



Stereo Review

November 1971



INFINITY 2000A SPEAKER SYSTEM

EQUIPMENT TEST REPORTS

By Hirsch-Houck Laboratories

The Infinity 2000A is a floor-standing three-way speaker system with notably smooth, wide-range frequency response and excellent dispersion. Its woofer, 12 inches in diameter, is rear-loaded by a highly damped acoustically resistive pathway terminating in a port. The principle used is that of an acoustic transmission line, and it has certain technical advantages over the bass-reflex design it superficially resembles. At 300 Hz, there is a crossover to a 4-inch mid-range driver with a lightweight cone. Four electrostatic tweeters take over above 1,700

Hz. They are oriented vertically along the right side of the cabinet, with the two upper units angled slightly upward. The cabinet is open to the rear behind the electrostatic tweeter so that their rear radiation can be reflected from the adjacent wall and dispersed through the room.

In the rear of the cabinet there is a continuously variable mid-range level control with a total range of 3 dB. The tweeter level is controlled by a three-position switch, with "normal" and ± 3 -dB settings. The third position, called "protect," inserts a small resistance in series with the tweeter transformer primary when the speaker is being used with amplifiers whose stability is marginal with capacitive loads.

The Infinity 2000A has an a.c. power cord (for the electrostatic-tweeter polarizing-voltage supply) that can be left plugged into a wall socket at all times since it draws negligible a.c. power. The system carries a 4-ohm nominal impedance rating, and an amplifier with a rating of at least 35 watts continuous power per channel is recommended. The speaker will handle up to 125 watts of program material. The 2000A is 26 inches high, 18 inches wide, and 12 inches deep. An optional pedestal base is available, increasing the height to 29 inches. The speaker system, finished in oiled walnut, is priced at \$289. A rosewood-finished enclosure is available for about 15 per cent more. The pedestal base is \$5.

Laboratory Measurements. The Infinity 2000A had a very uniform power output across its frequency range; our multiple-microphone "live-room" measurement showed a total variation of about ± 5 dB from 28 Hz to 15,000 Hz, the upper limit of our microphone calibration. If we discount a slightly emphasized output in the 60- to 70-Hz region (which room acoustics may enhance or diminish) the response was even smoother: ± 3.5 dB from 120 Hz to 15,000 Hz. The dispersion was good at all frequencies, although this was best judged by listening since the output above 1,800 Hz was about 50 per cent reflected and not amenable to our usual procedure of close-up measurement of polar response.

The low-frequency distortion was very low down to 50 Hz, rising gradually to 6 per cent at 40 Hz and 16 per

cent at 30 Hz. These measurements were made at a 10-watt test-signal drive level, which produced an impressive acoustic output down to the lowest frequencies. Tone bursts at low and high frequencies were reproduced almost perfectly — the latter being a recognized characteristic of good electrostatic speakers, and the former attesting to the effectiveness of the loading technique used with the woofer. We experienced difficulty in getting good tone-burst response in the mid-range, apparently because of interference effects between the mid-range and high-frequency drivers, plus the reflections from the rear radiation. Subsequent extensive listening convinced us that this was a problem of measurement rather than a characteristic of the speaker.

The measured impedance of the system was about 7 ohms over most of the mid-frequency range, with a broad rise to 10 ohms at 40 Hz, a minimum of 4 ohms between 2,000 and 4,000 Hz, and a maximum of 25 ohms at 13,000 Hz.

The simulated "live-vs.-recorded" test confirmed what we had deduced from our measurements — the Infinity 2000A is one of the finest reproducers we have tested. Its highs and middles were not only present in the proper amounts, but were so well dispersed that it did a well-nigh perfect job of "imitating" the original program at off-axis angles as great as 60 degrees. Considering that few speakers can do as well on axis, and most show a pronounced loss of extreme highs at moderate off-axis angles, this qualified the Infinity 2000A for an A+ rating in our subjective evaluations.

Comment. The real proof of a speaker's quality is its ability to give satisfaction over a long period of time. We had a pair of 2000A's in our listening room, together with a number of comparably priced speakers, for several months. When the time came to make room for new arrivals, we always preferred to remove one of the others and continue to enjoy the 2000A's for a while longer. As its measurements suggest, it is an uncommonly smooth, balanced, wide-range system. The "Live-vs-



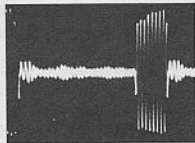
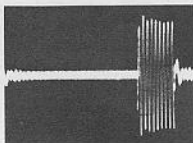
The Infinity 2000A speaker system employs four electrostatic elements, two of them pointed slightly upwards. The enclosure's port is visible at the lower left corner.

recorded" tests do not permit evaluation of response below 200 Hz, but our ears tell us that there is a solid, almost palpable low bass output from this speaker, even at low listening levels.

