
the sound

FULL REVIEWS

The Infinity Reference Standard

The Infinity Reference Standard is not a commercial loudspeaker in the usual sense of that phrase. Its price and its size will preclude its use by any but the very professional interested in accuracy in playback, or the very rich. Its manufacturer not only expects to be manufacturing no more than two a month, but he expects to lose money on each sale, a not preposterous notion when one considers some of the costs involved. It will be available for audition in

only the best of audio salons and, consequently, many dedicated audiophiles may never hear the system.

What this speaker is, rather, is a concept. It is an all-out attempt to design a speaker with virtually no compromises in its performance parameters, a system that represents more than a decade's thinking and meditation on the nature of loudspeakers. On a less lofty level, it is, I believe, a deliberate, systematic effort to design the

world's very best loudspeaker system, just to show that it can be done. Just as something provokes a man to climb Everest (because it is there), so that same something—call it drive, ambition, the quest for excellence—will inevitably obsess the audio industry's best designers and eventually force such men to attempt the summit of audio veracity.

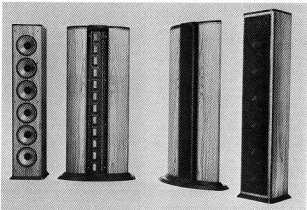
One could certainly cite other examples: Mark Levinson's HQD system is, in actuality, a concept rather than a practical commercial product. William Z. Johnson's new signed series of tubed electronics would appear to be a striving after the no-compromise very best. The designers of the Spectral preamp find themselves drawn to the idea of producing a \$10,000 version of their design for those ineffable pleasures that result from the attempt to realize fully a dream. And Dick Sequerra has a prototype of a major system using ribbons from 300 Hz up.

The field of high-end audio is, after all, based on a dream. That dream is the Philosopher's Stone of all ardent audiophiles, the re-creation of the real thing (or the illusion of the real thing) in the home. Because of the constraints of costs, profits and commercial realism, progress in audio is often the result of small incremental gains rather than any grand breakthroughs. And usually, it is only once in a decade that we see a spectacular effort to sum up the state of the

art in audio knowledge in one cost-banned product.

It is no coincidence that the Infinity Reference Standard comes along just now. The late '70s have been one of the most fertile periods in audio design since the '50s, when what was then called component high-fidelity parted ways with mass manufacture and design, at the time represented by RCA, Columbia, Zenith and Magnavox. Those were the days of the Weathers FM pickup, the Ionovac massless tweeter (not dissimilar in concept from today's Plasmatratics), the unibody suspension turntable (AR's pioneering effort, without which the Linn-Sondek would not be possible), the ZansZen electrostatic units, the KLH Model Nines (a bit later, at the tail end of this period of astonishing growth) and more, plus more. In fact, up until a few years ago, it was not possible for the best '70s speakers to exceed the performance of a late '50s hybrid consisting of Hartley woofers, Quad midranges and the Ionovacs.

In the here-and-now, we find the same sort of creative ferment running rampant again. And nowhere is this more evident than in America, as the high end dissociates itself from the mass merchandising mid-fi community and begins to gain a separate identity. The creative nadir occurred in the early '70s, when the Japanese applied genius for mass marketing of electronics produced a tsunami effect that nearly



abolished all those old-line names from the early days of component high-fidelity.

While the mid-fi philosophers debate if differences can be heard at all, the exponents of the high end are worrying about dynamic contrasts, imaging perspective and focus, grain, cable connections, turntable and pickup arm colorations, speaker dispersion and radiation patterns, the intricacies of power supplies, recording philosophies and manufacturing practices—and the list goes on.

What many do not realize is that today's high audio equipment prices are not merely the result of inflation, but rather the result of inflation on the designers' aspirations. Call it a creative competition, but remember that the best designers of contemporary vintage spend serious amounts of time listening to each other's work and learning from both the strengths and weaknesses of their competitors' products.

In its day, just over 10 years ago, the debut Infinity product, the Servo-Static I, was considered by many authorities as a summation of the technology of the '60s. With this product, Infinity has once again asserted afresh a commitment to a dream, a dream that over the decade often appeared to be in wobbly shape as the company went through unprecedented growth, corporate takeover and the loss of some of its original idealists. The widespread residual distrust of Infinity should not blind one to its all-too-rare corporate imagination, no matter how flawed its performance may have been at the practical level.

One of the staff wags suggested I begin this review by saying that the IRS is a taxing speaker to review. And those wags have turned out, in many ways, to be prophetic.

It is, first of all, a huge speaker system, consisting of four 7½-foot-tall columns—two consisting of 36 EMIT tweeters and 12 EMIN midrange elements; the other two consisting of six Watkins polypropylene woofers (each side, no less), separately driven by QMI-manufactured (to Infinity specs) 1.5 kilowatt amplifiers (one per channel, no less). Those woofers are servo-controlled by an accelerometer, so that instant correction is applied to keep the bass end both linear and free from any overhanging bass notes. This time out, Infinity has paid considerable attention to small detail: The baffles are sand-filled (a G.H. Briggs idea) to prevent resonances; the midrange elements connected by Monster Cable; the tweeter levels controllable through a sophisticated outrigger junction unit.

