

EQUIPMENT REPORT



NuPrime DAC-10H DAC/Pre and ST-10 Power Amplifier

True High Performance for Less

Steven Stone

In 2014, NuForce's cofounder, Jason Lim, with backing from the OEM factory, bought the assets of NuForce's high-end division, obtained the rights to NuForce technologies, and formed NuPrime Audio, Inc. Shortly afterward the NuForce company was sold to Optoma.

NuPrime's first offering, the IDA-16 integrated amplifier, was reviewed by Vade Forrester (Issue 252). He concluded that, "I wouldn't be ashamed to put it on a shelf next to the fanciest component." NuPrime's latest, the \$1795 DAC-10H DAC/Pre and the \$1595 ST-10 basic power amplifier, are slightly more expensive than the \$2600 IDA-16 integrated amplifier, but promise an even greater level of sonic refinement and flexibility. How do they stack up in this highly competitive price range? Let's see.

The DAC-10H

Although the DAC-10H is only 2.4" high by 8" wide by 14" deep, which corresponds to roughly half the width of a "full-sized" component, it packs a lot of features and performance into a small package. The DAC section is built around the ESS Sabre Reference ES9018 32-bit DAC chip. According to NuPrime this DAC chip can deliver 135dB signal-to-noise with -120dB total harmonic distortion levels. To reduce time-domain errors the DAC 10H utilizes symmetrical signal processing combined with asynchronous data transfer. It supports PCM up to 384/32 and DSD up to 256.

On the analog side, the DAC-10H has borrowed from the NuForce P-20 preamplifier the stepped, thin-film switched-resistor ladder network for controlling volume. This device uses a MUSES chip combined with a proprietary look-up table to ensure that only

a single resistor is in the signal path at any given volume setting. The volume adjustment is in 0.5dB increments and is displayed via a 0-to-99-numbered system on the front panel. Comparing different sources using these precise and repeatable volume adjustments was a pleasure.

In addition to the 99-step volume control, the DAC-10H also has dual gain settings for its outputs. The single-ended RCA output can have a maximum voltage of either 2 or 4 volts, while the balanced XLR outputs have 4 and 8 volt levels. The headphone amp also has two levels for its balanced and unbalanced output to allow for different headphone sensitivities and impedances.

In its input stages the DAC-10H uses ultra-low-noise JFETS with independent left and right power supplies that come from a multi-rail toroidal transformer coupled to a linear power supply. This helps achieve a crosstalk attenuation specification of at least 93dB at 1kHz.

The DAC-10H has two headphone outputs: a single-ended and a balanced connection. Both have the same output impedance of less than 10 ohms. The balanced headphone circuit uses an OPA2134 op-amp as a buffer for the pair of NuPrime-branded IC chips used to drive the output.

Setup and Ergonomics

The DAC-10H front panel has some stylistic similarity with earlier NuForce designs that lean toward a modernist aesthetic of understated minimalism. On the upper left side of the front panel, you will find a single-ended headphone connection; the balanced connection is on the right. Between them is a discrete set of LEDs that display the source and the bit-rate (if any) being generated by that source. Under the display and headphone connections is a single row of rectangular buttons. From right to left, they include the low/high output switch, down volume, power on/off, volume up, mute, and headphone volume selector. The only labeling on these buttons are small graphic symbols.

On the back panel of the DAC-10H, you'll find two pairs (one single-ended RCA and one balanced XLR) of variable-output analog connections, two pairs of single-ended analog inputs, two coaxial SPDIF inputs, two TosLink digital inputs, one USB 2.0 input, and an IEC AC power connection. While that sounds like a lot of connections to fit into a relatively tight space, the layout on the DAC-10H allows for easy access to all I/O's.

The overall fit and finish of the DAC-10H is commensurate with its technical specifications. All surfaces are impeccably finished. The little flourishes, such as the thin chrome bands around the two headphone outputs, give the DAC-10 an unmistakable touch of panache.

