MOON BY SIMAUDIO NEO 230HAD

HEADPHONE AMPLIFIER/DSD DAC

Before starting this review, I am going to briefly jump to its conclusion. The Simaudio Moon Neo 230HD headphone amplifier/DSD DAC has all the features that I consider vital for a DAC that you intend to use with a computer. It sounds great and perfectly handles datastream issues that many other DACs do not handle well at all.

THE EQUIPMENT

The full name of this DAC is a bit unwieldy so I'm just going to go with 230HD for the remainder of this review. It's a relatively compact component, not designed for mounting with a stack of components. It's only 178mm wide, and rather deeper at 280mm. It weighs 2.8 kilograms, so it's a solid bit of kit.

But what does it do? It's a digital to analogue converter—suitable for use with CD transports and computers—and a headphone amplifier. Simple enough. My application is for playing audio from a computer, and it's that on which I'll be concentrating.

Simaudio doesn't talk about what DAC chip or chips it employs, and I wasn't inclined to try dismantling the unit. It's what comes out of an audio device that's the important thing in my view, not how it does it. Within the constraints of multiple inputs, the device has been kept simple. There is no adjustment, for example, for the slope of anti-aliasing filters and such. You'll just have to trust that the implementation is sensible (and check out our measurements.)

Assuming competence on other fronts, here are the five things I consider vital for a DAC/Headphone amplifier.

First, it must support every audiophile format. That means both PCM and DSD. Remember, codecs such as FLAC are merely efficient ways of holding PCM, and your computer does the unpacking required to convert it into PCM. Even MP3 is created from PCM and when decoded produces PCM—and sometimes the latter is quite similar to the former.

It is PCM (Pulse Code Modulated) and DSD (Direct Stream Digital) that are the two fundamental digital audio formats. But each now come in several resolutions. Like it or not, the great bulk of music available to us now comes as 16-bits with 44.1kHz sampling, aka the CD format. But an increasing amount of PCM is available in 24-bits and at higher sampling frequencies.

Likewise, standard SACD-style Direct Stream Digital runs at 64 times the CD sampling rate, or 2.8224MHz. But now that DSD has been unshackled from the optical disc, some music is available—some even recorded natively—at 128 times or even 256 times the CD sampling rate. They are known, respectively, as DSD128 and DSD256.

The 230HAD supports PCM with sampling frequencies from 44.1kHz to 384kHz (including such oddities as 176.4kHz and 352.8kHz along the way). It also supports DSD64, DSD128 and DSD256. So, everything.

I do believe that some people are now experimenting with DSD512, and even DSD1024. If so, good luck, because DSD tracks are not compressed, so a five minute fifty-second DSD256 track will consume just short of a gigabyte of space on your hard drive. I'm not sure that going to two or four gigabytes would be worth it for what are almost certainly going to be completely inaudible differences.

The second vital requirement for a DAC/Headphone amplifier is that it must have a low output impedance. This is not so much for such things as damping factor, but to allow you to use any set of headphones without worrying about their impedance curve. A high-impedance output acts as a voltage divider, with the power burning off as heat in the output rather than producing sound in the headphones, depending on the impedance of the headphones. Some headphones have an even impedance across all frequencies. Some don't, and can vary widely… somewhat like loudspeakers. For those, the amount of power provided by headphone

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amps with a high output impedance will vary by frequency, which will mean a wonky frequency response. The 230HAD has a specified output impedance of 1.25Ω, which is perfectly satisfactory.

Third, high power and gain at the headphone output. High power again means that you don't have to worry so much about your choice of headphones. There'll be plenty on tap. The output of this unit is rated at 100mW into 600Ω, 200mW into 300Ω, and a full watt into 50Ω. They translate, respectively, into 20dB, 23dB and 30dB of volume above the sensitivity rating of the headphones (when specified, as most are, as dB for 1mW input). I doubt you're going to find any headphones which the 230HAD will not drive beyond all reasonable limits.

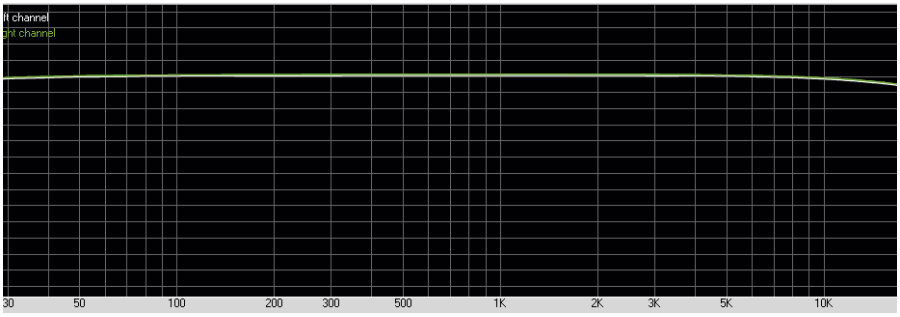
Gain? We'll get to that.

