Infinity Systems

BY JIM HANNON

While today Infinity may be best known for its branded automotive-audio systems, in earlier times Infinity Systems was a name synonymous with pushing the edge of the envelope in high-end audio—most notably, in reference loudspeakers. Founded in California in 1968 by audio hobbyists Arnie Nudell and John Ulrick, a nuclear physicist and laser scientist from Litton Industries, and laser scientist Cary Christie, the company rose from its humble origins in Nudell's California garage to become one of high-end audio's most acclaimed and commercially successful brands.

From its founding until the time guiding light, President and Chief Designer Arnie Nudell left the company in late 1989, perhaps no other loudspeaker company enjoyed more pages of commentary in *The Absolute Sound* than Infinity. Its flagship loudspeakers served as references for several of TAS' reviewing staff—and for good reason. Infinity Systems' ambitious original mission was to bring the concert hall experience into the home as faithfully as possible, and the company broke new ground in its quest to achieve its ambitious mission.

During that era and for some time thereafter, Infinity produced a prodigious number of top-tier loudspeakers able to bring the dynamic range, power, and grandeur of a symphony orchestra, large jazz band, or concert-grand piano to the listening room. Several had an uncanny ability to elicit the incredible thrill one gets at a live concert. For example, no other loudspeaker I've had in my listening room has ever rivaled the sheer number of goosebumps and spine-tingling shivers produced by my Infinity IRS Betas (although my Infinity IRS 1As and 1Bs produced their fair share of them).

Infinity's multi-talented design team produced a startling number of industry innovations, including a ground-breaking servo-controlled, separately-enclosed woofer system designed by Nudell and Ulrick for the legendary Servo-Statik; the use of rare-earth magnets in loudspeaker drivers; and a family of electromagnetically-driven push/pull planar drivers. Infinity also developed an impressive array of "other" advanced products including the reference Black Widow tonearms designed by co-founder Cary Christie; an innovative Class D switching amplifier designed by co-founder John Ulrick; a wonderful Hybrid Class A amplifier designed by Bascom King; and many more.

One of the keys to Infinity's commercial success was its ability to skillfully migrate elements of its reference technology down to much more affordable designs. For example, the EMIT tweeter used in the Infinity Reference System, a long-standing reference in TAS founder Harry Pearson's listening room, could be found in speakers such as the Infinity 1001 and the POS, retailing for $219 and $125 per pair respectively. Its EMIM midrange not only was found in the IRS, but also in its Reference Series (RS-1, RS-2, RS-4.5, RS-2.5), its Beta and Epsilon speakers, their derivatives (Gamma, Delta, Sigma), and others.

Acquired by Harman International in 1983, Infinity is currently focused on automotive and marine audio systems, as well as affordable home-theater loudspeakers. Given the plethora of products offered since Infinity's founding, this profile will focus on the company's earlier years when Arnie Nudell was at the helm and Infinity's products significantly helped advance the state of the audio arts.

Arnie Nudell

The Interview

What were you doing before you decided to start Infinity Systems, and what prompted you to start your own company?

I was developing the Servo-Statik 1 on my own time late at night for two-and-a-half years with John Ulrick while we were working at Litton Industries, running the laser lab there. Because of my keen interest in music and audio, I wanted to do something better and felt that what was out there didn't really represent music as I heard it. At Litton, we were working with inertial navigation systems with many servo systems to correct for errors, and we wondered if we could apply this technology to reproduce better sound.

My bass reference was a modified four-thirds Klipschorn with a 15-inch woofer I substituted for its 12-inch one. It didn't reach below about 35Hz or 32Hz, but I knew that if I could get an octave lower than that, with low distortion, it would add a lot to the music. We initially developed the servo-bass system to see if we could do it, and our simple servo system worked extremely well with distortion quite a bit lower than my big Klipschorn. We decided to cut it off at 16Hz, because there was too much woofer travel below that. The germ of our idea really came to fruition at that time.

But we knew that we had to have other pieces that would be as revealing as that servo-bass system was. The only design that we thought would have possibilities to mate successfully with it was some modified form of an electrostatic transducer, due to its low distortion and fast rise-time. Because high frequencies start to beam much more as the transducer gets larger, we designed a thin strip of electrostatic tweeters, in conjunction with the electrostatic driver company RTR, that was about a meter long. It had very good dispersion because it wasn't wide, and it didn't beam sound at you.

