



## NuForce Icon-1 Amplifier and S-1 Speakers



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NuForce isn't the first company to bring high-end audio to the desktop, but their first complete PC audio system blends trendsetting aesthetics and audiophile-quality performance to form one of the most intriguing new PC audio systems we've yet seen. Do the Icon-1 and S-1 provide a little slice of audiophilia on your desktop?

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### Introduction

One of my more treasured personal pastimes is reading reviews in the high-end audio press. From the time I first began taking notice of the field of loudspeaker design, the soaring language and subjective impressions of golden-eared audiophile reviews have intrigued me - could the megabuck audio systems they wrote about possibly deliver the sort of near-religious experience the described?

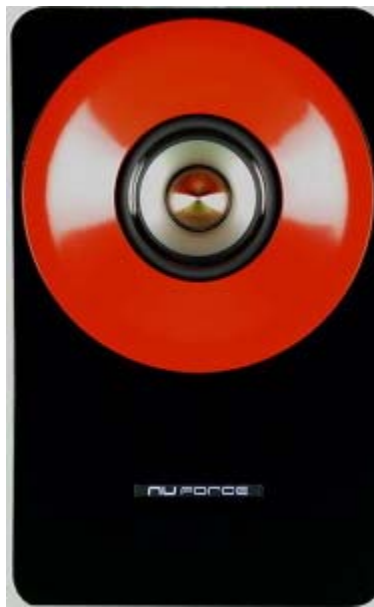
Music and its reproduction are still things that human beings struggle to describe, and we've evolved a certain set of terminology to describe what we hear. Loudspeaker design remains as much an art as a science, due to the set of compromises that must invariably be made in any audio system's design and integration.

These high-end audio publications, be they online or in print form, also showcase an amazing breadth of technology for connecting the listener to their music, from single-driver speakers whose technology has remained largely unchanged since the olden days of the console 'hi-fi' unit to multi-way speakers that employ novel electronic, electromechanical, structural, and material technologies, and price tags that rival many supercars. While I myself can't fathom being able to afford the vast majority of high-end audio gear, the pictures and the reviewers' impressions in these magazines do tend to fuel my dreamer's disease to some extent.

It was in one of these golden-eared audiophile magazines that I was first introduced to photos of the NuForce Icon-1/S-1 system, which at the time was being demonstrated at a high-end audio convention. If you've never heard of NuForce, that's entirely forgivable - unlike companies such as Audioengine, who made their name by producing high-quality audio products exclusively for PC audio, NuForce has built their reputation on a line of loudspeakers and amplifiers targeted at the audio high-end - the 'golden-ears' that I've been speaking of. The Icon-1 amplifier and the S-1 speaker are the company's first foray into desktop audio, however, promising to bring a bit of the audiophile experience to your PC.



The NuForce Icon-1 is a stereo 'integrated amplifier' (a term that means that amplification for more than one audio channel is 'integrated' into its chassis) with a built-in USB DAC. Here at Techgage, we've often discussed the importance of a PC's sound card in producing high-quality sound, but by relocating the functionality of the sound card into the amplifier's chassis, NuForce can ensure that the quality of the amplifier circuitry and the quality of the digital-to-analog conversion complement each other nicely. The Icon-1 uses a "Class-D" amplification stage, which borrows its technology from NuForce's highly-regarded Class-D integrated amplifiers in the high-end category.



Complementing the NuForce Icon-1 amplifier is the company's S-1 speaker, which is first most notable for its striking industrial design, due in large part to the round 'waveguide' that dominates its face. That waveguide has an effect on the speakers' sound that I'll discuss in detail later on. It's also notable for its single 3" wideband driver, with a titanium cone and a copper 'beak' that also serves as much of a sonic purpose as an aesthetic one. Like the Icon-1 amplifier, the S-1 speaker is also available in a variety of color combinations.

While NuForce isn't the first company to produce high-end audio products for the desktop listener (hacker-fi?), its approach is one of the more intriguing ones. Other companies that produce high-end audio products for the desktop include Audioengine, Hi-Vi Research (Swans Speaker), JohnBlue Audio Art, Sonic Impact, KingRex, and SilverStone (a name that owes its familiarity to the company's incredible PC cases). I'm excited to have a complete NuForce Icon-1/S-1 system on my desk for review. Will it fulfill its promise to deliver a little slice of audiophilia on the desktop? Read on.

