

light years  
ahead



HEIL  
amt 1

introducing  
the  
**ESS**  
amt 1

Threadbare though the word "revolution" has become, the ESS amt 1 loudspeaker marks a revolution in high fidelity reproduction through its incorporation of the Heil Air Motion Transformer, developed and perfected by Dr. Oskar Heil, of Heil Scientific Laboratories, Inc., over the last four and one half years. This exciting new device gives the ESS amt 1 the first authentically new approach to sound generation in fifty years. As an achievement, the ESS amt 1 leaps far forward in the pursuit of acoustic perfection, and it is so clearly superior to all other loudspeaker systems that no previous experience in high fidelity reproduction will have been adequate preparation for this revelation in sound delineation.

Because it uses an entirely new and singular moving system, the Heil Air Motion Transformer produces sound free from even the most subtle forms of distortion, distortion that robs music of its articulation and clarity, thereby creating listener fatigue, pain at high volumes, or coloration in the human voice. All forms of distortion are gone; not only the clipping distortion of high level demands, but the less immediately recognized motional errors that rob brasses of their "sheen," strings of their "guttiness," solo instruments of a natural "ease" and turn an orchestra of individual instruments into a homogenized sonic blur. Every detail of the recorded performance is revealed with a degree of purity never before achieved and completely beyond the ability of all other sound generating devices.

By utilizing the Heil Air Motion Transformer, the ESS amt 1 breaks completely with sound generating principles that stretch back, unchanged, to the earliest acoustic phonographs. From turn-of-the-century "talking machines" through today's most sophisticated component systems, the air pressures you hear as sound have been created by the direct push of a diaphragm surface moving forward and backward to get air motion. As the diaphragm surface works directly against the air its movement must be as great, and as rapid, as the required air movement—and this holds true for cones, electrostatic panels, piezoelectric crystals, traveling wave transducers and even ionized air devices that have an ionized cloud moving "forward and backward" just like a paper cone.

The Heil Air Motion Transformer, used as the mid and high frequency reproducer in the ESS amt 1, departs dramatically from this traditional concept of sound reproduction. By squeezing air instead of pushing it, it effectively creates *fives times* more air movement than the direct push of an equivalent flat surface and accelerates transducer design light years ahead. The Heil Air Motion Transformer has no "piston" surface, no voice coil, no elastic suspension devices, no significant mass, no "forward-backward" motion, no resonances, and is so light and simple that it carries a lifetime warranty. It surmounts all the motional and elastic restrictions inherent in conventional transducers and achieves a level of performance that finally approaches theoretical perfection.

## the need for the ESS amt 1

With the stunning improvements in recordings and electronics, the lack of significant improvement in loudspeaker drivers has become more and more apparent. Conventional cones and horn speakers have been produced since the turn-of-the-century, and electrostatics, supposedly new, were produced and sold in Germany in 1923. Listeners felt, and were right in feeling, that there must be a better way to generate sound than to push against air with a conventional "plunger" type loudspeaker motor.

In the conventional paper cone "plunger" speaker, the mass of the moving system is so great that it constantly struggles against its own immense inertia. Just as when starting to push a wheelbarrow full of mushy cement or trying to stop it once it gets rolling, the mass of these devices, at rest or once set in motion, makes precise starting or stopping impossible. As a result even the most compliant of these piston "plunger" speakers blur the sound to an extent now becoming fully realized. More importantly, because of their inability to recover rapidly once set in motion, they clip the tops off transients and thereby rob music of its dynamic range and hence its searing drama. Various attempts to overcome these deficiencies have led to cones at the end of "tubes," cones in sealed boxes, or multiple small cones. None of the "solutions" has had any significant effect in overcoming the inherent problem: too much mass and too little efficiency in transferring kinetic energy from the "plunger" to the air.

Electrostatic and ionic drivers have removed the mass of the moving system as a significant source of error, thus improving transient response through a more rapid recovery, but only at the price of releasing a Pandora's box of other limitations. The electrostatics are unreliable, have poor dispersion, cannot be played at high volumes, are costly, complex, inefficient and place difficult demands on an amplifier. The ionic tweeter has the added drawback of being able to produce only the extreme highs, while being inefficient and temperamental; moreover, it has this interesting feature: it consumes itself over a period of time.