Fourth, fixed level-line outputs… or separate volume controls for line and headphone output. I'd far rather have the full two volts output available to the line outputs, so that any noise that does make it into the interconnects is well down by comparison. If a single volume control is used to manage both line and headphone outputs, though, then there's the danger that one might forget and put on the headphones while the output is set to full volume. And you'll always need to disconnect the headphones when you're using the line level, lest they simply blow up from being played at too high a volume level.

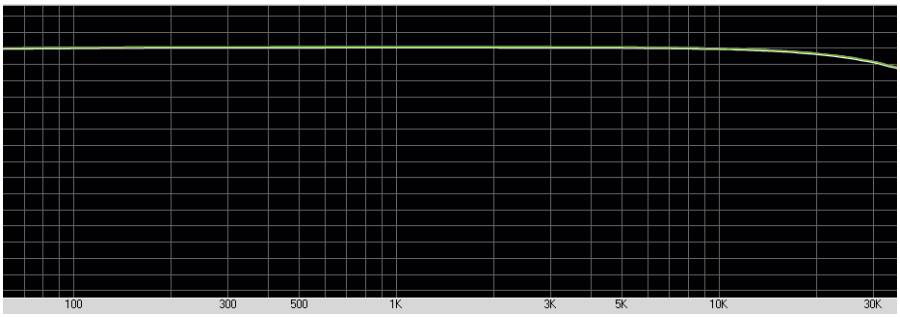
The 230HD has two sets of line-level outputs: fixed and variable. The latter is controlled by the volume control. That's even better because you have the option of skipping a pre-amp if you want.

Fifth, the DAC really ought to clearly indicate what format is playing. This is something that is ignored 'way too often, and it doesn't really matter if you're using the DAC with a CD transport. But computer digital audio is tricky. Things can go wrong. A small error in set-up. The wrong audio player software. Failure to properly install the relevant plug-ins. Any of these mistakes can result in your expensive, natively-recorded DSD256 tracks being delivered to the DAC in 16-bits and 48kHz PCM, and you not realising it, or perhaps being vaguely discomforted by the sound but not knowing why.

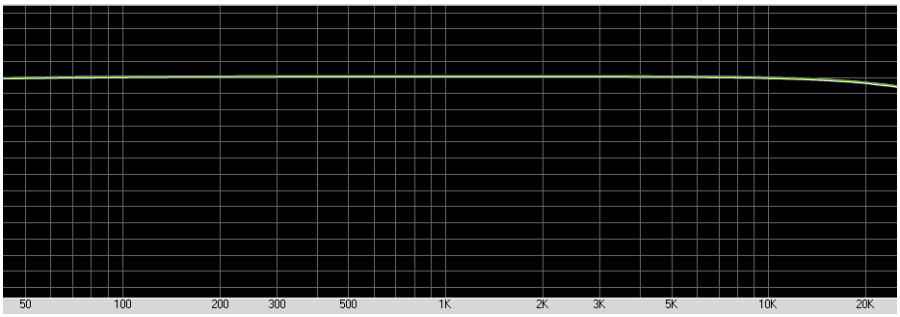
The 230HD has a clever system with five LEDs that in combination indicate unambiguously which signal it is receiving, covering everything from 16-bit/44.1kHz PCM to DSD256. Of course, there's more to the 230HD than those things. Yes, you can plug in transports and such. There are two coaxial digital audio and one optical digital audio input. Those are restricted to a maximum of 24-bit/192kHz PCM and DSD128.



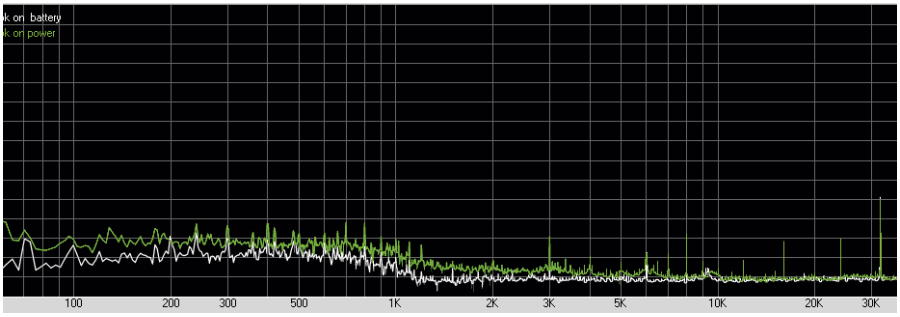
Graph 1: Frequency Response using 16-bit/44.1kHz data.