### First Impressions; Specifications

A complete NuForce Icon-1/S-1 system comes in two boxes - one for the Icon-1 integrated amp/DAC and a much larger, heavier one for the S-1 speakers. The speakers and amplifier are sold separately, for those who might care to pair the Icon-1 amplifier with other speakers than the S-1. The Icon-1's packaging is an attractive plastic box, while the S-1s come in a more utilitarian cardboard package, though I can't say whether NuForce has something more elaborate in the plans for further production runs of the S-1.





You'll first want to unpack the NuForce Icon-1 amplifier from its slim product box. The Icon-1's package includes the Icon-1 USB DAC/integrated amplifier module, a switching power supply, a set of special cables that terminate in a RJ-45 connector for connecting speakers to the amp, an AC power cable for the power supply, and a silicone-rubber base for standing the amp module upright.



Next, unpack the S-1 speakers. They ship with short cables terminated in RJ45 connectors at either end, to make connecting everything a 'snap'. The cables appear to be the same as Ethernet cables, but their terminations are wired differently than a typical LAN cable. Two pins are shorted to inform the amplifier that the S-1 speakers are connected - since the S-1 speakers' unorthodox design requires some active equalization at the amplifier itself.



The NuForce Icon-1 amplifier feels solidly-built at first heft, with its aluminum shell and steel chassis - certainly a notch above the plastic enclosures of some competing integrated amplifiers in this category. Its large knobs also feel solidly anchored to the cabinet, and they turn smoothly. The aluminum shell serves to dissipate heat, and is stamped tastefully with the NuForce logo on either side. The NuForce Icon-1 amplifier is available with four anodized color treatments to its aluminum shell, to complement just about any listening environment or personal taste. When placed in its rubber cradle, it also has a remarkably small footprint, and its styling unobtrusively complements even the most minimalist PC setups. We're definitely already feeling the audiophile 'vibe.'



The supplied documentation for the NuForce Icon-1 amplifier also includes an article entitled "A Beginner's Guide to Good Audio". Recognizing that many who might purchase the Icon-1 system may never have acclimated themselves to the task of critical listening - listening into the details of the musical and audio performance - NuForce has taken the time to lay out the range of considerations that go into producing a true audiophile experience, which go far beyond big, booming bass and sizzling treble. It's a nice touch, and a good sign that NuForce is attempting to introduce its customers to the world of high-end audio, instead of catering to some of the more misguided tastes prevalent in the consumer audio market segment.



The sense of quality associated with true 'audiophile' components is further enhanced by the S-1 speakers, which are also available in a variety of color combinations to complement a range of decors. My review sample was furnished in 'basic black', but even the combination of the piano-gloss finish on the round waveguide and the more subdued matte painted finish on the solid-feeling cabinets served to heighten the aesthetic. The drivers themselves feature natural-colored titanium cones, and a copper-anodized aluminum phase plug (the rigidly-mounted 'beak') at the center of each cone adds another elegant touch. (The original prototypes of the S-1 speakers that were shown at various trade shows leading up to their launch had natural-colored aluminum phase plugs, which I'd have personally preferred.)