At the heart of this system is an elaborate

passive crossover network, itself considerably superior to Infinity's disappointing earlier work on crossover units. That unit allows the user to:

(1) Adjust the crossover to any amplifier input impedance without changing the speaker's slope characteristics. This is accomplished through both a multi-input impedance selector and, for those oddball amps, extra resistors that plug in the back of the crossover for exact matching.

(2) Adjust the point at which the midrange/high-frequency panels cross over to the servo woofers. This can be accomplished as low as 64 Hz, and there are four higher settings.

(3) Adjust the damping on the woofers.

(4) Adjust the low-frequency cutoff of the woofers at 15, 22 or 30 Hz.

(5) Adjust the level of the bass speakers.

(6) Adjust the phase of the system.

So Intent is Infinity upon having this system correctly set up that it includes, in its pricetag, a factory technician who will fly to your home to set up and optimally install the IRS. This last detail ought to convince even the most suspicious that Infinity means business with this speaker and that the speaker is, in actuality, more of a conceptual effort than it is one from which the firm expects no direct financial benefits. That factory technician, as we shall see, turns out to be a necessity, so elaborate and complicated are the procedures for installing this system.

For us, there were some unexpected problems along the way, the most unpleasant of which was getting the IRS crates off the shipper's truck and to the Editor's main listening rail. Naturally, no one called from the truckers to tell us the anticipated hour of delivery, a not uncommon discourtesy in New York, anyway. At work the day the trucker arrived were the Editor, the Production Manager and the Copy Editor. The Production manager is a weightlifter, not so the Editor or Copy Editor. We impressed one of the local strongmen into service (he was the only person we could find hanging out in front of the local deli at the time), but even with the truckdriver's unwilling assistance—HP refused to sign for the speakers until they were safely off the streets—the five hardly found themselves able to unload two 550-pound-plus crates (8 by 2 by 2 feet, approximately) from the truck, much less get these dinosaurs the short distance from the side street to the house. The speaker, by the way, comes in five boxes—four of them elaborate crates with snapdown hinged, said by the manufacturer to cost Infinity \$1,200 the set. (A look at their construction

will make you believe the cost figure.) The entire system, with boxes, weighed in at more than 1,500 pounds.

To top it off, the weather was exceedingly humid, that sort of suffocatingly white-hot weather that characterized this past summer, and not only in New York. The boxes had been forklifted onto the truck and, predictably, the magazine has no comparable arrangement for getting things off trucks. RS came up with the idea of lowering the biggest boxes to the street, via ropes. It worked, and, several injuries later (a splinter through the truckdriver's hand, blood on the local strongman's hand and a pulled tendon in the Production Manager's hand), someone came up with the idea of turning the boxes side over side to get them to the front porch.

And there they sat for several days until Infinity's top executives, Arnold Nudell and Gary Christie, arrived to accomplish the actual setup. You may find this irrelevant, but I do wonder how any single purchasers will ever get these speakers from delivery truck to the house.

Nor did all go smoothly during setup, since one of the QMI amps failed and another had to be Federal Express-ed from Los Angeles to New York.

Though placement is critical with these speakers, we did not have unusual problems, since the Editor was highly familiar with the performance of dipolar radiators in his reference listening room (#3). The midrange elements operate in dipolar fashion; 12 of the 36 EMIT tweeters are on the back panels of the two front-standing units, and normally require a highly reflective back wall for best imaging specificity and focus. (This produced required adjustments since we had long ago damped that wall for best performance with other dipolar units.)

The woofer columns should be placed behind the main panels and to the outside of the panels. Because Room #3 is relatively narrow, we had to experiment to find another workable position. Nudell had suggested earlier that there were advantages, in terms of room loading, to the arrangement of the six woofers in a vertical column, although he, and most of this Magazine's staff, thought the IRS would be entirely too large for HP's listening rooms. There was even doubt, quickly dispelled upon installation, that the front panels' width would preclude effective wall-to-wall imaging—or, for that matter, separation—in the listening room.

Nudell's own listening room is approximately four times the size of the Editor's, and it has cathedral ceilings to boot. The speaker was designed with the goal of producing flat response from 16 to 22,000 Hz (within 2 decibels) and correct perspective on the orchestra, that is, the speaker was designed to retrieve not only the image width of the orchestra playing in a hall, but the sounds of the wall behind and the shell over the orchestra.

Having been burned before by criticisms, particularly from this Magazine, that his crossover points between midrange and low-frequency drivers were simply too high, producing an audible and discontinuously incoherent effect, Nudell and his design team used enough units to get the front panels down to 64 Hz, at which point the massive woofer systems would take over. To insure that those woofers would be coherently integrated into the overall sound, Nudell ordered not only integrated amps, but servo control and polypropylene to insure speed on the order of that of the midrange/high-frequency panels. Narrowing the bandwidth of the woofers would insure a better rise time as well, he and the design team decided. Additionally, curved panels, about an inch thick, had been attached to the front panels to prevent the well-known dipolar cancellation effect from interfering with the midrange elements' ability to reproduce sound in the midbass region.

