

# Audioengine D2 Wireless Digital-to-Analog Converter

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I've long felt that the folks at Audioengine understand better than most the needs of today's audio consumers. They made their mark years ago with compact, powered desktop speakers at low prices - perfect for the growing number of audio enthusiasts who wanted good sound in small spaces. Seeing the need for increased convenience, they came out with the W1 wireless adapter, a product I've used for years to send decent-quality sound from my computer to anywhere in the house where I have an audio system. It works perfectly. The subject of this review, the D2 24-bit/96kHz wireless USB DAC (\$599 USD), is perhaps Audioengine's most significant product for the *true audiophile* who wants the freedom made possible by wireless transmission.



## Description

The D2 system comprises a Sender and a Receiver, each of which is the same size (4.75"W x 1"H x 5.5"D) and about the same weight (less than a pound). Their front and rear panels are plastic, but the rest of the enclosure is aluminum. They're tiny, light, and attractive.

The Sender and Receiver are packaged in separate boxes, shipped together in a single larger carton along with the requisite cables (USB, analog stereo, power) -- you don't have to buy anything else. For this review I used Audioengine's stock cables instead of substituting audiophile models, and they worked fine. There are even microfiber bags included to protect the Sender and Receiver -- nice touches. The Sender's and Receiver's external wall-wart power supplies plug into their fronts, but the Sender doesn't need one if it's connected it to a USB port that provides enough power (most will).

Each device has two antennas of the type seen on wireless routers, and Audioengine says they can communicate from up to 100' apart -- enough range for most homes, I suspect. The Sender and Receiver *don't* use your wireless network -- to me, a big plus, and one of the reasons I feel that the D2 is a significant product: Most wireless DACs rely on an already established network. If you do have a network, Audioengine says, the D2 won't interfere with it, and the claim seems accurate; during the entire review period, the review sample didn't interfere with mine. And if your house has multiple systems, the D2 can also be expanded: one Sender can simultaneously transmit to as many as three Receivers (\$349 each).



On the Sender's front panel are two digital inputs: USB, which is capable of 24/96 resolution, and S/PDIF optical (TosLink), which is capable of up to 24/192. That 24/192 spec might seem exciting enough to sway you into thinking that TosLink is the way to go, but the Sender and Receiver are limited to 24/96 transmission: if you send a 24/192 signal into the D2 via TosLink, it will be downsampled to 24/96 for transmission. Conversely, any signals that enter the D2 at a resolution *lower* than 24/96 (CD resolution is 16/44.1), whether via USB or TosLink, will be upsampled to 24/96 (more about that below). If you want to play a 24/192 file via USB, you must first have your playback software downsample it to 24/96 -- no big deal. Although the down- and upsampling might be off-putting to audiophiles who want to maintain a signal's native resolution throughout the system, it didn't seem to adversely affect the D2's sound quality. Still, I had other concerns about it, as you'll read about below.

Some audiophiles might wince at the USB input's 24/96 limit -- many of today's wired DACs operate at 24/192 -- but now, having used the D2 for a while, I think it was a wise choice for Audioengine to limit the D2 to 24/96. It's a rather inexpensive product, and, as far as I can tell, the first of its type with resolution this high. (NAD's wireless DAC 1, for \$300, operates up to only 16/48.) The choice was wise because: First, few recordings are readily available at resolutions higher than 24/96. Second, there's considerable debate as to whether we can hear any improvements past 24/96. Third and most important, the D2 worked reliably in my system over a pretty good distance. I suspect that if Audioengine stepped things up to 24/192, reliability and/or distance would be compromised -- it's twice the bandwidth. Finally, Apple's Mac operating system natively supports up to 24/192, but Microsoft Windows natively supports only up to 24/96. To go beyond 24/96 with Windows, you need to install a third-party driver, which is what all those wired, asynchronous DACs use. Keeping things at 24/96 makes them simpler.

The Sender's front panel also has lights for Power and Pair; the former indicates that the unit is on, the latter that it's synced with the Receiver. Finally, at the center, is the Output Level control, which is superbly implemented. My first thought was that it would digitally attenuate the volume level, which would mean a loss of resolution, but that's not what it does. When the knob is turned, volume "information" is sent *digitally* from Sender to Receiver, separate from the audio signal. The Receiver accepts that separate signal and attenuates its analog output level accordingly. Very smart. At the

maximum volume setting the Receiver's output level is 2V, the industry standard for CD players and DACs.



The Receiver has its own Power and Pair lights, an optical digital output for connection to an external DAC, a jack for the wall-wart power supply, and a pair of single-ended RCA jacks for the outgoing analog signal. Most people will probably connect the D2 to an integrated amplifier or preamplifier, but the fact that it has its own volume control makes it possible to be directly hooked up to a power amp or active speakers.

