stereophile

ELECTRONICALLY REPRINTED FROM DECEMBER 2011

FIFTH ELEMENT

John Marks

## Grace Design m903 D/A Headphone Amplifier

New and very much improved: The Grace m903 D/A headphone amplifier.

I have long been a fan of Grace Design's headphone amplifiers. In fact, I have long been a fan of Grace Design. Like many of the pioneering companies of the hi-fi era (Klipsch, McIntosh, Marantz, and Fisher, to name a few), Grace is the result of a single person's conviction. Michael Grace was working for the Jeff Rowland Design Group, and wanted to design a microphone preamplifier that was as good as the stuff Rowland was building. Rowland was unwilling to expand into the pro audio field, so Grace departed to pursue his dream.

After getting his microphone preamplifiers well established (users include Skywalker Sound and the band Phish), Grace built a one-off headphone amplifier for a customer. Friends who heard it wanted their own, so he made 50 of them. Those soon vanished, and the rest is history. You don't have to look too hard to see that Grace Design's products have some of the same design aesthetic as Rowland's, even though Grace's products are not quite the same level of "audio jewelry."

It's a bit hard to believe that Grace's first headphone amplifier, the model 901, debuted 10 years ago (my coverage of it ran in *Stereophile*'s March 2003 issue). Two years later, in June 2005, I wrote about the 901's replacement, the m902, which added a new DAC capable of handling 192kHz inputs, unbalanced analog outputs, a blue LED numerical display, a crossfeed circuit for headphone listening, and a USB 1.0 input. The m902 used the same transimpedance amplifier circuit as the 901, however. It's fair to sum up my reaction to the m902 as "Same great sound, more features." I think that, for many listeners, the most important new features were the line-level analog outputs, which allowed the m902 to function as a DAC and preamplifier.

Back in 2005 I paid little attention to USB connectivity, for two reasons. First were my own listening experiences, which were overall not very positive. Indeed, Wes Phillips found the m902's sound via its USB connection to be "murky." The second reason was professional snobbery: none of my colleagues who were professional recording engineers used USB to record. Such snobbery was not groundless: USB 1.0 is bandwidth-limited. Furthermore, when professional musicians are playing or singing their hearts out, you don't want your recording rig hiccupping because some arcane internal function decides it's high time to make sure that its internal date and time are exactly what the mother church in Cupertino, California, says they should be. So, back then, many engineers used only digital-audio computer interfaces (such as RME's Hammerfall) that tie directly into the computer's system bus via the PMCIA slot or via a FireWire link. Today, with the advent of USB 2.0 (and lots of lessons learned), the situation is different. One of the most respected digital interfaces is Sadie's LRX2, which uses USB 2.0 to store 16 channels of 24-bit/96kHz PCM on a Windows laptop, and is the preferred location-recording rig of Peter McGrath.

Grace has now replaced the m902 with the m903, which, unlike the m902, is pretty much new from stem to stern (except for its industrial design and ergonomics). New are the m903's DAC, USB module, transimpedance amplifier circuit, and volume control. The power supply, balanced current-to-voltage converter, headphone crossfeed, and s-Lock PLL digital lock all are improved. The m903 comes standard with balanced analog outputs, although to save rear-panel space these are on ¼" TRS phone jacks rather than XLR jacks. (Balanced outputs were first offered late in the m902's production, as an extra-cost option.) The numeric display is now white rather than blue. Despite all these improvements, the m903 remains reasonably priced at $1895. (Infrared remote control remains an extra-cost option.)

The biggest news is that the m903 is not only a USB 2.0 device, and plug'n'play on a Macintosh up to 192kHz (to go above 96kHz with Windows requires installation of a driver, available free from Grace's website), but, equally as important, its USB module is an asynchronous-mode USB converter using technology licensed from Wavelength Audio that was developed by Gordon Rankin—the same technology behind Ayre Acoustics' well-regarded QB-9 USB-only DAC. As one would expect, Grace's implementation of the USB upgrade is impressive: the m903's USB port is isolated from the audio ground, to prevent noise from the computer's power supply getting into the audio circuits.