The burning questions: What would the IRS sound like? Would it be a big and bloated sound, as some TAS reviewers suspected? Would the speakers produce their best effect in a small listening room?

Would they be worth the \$20,000 pricetag? Would the system be mechanically reliable? Would the system achieve state-of-the-art and would anybody believe us if it did? Would the bass be audibly discontinuous? Would the midrange/high-frequency units sound metallic? What kind of associated equipment would be good enough, assuming the speaker was what its designers had intended, to give the reviewer a handle on the system's real strengths and real flaws?

Imponderables. So, with trepidation, we turned the system on. —HP

Chapter Two, the final installment, will appear in the December issue.

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FULL REVIEWS

The Infinity Reference Standard, Part II

The first two things immediately evident upon a first listen to the IRS are, in fact, the speaker system's hallmarks: its very cool and precise-sounding reproduction of the middle and high frequencies and its tight, even awesome reproduction of the lowest bass fundamentals.

Moreover, the entire spectrum of sounds is rendered in the coolest imaginable fashion—a characteristic, when mated with the system's remarkable imaging and soundstage presentation capabilities, that makes the IRS the most analytic speaker system in a generation.

There is an almost icy clarity about the IRS, a clarity that can be cruel in its revelation of the flaws in the components that precede it in the audio chain. The clarity is so great that, by comparison with all other speaker systems, the tiniest differences it detects are writ as if in **boldface** upon the air.

For the professional reviewer, designer or record producer, the speaker is necessarily an invaluable adjunct. Those whose working livelihood is based on an ability to hear differences in the smallest component part of any system know it often takes wearying hours to ascertain the exact sonic character of, say, different manufacturers of the same capacitor. The best present-day speakers just don't have the resolving capability to allow audio professionals to make such determinations with swiftness and certainty.

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. What Quad started 20 years ago with its electrostatic, and Harold Beveridge developed during the past decade, Infinity has now carried to the frontier.

Nor will Infinity be able to rest at this frontier. The fact that such a speaker exists, even though it is impractical for all but the most dedicated, will allow other component

designers to reach greater heights in their own designs. The electronics experts will now be able to hear things that had been nebulous to all but the most finely attuned ear. Other speaker designers will have a standard to exceed.

The IRS carries the seeds of its own obsolescence. At best, it is a brute force approach to the technology of current-day drive devices. It represents a sort of summation in driver technology rather than a breakthrough therein. It employs a huge number of driver elements to achieve its ends and, for infinity itself, represents a decade of thinking about what speakers should do. (The company has used a servo-drive woofer system before [the ServoStats]; it has used polypropylene before [the 4.5's]; it has used a separate woofer system many times before, and so on.)

What is new here had its seeds in the QRS system, that is, the use of a line radiator to achieve a truly three-dimensional soundfield, an area in which the design team has demonstrated a good deal of subtlety. In other words, if there is a breakthrough in the IRS, it is in its imaging capabilities. That design team—Arnold Nudell, Cary Christie, Bascom King and John Miller—have *per se* demonstrated that a (nearly) true line radiator can and does behave in a fashion similar to the (theoretically) ideal pulsating sphere.

Nor should a product like this one be without its touch of serendipity. That comes with the 105 drive elements that make up the speaker. And just what, you may ask? Efficiency, that's what. The IRS is, for an all-out design, a comparatively efficient speaker system.

This means that with the IRS you get relatively high efficiency walking hand-in-hand with high-resolution driver elements arranged to reproduce a superlative facsimile of the original soundfield. It is also capable of moving a great deal of air. Hence, it is the most analytic speaker system in a generation, since the stereo revolution occasioned

the eclipse of the high-resolution, high-efficiency behemoths of the late 1950's. (Monster speakers like the Klipschorn and James B. Lansing Hartsfield gave way to low-efficiency, low-resolution speakers like those from AR and KLM, watt-eaters of inherently limited dynamic range that you could play loud, but not without straining the 60-watt "super" tube amps of the day to psychosis. The speakers made impossible the reproduction of a realistic sense of the dynamic contrasts inherent in the real thing. To accommodate the speakers, record makers began recording very loud and highly compressed signals onto American recordings, which were getting wider in dynamic contrasts up till then so that things would sound "better" on the average home music system.)

Perhaps, one muses, the solid-state revolution would have been impossible on high-resolution speaker systems since the aberrations and distortions of those early transistorized electronics would have been more nakedly revealed. Certainly, their "brightness" did tend to come through on the small-box, low-efficiency designs as extra "definition" and the inherent limitations most transistorized gear had in reproducing a realistic sense of dynamic contrasts went unnoticed.