Was that your original vision for Infinity Systems?

My original vision for Infinity was to replicate the dynamic range of a full orchestra, and since I went to so many orchestral concerts, I knew at the time that nobody was even remotely close. The dynamic range of certain particular instruments, like the piano, is also enormous, and that was something that I really wanted to replicate, too.

You have an impressive background in nuclear physics and music. How were you able to bring those diverse elements together into your work in loudspeaker design?

Well, I think my extensive physics training gave me a good understanding of acoustics, but what really drove me was the music. I had an unusual ability to recognize what an instrument really sounded like, and when I heard an instrument reproduced by an audio system I could tell immediately if the reproduction was accurate. Now, obviously the clarinet was the easiest because I played it, but if I heard a violin on an audio system, I would still immediately know if the harmonics or the dynamics were wrong. That gave me a tremendous advantage, because when I started to put together the Servo-Statik and other loudspeakers, I knew what I was looking for, and I didn't stop until I got as close as I could.

Introducing the Infinity Servo-Statik as your first product sounds like a risky proposition. Did you have any doubts about the financial viability of a company committed to pushing the limits of the state of the art?

Oh, it was terribly risky. I was 30 years old at that time (1968), and was well-established as a physicist. I did a lot of things in lasers and then in aerospace and I thought, what am I doing? So yes, I had a lot of trepidation, but I've never been afraid of taking chances with reasonable probabilities going for them.

But it wasn't just a blind jump into the company. We made a number of the Servo-Statiks and gave them to a dealer in Woodland Hills, where Litton Industries was located. We played it for him and he said, "How many can you make of those?" And I said, "Well, not very many, but before you get too excited, let me tell you how much it's going to cost retail." He says, "I don't care." I said, "It's going to cost the same as a Volkswagen Bug, $2000." He said, "I'll sell more than you can make." So I said, "Okay."

We gave him a pair for a demonstration, and true enough, he sold them much faster than we could make them, and said, "None of my high-end customers have ever heard anything like this before." And they immediately bought it. Some of them put a mortgage on their house to buy it. I couldn't believe it! So when we were offered the chance of going into business, it wasn't as risky in the sense that we might've thought because we did have some feedback that was reassuring.

How were you able to attract such an impressive array of talent, besides yourself, to the company?

To me the greatest assets of a company are its people. At Infinity, we had such an excellent cast of people who really knew their stuff and worked extremely hard, and believe me, a lot of the success of that company was due to them. For example, the third guy in Infinity was Cary Christie, and Cary came in with a wide variety of talents. We didn't even know about all of them, but when we had to make a whole bunch of these Servo-Statiks for Woodland Stereo, he made them all by hand using Brazilian rosewood. He had many other talents, too, was technically very astute, understood what we were trying to achieve, and loved music—a great combination!

Why did you abandon the electrostatic midrange and tweeter elements from the Servo-Statik 1A in your subsequent loudspeaker designs? Was it because they were voltage-driven and subject to breakdown?

Yes, and as much as we refined the electrostatic, we could tell theoretically and practically that we weren't going to be able to replicate the full dynamic range of a piano or an orchestra. I realized we had to make a magnetic analog of the electrostatic by using a thin-film diaphragm, a very light voice coil, with magnets on either side to make it push-pull to lower the distortion.

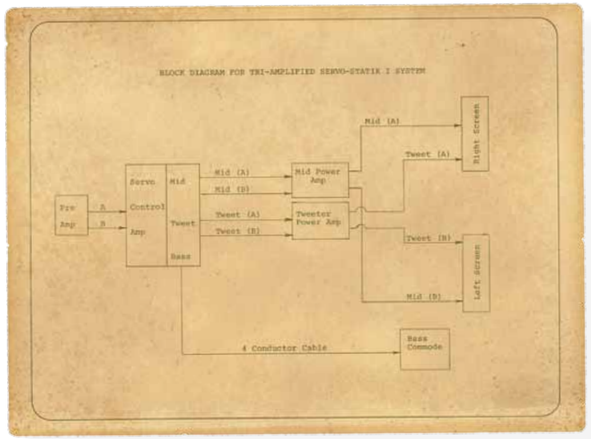
What's the story behind the development of the EMIT and then subsequently the family of larger electromagnetic drivers, like the EMIM and L-EMIM?