About that resampling: The inclusion of an optical digital output means that the D2 can be used as a wireless USB-to-TosLink converter, but if you plan to use it that way, it's important to understand that if you send the D2 a 16/44.1 or 24/88.2 signal, the Sender will upsample that signal to 24/96. The D2 won't retain the signal's native resolution, which is what audiophiles usually want such a device to do. I tried the D2 as a USB-to-TosLink converter and it worked without fail, albeit with upsampling -- the only real limitation of this otherwise outstanding product. I hope that one day Audioengine will produce a wireless DAC that doesn't change the signal's native resolution. However, that's a small point; I think that the primary use for the D2 will be as a DAC, and the DAC chip doing the conversion inside the Receiver is the Burr-Brown PCM1792A from Texas Instruments, a well-regarded device.

### Initial setup and testing

I had the Sender and Receiver unboxed and working with my system within five minutes. I'm very familiar with computer-based audio, so I knew exactly what to do to get it hooked up quickly, but I realize that those who don't know about this kind of thing might take a little longer. Still, setting up the D2 was, for the most part, a snap. I didn't even have to do anything to make the Sender and Receiver talk to each other (or Pair, in Audioenginespeak) -- they started chatting as soon as I turned them on.

First I connected the Sender to the optical output of my NAD C 565BEE CD player, just to see if it would work -- and it did. That kind of use, though, wasn't the focus of my review; instead, I was primarily concerned with how it would operate as a DAC in a computer-based system. So for this review the D2 Sender was mostly connected, via USB, to my Sony Vaio laptop running Windows Vista and JRiver Media Center 17. An external hard drive contains my entire music collection.

When I tried to optimize the D2's output with Windows and JRiver Media Center 17, there were some hiccups. Basically, when a DAC is hooked up to a computer running Windows Vista or Windows 7, JRiver Media Center defaults to an Output Mode called DirectSound, which can be thought of as a Windows sound subsystem that controls the flow of music data from the player to the port; it's controlled via the Sound icon in the Control Panel. DirectSound works very reliably, and is good enough for computer sounds and playing music through cheap computer speakers. But most audiophiles agree that, in a high-end setup, it screws up the sound enough that you're better off using another Output Mode that allows the player to establish a direct connection with the port, so long as the hardware and software support doing so.

I was pleased to find that JRMC 17 could use the following Output Modes with the D2: Kernel Streaming, WASAPI, and WASAPI Event Style. (To select the Output Mode in JRMC, use Tools, then Options.) These modes, which talk directly to the computer's port, all worked flawlessly with CD-resolution (16/44.1) signals, but produced audible dropouts at their default settings when I played 88.2 and 96kHz files. Thinking it might be a hardware-compatibility problem, I tried a second Windows computer but got the same result.

I went through half an hour of hair-pulling and swearing (I have a short fuse) before I got the D2 working correctly with 24/88.2 and 24/96 files, trying every combination of Output Mode and buffer size and listening closely to the results. (There is no universal buffer size with JRMC; the buffer size must be set separately for each Output Mode.) In every instance, increasing the buffer size to the maximum either resulted in no sound at all or dropouts throughout; each expansion of buffer size increased the number of problems. I found this counterintuitive -- JRiver's instructions say that increasing the buffer size should *reduce* ticks and dropouts. Nevertheless, setting the buffer size to the minimum value eliminated the problem entirely with Kernel Streaming, though I could still hear the odd tick with WASAPI or WASAPI Event Style. The ticks happened rarely enough that I could have used either mode, but I stuck with Kernel Streaming because that's what worked perfectly.

The problems I've described may or may not occur with other playback software running in Windows or Mac. The folks at Audioengine admitted to me that they don't use Windows computers and couldn't offer much help. I find this odd, given the popularity of JRiver's outstanding player, as well as of other players that work only with Windows. You'd think Audioengine would at least *try* to support them. Here's hoping my experience will save you time, if you run into the same problem.

But once I had the setup nailed, the wireless connectivity worked flawlessly -- in fact, it was every bit as good as a wired connection. My laptop computer even worked fine from the kitchen, which is two flights of stairs and another 20 steps away from my listening room. Obviously, there's a limit to the D2's effective transmission distance; the important thing to know is that Audioengine's wireless streaming will work well in a typical house.

## Sound

I've been hooked on Leonard Cohen's new album, *Old Ideas* (16/44.1 FLAC, Columbia), since the day it was released, and I was absolutely floored by the D2's presentation of it: Cohen's baritone voice sounded monstrously full (which is precisely how it should sound), the bass had great weight, and the highs were thoroughly extended but never edgy or unrefined. The level of detail the D2 unraveled was on a par with DACs at twice the price, if not more, and the soundstage had excellent width and quite

good depth. Back in the day, lower-priced digital components sounded thin, dry, and edgy, with no hint of dimensionality or soundstage depth. The D2 sounded anything but: it was surprisingly smooth, refined, and full.