Like the piston engine, the piston cone has endured because, until now, the alternatives have been complex, expensive, and even more inefficient and temperamental. Above all, no alternative has achieved sufficient sonic improvements to warrant the trouble. And yet the existence of these mechanisms even with all their problems and limitations, proves that the public wants greater fidelity in reproduced sound. Fidelity *surpassing* these devices and unhampered by limitations is now available with the revolutionary new ESS amt 1.

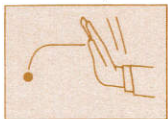
## the loudspeaker of the future — the ESS amt 1

Utilizing the newly perfected Heil Air Motion Transformer, developed by noted physicist, Dr. Oskar Heil, and manufactured under exclusive license by ESS, the amt 1 is the most advanced loudspeaker system available today.

The Heil Air Motion Transformer, around which the ESS amt 1 was designed, is a revolutionary new transducer that does not generate sound waves by pushing air with a piston "plunger." As dramatically different from vibrating cones and panels as the rotary is from the reciprocating piston engine, the Heil Air Motion Transformer takes advantage of previously unutilized laws of physics to produce air movement with a technique that approaches the ideal massless generation of sound.

Instead of trying to displace air molecules with the forward-backward motion of a flat or cone surface, the Heil Air Motion Transformer harnesses the power-purchase of a pneumatic "lever" and by applying small squeezing forces over a large surface area produces air movements *five times greater* than an equivalent "pushing" piston surface. And whereas the energy applied to a piston driver is used to push a cone that pushes the air, the Heil Air Motion Transformer squeezes air *directly*. As a result of this greater, more direct and near massless transfer of energy, the Heil Air Motion Transformer approaches instantaneous acceleration for flawless transients, has no "cone breakup" to create coloration, and shows distortion figures as fine as modern electronics to recreate the sharpest of images, the cleanest of attacks and the highest harmonics with a clarity and immediacy never before experienced.

To form a picture of the completely new technique by which the Heil Air Motion Transformer generates sound, imagine trying to set a cherry pit, a low mass object (air), into motion with a high mass object, the flat of your hand (cone and voice coil).

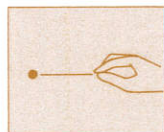


This is obviously a technique of low effectiveness because the great mass of your arm and hand relative to the small

mass of the cherry pit prevents rapid movement and results in a poor transfer of kinetic energy from your arm to the cherry pit. Result: the pit can never move faster than your hand pushes it. Moreover, when trying to accelerate your hand rapidly and stop it suddenly, the great inertial force created by the mass of your arm results in sluggish starts and overhanging stops. All the dynamic drama of music is removed.

And yet for all its shortcomings, this is the way sound has been reproduced since the acoustic phonograph. Now imagine placing

the cherry pit between your fingers and squeezing. The result: high effectiveness in the transfer of kinetic energy from your finger to the cherry pit, great movement of