Although it does use reflected sound to some degree, the Infinity 2000A is nevertheless quite tolerant of room placement. In fact, we used it at distances varying from 3 inches to 5 feet from the wall and did not find any significant change in its essential sound character.

Our own experience confirms the manufacturer's recommendation for the associated amplifier. Some medium-price receivers and amplifiers, in the 25- to 30-watt-per-channel range, produced dismal sound when driving this system, and their overload protection circuits often tripped. The 2000A is quite inefficient, but when driven by a really good 50- or 60-watt-per-channel amplifier, the results can be described conservatively as truly impressive.

Tone-burst response of the Infinity 2000A, shown at (left to right) 100, 3,000, and 8,000 Hz, was generally excellent. The apparent ringing at 3,000 Hz is believed to be due to measurement difficulties.





ARTS & MUSIC Magazine, Inc.

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EQUIPMENT TEST PROFILE:

AN OUTSTANDING NEW BOOKSHELF SPEAKER FROM INFINITY SYSTEMS, INC. GIVES OUR REVIEWER A CHANCE TO EXPOUND ON SPEAKER TESTING IN GENERAL.

TESTED: Infinity 2000A Speaker System by Infinity Systems, Inc., 9001 Fullbright Avenue, Chatsworth, California 91311. Dimensions: 26" x 18" x 12". Price: \$289.

Our review of the new Infinity 2000A speaker system seems to us to be an appropriate time to reiterate our philosophy concerning speaker testing in general, for reasons which will hopefully soon become apparent.

More than any other stereo component, speakers require a subjective hearing by their prospective buyers. Other components can be bought "blind" — that is to say, on the basis of manufacturers' specs, (particularly when they have been confirmed by independent test reports), reliability and reputation of the product and its manufacturer, a comparison of features, compatibility with other equipment in the system, and cost. Not so with speakers. Speakers present the most clearly and immediately apparent difference in any listening set-up. The upgrading of an amplifier or tuner by as much as \$200 can sometimes make only a barely audible difference in overall sound quality on most program material, (though admittedly such upgrading may buy additional features not found on lower priced units). Yet so-called "horizontal trading" of speakers — the substitution of one pair for another of roughly the same price but of a different manufacturer — can often make a distinct audible difference which is instantly apparent to even the most tin-eared listener.

It is for this reason that Arts and Music has always stressed the subjective end of speaker testing more

than the technical end. Speakers not only sound noticeably different from one another, they sound different in different locations. The awareness of this latter factor among sophisticated listeners may account for the rising popularity of equalization devices to compensate for the definite and pronounced effect of room acoustics on speaker performance.

Yet the choice of a speaker system is not quite so simple. There is, to be sure, no effective argument to counter the simplistic and infuriating "I-don't-know-what's-good-but-I-know-what-I-like", and this is so whether we are discussing taste in music, art, speakers or what-have-you. If a listener truly "likes" the sound of his \$60 "hi-fi stereo receiver/turntable/speakers/tape modular console" and is perfectly satisfied with the reproduction he gets from it, far be it from me to try to persuade him otherwise. To be sure, it can be empirically demonstrated that such a system is far from "high-fidelity" — if by high fidelity we mean accurate reproduction of the full frequency spectrum of recorded sound — but we cannot demonstrate that such "lo-fi" is not to our friend's liking. In much the same way, many of today's rock listeners seem to prefer a kind of "jukebox bass" sound in their listening. Though it may be shown that such sound is not the result of accurate or good reproduction, but is instead the result of bass resonances, doubling, sometimes even pure out and out fuzzy distortion, this is not to say that it is not to their liking. For this reason, some of the demonstrably excellent speaker systems of recent vintage often sound "thin" and lacking in bass response to these listeners, simply because they do not have the false boomy bass resonances that these listeners prefer and are used to. That these same, high quality speakers are hardly deficient in the low end can be easily demonstrated by playing program material on which real bass content was originally recorded. By any tests, such speakers are more accurate, have a smoother and wider frequency response, less distortion, and consequently are to the trained ear better sounding

speakers. They may not be as pleasing to one who has been conditioned to look for something quite different.