Sade has also had a lot of recent play here, mostly because Audio Fidelity has just released an audiophile-grade LP of the band's first album, *Diamond Life* (first released on LP in 1984, and on CD in 1990). S. Andrea Sundaram is comparing the new LP with all previous CD and LP editions for an article for our sister site, *SoundStage! Hi-Fi*, so we've been talking about it quite a bit -- I'm a big fan of Sade, and have every one of the band's albums ripped to my hard drive. *Diamond Life* (16/44.1 FLAC, Epic) needs a remastering -- the original CD sounds pretty abysmal: thin, dry, and a bit fatiguing in the highs. The D2 didn't ameliorate any of those inherent limitations, nor did it exacerbate them. If anything, the D2 edged toward sounding slightly polite up top. But *polite* doesn't mean *rolled off* or *stunted* -- the D2 always sounded detailed enough to reveal those flaws, but at the same time very clean and thoroughly refined; it didn't sound unduly edgy or bright, as this album can through lesser-quality DACs.

Sade's latest album, *Soldier of Love* (16/44.1 FLAC, Epic), from 2010, sounds quite a bit better than *Diamond Life*. Sade Adu's voice obviously isn't as deep as Cohen's, but through the D2 it sounded similarly fleshed out and full, and was distinctly carved out in the mix, with excellent separation from the instrumentalists. If you like a full midrange presentation with just the right amount of detail, you'll dig the D2. The soundstages on *Soldier of Love* and *Diamond Life* are creations of studio mixing boards -- these are not the most natural-sounding recordings in that regard -- but their width was very good, and the illusion of depth was credible.



As recording quality improved, so did the D2's sound. Our own *2L-TWBAS 2012 Sampler* is as good a set of recordings as any to evaluate a stereo system with because of the superb sound quality of all 21 tracks -- and it's available in a variety of resolutions (16/44.1, 24/88.2, and 176.4) that are

interesting to compare (see [SoundStageRecordings.com](http://SoundStageRecordings.com)). I played the 24/88.2 version through the D2 and found that *Crux Fidelis*, sung by a men's chorus in a large hall, put the D2's considerable strengths in the context of its subtle weaknesses (as compared with far costlier DACs).

The men's voices had the requisite robustness and presence through the D2 -- the sound was full and startlingly real. The soundstage had outstanding width and very good depth, each singer occupying a distinctly defined position within the very large acoustic. The level of detail was extremely good, making it a snap to aurally "map" the front of the hall, and easy to pick out tiny musical nuances. For the D2's price of \$599, I found nary a thing to criticize; in fact, I'd be hard-pressed to find anything to complain about if I were thinking of spending *twice* as much.

It was only when I compared the D2 with DACs that approach or define the state of the art -- respectively, the Eximus DP1 (\$3000) and Simaudio Moon Evolution 650D (\$9000) -- that I realized that the D2 didn't have *quite* their weighty sound, lacked some definition in the bass, and couldn't nudge out the tiniest musical details. And with a superb recording such as *Crux Fidelis*, it lacked just a bit of those top models' soundstage depth. That said, it's important to note that my use of such qualifiers as *quite*, *some*, and *bit* is as deliberate as it is telling -- the differences I heard were slight to the point that some listeners might find them inconsequential. In fact, through a system that lacks the resolution of my own rig, they might not even be noticeable. Sonically, the affordable, feature-rich, super-convenient Audioengine D2 reaches very high.

## Conclusions

If Audioengine's D2 were merely a 24/96-capable wired DAC, I could still recommend it based on its sound quality alone -- it fell short in any meaningful way only when I compared it with DACs costing many times its price. The thing that makes it special is its wireless operation, which worked exceedingly well and doesn't rely on a home network. That, coupled with its excellent sound quality, makes what would otherwise be a very good product a truly great one, and one that is likely a harbinger of digital products to come: With the D2, Audioengine is ahead of the pack. It's also a product that proves what I've long suspected: Audioengine understands the audio market better than most. The D2 is exactly what many audiophiles have been waiting for.

The Audioengine D2 is not only one of the most innovative products I've reviewed in a long time, it's also one of the best. The fact that it's so affordably priced makes this game-changing DAC all that much easier to buy. Highly recommended for those who want excellent sound quality and the convenience of wireless transmission.

... *Doug Schneider*

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## Associated Equipment

- **Speakers** -- PSB Imagine T2, Focal Chorus 836 W Prestige
- **Amplifier** -- Bryston 4B SST<sup>2</sup> (stereo), Eximus S1 (stereo/mono)
- **Preamplifier** -- Simaudio Moon 350P
- **Digital sources** -- Simaudio Moon Evolution 650D DAC-transport, Eximus DP1 DAC-preamplifier, Sony Vaio laptop, NAD C 565BEE CD player
- **Digital interconnects** -- AudioQuest Carbon USB, Audioengine USB
- **Analog interconnects** -- Nirvana S-L, Nordost Valhalla
- **Speaker cables** -- Nirvana S-L

**Audioengine D2 Wireless Digital-to-Analog Converter**

**Price: \$599 USD.**

**Warranty: Three years parts and labor.**

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