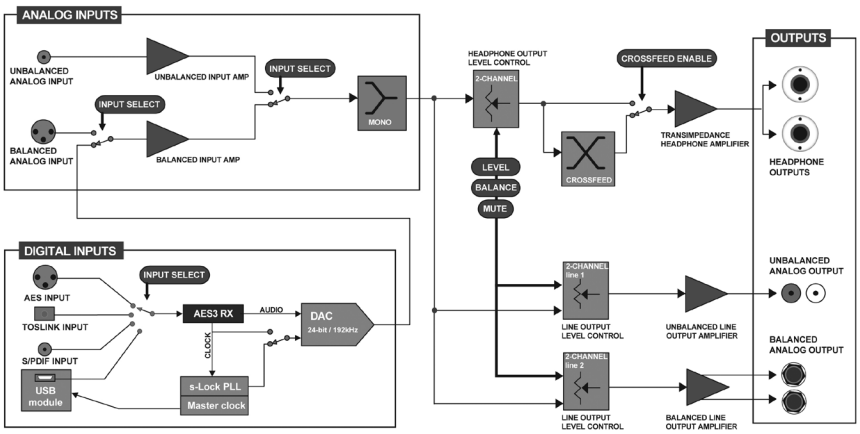
What makes asynchronous conversion desirable is that it reverses the usu-

1 To varying degrees and at different times, all three "Religions of the Book" (Judaism, Christianity, and Islam) have been "anti-image." There is a continuum, of course. For the most part, Christianity has embraced iconography. However, many strands of Reformation Christianity totally renounced images. To take one example, the Auditorium of the Third Meeting House of the First Baptist Church in America entirely lacks not only icons and images but also symbols: there is not even a cross. Shlain's notion that totally banishing images from the social sphere will change how people perceive reality and think about reality does not strike me as far-fetched.

al master-slave relationship in which the computer's internal clock dictates the timing of the digital-audio signal. In asynchronous mode, it is the clock in the USB DAC that is the master, and the computer the slave. The reason this makes a difference is that the computer's own clock has other tasks to perform, which makes for more jitter. Asynchronous implementation also means that sample-rate conversion and phase-locked loops are not necessary. Technical explanations aside, asynchronous USB simply sounds better, at least in my experience. The m903 uses a miniature USB jack, and so Grace thoughtfully provides a cable with a full-sized USB plug on one end and a mini-plug on the other; this was the only USB cable I used.

A few other nifty things about the m903: It has balanced and single-ended analog *inputs* on XLR and RCA jacks. When an analog input is selected, the m903's digital circuits power down. This is just one example of how thoroughly thought-through this design is. Another example is the Menu's Mono setting, which the owner's manual recommends you use to listen to early Beatles recordings.

The m903 has two headphone jacks; these are wired in parallel, so the volume control controls both together. There are two sets of line-level analog outputs: L1 is single-ended on RCA jacks, while L2 is balanced on ¼-inch TRS jacks. The levels for the headphone jacks and the two line-level outputs are independently controllable. Which output is being controlled is determined by sequentially pressing the volume knob, and indicator lights on the front panel show which input is under control: the headphone jacks can be at one level, L1 at a different level, and L2 at a third level. However, by using the setup menu, which is called up by pressing in and holding the volume knob, it's possible to gang L1 and L2 together. This means that the m903 can control a satellites-and-subwoofer system—which many professional and prosumer monitoring setups are.




A logical signal flow: The m903's block diagram.

That volume knob is a "smart" knob with a three-stage acceleration curve in increments of 0.5, 2.0, and 4.0dB. The m902 had a menu function to set all analog outputs to Hi or Lo. This has been replaced in the m903 by a function that can independently master-adjust the levels of the three outputs over a range of ±9.5dB.

For the digital inputs other than USB, the m903 employs a proprietary phase-locked loop that Grace calls s-Lock. This locks to the incoming clock, and once lock is achieved (as indicated by a front-panel LED), the m903 runs off its own internal clock. The m903 can lock to an incoming signal within a range of ±5Hz at 44.1kHz. However, if lock is not achieved, the m903 will nonetheless play in most cases, with claimed "excellent" recovered-clock jitter performance (though this will largely be determined by the quality of the source device). In USB mode, the m903's system clock is the master clock to which the computer is synced, and so s-Lock is inactive.

I did, of course, listen to the Grace m903 with headphones, but mostly I used it as I think most audiophiles will: as a DAC in a system. Mine comprised Vivid Audio's B-1 and K-1 loudspeakers, Cardas Clear speaker cables and single-ended interconnects, Luxman's C-600f solid-state power amplifier and surprisingly powerful MQ-88 tubed power amp, Ayre's CX-7e$^{MP}$ player as an AES/EBU digital transport, Meridian Sooloos's Control:15 as an S/PDIF source, and my iMac computer as a USB source. My headphones were Audio-Technica's cheap'n'cheerful closed-back M50s ($199, reviewed in the February 2010 issue) and, briefly, the 600-ohm variant of Beyerdynamic's wonderful DT 770 Premium closed-back model ($269). (Medium- and low-impedance models are also offered for use with portable music players, but I found the sound of the high-impedance version slightly more appealing. More in a future column.)