- ▶ **Specifications:** NuForce Icon-1 USB DAC/Stereo Integrated Amplifier
- ▶ **Inputs:** Stereo RCA, USB (1.1, 2.0 compatible), stereo 3.5mm minijack
- ▶ **Speaker Outputs:** 2x RJ45 connectors with 15 micron thick gold plating
- ▶ **Headphone Output:** Stereo 3.5mm minijack, 31.25 mW @ 32 Ohms, >0.03% THD Line Output for subwoofer connection
- ▶ **USB DAC:** 32-48 kHz, 16-bit
- ▶ **Power Output:** 12 Watts \* 2, peak power 15 watts \*2 @ 4 ohms
- ▶ **Power Bandwidth:** 26 Hz - 50kHz, -1dB, 1W @ 4 ohms
- ▶ **Signal-to-Noise Ratio:** 84dB at 7W @ 8 ohms
- ▶ **Power Adapter:** 12-14V, 25W, 100-240VAC (full-range)
- ▶ **Dimensions:** 6" x 4-1/2" x 1"
- ▶ **Weight:** 1 lb (Shipping: 5 lb)
- ▶ **Specifications:** NuForce S-1 Speakers
- ▶ **Driver:** 3.5" Titanium Cone Full-Range
- ▶ **Motor:** Neodymium, Underhung
- ▶ **Impedance:** 8 Ohms
- ▶ **Sensitivity:** 87 dB 1W/1m
- ▶ **Frequency Response:** 80 Hz to 20 kHz
- ▶ **Maximum Input Power:** 30 Watts
- ▶ **Dimensions:** 9.5" x 6" x 4.75"
- ▶ **Weight:** 5.5 lb each

Now that we've taken a look at the Icon-1 and S-1 from the exterior, let's go a little deeper and see how the unique design features of the Icon-1 and S-1 contribute to an elevated audio experience.

## Features Overview

The NuForce Icon-1 and S-1 system's approach to high fidelity audio on the desktop doesn't focus on big bass - evidenced by the fact that the system lacks a subwoofer. Instead, the focus is on component quality and sonic clarity. There's also a decided simplicity in its design. Let's take a look at how the two products' feature set is designed to achieve synergy - a result that's more than the sum of its parts.



NuForce's claim to fame as a manufacturer of audiophile products is their efficient "Class-D" amplifiers. While ordinary amplifiers simply allow their output transistors to track the incoming audio signal, resulting in varying states that fall somewhere between completely 'on' and completely 'off' and a large amount of heat output from those partially-resistive states, a Class-D amplifier switches its output transistors completely 'on' or 'off' for varying lengths of time, resulting in an 'average' voltage output, which is smoothed into a consistent output signal by filtering circuitry that filters out the switching noise. It's this completely 'on' or 'off' transistor operation that gives a Class-D amplifier its namesake - 'digital' operation.



A transistor that operates in a fully 'on' or 'off' state produces much less heat than a transistor that is partially resistive, so Class-D amplifiers can achieve extremely high efficiency, and can be packed into a far smaller enclosure than typical amplifiers - and indeed, the Icon-1 is tiny, at only six inches tall and an inch thick.

To control the amplifier, NuForce uses a circuit that self-resonates at 500kHz to ensure that any operating noise that isn't filtered out of the final audio signal is well above the highest frequencies present in music, so it won't create audible distortion. The Icon-1 embodies an extremely advanced approach to Class-D amplifiers, and the result is a stylish, compact amplifier module that will fit perfectly on any desk.



The front panel of the Icon-1 USB DAC/integrated amplifier is fairly simple, and the purpose of the controls is straight-forward both from their labeling and tactile feedback. The volume control turns smoothly, while the source selector knob moves from one position to another, and is labeled with a series of dots, which correspond to each of the Icon-1's three inputs. A blue power LED indicates operation, while a black headphone jack virtually disappears against the amplifier's flat-black faceplate. The knobs have a solid feel, reflecting the designers' attention to detail.



The USB input port on the rear of the Icon-1 is our first indication that the Icon-1 isn't your typical small solid-state amplifier - it's designed with PC usage in mind, but that won't stop you from using the Icon-1 with a variety of analog input sources as well. Each of the audio inputs are labeled with the same dot symbols that appear on the front panel's input selector control, helping you make sense of which dial selection corresponds to each input. There's also a line output jack on the rear of the Icon-1, which means you can connect additional amplifiers, or even a powered subwoofer.

The Icon-1's speaker outputs are via a pair of RJ45 connectors, like the type that's used on ordinary Ethernet cable. Included in the Icon-1's hardware package, there are a pair of cables that have an RJ45 termination at one end, and banana plugs at the other end, for connecting third-party speakers. If you prefer to use binding posts, there's an optional I/O module available from NuForce that converts the RJ45 speaker-level input to a binding post pair for each channel.

