulty in any driver is getting the diaphragm surface to move in absolute uniformity, so that all parts move linearly in the same direction, by the same amount, at the same time. Although not perfect, Infinity's planar drivers come very close to achieving this theoretical ideal. Infinity's breakthrough solution is to use two arrays of magnets, one on each side of the diaphragm, which have "like" poles facing each other. Because "like" poles repel, the opposing fringe fields are strongly compressed into a

powerful, uniform and linear field. To develop maximum performance from this design, Infinity engineers optimized the magnetic circuit and its field geometry using advanced computer modeling techniques. The advantages are simple to understand: The magnetic field in which the coil and diaphragm move is both strong and extremely uniform, yielding higher efficiency and far lower distortion. The high field strength and the resulting high motor strength mean that the diaphragm-to-magnet spacing can be large enough for the excursions required to generate very high acoustic output. Finally, the drivers can be made small enough to yield wide dispersion and outstanding overall acoustic power response.

While the solutions to the problems of the magnetic circuitry resulted in considerable performance gains, additional attention was paid to the construction of the laminated diaphragm/voice coil assembly. A planar diaphragm (and its voice coil) has to be under tension i order for it to have a zero signal resting point at the exact center of the magnetic field-- this assures full excursion capability in both directions of movement and fast restoration to center when the driving signals cease. Midrange (and high-frequency) diaphragms also must have extremely low mass in order to have high efficiency and quick acceleration under the drive of fast transient signals. For years, Infinity has employed a polymide film for the diaphragm base material of our planar driver designs. The polymide film offers excellent strength, very low mass, and extremely high dimensional and thermal stability when laminated to the voice coil (which becomes hot under high power drive conditions). Its strength makes it easy to work with in assembly operations and it also offers superb production consistency.

We have developed exclusive laminating techniques and procedures to work with extremely thin films of polymide, aluminum and adhesives. The intricate voice coil shape is etched from a full-surface aluminum film after its lamination to the other components. The adhesive layer which bonds the voice coil also is etchable. After etching, the adhesive remains only under the actual aluminum voice coil trace, which helps to reduce total mass. The voice coil trace and the adhesive together are only one-thousandth of an inch thick - and most of this thickness is in the aluminum trace to give the voice coil high current handling capability.

However, the issue that most concerned us was that of damping the laminate diaphragm structure to eliminate the standing waves that develop when the wavelength of reproduced sound is smaller than the dimensions of the diapragm surface. This phenomenon, known as modal break-up, is found in diaphragms of any shape. It is most audible in the diaphragms of large drivers such as midranges and woofers, because the frequencies of break-up in these drivers are in the most sensitive range of human hearing. The challenge was to find an adhesive damping material which would suppress the break-up without adding excessively to the mass of the diaphragm. It would make no sense to develop ultra-thin, light diaphragms only to give up the low-mass benefits by using a heavy damping material that would result in a diaphragm with the mass of a conventional material. After much searching, an isothermic damping material was found which meets the design objectives of low mass and high damping. In the final design, the damping layer, which is a pressure-sensitive adhesive, is layered between the 0.002" thick polymide base film and a second, much thinner layer of polymide which provides both a smooth outer working surface and additional strength to the final diaphragm. The complete laminate assembly, including the voice coil, is only 0.0043" thick, approximately one and a half times the thickness of a typical human hair. Together with the improvements in the magnetic circuit, this advanced diaphragm construction gives the new EMIM driver more than 12dB greater dynamic range than the previous Infinity EMIM design, as well as smoother response and wider bandwidth. These performance gains extend to the EMIT driver as well.

The construction of the new EMIT tweeter diaphragm is like that of the new EMIM driver and shares all of its sonic benefits. The EMIT's primary difference is in thickness-the complete EMIT diaphragm is a mere 0.0018" thick, less than half the thickness of the EMIM construction. This means that it also has less than half the mass, an element critical to the upper bandwidth of a tweeter's response.

The disadvantages of uncontrolled dipole radiation

OMEGA's EMIM and EMIT drivers place difficult constraints on enclosure design. Planar drivers are generally operated as dipole paners that freely radiate equally from front and rear. In order to prevent out- of-phase interference and cancellations, these panels are large, acting as their own baffles at upper midrange and tweeter frequencies. Since dipole drivers radiate equally 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 reflects off room surfaces, and then interferes with the direct sound. Even more significant are the cancellation effects that occur in the near field of the speaker. These near field cancellations, which are the result of the baffle cutoff effects and of reflections and diffractions, have a powerful negative effect on the quality of the direct sound reaching the listener.

The acoustic result of these direct and indirect phase cancellations is the creation of acoustic "comb" filters that cause manifold and serious deep notches in the frequency response of the speaker. The sound quality of uncontrolled dipole speakers is often promoted as having unusual "depth." In our experience, however, this depth is artificial; it is actually the result of amplitude variations caused by the comb filter action of the dipole radiation. Instruments and voices typically seem to move back and forth on the acoustic "stage" as they go up and down the scale, moving in and out of the amplitude notches of the comb filters. They literally fade in and out, creating a false sense of stage depth.