For most of the review the DAC-10H's balanced outputs were tethered to the NuPrime ST-10 power amplifier. The unbalanced outputs were split, one leg routed to a Velodyne DD10+ subwoofer, the other connected to an outboard headphone amplifier.

The DAC-10H comes with a unique-looking remote that is eight inches long and hexagonally sided. It's the same remote that NuPrime uses with its IDA-16 integrated amplifier. It duplicates all the controls on the DAC-10H, which is fortunate because if the DAC-10 is located beneath your desk—as it usually is in my nearfield system—it's very difficult to operate it "by feel" since all the buttons

EQUIPMENT REPORT - NuPrime DAC-10H DAC/Pre and ST-10 Power Amplifier

feel the same. To ensure that you are pushing the correct button requires counting across from right or left. Ninety-nine percent of the time I used the remote. I found its angle of acceptance to be quite wide, even more so than most units I've used. My only complaint is that all the buttons rattle; in fact, they rattled so much that the DAC-10 remote is suitable for use as a percussion instrument.

During the review period I tried all manner of digital sources, from lowly 128kbs MP3s to 128x DSD and 192/24 PCM. In every case, the DAC-10H played the files without incident. I'm also happy to report that during the review period the DAC-10 proved to be an extremely trouble-free component. Unlike many devices, the DAC-10H was absolutely silent during turn-on and turn-off with no thumps, clicks, or buzzes. Also, when you change inputs or un-mute the DAC-10H, it does a gradual volume ramp-up instead of giving you the full volume setting immediately; this allows a user time to lower the volume if it was set too high from the previous input.

Considering its plethora of input options, I see no reason why, despite its diminutive footprint, the DAC-10H would not be up to the task of serving as the control center of a highly evolved audio system—it even has a home-theater-bypass mode so you can use it in conjunction with a multichannel AV processor.

I tried a wide variety of headphones with the DAC-10H. With my most sensitive custom in-ears, the Westone ES-5, there was a slight amount of low-level hiss. On the other extreme, using the single-ended outputs, the DAC-10H had no trouble driving a pair of Beyer Dynamic DT-990 600-ohm headphones well past satisfying levels. The balanced outputs worked splendidly with both the Mr. Speakers Alpha Prime and HiFiMan HE-560 headphones. My original Grado RS1 headphones also had excellent bass extension and drive when connected to the DAC-10H's balanced output.

The Sound of the DAC-10H

For me, the most outstanding aspect of the DAC-10H's sonic performance was its silence. Even with DAC/preamps that have almost the same signal-to-noise specs, I can usually hear differences between the "silences" at full output compared with fully attenuated outputs (bear in mind that in my nearfield system the speakers are only three feet away from my listening position and my room is very quiet). With the DAC-10H/ST-10 combination I could hear only the very faintest added hiss at full levels when I moved my ears within a few inches of a tweeter, but at the listening position I heard nothing. And why should this be such a good thing? Because the DAC-10H's excellent signal-to-noise ratio lets the music emerge from silence with a level of delicacy and subtlety that more closely approaches what I hear from a live musical event than noisier DAC/preamps which don't have the same signal-to-noise capabilities.

Inner detail and low-level resolution through the DAC-10 are as good as I've heard through any DAC including the Antelope Audio Platinum DSD DAC. The differences in depth recreation and soundstaging precision between my original 128x DSD recordings and 44.1 down-sampled versions were immediately obvious when comparing them through the DAC-10H.

Depending on the recording, the sense of three-dimensionality portrayed through the DAC-10 can be nothing short of remarkable. Listening to B. B. King's classic album *Live at the Regal* over the TIDAL app, combined with the latest Amarra SQ+ 2.1 on my Mac

Mini connected to the PS Audio DSD DAC, it was easy to hear how the audience sound comes from a point well behind the lateral plane of the band. Also, the clarity and tightness of the electric bass were exemplary.