The key to all of those electromagnetic drivers was finding a magnet that was small and had incredible power. There was nothing like that at the time. Fortunately, I was in Germany showing off the Servo-Statik, and I was sitting in a restaurant and picked up a magazine. I noticed there was an article by an eye doctor talking about this disease where people cannot keep their eyes open because the muscles don't work. Samarium-cobalt magnets had just come out, and what this doctor did was take a small piece of samarium-cobalt, implanted it into the eyelid, and a tiny one into the brow, and the patient could then just open his eye and it would stay open. I wrote down "samarium-cobalt" and when I got home, I found out that there was a Japanese company just beginning to make samarium-cobalt magnets, so I flew to the factory and when they told me the Gauss levels that could be achieved with these magnets, I flipped. I said, "This might be the answer!" We believe we were the first people to use rare-earth magnets in our speakers, and we made the EMIT tweeter. Then we went from the EMIT to a bigger midrange driver called the EMIM using the same kind of push-pull technology.

Top: Nudell's garage was the initial Servo-Statik development center.

Bottom: The early Infinity Systems team in 1970. Co-founders Cary Christie, John Ulrick, and Arnie Nudell are in first row.

Previous page: The Infinity IRS Beta. (All images pages 63–74 courtesy of Harman, except where otherwise credited.)



With the IRS Beta we made an even larger driver with a low-mass diaphragm called the Large-EMIM, and we used two of those in each screen of the IRS Betas. We were making a lot of speakers with just the EMIM, and you could coax the EMIM to get down to around 100Hz if you used a lot of them, like the IRS, but if you wanted to use fewer of them, there wasn't any way. The L-EMIM enabled us to make a more viable speaker which more people could buy, using only one regular-sized EMIM and four EMIT tweeters. The Beta was one of the most successful expensive speakers we ever built. When people got word that we were going to make such a speaker in Brazilian rosewood, like the IRS, we had 300 pairs on order. I couldn't imagine it!

Infinity Systems was known for migrating technology from its reference products down to more accessible price points. Was this the original business model you had for the company?
It was certainly not the original business model, because initially we had no business model. As the company started to grow, we began to get the idea that maybe if we could take some of our technology, whatever it was at the time, it would elevate people's music listening pleasure, and that's how we came upon that business model. We actually used the EMIT tweeter in speakers around 150 bucks or 200 bucks a pair, and we couldn't make them fast enough. Our company became huge, much bigger than I ever envisioned or even wanted it to be.

Was the original IRS, introduced a decade or so after the Servo-Statik 1, another deliberate attempt to design the world's very best loudspeaker system?
That's right! It was another case of having all the elements at our disposal at that time to create such a system. A line source is the best way of getting rid of your room nodes so we knew it had to be about seven-and-a-half feet tall, and we also knew that with the multiplicity of drivers that we used we could finally reproduce the full dynamics of a symphony orchestra or a piano. Nothing before that did it! The IRS could do it, and with reliability. With such a large dipole, you didn't get a ceiling bounce or a floor bounce, and the radiation on the side of the speaker was close to zero. That meant that you could use an IRS in a smaller room if you could accommodate the size of it. A number of people, some of whom I think you know, had them in a small room.

You priced the IRS at what seemed like an astronomical amount in its day. Did you help make it acceptable for people to pay more for loudspeakers than their cars?
We didn't know that the IRSs would sell as well as they did, because they were incredibly expensive. You know, I complain a lot when I see the prices of speakers and equipment and I just shake my head and say, "How can all these companies charge that much for these speakers and these components?" And then I stop and sigh and say, "Yeah, but I started it!" The original IRS was ridiculous. I think it started out at 25 grand, and the IRS V ended up costing 80 or 90 grand. Nobody had products that expensive at the time.