All that began to change several years ago with the revivification of interest in wide dynamic range recordings that used limited microphone techniques to preserve the acoustics of the original recording site. Then, certain equipment, notably the best tubed amps and preamps, that did have the ability to suggest dynamic contrasts began to be appreciated for just that. One might conclude that the IRS came along at just the right time.

It is not my intention to imply that the IRS is anywhere near perfect in its resolving power, its imaging field or its ability to suggest dynamic contrasts. I believe that the speaker has problems in all three areas. The problem I have had, in attempting to evaluate the thing, is that it is, as yet, unclear to me how much to attribute to the speakers and how much to attribute to failings in the components that precede it in the audio chain.

Let us consider this for a moment: The IRS might be said to sound like a very good half-speed master done by Stan Ricker, that is, the half-speed analog masters he does for Mobile Fidelity (and, on at least one occasion, for Reference Recordings Dr. Johnson's Sound Show). The sound is clean, analytic to the point of coldness, very low in

distortion, incredibly tight and without much bloom.

Now, some of Mobile Fidelity's work, namely, its two classical releases, the EMI/Boult recording of Elgar's *The Sanguine Fan* and the EMI/Previn version of Tchaikovsky's *1812 Overture*, has a distinct "hardness," especially in the upper midrange, a hardness not present on EMI and evident on massed woodwinds and massed strings. This hardness is made manifest as a metallic sound. (A quick comparison of the original EMI and the Mobile Fidelity will demonstrate that point.)

I would have said that the IRS itself also demonstrates a "metallic" quality in the upper midrange. I would have said that until I heard the Goldmund arm correctly set up in the same system with the IRS, at which point the metallic quality entirely disappeared from the speaker. Considering that several other arms and cartridges have been used with the IRS system, what is one to make of this? That the Goldmund is so far superior in respect to conventional arm/vinyl resonances to other arms; that, in this regard, there is no contest. Or that the Goldmund suppresses some vital and omnipresent disc coloration? (As a corollary: Could the metallic edge on digital recordings be simply the result of that same coloration, more vividly exposed because of the lack of high-frequency ambient and harmonic information inherent in present-day digital technology?) Or that the damping on the Goldmund arm has been, for once in a damped pickup arm, so successfully applied that it does indeed reduce resonances inherent in nearly all arms?

One could note that the Goldmund, when heard through the IRS, provides a degree of sheer "focusing" power that no other tone-arm has done and that its distribution of orchestral harmonics and concert hall "air" more nearly resembles the real thing than other arms. And since it sounds more musically right, one could assume that the Goldmund is indeed more accurate and the IRS demonstrates that accuracy with nearly breathtaking virtuosity.

I could multiply this example several times again discussing other components we have evaluated on the IRS. But I hope you understand the difficulty an advanced product like this one presents to those of us who wish to assess it fairly.

The IRS has three separate radiation patterns. It is dipolar in the midrange, reflective in the highs and a direct radiator at the extreme bottom. Past experience suggests that there will be some disparity between

the three parts of the frequency range, and while I must say that listening does bear this out, the IRS, given present-day electronics and the limitations of the mechanical portions of any audio system, sounds surprisingly coherent, in spite of everything. I simply do not believe that present-day playback gear is revealing enough to demonstrate the IRS's radiation pattern disparities as forcefully as will the best equipment of some future day.

Since the IRS was designed by a team that knows well the limitations of modern-day electronic and mechanical systems, I suspect that some legerdemain has been involved. For instance, the high-frequency crossover to the EMIT units (24 direct radiators in the front of the speaker, 12 behind) occurs at 4,000 Hz, high enough to avoid the overwhelming majority of fundamental musical tones. The midfrequency orchestral fundamentals are radiated in dipolar fashion, that is to say, in a pool of space created behind the speakers. High-frequency harmonics and overtones from these fundamentals are reproduced by the EMITs in direct/reflecting fashion, which, to these ears, tends to rob the top part of the spectrum of "bloom" and that last degree of "airiness" that helps the listener differentiate between live and canned sound. Most of the fundamentals and some of the basic harmonics fall in the dipolar mid-range units; one can still hear the ambient information around those fundamentals and harmonics defined in quite remarkable fashion. This is not so with fundamentals and harmonics in the EMITs' range.¹ While one is never aware that anything obvious is missing in this arrangement, one is aware that something—a thing nearly ineffable—is missing. A few sentences ago, I called it "bloom" and "airiness," possibly the wrong words since the occasional you-are-there vividness of the midrange soundfield is not matched by that same quality at the top.