Ideally, we would like to completely absorb the rear wave of the planar drivers. Unfortunately, the low mass diaphragms of our planar designs, which are a huge benefit in generating accurate sound, also create difficulties. These ultra-thin, light diaphragms are essentially transparent to acoustic energy, which passes right through them. Even materials that are ordinarily considered absorptive can reflect considerable energy, especially at longer wavelengths. This means that any sound waves reflected from a rear enclosure or its filling, however weak, will enter the room as a source of phase distortion. Furthermore, a sealed enclosure can load or stress the diapragm, adding "stiffness" to the system which impairs its designed operation.

Rather than suffer 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 an integral part 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. Even with this advanced baffle design we discovered that cancellation effects were occurring in the lower midrange that adversely affected the uniformity of the total power response. One problem is the deep cancellation wells, or notches, at 0 and 180 degrees. the second problem is amplitude notching that occurs at approximately 800 hertz, at 90 degrees (the on- axis response), and is a side effect of the baffle cutoff frequency. Experimentation with partial absorption of the rear wave by use of long fingered foam proved that most of the dipole cancellations could be eliminated. At the same time, the front hemispheric response significantly improved in smoothness and extension, indicating improved acoustic power response... an extremely important parameter of high quality speaker design.

The crossover networks

The crossovers control the response characteristics of the drivers within their optimum operating frequency range while creating a seamless transition from driver to driver. All networks must be designed for minimum distortion combined with optimim phase linearity, low noise and low insertion loss. It is for this reason that Omega utilizes an acoustic fourth order Linkwitz- Riley network with 24dB per octave slopes. The advantages of this type of crossover are numerous.

- All drivers are wired in phase thereby preserving the harmonic structure of music and voice.
- Extremely rapid attenuation in each driver's stop bands minimizes the audibility of the breakup and other distortions originating at the ends of the driver's bandwidth.
- Each driver is attenuated 6dB at the crossover point producing a flat overall amplitude response. This reduces the power requirement to the drivers at crossover.

Each of the four crossover networks employed in Omega utilize components with heavy duty ratings and are capable of failsafe operating even under the most demanding and taxing conditions. Capacitors were chosen for their sonic quality as well as their reliability over extended periods of operation. Highest quality low-loss polypropylene capacitors are used in the signal path of the planar drivers along with precision, low distortion resistors to deliver spacious, super- detailed sound. High quality inductors (air core in the tweeter network) are precision wound for tight tolerance. All nonpolar

electrolytic capacitors (except in the woofer section) are bypassed with polypropylene capacitors in order to obtain smoother, clearly defined sound.
Design of the Omega crossover was researched by computer design, extensive measurements and by careful and constant listening. By designing the crossovers in real-time, the effects of phase, amplitude and reactive effects of the individual components were considered as they influence performance and most especially sonic quality. Each time the network was modified by changing even a single component, the system was subjected to a listening test to insure cohesiveness and that there was no deterioration in musicality.
The input terminals are gold- plated for long term resistance to corrosion and for the best possible contact with the speaker connecting wire. Two sets of terminals (normally bridged by a pair of heavy gold-plated straps) permit bi-amplification or bi-wiring. Also included on the rear panel are two low distortion switches which permit the user to adjust the treble and midrange to suit room acoustics. The EMIT-B tweeter can be adjusted with a three-position switch; center is flat response, up is 1dB boost and down is 1dB cut. The EMIM midrange can be adjusted with a two-position switch: center is flat and down is 1dB cut.

About Infinity: Over a Quarter Century of Sonic Excellence

Infinity Systems, Inc. was founded in 1968 from a passion for music, with a commitment to excellence and a drive to perfection. Its founders brought advanced aerospace technology and materials science to the task of building the finest possible loudspeakers.
The company's first product, the Servo Statik 1, was the world's first hybrid three-piece system, employing a servo-controlled subwoofer and a pair of electrostatic satellites. The Servo Statik immediately captured the attention of audiophiles and Infinity was on its way to creating an American tradition of breakthrough audio technologies.
Today, Infinity builds advanced audio products covering a wide range of audio applications, with advanced technology loudspeakers as a primary focus. Whether for audiophile grade stereophonic reproduction, high performance home theater, or high-quality, yet high-value smaller systems, Infinity's goals remain the same as they were at the company's founding - to extend the boundaries of the art and science of loudspeaker design and manufacturing.

The term "High End" and the name Infinity have become synonymous over the past 30 years in the audio world. Infinity Systems, founded with the breakthrough speaker, the Servo Statik One, has time and time again hit home runs with products that pushed the state of the art even farther than ever thought possible at the time of the company's founding.
The firm's secret has been its unswerving commitment and total dedication of resources to innovation at the highest levels of audio reproduction. Striving to achieve a theoretical ideal, innovation upon innovation has driven Infinity to the forefront of the audio community as an internationally leading manufacturer of the world's finest loudspeakers.

Infinity 250 Crossways Park Drive, 11797 Woodbury, NY, USA / Europe: Kongevejen 194B, DK-3460 Birkerød

design RASMUSSEN, G / Printed in Denmark by From & Co.