So the IRS was not only a critical success but also successful commercially?
Yes. It was initially going to be a show-off item to demonstrate that that this huge dipole could do certain things that maybe hadn't been done before. I'll never forget the first demonstration we had of the IRS. We had a pretty large room at CES in Chicago, downstairs in the basement, and we talked Tom Stockham of Soundstream and Keith Johnson of Reference Recordings into bringing their tape machines and master tapes. We wanted to make sure that the deck was stacked in our favor when we demonstrated the speaker. We actually also got the room next to us, because we knew we were going to kill people otherwise with the big woofer power, and Tom Stockham playing his *1812 Overture*.

The interesting thing about that show was that we had a lot of people lining up to listen to the IRS. Once the word got out, the line was two hours long and went around the building. We knew then we had something! The show was a great marketing tool, and the speaker became a big financial success. We shipped the IRS all over the world.

Top: Infinity Systems produced innovative non-speaker components, too, like its DSP Switching Amplifier, designed by John Ulrick.

Bottom: Block diagram for tri-amplified Servo-Statik 1 System.

How else did you innovate on the business side?
We developed a cadre of really high-end dealers and two reasonably high-end audio chains, and that was our distribution. We stayed away from Circuit City, and though I got a lot of pressure from Harman to take them on, I just totally declined. I was also very scrupulous about our profitability. That was very important, because we spent a lot of money on R&D in all kinds of directions, not only on speakers. In order to spend those kinds of funds on R&D, you have to be a very profitable company, and Infinity was.

Didn't Infinity move into car speakers during your tenure there?
Yes, we developed a line of car speakers that were in every Chrysler product. We were part of Harman International, so it must've been in '83, and we got a group of people from JBL and Infinity to talk to both Ford and Chrysler, because Bose had General Motors, and they thumped everybody, so we decided that one of us was going for Chrysler and one of us was going for Ford. Both Chrysler and Ford clearly knew that GM's profitability was very high on Bose's audio system, but it was still a difficult sell. Infinity shipped an enormous number of audio systems that were installed in all of the Chryslers, and car stereo is the lion's share of Harman's business today.

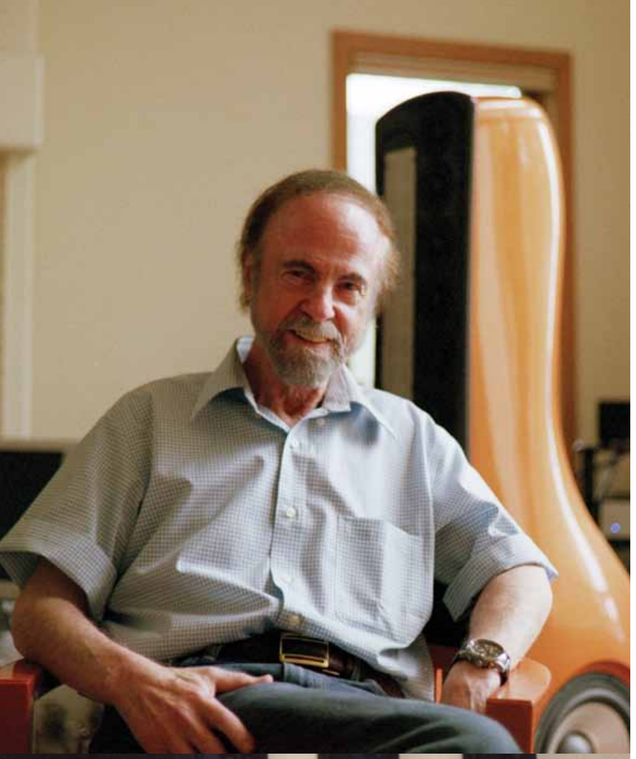
Top left: Christie and Nudell hold the smallest speaker in the RS series with EMIT driver in front of the imposing IRS with a slew of EMITs.

Top right: Infinity's IRS flagship loudspeaker clearly demonstrated the significant advantages of a full-sized line-source.

Bottom: The IRS Beta added two large EMIM drivers per side so only one standard EMIM midrange driver was needed in each.

Taking a step back, what do you think were the biggest game-changing events for Infinity?
A major game-changing event was when we sold our company to Harman International in 1983. Several years earlier we had been purchased in part by EAD, which already owned KLH. We did it as an earn-out because John, Cary, and I had tremendous confidence in what we were doing, and we could make a lot more money for the company and for ourselves. But we were growing too fast for EAD, and I recommended Harman International. As part of the original agreement we were absolutely a separate division with our own facility, and Harman left us alone for a long time.