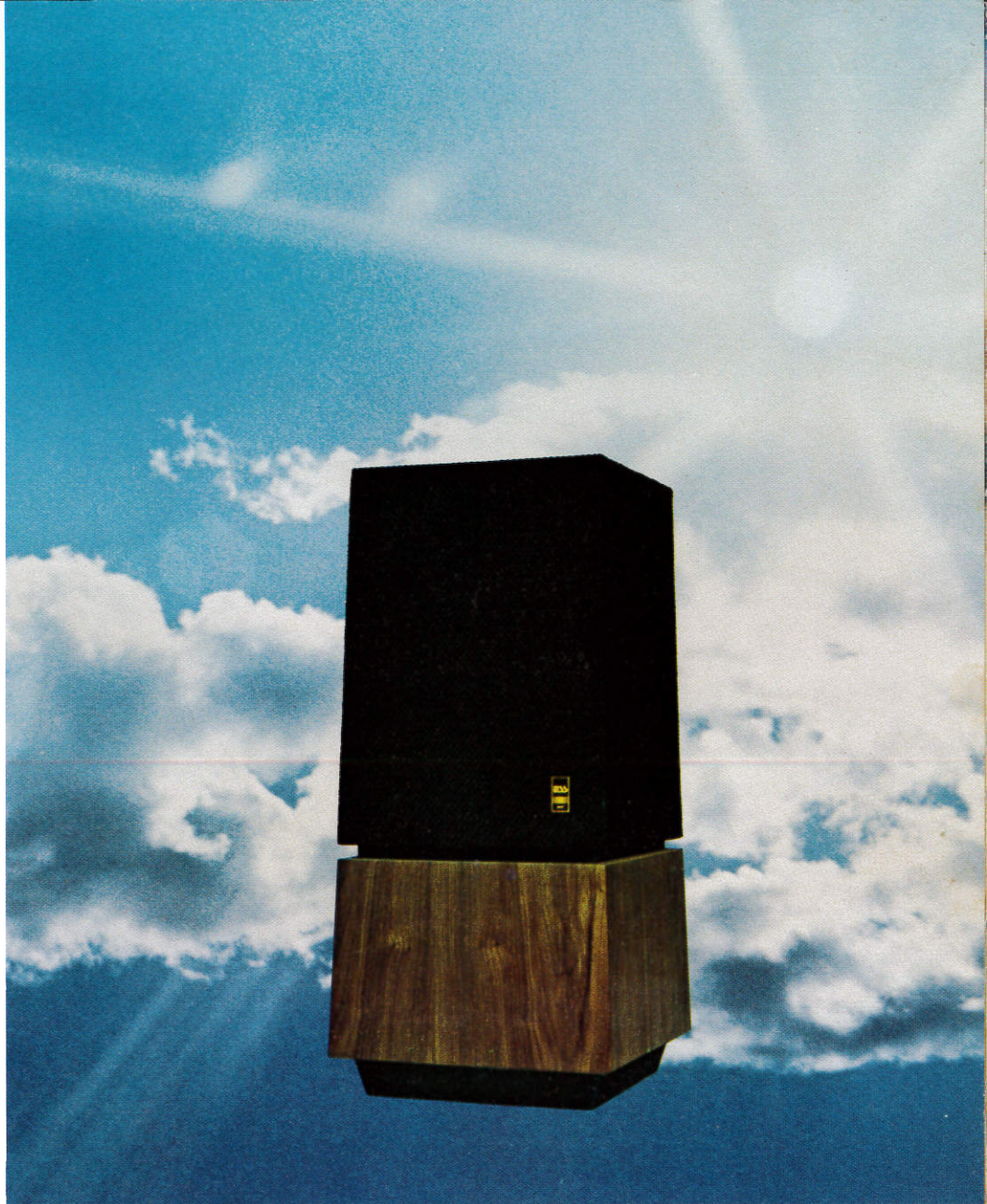


the cherry pit with a small but powerfully effective lever-like movement of only the tips of your fingers.

This analogy describes the ESS Heil Air Motion Transformer's principle. Sound is squeezed into the air instead of pushed toward it. A light small surface only .5 mil thick and made of a recently perfected plastic having enormously high internal molecular damping is formed into multiple interfacing cavities. The volume of these cavities alters in response to electromagnetic forces generated by a uniformly distributed conduction cortex and projects sound outward with an almost perfect transfer of kinetic energy. The entire moving system is only two inches by five inches and its mass is effectively equivalent to only *three-quarters of a linear inch* of air across its surface—by contrast a conventional cone mechanism is effectively equivalent to

one to three feet of air. This permits the moving system to react exactly with the input signal and results in an incredibly accurate conversion to sound waves, a conversion realized by the listener as vastly superior definition, clarity and spatial proportionality. Music is reproduced to scale with a distinctiveness to each individual timbre that marks the difference between merely satisfactory reproduction and sound as clear as light.