Where one can hear a problem, if one wishes to concentrate a bit, is at the bottom end of the midrange units' (EMIM) operating range, that is, below 125 Hz. Despite the presence of 12 coupled midrange units per channel, and despite the pains the design team have taken to avoid cancellation effects (the wrap-around wings on the front panels), the EMIMs grow increasingly uncomfortable as they plunge below 100-125 Hz to their lowest point, around 64 Hz. As

long as there isn't much musical information in this octave, and as long as the units aren't stressed with amplifier power, things are adequate, even satisfactory. One might describe the IRS as sounding "lean" in the midbass. Read: Lean and highly defined. Such a sound is an all-too-welcome antidote to the overly warm and sluggish response of most speakers in this region; the sound is actually attractive, by way of being a counteractant. There is a price to be paid, though. The IRS, as we have noted, is cool to the point of iciness. And it lacks a certain "bloom" in its overall sound, not just that at the top. Sometimes you might describe it, for want of better words, as analytic, highly defined, etc. (One must return to the QRS-1D with those Tympani base panels to see just what is missing here.) A certain body is not present with this system, although the presence of its staggering low end tends to compensate handily for the shortage. Another gasp at this: If one cuts off the IRS woofer system and listens simply to the response of the midrange and tweeter panel, it certainly doesn't sound as if the speakers reach 64 Hz flat. It sounds as if the output goes down below 125 and as if the entire system has a more "metallic," highly etched midbass quality.² The stroke of genius in this system, and one that tends to balance its sound out (not to mention filling it out) is at the lowest octave, viz., in the subwoofer system. Its bottom end is so good that it actually disguises some balance problems that might otherwise be fairly obvious. And might I say, after years of failed efforts along these lines, truly created the most impressive, and the most accurate, low-bass system of all time, one sonically neutral enough to mate well with virtually any standard speaker system. (I suppose I need to say that it ought to be available separately, even though there is no point in saying it, since the Arnold Nudell I know will never, ever concede to selling the woofer system alone.)

The design team has used six Watkins woofers (per side) in a sand-lined box, arranged in line radiator fashion, powered by an amp estimated at 1.5 kilowatts, servo-controlled, steeply rolled at the top end for unusual rise time characteristics (for a woofer), coated with polypropylene. This combination of ingredients, though not necessarily recommended by your doctor,

does result in a woofer system of exceptional speed, tautness, clarity and "punch."

That woofer system is not without a sound of its own, to be sure. But given present-day electronics, it is surprising just how well integrated it is into the overall sound of the entire system. Perhaps surprising is too mild a word. It borders on miracra. And, you should remember, these woofers were designed to be placed well behind the front panels. So there should be a time-delay problem. And so there is, at least, there was with a John Iverson-designed, very fast prototype amplifier. But with every other contemporary and available amp we tried on this system (including the Threshold Stasis and Audio Research D-79), the IRS woofers blended beautifully into the overall sound, with no listening panel member (so far) being able to hear a sonic problem in the troublesome crossover region, or time-delay problems. In other words, the transition between the midrange panels and the woofer system is as well accomplished (make that better accomplished) as in any other speaker system I have heard.

Still, the quality of the bass is somewhat different from that of the rest of the speaker, a fact of listening life that gets more evident as the notes go lower and lower—and on this speaker, they go lower and lower. The lows are their tautest down to about 26 Hz, and incredibly well defined. I doubt any of you have heard this much air (outside the concert hall, that is) being moved with this kind of power and definition. From 26 down to 16, the lows sound "rounded," a touch sweet and not all that well defined.

There is also a somewhat "rounded" sound to the bass notes as the speaker approaches the crossover point, which tends the woofer a terribly distinctive, though not easy to describe, character. It almost sounds as if the woofers are at their best in the middle part of their range, a saving sonic grace, I might add, since the places your ear usually focuses upon in the bass won't be the places where this woofer is soft. Again, the design team may know something about psychoacoustics that has not been evident in past Infinity designs. Since the sonic results approach alchemy. (If you want to see what I mean, get one of the few dealers who will handle this system to play Tam Henderson's Reference Recording of *Dr. Johnson's Sound Show*, especially the African section with its thundering and astounding bass drum.)

So what you have here, in terms of sonics, is a craftily balanced speaker. The points at which its energy transfer charac-

teristics are—er—less than ideal would seem to have been chosen with a great deal of wit and insight, that is, chosen to fall at spots where the ear will be most forgiving.

Its areas of strength, on the other hand, are truly imposing, since the IRS does well in portions of the spectrum where most high-end speakers demonstrate genuine weaknesses. (Wait until you hear its performance on massed strings, its speed and recovery from really difficult transients—as with, say, *Casino Royale*—its ability to untangle the most densely scored orchestral passages.) Taken alone, the IRS's ability to reproduce the frequencies from 16 Hz to beyond audibility (and with a remarkably consistent energy-transfer characteristic, despite my quibblings) would place this system in a class of one.

But that is not all.