Before Harman, some of the reviews that we received over the years were game-changers. The most stunning was on the Servo-Statik 1 in *High Fidelity* magazine, which used CBS Labs to measure all of the speakers it received. With great trepidation I sent the Servo-Statik I to CBS Labs. The upshot of it was that the Servo-Statik 1 measured ±3.5dB from below 25Hz to 20kHz, and no other speaker that CBS Labs ever measured subsequently even came close to that. That was mindboggling and a real milestone for us.



How do you think The Absolute Sound *contributed to or limited your success?*
Well, to be honest, Harry Pearson was the most critical reviewer I've ever come across, and for that reason I really loved him, because he could pick out things in our products that we weren't even aware of, and what he did was make our products a lot better. At times I thought he was overly picayune, but many times he picked out weaknesses that we later fixed. The reviews that Harry Pearson gave us on most of our products were incredible, and helped us a great deal, but Harry personally also helped us a great deal. His quest in music listening was like mine. He's a concert-goer, and he wanted to have the dynamic range, the low distortion, and the imaging grandeur. He made us much more aware of two-speaker imaging and started a new movement.

Was that with the QRS-Tympani 1D? How did you feel when he said, "If you combine this Infinity piece with this Magneplanar piece, you can have an even better system!"
Initially I hated it! I called him words that I can't repeat in this interview, but on the other hand, I started to look into what he was talking about. It made a lot of our subsequent speakers a lot better, but initially I did hate it. I guess when you have so much pride in your own product, and then something like this occurs, it's quite a shock to your system, but in the long run it was a good thing.

What current high-end audio products most impress you today?
While I haven't heard everything, two products really stand out in my mind because they're able to convey the musicality and emotion of a live concert. The first is the new Modwright-modified Oppo BDP-105 universal disc player. With the right program materials and the innovative use of vacuum tubes in the analog section, and a full vacuum tube power supply, it does as good a job as any source I've ever heard. It's truly remarkable! Second are the amplifiers from Constellation Audio designed by Bascom King. They are genuine breakthroughs in solid-state design and don't use conventional transistors. They're just as good as the big tube amplifiers I use as my reference, and that's saying something for solid-state electronics. Bascom is like Giuseppe Verdi, doing some of his greatest work in his later years.

Are you currently working on any new designs? Can we expect to see some new products from you?
That's a big question mark. Yes, I do have a new design in my living room which I think sounds better than anything I've ever made. The reason it's not on the market is because the idea of getting it into production and starting a company again is not something first on my list. It's only about five feet tall, and it can play as loud as the IRS V, and it uses a very interesting ribbon midrange, and of course the ribbon tweeters. The whole speaker is a dipole and it has a brand-new servo-system.

You've had so many achievements. When you look back over your body of work, what are you most proud of?
Frankly I'm most proud of providing a wonderful musical experience to a lot of people who bought our products. People often tell me how much they love our speakers, and that gives me the warmest feeling. tas

Top: Arnie today with his new IRS-killer design. (Photo courtesy of Arnie Nudell.)

Bottom: Cary Christie with his new Artison cube subwoofer and flat speakers. (Photo courtesy of Cary Christie.)

ICONIC PRODUCT
Servo-Statik 1/1A

The Servo-Statik, introduced in 1968 at $1795, was the first in a long line of Infinity reference loudspeakers that helped capture the power, frequency extension, and dynamic range of a full symphony orchestra. It was arguably the most ambitious first product the high-end industry had previously seen. Litton laser-physicist Arnie Nudell and electronics engineer John Ulrick began work on the SS1 in 1965 during their off-hours, and enlisted mechanical engineer Cary Christie to build the enclosures. Nudell and Ulrich applied their knowledge of servos to correct for errors in laser-guidance systems in the SS1's design, making it the first speaker system to incorporate a bass amplifier/crossover unit mated with a separately enclosed, custom, servo-controlled 18" woofer, electronically cut off at 16Hz. The two-midrange/tweeter screens employed narrow, vertically-mounted electrostatic tweeter arrays from RTR flanked by angled midrange drivers from Infinity. One additional high-quality power amplifier was required to separately drive the midrange and tweeter electrostatic arrays via the crossover unit.