Also, while the included cables are only one meter in length, a set of two-meter cables is also available as an add-on. NuForce also offers a 45-watt power supply that enables the NuForce Icon-1 to drive low-impedance (4-ohm) speakers more effortlessly by supplying more current than the Icon-1's stock power supply.



Delving into the guts of the amplifier itself, we can see that the Icon-1's internal design is fairly simple, occupying a single circuit board. Near the USB input port, there's a Texas Instruments Burr-Brown PCM2706 digital-to-analog converter - among the finest available. The amplifier's output stage is controlled by a NuForce-designed Class D amplifier IC, instead of another off-the-shelf component. The NuForce IC (situated in the middle of four choke coils) is essentially the same as the one that's used in the company's high-end 'audiophile' products, though designed for far lower power output.

Also, we can see that a high-quality volume potentiometer and beefy input selector switch have been chosen, instead of cheaper alternatives. NuForce definitely didn't scrimp on the quality of their internal components, further accentuating the point that NuForce didn't intend to build a consumer electronics product with the Icon-1, but a desktop audio system for audiophiles.



To compliment the svelte Icon-1 USB DAC/integrated amplifier, NuForce designed the striking S-1 speakers. Each one features a single 3"-diameter full-range driver with a titanium cone, mated to a 6" round waveguide. Single-driver speakers are preferred by some audiophiles

because all of their acoustic output originates from a single point - the apex of the cone - and there's no passive crossover network that could potentially harm coherence.

Single-driver speaker enthusiasts often cite a single-driver speaker's uncanny ability to produce a near-holographic sonic image, with seamless integration of the midrange and treble ranges. In fact, the only area where single-driver speakers tend to fall short of multi-way speakers is in low frequency and high frequency extension at the very extremes of the driver's frequency range.



To improve the speakers' treble extension, NuForce selected a driver with a lightweight, paper-thin titanium cone and a compact yet potent magnetic structure using Neodymium. The result is a driver that boasts treble extension beyond the limits of human hearing. Also, the copper-anodized aluminum 'beak' in the center of the driver (called a 'phase plug') further improves high frequency performance by eliminating the drawbacks of the "dust dome" that's at the center of many cone drivers. The round waveguide controls the speaker driver's dispersion through the midrange, down to about 1.5 kHz, reducing distortion and preserving detail by preventing sound from bouncing off nearby surfaces (most notably your desktop).



The S-1 speakers use an RJ-45 input jack, which is designed to allow the use of typical Ethernet cable to carry voltage from the amplifier to the speaker. Not only is connection literally a 'snap', but you can use any Ethernet cable that you might already have available, if the

included speaker cables aren't long enough to get the job done. The Icon-1 amplifier uses six of the eight RJ-45 pins to transmit output voltage; the input jack of each S-1 speaker is wired to short the unused terminals together, signaling the Icon-1 to apply a gentle active equalization curve that compensates for the sonic effects of the S-1 speaker's waveguide.



The NuForce S-1 speakers' enclosures are made of 3/4"-thick fiberboard, which forms a solid and inert container for the speaker driver's back wave. There's no reflex loading of any sort - instead, the enclosure is partially stuffed with polyester batting to absorb the rear radiation of the cone. The wire used to connect the speaker driver to the input terminals looks thin and flimsy, but it's solid copper - with very little insulation around it. I took care when reassembling the speaker to ensure that the leads would not touch when I reinstalled the speaker's rear cover.

Thus far, we've seen that the NuForce Icon-1 and S-1 take an uncommon approach to PC audio through the use of high-quality components in a simple design. It's a theme that's common in many entry-level 'audiophile' high-fidelity music systems as well. Now that we've discussed the products' feature set in detail, let's see how the NuForce Icon-1 and S-1 perform when paired together.

## Setup, Listening Tests

Assembling the NuForce Icon-1 and S-1 into a complete audio system is easy and intuitive - simply connect a USB cable between the host PC and the Icon-1, and then snap the speaker cables into the left and right speakers, then into the corresponding speaker output jacks on the Icon-1. Upon connecting the Icon-1, my PC instantly recognized the device as a generic USB audio codec. Convenient, yes, but it can prove to be a bit of an annoyance at times.