Those of you who have read this author's speculations on the Beveridge 25W system may recollect that one of the things about it that was most impressive was its ability to resolve low-level passages (in the 30 to 70 dBA region) with a verisimilitude suggestive of the actual levels that occur in a good concert hall. Up until the Beveridge, speakers I had evaluated had to be played at levels 10 decibels or higher to achieve the same illusion of sound levels in the hall. Sitting in the fourth row at Carnegie Hall and armed with an Iwiv meter, I was really unsettled to learn that I was constantly overestimating how loud the orchestra really was. In other words, 75 dB in Carnegie seemed as loud to me as a measured 85 to 90 dB at home. And when the orchestra was going full-tilt on loud, modern classical music in the hall, the meter was almost never exceeding 90 dBA. I was truly perplexed. Why did a full symphony orchestra in a hall sound louder at 75 dBA than it did in the home at the same measured level? I called upon several experts who suggested much the same thing, that most speaker systems lose their resolving power at levels under 90 decibels (the Beveridge did not) and, consequently, most listeners, to get a simulation of the impact of the real thing, would be forced to play their systems louder.

The IRS is more nearly ideal in its ability to approximate the real dynamics of a performance in the hall than any speaker I have evaluated. Unlike the Beveridge 25W, which began to experience real mechanical difficulties with the average levels above 85 dB, the Infinity speaker can handle truly loud playback settings with aplomb. Assuming, naturally, that your amp is agreeable.

Combine its remarkable ability to repro-

¹High-level transients, and transient overtones, seem to occur near the tweeter elements, if not directly on them on occasion.

²You can, of course, choose a higher crossover frequency with this system. But with a price to be paid in terms of cohesiveness and continuity of the sound.

duce dynamic contrasts, its resolving power at extremely soft playback settings (below 50 dB) and its sense of unrestrained freedom when the going gets tough, and the results are musically formidable. I should not have been surprised to learn, at one point during these tests, that what I thought was a loud playback level on a difficult classical disc was exactly as loud as I would have heard that same passage at Carnegie in the fourth row.² In other words, the speaker's approximations of the real thing, dynamically speaking, are the best I've heard.

I would hope that the number of drivers in use here have somewhat more to do with this effect than mere speaker efficiency alone would dictate. At 75 decibels in the hall, you also experience a large number of wave fronts from multiple sources (the instruments). The orchestra is, simply put, a large sound source—it moves huge amounts of air.

In regard to its imaging characteristics: The IRS will allow one to hear the back wall of the orchestra with the kind of surety that could prompt acousticians to guess (correctly) the kind of material used in the construction of that wall. In certain rooms with very high ceilings, you can even hear the top of the shell over the orchestra. (I have heard this elsewhere, not in my own room, since the 7½-foot-tall panels are close enough to the 9-foot ceilings for diffraction effects to spoil that particular illusion.)

In spite of the array of drivers extending upward seven feet and more, there is no illusion of excessive vertical height—if you have properly functioning electronics. Instead, the orchestra spreads out, wall-to-wall (i.e., well past the outside edges of the front panels). Poor electronics—or poor recording technique—that shrink the image width will not only cause an unnatural field of depth but will also cause vertical distortion of image size. In short, excessive shrinking of lateral image width will cause an increase in vertical image height. Which is perfectly logical once you think about it for a while.

With many pieces of electronic gear, I have heard some increase in image height during giant orchestral storms (and, to be sure, some shrinkage in both the sonic soundstage's width and depth). This, I attribute to some forms of distortion—as yet unmeasurable—in the electronics at over-

load, but I am not certain that the attribution is correct.

Considering the size of these speakers, one might expect a "bloated" image of a single voice, or guitar, or other solo instrument. But that is not the case. The only way to get a larger-than-life image from a soloist is to turn the volume up past the level that would be natural if that soloist were in the room itself. (Closely miked soloists would and do suffer from image size distortion.) Because most speakers distort image size in one way or the other, it is difficult to say definitively just how good the IRS is in regard to a natural re-creation of the proper image size, but it certainly is a better approximation of what is right than anything else I know. (We dug up some of the early '60s Capitol recordings of Laurindo Almeida and Sallí Terri, recordings that usually featured simply the voice and a guitar, as a preliminary check on image size. With happy results.)

Overall, the IRS presents, in both convincing and unique fashion, the width, depth and (I think) height of the sonic soundstage. And its re-creation of the proper image size within that soundstage is, I think, proximately right. The problem with this judgment, with your indulgence, please, is that a speaker system that is better than the competition is hard to fault until one hears something even better. Apply that to imaging, if you will.

If I am troubled by anything here (and I am), it is the consistency of the imaging field, and perhaps the matter of focus within that field.

I simply am not convinced that something isn't interfering with the focus of instruments in that soundfield, and I say that knowing full well that the failures may well be attributable to the deficiencies of even the best electronics and/or to the deficiencies of the best discs and master tapes. But it does seem to me that the raised grille edges on the EMIM midrange units ought to cause diffraction effects (spare me a wavelength discussion, please) and that the speakers' three dispersion patterns (remember them?) must, if only subliminally at our present level of listening sophistication, interfere with the system's ultimate "focus." I am not so sure that those stylish-looking curved panels surrounding the midrange and high-frequency units do not have an effect on the focus.