The $1795 SS1 contended for reference supremacy, and its innovative servo-controlled woofer system was reportedly used successfully as an $800 powered-subwoofer option with the KLH Nines, among others. The SS1's "commode," as it was called, could be separately located where it sounded and blended best with the main speakers. It's fair to say that bass with this kind of extension and power had never been "felt" before in a commercial system, and CBS Labs measured the SS1's "remarkable" response from below 25Hz to 20kHz within plus or minus 3.5dB. Better still, the clarity and immediacy of the midrange/tweeter screens were astounding when everything was working properly. Regrettably, the voltage-driven electrostatic screens had some reliability issues.

The SS1 was replaced a few years later by the larger, floorstanding $4000 Servo-Statik 1A, using more electrostatic arrays per channel and a higher-power bass amplifier. The SS1A quickly earned the highest rating among speaker systems in TAS in 1975–76, and was praised by Patrick H. Donleycott for its "top to bottom range, balance, and realism." HP added: "Sonically, it stands above and slightly beyond any commercially manufactured loudspeaker system produced in this country."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Infinity in *The Absolute Sound*

Servo-Statik 1A

"These speakers are—first, last, and in between—the product of someone who knows, perhaps intuitively, how to significantly reduce the colorations and distortions common to most speaker systems, and reduce them by a degree that does entitle this system to the coveted state-of-the-art designation."—Harry Pearson, Volume 2, Number 7, Winter 1975-1976

QLS-1

"When it comes to imaging, depth, and the relative stability of the musical field that is presented by a stereo speaker system, the QLS is without equal."—Patrick H. Donleycott, Issue 10, Summer 1977

Quantum Reference Standard (QRS)

"This is a speaker that is destined to become my new and, I believe, long-term reference."—Patrick H. Donleycott, Issue 12, Late Spring 1978

"Let me say this: From the lower midrange (about 200Hz) on up to the top octave (around 14kHz), the QRS renders orchestral harmonics more neutrally than anything else I've heard, electrostatics included."—Harry Pearson, Issue 12, Late Spring 1978

QRS/Magnepan Tympani 1-D Hybrid

"But, as it stands, the QRS-1D has dynamic range, clarity, low distortion, the lowest coloration of any commercially (un)available speaker system, and the best imaging of any system on the market. Its virtues are formidable; its faults, at this stage in our mutual audio development, seemingly minuscule."—Harry Pearson, Issue 13, Summer 1978

The Infinity Reference Standard (IRS)

"What makes the IRS special, even outstanding, is that it does have the resolving capability to make small differences loom large in the trained ear. And it is in this area of its performance where the speaker is incontestably the best. In a word, it is a landmark achievement, and, one trusts, a gateway to the future."—Harry Pearson, Issue 20, December 1980

IRS Series V

"Here, for the first time, we have a truly full-range speaker whose lack of coloration begins to approach that of the best electronics. The speaker can recreate a nearly perfect soundstage. It is a good design that, thanks to patient refinements, has become, at last, a great one."—Harry Pearson, Issue 49, Fall 1987

IRS Beta

"It is an outstanding speaker, a truly high-definition system that authentically retains many crucial dimensions of the live experience. On an overall basis it is a state-of-the-art offering in many respects, and is unquestionably one of the finest speaker systems ever designed."—John Nork, Issue 53, May/June 1988

ICONIC PRODUCT
The Infinity Reference Standard (IRS)

Like Infinity's previous flagship loudspeakers, the goal of Infinity's formidable seven-foot-six-inches-tall, four-tower Infinity Reference Standard was to reduce "the musical distance between the live performance and its reproduced illusion." Its sole design objective was to "achieve the world's highest level of musical accuracy, and to develop the new technology needed to attain that objective." Originally designed as a statement of what could be achieved by a large line-source dipole without any design compromises, the IRS achieved surprising commercial success, and served as HP's long-time reference, ultimately replaced by Nudell's own Genesis I loudspeaker system. That alone should be enough for the IRS to attain iconic status!