First crack off the bat, I connected the m903 to my iMac and listened via Amarra (I still can't get over how much better it sounds than iTunes) to HDtracks' 192kHz download of Bill Evans' "My Foolish Heart," from *Waltz for Debbie*, using the Beyerdynamic DT 770s. Wowzers. A night-and-day difference from Grace's previous USB (1.0) sound. I quickly cued up my AIFF "Red Book" file of the same track, but from *The Complete Village Vanguard Recordings*, and while it was nowhere near as immediate, it was still very, very good.

Whether via USB, S/PDIF, or AES/EBU, the m903 carried on the Grace tradition of (to quote Sam Tellig) "warm, rich, and full-bodied," easy-to-listen-to sound, but definitely took it up another

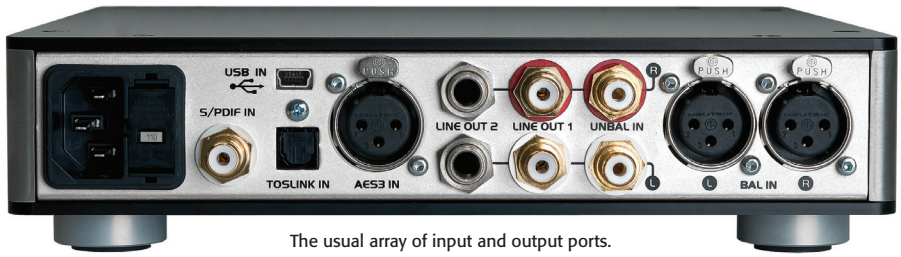
## CONTACTS

**Arcam**, Pembroke Avenue, Waterbeach, Cambridge CB25 9QR, England, UK. Tel: (44) (0)1223-203200. Fax: (44) (0)1223-863384. Web: www.arcam.co.uk. US distributor: American Audio & Video. Tel: (866) 916-4667. Web: www.americanaudiovideo.com.

**Grace Design**, 2434 30th Street, Boulder, CO 80301; PO Box 204, Boulder, CO 80306-0204. Tel: (303) 443-7454. Fax: (303) 444-4634. Web: www.gracedesign.com.

**Howard Leight by Honeywell**, Sperian Hearing Protection, LLC, 7828 Waterville Road, San Diego, CA 92154. Tel: (800) 430-5490. Fax: (401) 232-3110. Web: www.howardleight.com.

notch in every respect, especially in that intangible called "sophistication." I expected the USB performance to be much better, and found it outstanding. However, I was not prepared for how much better the S/PDIF and AES/EBU performance was in terms of resolution of musical details and overall involvement. Still, taking into account changes or improvements in the DAC, the amplifier, the power supply, and the volume control, I probably shouldn't have been surprised. The m903's USB performance was at least as good as S/PDIF or AES/EBU; indeed, Joni Mitchell's piano and voice in *Court and Spark*'s title track seemed almost imperceptibly richer through the USB input.



The usual array of input and output ports.

A visitor who listened to the m903 made an interesting comment. He said that the m903 handled the music so gently that it was the first DAC he'd heard that he'd be tempted to describe as "feminine." I think that's a large part of its charm. However, most virtues have flip sides. In a direct comparison with the $5500 combination of Antelope's Zodiac Gold D/A headphone amp and its optional Voltikus power supply that I wrote about in October, the Antelope started and stopped faster (like a wildebeest?), and had punchier dynamics. For my own tastes, I put timbre ahead of dynamics, so I'm not bothered by this. But if "slam" is what you're looking for, perhaps the Grace m903 is not the DAC for you.

The Grace Design m903 continues the tradition set by its predecessors by being "a great, high-resolution DAC in a very cost-effective package" that offers remarkable clarity, continuity, and roundness of tone, and is better in almost every way than the m902. Major performance gains with only a $200 increase in price, and still made in good ol' Colorado. Those looking to upgrade their CD player or music server should check out the m903. Highly recommended.

GRACE
DESIGN

Posted with permission from the December 2011 issue of Stereophile ® www.stereophile.com. Copyright 2011 Source Interlink Media. All rights reserved.
For more information about the use of this content, contact Wright's Media at 877-652-5295

83194