It should be said that the manufacturer and I have had a running debate on the back wall reflectivity characteristics required by this system. He insists that the IRS (de-

signed largely in his highly reflective listening room at home) requires an undamped back wall. Not only am I reluctant to take down the curtains on the bay windows behind the IRS in Music Room #3, but I am not exactly bewitched by the extra sheen and brightness that result when I do move those curtains aside. There is, it's true, some gain in focus when this is done, but not enough in my opinion to offset the doubts I have on this point. It must be understood that my "doubts" are relatively minor in the context of how well the system does focus overall (it can, after all, create the semblance of a solid image within the soundfield and re-create the proper image size). While I suspect this is a point to which I will return in further listening sessions with the IRS, I have heard at least one speaker with superior focusing characteristics in my room, curtains and all, and that was the Beveridge 2SW, though its imaging characteristics and soundstage presentation were wrong. I'm not even certain that the QRS-1D's, sans sand-filled, curved baffles for the midrange/tweeter strips, didn't have better focusing over much of the spectrum. (Honesty requires that I say that the QRS-1D's do have much better "focus" in their new home, Music Room #1, which is highly reflective. Perhaps the manufacturer is right. Considering the very real difficulties of taking the IRS system down, I am loath to reinstall the QRS-1D's in Room #3 to ascertain the point with exactitude.)

The matter of the consistency of the soundstage presentation is a point that is, I believe, related to the question of focus. At this juncture, however, I should warn you that the discussion is going to get somewhat arcane, since there is a sea of variables in which one might easily drown. To wit: Are the electronics and mechanical systems (that is, turntables and pickup arms and interconnectors) adequate to demonstrate the IRS's weakness? (I doubt it.) Does the sheer size and imposing look of the IRS get in the way of appreciating their soundstage capabilities? (Listening in the dark suggests this might well be so.) How much of a problem is the somewhat damped back wall in Room #3? (You may consult the doubts listed above.) So, I'll just note that I got a better sense of image-fill beyond the outside edges of the QRS panels than I do here. And, I'll add, a better sense of image-fill on the outside edges from Dick Seguer's quasi-full-range ribbon panels when I heard them in prototype again recently. And, I'll add, even in Nudell's own listening room, I was not totally satis-

fied with outside image-fill.

I do not wish to unbalance this review, however, and I fear that further concentration on the IRS's minor (minor means in context of present speaker technology—in the future, we'll all know better) shortcomings will have this effect.

The IRS, as presently set up here, is a sort of once-in-a-decade achievement. It is the kind of product that gets you excited about audio all over again, never more so than now in the face of some of the disappointments afforded all of us by high-end products that have crippling, major flaws (especially in the speaker category). I have tried to suggest the speaker isn't perfect—maybe because I don't want to read this review with a red face in 1990, embarrassed by my own imperceptibilities—but it is, I think, more nearly perfect in more ways than any other loudspeaker system presently in existence (I have counted the ways). To dispense it, it seems to me, would require that the cynic disregard its imaging capabilities, its overall tonal neutrality, its low distortion, its successful blending of the low end to the overall system, its dynamic range capabilities and its resolving powers. Just keep this in mind when somebody who hasn't heard it set up right* (or who hasn't heard it at all) says it stinks. I can't imagine that those who could afford it for home use will find it obsolete or surpassed in the foreseeable future. I am convinced that it is such an accurate transducer, overall, it will inspire others who use it as a reference tool to better their past achievements. In a word, it is a landmark achievement, and, one trusts, a gateway to the future. —HP

Manufacturer: Infinity Systems, Inc., 7930 Dearing Avenue, Canoga Park, California 91304. **Source:** Manufacturer's loan. **Best Price:** \$20,000. **Price:** \$20,000.

Manufacturer's Comment:

Being a detective just isn't very simple anymore. The usual suspects—the butler, the maid and the mailman—are not really the foes anymore. The culprits now are more subtle, cunning and insidious, like the brilliant but tortured Raskolnikov or the stylish elusive Jean Valjean. In audio, we cannot with certainty expose the culprits anymore as those God-damned speakers, amp-

²That is, 90 dB here sounds as loud in the home as 105 dB used to sound. I'm talking about undistorted loudness.

lifiers, preamplifiers, cartridges, turntables, tonearms, etc. The fact is, at the state of the art today, speakers, amplifiers, preamps, arms and cartridges are getting to such a high level that a kind of audio "uncertainty principle" may exist. HP, throughout the IRS review, questions himself constantly, is it the speakers? Is it the tonearm? Are the electronics good enough (as good as they are) to expose problems in the IRS? He has exactly characterized a current problem to the audio cognoscenti, the excellent sonic quality of many top-end pieces of equipment.

But, if this is so, why can't we really experience the live musical illusion in the home today? (Certainly, at times, we can experience, under some circumstances, a convincing verisimilitude.) What, then, are the elusive and insidious elements of the audio chain and why are they defeating us? The answers to these questions lie with a series of confusions that have confronted and confounded the audio community for many years.