Since I also have an early stereo LP pressing of the same recording as well as a CD version, I was able to do some A/B/C listening, comparing the Tidal stream with the ripped CD played back through Amarra Symphony, and then the LP played back via my VPI TNT III turntable with Graham 1.5 tonearm, Clearaudio Victory II cartridge, and Vendetta 2B phono preamp.

While the differences in soundstaging, depth, and frequency extension were essentially non-existent between the CD and the Tidal stream, the LP had noticeably superior dimensionality—instead of a wall of audience there was an individualization of each voice within that audience. Also B.B.'s vocals on the LP had more immediacy and dynamic energy. A friend who was present during the comparisons said to me, "I wish I could have the top end, mid-range, and spatial characteristics of the LP in the digital copy, and the low-frequency clarity and punch of the digital on the LP." Yes, the DAC-10H's analog section and stepped volume control are capable of passing through even the subtlest of audible information in both the analog and digital domains.

Using the DAC-10H's headphone output I was impressed by the solidity of the image, the delicacy of upper frequencies, and the control of lower frequencies. Compared with the built-in amplifier in the Oppo HA-1, which was the DAC/pre I had in the system previously, the DAC-10H was a step up, both in its ability to drive difficult headphones via its balanced connections, and in its portrayal of low-level detail. I also compared the DAC-10H's headphone outputs with a dedicated single-ended tube headphone amplifier. The DAC-10 was its equal for midrange purity and upper frequency extension. In the bass, the DAC-10H

SPECS & PRICING

DAC-10H DAC/Pre

Inputs: One USB digital, two coaxial digital SPDIF, two optical digital SPDIF, two analog stereo RCA
Outputs: Optical (up to 24-bit/192kHz), stereo RCA (line out), stereo balanced (XLR-3 socket pre-out), balanced headphone amplifier (XLR-4 socket), unbalanced headphone amplifier (6.3mm jack socket)

USB sampling rates: 44.1kHz-384kHz and DSD 2.8MHz, 5.6MHz, 11.2MHz
Max. output power: 680mW @ 1kHz and 600-ohm load at the XLR-4 output

Dimensions: 8" x 2.4" x 15"

Weight: 10.5 lbs. (4.8 kg)

Price: \$1795

ST-10 Power Amplifier

Input: Two RCA
Output: Five-way binding posts
Power output: 150Wpc at 8 ohms
Gain: 28dB
Input impedance: 23.5k ohms
Sensitivity: 0.89V to rated power
S/N ratio: 110dB at 1W, 10W, 100W
Dimensions: 215.4mm x 59mm x 394mm
Weight: 13.4 lbs. (6 kg)
Price: \$1595

EQUIPMENT REPORT - NuPrime DAC-10H DAC/Pre and ST-10 Power Amplifier

was more controlled with better inner detail and dynamic punch. My conclusion: The DAC-10H's headphone outputs are good enough to make the need for an external, dedicated headphone amplifier optional.

The NuPrime ST-10 Power Amplifier

The NuPrime ST-10 amplifier is what NuPrime calls “near-reference class.” Why only near-reference? As far as I can tell it's thus named because this stereo amplifier only puts out 150 watts per side into an 8-ohm load. The ST-10 utilizes NuPrime's proprietary, fourth-generation V4 amplifier module. According to NuPrime, this latest version offers substantial improvements including a 20dB reduction in the noise floor, a shortened circuit pathway, increased output current, and a 600kHz switching frequency. Other improvements over earlier designs include a new linear power supply that employs a high-efficiency toroidal transformer; superior reliability when not under a load, and an enhanced even-order harmonic circuitry that according to NuPrime, “resembles the most attractive features of tube-amp sound.”

Although the ST-10 has a switching output stage, it is not a standard Class D switching amplifier. According to NuPrime's owner's manual, “Instead of the conventional saw-tooth configuration, NuPrime's patented circuit design uses an analog-modulating signal that adds neither noise nor jitter. Rather than reverting to off-the-shelf solutions, NuPrime's in-house advances have further unlocked the switching amp's potential without the difficulties pure

switching amplifiers simply cannot avoid.” The cliché that should follow would be, of course, “Not your father's Class D amplifier.”