The ESS amt 1 combines the amazing Heil Air Motion Transformer with a newly developed ten inch woofer which has an oversize, deep-drawn frame assembly and a powerful magnet to permit exceptional excursions at the highest possible acceleration. The woofer is critically designed for clean, impactful low frequency response and exciting transient capabilities that precisely complement the open articulation of the Heil Air Motion Transformer. The ESS amt 1 triumphs over time and space by recreating in all its past, distant grandeur, every nuance of the original performance. Nothing we say, or can say, will adequately prepare you for the ESS amt 1's incredible new aural freedom, clean, clear and airy as light.





sound as clear as light

## ESS amt 1 specifications

### Description:

The ESS amt 1 is a two-way floor standing system of compact size. Frequencies above 600 Hz to beyond audibility are reproduced by a single Heil Air Motion Transformer unit, which is positioned for completely unhindered radiation in all directions. A newly developed ten inch woofer, mounted in a critically ported enclosure, reproduces the lower frequencies.

### Frequency Response:

±2db 45 Hz through 24,000 Hz as measured in a controlled field environment.

### Distortion:

Less than .5% at 90 db out at three feet distance for any frequency or combination of frequencies from 600 through 24,000 Hz. Less than 1% at 90 db out at any frequency or combination of frequencies from 80 Hz through 600 Hz.

### Square Wave Rise Time:

20 microseconds at 5,000 Hz.

### Power Requirements:

30 watts RMS minimum per channel.

### Power Handling:

Greater than 350 watt musical peaks without distortion. The system is fused against excessive current input.

### Input Impedance:

4 ohms minimum

### Finish:

Hand rubbed oiled walnut.

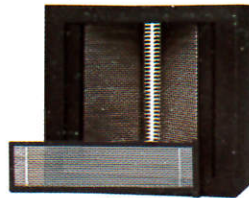
### Dimensions:

31 inches high, 14 1/4 inches wide, 14 1/4 inches deep.

### Warranty:

Lifetime warranty to original owner for the Heil Air Motion Transformer unit, five years for the remainder of the system. The warranty covers parts and labor.

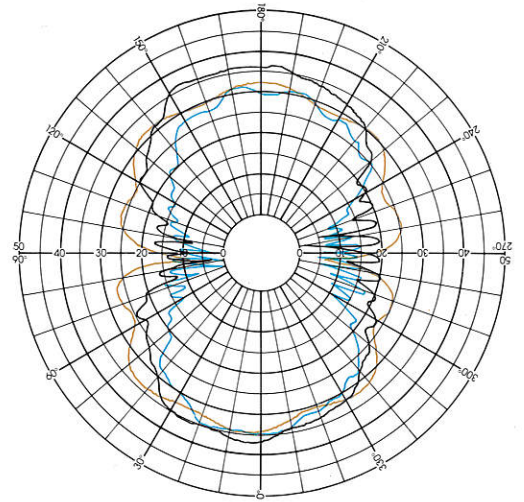
Design refinements may alter specifications without notice or obligation.



The Heil Air Motion Transformer diaphragm is made of close tolerance, specially formed folds in a light-weight, thin, self damping plastic.

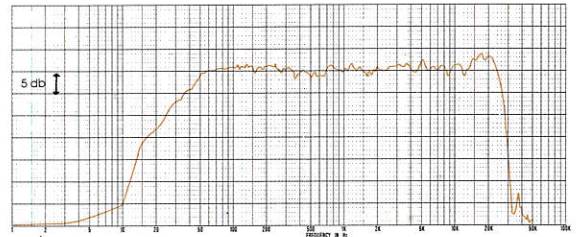


The ESS amt 1 with grill cap removed showing the butyl foam surround woofer and the freely radiating Heil Air Motion Transformer.



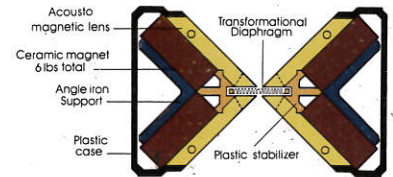
polar response at

4,000 Hz 16,000 Hz 20,000 Hz



typical room response of the ESS Heil amt 1

### cross sectional view of the Heil Air Motion Transformer



### wavefront formation

A curved wavefront (1,450 Hz shown) is produced by the carefully dimensioned grid laminations.



### diaphragm response and resulting air motion