Yet even among relatively accurate speaker systems there are often marked sonic differences. Demonstrably high quality speakers from different manufacturers and of different designs can often display differences in brightness, presence and so forth. Though theoretically only the exact equality between program material and speaker output constitutes absolutely perfect accuracy, no speaker system is able to do this; after a certain high point of accuracy has been reached, however, we are justified in terming the reproducer "high quality", and it is among even these products that differences in sonic character may exist. Specifications of speakers' response which are often remarkably similar (if not identical), can often display large apparent differences in sonic character to a given listener. Why this is so is a complex question of psychoacoustics; the fact that it is so is even more justification for a thorough subjective hearing of a given speaker before purchase. Once selection has been narrowed down to a small group of demonstrably high quality reproducers, as evidenced by lab reports and so on, subjective taste can then do the rest.

All this brings us full circle to the main subject at hand, the INFINITY 2000A, which in many ways is a truly remarkable unit. The INFINITY 2000A is the latest product of a new, California based firm which is perhaps best known for its SERVO-STATIC 1, an elaborate tri-amplification four-piece speaker system set-up with supplied bass commode/electronic crossover and two electrostatic screens. (This journal has not had the opportunity of yet reviewing the SS1, but it has been widely acclaimed by other publications as constituting one of the finest systems possible with the present state of the art). The 2000A is a 3-way, 6-speaker system of somewhat unusual design. The bass driver is a 12" woofer, crossing over at 300 Hz to a 4" mid-range high-flux density driver. The mid-range's cone is ultra-light, which according to Infinity permits a constant energy output and is responsible for better dispersion characteristics and articulated mid-range sound radiation. (This was more than borne out in our listening tests, as will be discussed below). Beyond 1800 Hz four electrostatic tweeters take over, vertically situated one on top of the other and placed in a specially designed "tunnel" on the extreme right hand side of the enclosure. The two upper units of these four are facing slightly upward, and the cabinet is open in the back to all four. The upward facing of the two top tweeter elements produces greater dispersion, and the back opening of the cabinet permits the use of reflected sound.

The INFINITY 2000A design philosophy was to combine the best elements of both reflected sound and direct radiation in a rather unique and clever manner, which is to reflect approximately 50% of the sound above 1800 Hz, or those frequencies which are handled by the electrostatic elements in the system, off the (presumably) rear wall of the listening room. In this way, the design of the Infinity differs substantially from other designs which have attempted to solve the aural problems inherent in direct radiation designs, notably the BOSE 901 (which also uses reflected sound, albeit in a different manner), and the more standard "omnidirectionals" currently on the market. For reasons which will soon become apparent, we far prefer Infinity's solution to this problem.

A word is in order about the rather ingenious crossover network. To achieve overlap, each of the electrical crossovers are "staggered" between transducers. The Infinity designers claim to have developed the crossover employed in the 2000A while working on the transducers themselves, and thus treated the entire crossover/transducer as a system rather than as separate entities, which accounts for the superb blend which characterizes the interaction of all the elements and results in a more "homogeneous" sound from the system than would otherwise be possible.

The back of the cabinet of the INFINITY 2000A contains two controls: one, a 3-position switch, controls the tweeter level, and allows for "normal" and "plus 3 db" settings, plus a "protect" setting which is for use mainly with amplifiers of marginal stability with capacitive loads. We would guess that such an occurrence is unlikely, since the INFINITY 2000A deserves only the finest associated equipment, and we would suspect that any prospective purchaser of this speaker would be unlikely to couple it with anything but. There is also a continuously variable mid-range level control which has a total range of plus/minus 3 db.

The INFINITY 2000A has a rated nominal impedance of 4 ohms, though we measured it at approximately 6 ohms through most of the mid-range. It never dropped below 4 ohms, and rose to 24 ohms at 13,000 Hz. Caution should therefore be used in multiple speaker hookups when using the INFINITY 2000A or any other 4 ohm speaker, if the intention is to drive more than one set of stereo pairs simultaneously. Many transistorized amplifier manufacturers caution against driving multiple speaker set-ups simultaneously if there is a danger of the combined impedance falling below 4 ohms, as there sometimes is when one of the systems used is

itslf 4 ohms. (The formula for total impedance value when the speakers are wired in parallel off the same amplifier output terminals is:

$$z = \frac{1}{\frac{1}{z_1} \text{ plus } \frac{1}{z_2} \text{ etc.}}$$

Thus two 8 ohm speakers in parallel give a total impedance of 4 ohms, safe with most solid-state equipment; but one four ohm and one eight ohm, or two 4 ohm speakers may present problems, with total impedance for these combinations of speaker pairs being 2-2/3 ohms and 2 ohms respectively. If in doubt, consult the manufacturer. This provision should not deter one from buying the INFINITY 2000A, since there are various ways to get around such conditions, and the manufacturer of your amplifier will more than likely be happy to suggest them.