I'll explain. Whenever you turn off the Icon-1 using its volume control, the host PC ceases to recognize it. So if you happen to switch it off while music is playing, you'll need to exit your media player program and open it again before your PC will send audio to the Icon-1 again.

The simple workaround is to leave the Icon-1 powered on at all times - its amplifier circuit is so efficient that it wastes very little power when no music is playing. But if you're the obsessive-compulsive type, be aware that if you shut the Icon-1 off every time you leave your workstation, but leave the media player program running, you may encounter this issue.

Aside from that tiny hiccup, the Icon-1 was a joy to use. I tested the Icon-1 and S-1 using lossless FLAC-encoded audio files, played back using Foobar2000, which is one of the best-sounding player applications that I've encountered. That's right, 'best-sounding' - some media players will continue to carry out DSP processing on all audio passing through them, and what arrives at the sound card isn't always a bit-perfect manifestation of what was recorded in the audio file.

The test system for this review was a Gateway laptop PC from 2006 that I use for monitoring email, instant messaging, and chat. The NuForce Icon-1 handles all digital-to-analog conversion, so any other audio hardware that the host PC may possess will have no bearing on the final overall sound of the Icon-1 - which in the case of my laptop is a very good thing.



One of the first things I discovered about the S-1 speakers is that they are very placement-sensitive. Their lack of large bass drivers or reflex venting means that they'll be hard-pressed to reproduce low-frequency material, so it came as no major surprise that the S-1 speakers were characteristically bass-shy.

For some, this may be a deal-breaker straight away - though the speakers' lack of bass is no reason to simply dismiss them out-of-hand, since the Icon-1 amplifier features a line-output jack for connecting a powered subwoofer, if desired. However, I did find that a fuller bass response could be achieved by placing the S-1 speakers closer to a wall. If your computer desk isn't set against a wall, however, then you'll need to consider adding a subwoofer - and if hip-hop, desktop theater, or earth-shaking bass effects are your thing, man...then consider an additional subwoofer an absolute necessity.

### Listening Tests

Throughout my time with NuForce's Icon-1 and S-1, I listened to music spanning my entire collection, covering genres from rock to classical, to country, to bluegrass. Eventually, for my critical listening, I settled upon the Barenaked Ladies' Barenaked Ladies Are Me album, which blends acoustic rock with rootsy bluegrass. It's been a favorite of mine for quite some time, thanks to its musical variety and the fact that a broad assortment of instrumental sounds appear within its cleverly-written songs.

The goal of any high-end audio system that claims to be 'high fidelity' is to connect you with the recording in a way that removes the audio system itself from your consciousness as you listen. And if you close your eyes as you're listening to the NuForce Icon S-1, you might just forget that you're sitting at your PC - these speakers have an uncanny ability to construct precise sonic images with both width and depth, as though you could walk into their sound - a rare and thrilling effect to experience on the desktop. In the second track, "Bank Job", instruments inhabited their own acoustic 'spaces' nicely, even during complex vocal harmonies. Drums and cymbals had both immediacy and realistic decay characteristics - with the S-1 speakers, timing is truly everything.



On the sixth track, "Bull in a China Shop", the S-1 speakers had a little trouble with the complex harmonic structures of multiple electric guitars playing simultaneously, something that single-driver speakers traditionally don't do as well with. However, these do far better than many other single-driver speakers that I've heard. The S-1s also imparted a bit of a bright, 'splashy' coloration on this track, a side-effect of using a metal cone in a full-range driver. Remember, though, that these criticisms are relative - these speakers wear their high-end nameplates well, and embarrass many other contenders for 'high-end' PC speakers with their clarity and poise.

As the cello plumbed the bottom end of its range in track 7, "Everything Had Changed", the S-1 speakers preserved the instrument's woody fullness, and as the cello's player switched from a bowed to a plucked style of play, the sound of fingers on the strings was clearly audible along with the cello's own round, full tone. There's a spot where the accordion expands, drawing an audible 'breath' that I'd never noticed before. I had to go back and listen to this track on my reference headphones, just to confirm what I'd heard - it's rare that a speaker will call attention to this nuance.