Each of its two woofer towers had six 12" polypropylene woofers driven by its own specially designed 1500-watt-per-channel servo amplifier. The servo woofer system combined a military-grade accelerometer with an instantaneous feedback loop to constrain the woofers to obey the corrected servo signal, thus producing low distortion and greater bass extension. Its two midrange/tweeter towers each contained 24 front-facing and 12 rear-facing EMITs, and 12 of Infinity's new midrange electromagnetic induction drivers (EMIMs). The beautiful rosewood cabinet wings of the tweeter/midrange towers, custom built by a shipbuilder, were precisely curved to minimize diffraction, sand-filled to dampen vibration, and required separate, user-supplied amplification. The system's awesome frequency response was rated from 16Hz to 40kHz within plus or minus 2dB.

The IRS evolved throughout its history culminating in the IRS V (there was no IRS IV), most notably with driver improvements resulting in fewer colorations, greater transparency, and more clearly defined low-level details. It also included a 2000Wpc servo amplifier, among other enhancements. In its final iteration, this IRS achieved greater coherency between its powerful bass drivers and nimble electromagnetic induction ones, producing a more seamless transition between them. The IRS V was "a dream realized and a dream for this listener," said HP.

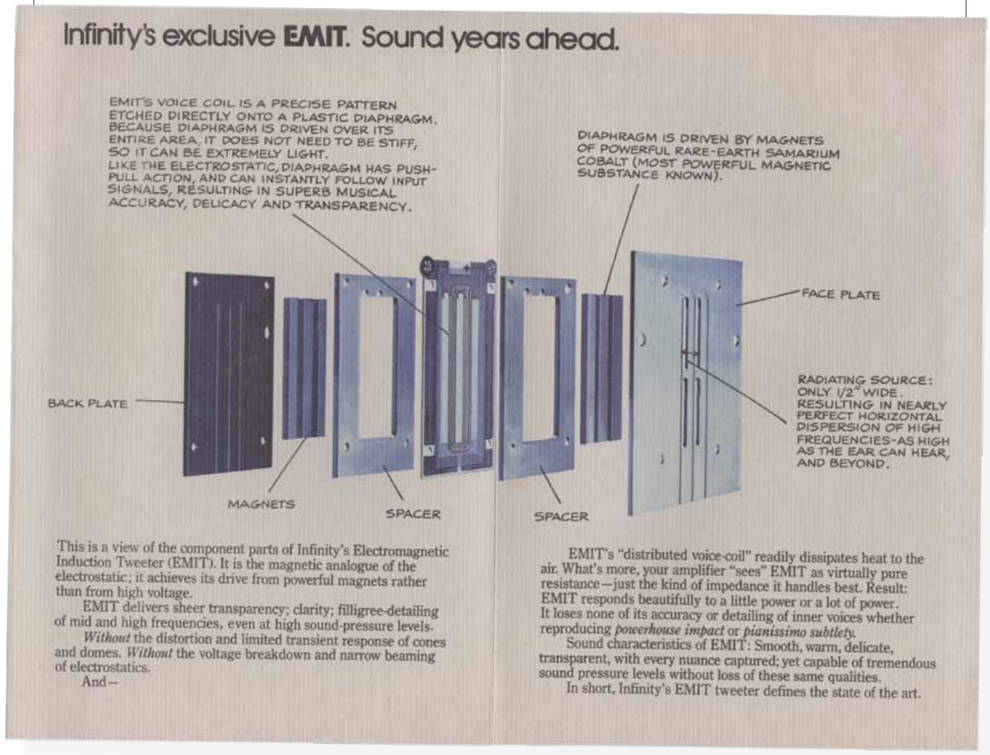
TECH FOCUS

Infinity Electromagnetic Induction Drivers

The voltage-driven electrostatic tweeter in Infinity's Servo-Statik 1/1A was deficient in reliability and dynamic range. Consequently, Infinity developed a remarkable current-driven quasi-ribbon driver that thrived on high power and wide dynamics: the Electromagnetic Induction Tweeter (EMIT). This planar tweeter worked on the principle of magnetic repulsion via a thin diaphragm with a tiny etched voice coil on its surface suspended between two very powerful rare-earth magnets.