Graph 2: Frequency Response using 24-bit/96kHz data.



Graph 3: Frequency Response using 24-bit/192kHz data.



Graph 4: Noise floor when connected to laptop running on battery (white trace) vs laptop running on mains power (green trace). See copy.

The higher-resolution signals are limited to the USB connection. There are also rear panel analogue inputs, and a front panel 3.5mm analogue input, so you can use the headphone amp with analogue sources. LEDs on the front panel indicate which input is in use. A button cycles through them. An infrared remote control, borrowed from some of Simaudio's other products, can cycle through also, but it offers both directions. It also controls the volume (by means of a motor on the volume control) and switches between 'Standby' and 'On'. The other keys on the remote aren't used.

The headphone amp section has a rated frequency response of 20Hz–20kHz ±0.1dB, and 5Hz–100kHz –3dB, and a signal-to-noise ratio of 115dB at 'full output'. The DAC section's response is quoted as 20Hz–20kHz ±0.2dB and 2Hz–72kHz –3dB, and its S/N ratio at 114dB, similarly referenced to 'full output'. It is rated to support headphones with impedances from 20–600Ω.

Is there anything missing? Fans of balanced headphones—or for that matter, balanced interconnects to your main amplifier—will be disappointed. Other than that, no.

LISTENING SESSIONS

I used the Moon 230HAD with both a Windows computer and a Mac. The Mac required no drivers. Since my computers are running the most recent version of Windows 10—the Fall Creators update (Version 1709)—it kind of didn't for them as well. But Microsoft still seems to be developing the drivers for USB Audio Class 2, so they were very limited and wouldn't even allow the selection of a sampling frequency. To really take advantage of this DAC with a Windows computer you should install the appropriate drivers—which you download from the Simaudio website. These put in place both ASIO and WASAPI drivers.

With the Mac I used Audirvana Plus software and with Windows I used Foobar2000 for playing music.

Detail was first class. Everything in the music was revealed without veil, whether to the good or bad.

The latter has the advantage of being utterly free, but the disadvantage of taking some working out to do things like deliver Direct Stream Digital in a pure format to the DAC. (Audirvana Plus also takes some deep digging in the Mac Terminal interface, fiddling with operating system permissions, to fully deploy—see http://hifi-writer.com/wpblog/?p=4511.)

In both cases, though, I did configure the players to deliver the audio in bit-perfect format. That is, they extracted the original PCM from their FLAC compression schemes, and fed the bits without any processing to the DAC. With Foobar2000, the DSD was delivered using DoP (DSD over PCM), a system that disguises the DSD signal as high-resolution PCM.

The DAC recognises that this purported PCM contains DSD within it and treats the stream appropriately. I split my listening between several sets of headphones, a variety of proper room stereo systems—I tend to use quite a few—and my desktop computer's near-field speaker system, which is based around a pair of KEF LS50 loudspeakers and a Krix Seismix 1 subwoofer. Aside from checking out the variable level outputs to make sure nothing untoward happened with them, I relied on the fixed level outputs.

The sound delivered through the speaker systems was of the highest quality. There was no noise. At all. Stereo imaging was as good as it gets. Detail was first class. Everything in the music was revealed without veil, whether to the good or bad.

I've been accumulating some natively-recorded high-resolution PCM and DSD tracks of late, and the level of transparency with those was truly astonishing. It sounded to me as though the microphones capturing the sound were connected via wire directly to my sound system. All points in the chain—the ADC at their end, the Internet, the 230HAD at my end—all of them disappeared. The sound was entirely dependent upon their microphones and my speakers and amplifier.

As for headphones, the 230HAD took total control over all of them—even such seemingly mismatched gear as Sennheiser Momentum In-Ear earbuds. These usually tend to be rather bright, but the 230HAD seemed to tame their top end somewhat. Likewise, when I later pulled out my old Sennheiser HD350 headphones to check the gain situation, I found a welcome body in the deeper bass regions balanced out their occasional lightness.

All five of the headphones I used were smooth, controlled, and as able to be driven as high as they could manage. Any volume limitations lay in the capacity of the headphones, not in the ability of the 230HAD to deliver fine music.

What I had in mind specifically when I mentioned 'datastream issues' at the head of this article is switching noise. As I'm writing this paragraph I have Foobar2000 playing a list of tracks in the following formats: 16/44.1 PCM, DSD64, DSD128, DSD256, 24/352.8 PCM, 24/384 PCM. And you know what? As each track draws to a close, there's a moment of silence and then the next track starts playing. In other words, as the DAC switches between radically different digital formats, it does so without any switching noise. That is not always the case, even with some very expensive DACs.