The INFINITY 2000A, like all speakers using electrostatic elements, requires the use of an ac power cord, but this can be left plugged into a socket at all times. Measurements of the INFINITY 2000A are 26" height by 18" width by 12" depth. An optional pedestal base is available from Infinity or their New York distributor, Harmony House, for \$5. The cost of the system, minus the optional base, in an oiled walnut finish is \$289, or \$578 the pair.

SUBJECTIVE LISTENING TESTS: The INFINITY 2000A easily met or exceeded its published specifications. It has an extremely smooth frequency response, exceptionally low distortion, and superb transients. But laboratory tests alone can in no way convey the true value of this speaker system. Dispersion — the prime bugaboo, to this reviewer's ear, of direct radiating designs, was well-nigh the finest we have ever heard from a bookshelf speaker, and darn near as good as any we have ever heard from any speaker at any price. The "boxiness" that one often hears from conventional speakers, even from the best of them, that makes one continually aware that you are listening to a speaker, was simply not present with the INFINITY 2000A. In addition, the overall transparency of the system was almost unbelievable. Music came through with a crackling clarity and crispness that is characteristic of the finest electrostatics, yet with none of the characteristic loss of low end response that often plagues full-range electrostatics. If the 2000A sounds thin at first hearing, it may be due to precisely those factors which we discussed earlier in this report: what often passes for "good bass" is no more than artificial resonances, doubling and sometimes downright distortion. The INFINITY 2000A has none of that. If you hear

little deep bass from the speaker on certain program material, you can be sure of one thing — the program material doesn't have any! If one doubts the capabilities of this speaker on the low end, we suggest listening to a recording such as the title tune from Freddy Hubbard's "Red Clay" album on CTI records. Infinity advertises its speakers as providing room-shaking bass when it's there! We couldn't agree more.

In fact, bass notes which are felt but not really heard through conventional speakers take on an added clarity and definition when played through the 2000A. Our musical panel could pick out every note of a walking bass line such as the one on the aforementioned recording and with an ease that simply isn't possible with other speakers we've heard.

And as for piano records! Listen to the London recording of Ashkenazy's performance of the Mozart A minor piano sonata. The music came through with transparent clarity, with every detail of piano sound being reproduced with virtual perfection. To fully appreciate the difference between the INFINITY 2000A and conventional speakers, one need only compare them with a well-recorded piano record such as the Ashkenazy. The realism of the Infinity will put any other speaker at anywhere near its price to shame. And if it sounds like we're raving — it's because we are!!

One note of caution: There are amplifiers on the market, due to a variety of technical reasons out of the scope of this report and having to do primarily with phase response which are not well-suited to use with electrostatic speakers. Since the INFINITY 2000A's do employ electrostatic elements, it is wise to first check with the distributor as to the compatibility of a specific amp and the 2000A, or any other fine electrostatic, full range or otherwise. We tried the INFINITY 2000A with one of these amps, which is in all other respects an excellent unit, and the sound was indeed dismal, contrary to what we knew the speaker was capable of. When we discovered that the cause was not in either unit, but simply in their incompatibility, we then tried the speaker with Crown DC 300's and D150's. In a word, our reaction was WOW!

Make no mistake about it, though, the INFINITY 2000A is hardly a high-efficiency speaker. This unit, though rated for a minimum input of 35 rms watts per channel, can easily take up to 125 watts; and to do justice to this speaker's extraordinary capabilities, make sure to use it with equally outstanding associated equipment, and this means high powered, good, clean amplifiers, and smooth, wide-range cartridges, which is exactly what this system deserves.

In summary then, this is unquestionably one of the best speaker systems we have yet come across, and deserves a serious hearing by anyone in the market for top performance at any price. If any further proof is needed of our own unqualified endorsement of the INFINITY 2000A we are now in

the process of trying to acquire a pair (budget permitting) for use as reference speakers in future tests. All in all, a superb contender in a highly competitive field. And if this is what this young company can do for \$289, the mind boggles at what those SERVO-STATIC 1's must sound like!!!