Surprisingly, the EMIT was initially designed by Infinity for its sister-company at the time, KLH, but Infinity subsequently introduced its own EMIT with wider dispersion and greater power handling, using eight of them per side in its Quantum Line Source (QLS) loudspeaker. The EMIT was able to reproduce frequencies up to 45kHz with high efficiency, lightning-fast transient speed, and low distortion. The magnets were made from samarium cobalt, previously used in Europe in the medical field, and later neodymium.

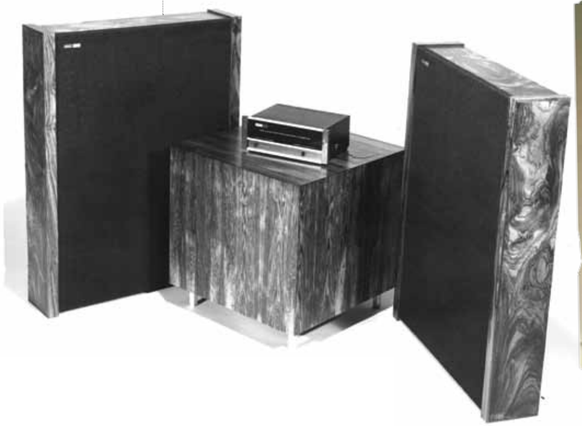
As Infinity evolved this technology it was able to produce larger quasi-ribbon drivers such as the EMIM midrange used in the IRS and RS series, among others, and my favorite, the L-EMIN midbass unit, used originally in the IRS Beta/Gamma/Delta and later Epsilon-series loudspeakers. As Infinity reduced the mass of the diaphragms of the EMIT and EMIM they became less colored, cleaner, and more transparent, with greater definition and transient speed, and led to the creation of the EMIT-R radial tweeter and the SEMIT super tweeter. One of the keys to Infinity's phenomenal commercial success was its ability to use these electromagnetic induction drivers not only in its flagship loudspeakers, but also in its more affordable ones.



The Infinity Timeline

1965 — Two Litton laser scientists, Arnie Nudell and John Ulrick, begin work on the Servo-Statik I in their spare time in Nudell's Chatsworth, CA garage.

1968 — Nudell, Ulrick, and mechanical engineer Cary Christie found Infinity Systems, introducing the Servo-Statik I, a breakthrough hybrid electrostatic speaker with the first servo-controlled woofer system.



1970 — The smaller and less expensive 2000A with dipole electrostatic tweeters, cone midrange, and transmission line woofer is launched.

1971 — Infinity debuts an improved flagship, the Servo-Statik 1A, with larger tweeter arrays.

1973 — The WTLC, a small, transmission-line speaker with omni-directional Walsh tweeter, is introduced.

1975 — Creative tension between Nudell and Harry Pearson drives product refinements.

1976 — Infinity launches a digital DSP switching amplifier and FET preamplifier, designed by co-founder John Ulrick.

1976 — Infinity introduces its Quantum Series sporting EMIT tweeters and Watkins woofers.

1977 — Infinity's low-cost Qa mates an EMIT with a polypropylene Q-woofer for $139.

1978 — Second version of the Black Widow replaces the original's aluminum armtube with a low-mass, carbon fiber one. It becomes an inexpensive reference tonearm.

1978 — Infinitesimal 0.1 is introduced at $300/pair with EMIT and 5" Infinity/Watkins Dual-Drive Woofer.

1979 — RS4.5 and RS2.5 are the first speakers with EMIM midranges, combined with EMITs and Watkins polypropylene woofers.

1980 — 1st IRS speaker system introduced along with RS-1. Both become TAS reviewer references.

1983 — Infinity acquired by Harman International.

1987 — Chrysler offers Infinity Gold Sound System for its Jeep line.

1987 — IRS V launched at $60,000—the last and best in this series. IRS Beta introduced with the first L-EMIM mid/bass drivers plus injection-molded graphite-cone woofers..

1989 — Co-founder and chief loudspeaker designer Arnie Nudell resigns.

1991 — Renaissance series with "high energy" EMITs and EMIMs are introduced. Significantly, these were not dipoles.

1993 — Co-founder Cary Christie resigns but continues to develop Epsilon and Sigma for Infinity via his design firm.

1995 — Infinity Epsilon and Sigma introduced with redesigned Electro-Magnetic Induction Drivers. The rear of the speaker is enclosed.