As for gain, let me say that it was ample. To check I played the rip of my old Seiji Ozawa/Boston Symphony recording of Vivaldi's 'Four Seasons' on Telarc. This is recorded at a sometimes problematically low level. I plugged in my twenty-year-old Sennheiser HD535 headphones—which are really fairly insensitive, and played the music in Foobar2000 with the volume slider set to slightly quieter than –20dB (I normally have it set to 0dB). Rotating the 230HAD's volume control to the maximum position produced a very satisfying level. Returning Foobar2000's level control to the normal 0dB, it was difficult to rotate the 230HAD's level control to much more than the half-way point before the sound level was ludicrously and inappropriately high.

There was one small usability issue. Putting the 230HAD into standby stops the signal, but it seems that it leaves the USB and DAC circuitry fired up. At least the computers *thought* that it remained on, so they'd just keep on playing into, well, nothing, rather than switching automatically over to another audio device.

And to be really picky, if the 230HAD were mine I'd put a white dot on the volume control. The indent in the black knob isn't very easy to make out.

TEST MEASUREMENTS

With the bulk of your music, which will have 16-bits of resolution and 44.1kHz sampling, this DAC's frequency response will begin a very gentle roll-off slightly below 10kHz and be down by almost 0.4dB at 20kHz. At 21kHz the output is down by only 1.3dB.

For 96kHz sampling, the output is down by less than 0.2dB at 20kHz, and only gets to –1dB at 43.5kHz, at which point it hits the brick wall.

With 192kHz sampling, the filter is much the same as for 96kHz, but extended into a smooth roll-off. It's down by 0.2dB at 20kHz, 1dB at 45kHz, 2dB at 58kHz and 3dB at 65kHz.

(For all the foregoing, ignore the 0.2dB droop at 20Hz. That's introduced by my measuring rig.)

My measurement environment doesn't really let me plumb the very extremes of what some equipment can manage. Still I measured an A-weighted noise level of –106.2dB. But that was when the computer I was using—a Microsoft Surface Pro 4—was running from its internal battery. When docked, so it was connected to power, but not to the wired network, the noise level rose to –100.2dB, mostly due to midrange and bass noise breaking through. I don't know if it's possible, but ideally a DAC would somehow isolate its analogue output entirely from electrical noise delivered over its digital input. DACs work with computers, and computers are noisy.

CONCLUSION

The Simaudio Moon Neo series 230HAD is a wonderful device, both as a system DAC and a headphone amplifier. If it is in your price range, do audition it. Take your own favourite headphones, just to be certain. I think you'll like it. *Stephen Dawson*

Moon vs. Moon

Just in case you were wondering why this review is titled 'Moon by Simaudio', it's because there are several different and completely unrelated hi-fi manufacturers using the word 'Moon' in relation to hi-fi products, in particular Moon Audio, a small outfit that operates out of Wren Square, Cary in North Carolina, USA. This company, which was established in 2003, owns the URL www.moon-audio.com, has a Facebook page of the same name and sells many hi-fi products under its 'Moon Audio' name.

The Moon Neo 230HAD is manufactured by Simaudio, a company that started out life as Sima Electronics in 1980 but in 1990 changed its name to Simaudio, and the name of its branded products from 'Sima' to 'Celeste'. Simsudio first introduced the 'Moon by Simaudio' line of products in 1997. The company is headquartered in Quebec, Canada.

PRODUCT DETAILS
MOON BY SIMAUDIO NEO 230HAD

Inputs: 1×USB Type-B, 2×coaxial digital audio, 1×optical digital audio, 1×stereo analogue audio (RCA), 1×stereo analogue audio (3.5mm, front panel)
Outputs: 1×6.35mm stereo headphone (front panel); 1×stereo analogue audio (RCA, fixed level), 1×stereo analogue audio (RCA, variable level)
Dimensions (WHD): 178×76×280mm
Weight: 2.8kg

CONTACT DETAILS

Brand: Moon by Simaudio
Model: Neo 230HAD
Category: Headphone Amplifier/DAC
RRP: $2,099
Warranty: Three Years
Distributor: BusiSoft AV Pty Ltd
Address: 158 Christmas Street
Fairfield VIC 3078
TF: 1300 888 602
T2: (03) 9810 2900
E: info@busisoft.com.au
W: www.busisoft.com.au

- Excellent headphone amplifier
- Excellent signal support
- Visual assurance of digital signal format

- Some (inaudible) noise from computer breakthrough
- Balanced outputs