Among its technical advantages, the ST-10 has a damping factor of 400, which means it should be able to control any excess diaphragm movement better than an amplifier with a lower damping factor. The ST-10 also has far lower amounts of phase shift than most amplifiers, due to its unique closed-loop circuit.

The front panel of the ST-10 closely resembles that of the DAC-10H except it has fewer buttons and lights. Actually the ST-10 front panel has exactly one button, on the left side of the faceplate, and one light on the right side of the faceplate. That's it, apart from the NuPrime logo in the center.

Setup and Ergonomics

Although the ST-10 provides 28dB of gain rather than the standard 26dB, for most systems this won't be an issue, and many systems will benefit from that extra 2dB of gain. The ST-10's rear panel has all the connections that you would expect on a basic power amplifier: one pair of balanced XLR inputs, one pair of single-ended RCA inputs, one set of stereo outputs using five-way binding posts, a 12-volt trigger connector, an IEC AC connector, and a toggle switch for balanced or unbalanced input selection. However, unlike many stereo power amplifiers, the ST-10 doesn't have provisions for bridging it into a mono mode.

When you push the on/off button on the front panel you will hear a soft click from the amp's relays after a second, and then it's



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NuPrime DAC-10H DAC/Pre and ST-10 Power Amplifier - EQUIPMENT REPORT

good to go. When you turn the ST-10 off, it has a delay of approximately ten seconds before it shuts down completely.

The Sound of an ST-10

Over the years I've reviewed and used plenty of switching power amplifiers from Bel Canto, Wyred 4 Sound, April Music, and others, and I appreciate what a well-designed model can bring to a system. And it happens that the ST-10 is the best switching power amplifier I've heard to date.

As you might have gathered from its specifications, the ST-10 is a very quiet, extremely low-noise power amplifier that, as long as it isn't pushed into clipping, sounds exceedingly neutral and uncolored. I tried the ST-10 with a variety of speakers from the 84dB-sensitivity Aerial Acoustics 5B to the 95dB-sensitivity Audience 1+1, as well as the ATC SC7 II, Dunlavy SC-1AV, and Mirage OM3. In every case the amplifier did a superb job of driving the speakers with authority and control.

I was especially impressed by the ST-10's performance at the top and bottom of its range. The bass was taut and tuneful. Conversely, the upper midrange and treble were airy yet accurate. On recordings with exaggerated upper midrange or treble energy I was aware of the additional musical information, but it was never emphasized to the point of harshness. After living with the ST-10 for a while I can understand why NuPrime draws attention in its sales literature to the ST-10's "tube-like" upper-frequency characteristics. While the ST-10 certainly doesn't soften or roll those off in the manner

of classic tube designs, it brings to its upper frequencies the kind of ease and sweetness that are usually found in power amplifiers that employ tubes somewhere in their circuitry.

Depth recreation, dimensionality, and image specificity were also exemplary through the ST-10. On my live 128x DSD recordings of the Boulder Philharmonic, the soundstage was accurately portrayed with the spaces between the instruments elucidated with a level of specificity that was equal to the best I've heard from any amplifier.

Final Thoughts

Within their product categories the DAC-10H DAC/preamp and ST-10 basic power amplifier are priced at the lower mid-level, yet they both deliver performance that could be considered exemplary regardless of cost. The DAC-10H has the capabilities, sound, and feature set that should keep it current for years, while the ST-10 offers sonic quality that, unless you absolutely must have more power output, will make "upgrading" to anything but a far pricier amp more of a sideways proposition than an upward one.

As it is a relatively new firm, NuPrime has yet to develop the reputation of more venerable audio companies. But given the quality of its first three products, the IDA-16, DAC-10H, and ST-10, it's hard not to predict that NuPrime will be a force to be reckoned with now and in the future. Even if you have far more in your equipment budget than what the DAC-10H and ST-10 cost, I recommend giving these NuPrime products a listen, if you can. They deliver true high performance for far less money than you might expect. **tas**

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