Of course, one says defensively, speakers and cartridges are both transducers, so they should have been the major offenders. In the past they definitely were among the major offenders. They were usually primitive in so many ways (especially with respect to phase considerations) that they tended to mask other problems (our real villains today). Confusing the situation further was a hodgepodge of poor phase response characteristics and other distortions emanating from a plethora of screaming transistorized amps and preamps (TIM, lots of feedback, SID, etc.). And highly resonant turntables equipped with tonearms that had the size and weight of rather large prehistoric animals (thank you, Infinity, for first creating a willowy, virtually massless spider of a tonearm) which carried primitive cartridges ponderously overthrough the record grooves.

The main culprits, as I see them today, are the listening room, speaker interface problems and phonograph records (to some extent, all program material, although records far exceed the rest). I'm not suggesting that we didn't know for years that records were our worst enemy, but I believe we did not really know just how bad they are.

On the IRS (driven by superb electronics in what, admittedly, is a great room), a comparison of a master tape with its corresponding disc counterpart reveals the naked pathology of the phonograph recording. Gobs of detail are lost, ambience of the concert hall is lost or, worse, greatly dis-

torted, the air and space between instruments obliterated. And, to make it worst, most master tapes are no works of art, either. Yet the sound of some master tapes through the IRS is so stunning that one is almost breathless in waiting for various forms of advanced audio playback systems that are just upon the threshold.

The listening room speaker interface is our next great challenge as speaker designers. Part of the witchcraft that HP spoke of with reference to the IRS has to do with our first serious look at this important interface and the subsequent applications of some of our findings to the IRS.

Let me digress a moment in order to clarify a subsequent assumption. HP opined that the IRS has "three separate radiator patterns." In fact, the IRS has essentially only one radiation pattern; simply stated, it is omnidirectional about an axis running through the midrange tweeter elements, 7.5 feet high. The out-of-phase tweeters at the rear act exactly as if the tweeters themselves were true dipoles. The bass below 65 Hz also is omnidirectional; in fact, more omnidirectional than a dipole woofer panel, since no front-rear cancellation can occur except that which would naturally occur in the listening room. One of the reasons for the phenomenal phase coherence of the IRS is that it approximates a pulsating line source (cylinder) very nearly from 16 Hz to 20 kHz! It is precisely for this reason that HP's observation that "it sounds surprisingly coherent" is correct, except there is no surprise here; it was part of the design, the "witchcraft," if you will.

My digression ends by asking that if two ideally pulsating line sources (PLS) are situated in a room (box) separated by distance x and observed (listened to) at a distance $1.5x$ to $2.5x$, what should be the energy distribution and phase of each PLS such that together they produce the proper energy distribution and phase at the listening position? It is this kind of systems approach that was taken for the IRS design and is still being investigated. Various other speaker-room interfaces solutions can clear up other anomalies experienced by HP. For ex-

ample, the frequencies from 16 Hz to 26 Hz "sound rounded, a touch sweet and not at all that well defined." HP is quite right in his judgment of this frequency domain in his room. This room, being rather small, should not even be able to support 16 Hz to 26 Hz frequencies. It is only due to the fact that the bass-radiating area of the IRS is so immense that the radiation impedance of the air is resistive at these frequencies so that real power can be developed into the air. Since the room cannot really support these frequencies (modewise), it is not surprising that in HP's room these frequencies are not as correctly reproduced as the rest of the bass range. The IRS servo mechanism system on the bass has virtually no way of distinguishing one frequency from another, and is, therefore, not selective in its range except where woofer excursions go beyond some incredibly large limit.

I don't wish to belabor the point, but many innovations were incorporated into the IRS including systems analysis, from reanalyzing the driver units to rethinking crossovers. It is left as an interesting exercise to other speaker designers to examine in detail our IRS. Infinity personnel, for years, have dissected, drawn out schem-

atics and looked at every detail of our fellow designers' work. Nobody stands alone; we build on each other's innovations. Einstein put it more elegantly: "If I have created anything new, it is because I have stood on the shoulders of giants."

HP used the phrase, "The sonic results approach alchemy." The early alchemists had an eternal goal, to make lead into gold. Modern alchemists, the nuclear physicists, have achieved that goal by transmutation of the elements via bombardment of lead by high-speed elementary particles. The quantity of the gold created is very small and it is extraordinarily expensive—so it is with the IRS.

Finally, I should like to express my admiration and appreciation to HP and The Absolute Sound team for a review worthy of our speaker. How he unearns so many of the subtleties and mysteries of an enormously difficult product in such a relatively short period of time is a tribute to his dedication. HP, as a detective (I bet), could have nailed both Rasokolkov and Jean Valjean in the time it takes to say "IRS."

Arnold Nudell
President
Infinity Systems, Inc.

*Not that I don't acknowledge the magnificent work done recently to improve records and recording techniques. For example, after hearing the fabulous Stereo Sound master tapes, one realizes the real talent and dedication of Messrs. Renner and Woods of Telarc Records and, of course, Tom Stockham. The organic thought of these tapes (as well as others transcribed digitally to an audio tape for the device) perfectly preserved for playback at our very own homes indeed inspires us to move onward and upward at a heightened pace.