At extreme volumes, the S-1s' midbass performance could take on a 'chesty' character, but they didn't show any hint of real distress until I was wringing the last few drops of juice out of the Icon-1, even on the Barenaked Ladies aptly-named, rocking final track, "Wind It Up". By that point, however, my ears had already begun to complain, so it's safe to say that the Icon-1/S-1 combination can do 'loud' -- if that's what you happen to feel like listening to.

Overall, the S-1 speakers made a great showing on the album, proving that they're versatile enough to sound great with a variety of material. One more thing to note here is that if the music you're listening to is compressed, you'll hear it through the Icon-1 and S-1 system.

To put the Icon-1's bass response to the test, I connected a set of larger speakers, with over four times the cone area of the S-1's tiny wideband drivers, and discovered that the amplifier still maintained tight control over larger woofers, providing taut, firm low end. So if you'd prefer to pair the Icon-1 with larger speakers, it won't complain.

Next, let's wrap things up with my final thoughts.

## Final Thoughts

In both design and execution, NuForce's first complete PC audio system is impressive. The stylish S-1 speakers and slim Icon-1 USB DAC/integrated amplifier convey a level of sophistication that's thus far been unmatched by any other system I've encountered, and together they deliver an audio performance that befits their high-end audio pedigree.

Rather than cutting costs, NuForce has taken the uncommon route of trimming away features (like multichannel surround sound or a separate subwoofer module) and power output (24 watts for the system), favoring a simpler embodiment that maximizes component quality. And the result is an audio experience that mesmerizes, despite producing relatively little bass - the 'see-through' clarity, spacious realism, and unflappable solidity of the system virtually excuses the lack of low-end oomph.

However, that lack of bass may be a deal-breaker for some who can't justify purchasing a complete PC audio system for \$500, then spending another \$150-\$300 on a competent powered subwoofer. I'll admit that I usually fall into the camp that feels a part of the music is 'missing' when the bass performance is lacking, but the Icon-1 and S-1 are a perfect fit for a small bedroom workstation where placement against a wall boundary is possible, and where it isn't desirable to shake the house.



If you've already got a high-end audio system, the Icon-1 and S-1 together present an attractive solution for adding enthusiast-level sound quality at your PC. However, if you intend to turn your PC into the media hub of your home, it may make sense to couple the very competent Icon-1 USB DAC/integrated amplifier to a pair of larger bookshelf-style speakers for deeper, fuller bass.

I'm awarding the Icon-1 and S-1 speakers separate Techgauge scores, since the two products are sold separately, making a variety of component pairings possible. The NuForce Icon-1 receives a Techgauge score of 9 for its excellent source connectivity, and offering plenty of clean power on tap for rich audio performance on the desktop.

The Icon-1 is perhaps the most complete and highly-perfected desktop audio amplifier on the block at this point, and if you're considering assembling an audio system for your PC that aspires to better performance than is possible from most PC audio solutions, the Icon-1 is a great starting point.

The S-1 speakers complement the Icon-1 nicely, and produce a lively, spacious, and detail-rich sound, though their lack of bass hamstrings them somewhat, earning them a score of 8. Off the top of my head, I can think of a few design decisions I'd have approached differently during the design of the S-1 speakers that would have provided improved bass performance. Still, their style and high-fidelity sound makes them a near-perfect pairing for the Icon-1, and a system consisting of the Icon-1 and S-1 can get you remarkably close to the true sound that the recording artist intended. And in this business, that's high praise.

#### NuForce Icon-1 USB DAC/Integrated Amplifier

##### Pros

- ▶ Slim, space-saving chassis
- ▶ Sophisticated industrial design
- ▶ Accommodates plenty of source inputs
- ▶ Offers subwoofer output
- ▶ Taut, controlled bass response and clear, transparent sound

##### Cons

- ▶ 24-watt power output may not be enough for very large rooms



#### NuForce S-1 Desktop Speakers

##### Pros

- ▶ Attractive styling
- ▶ Accurate, detailed sound

- ▶ Solid build quality
- ▶ Near-holographic "imaging"

**Cons**

- ▶ Somewhat large
- ▶ Anemic bass response



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