KALMAN RUBINSON

NAD C 298

POWER AMPLIFIER

Rather than stressing the NAD, it both startled and thrilled.

Power amplifiers should be boring. They have a single, well-defined function: Make the input signal large enough to run a loudspeaker so that it makes sound at levels suitable for listening to music. Generally, controls and features are few or none. Peter Walker of Quad famously defined the ideal amplifier as a "straight wire with gain." That's just one feature: gain.

That ideal is not easy to achieve, for many reasons. Even a straight wire of any practical length and structure has properties (resistance, capacitance, inductance) that can affect how the signal is transferred to it on one end and how the signal is transferred from it on the other. These effects can be within the audible range depending on what device is at each end. Insert a complex device like a real-world amplifier (with different wires in and out) and Walker's ideal starts to seem unrealistic, although it should be possible to get close.

Walker further stated that an "audio power amplifier is required to produce an output signal that differs from the input signal in magnitude only."[1] In attempting to realize that goal, he tried both tubed and transistor designs (although he averred that the latter were superior). Today, with the availability of tube amps and an expanding range of solid state designs, we have a broad range of options but no better standard than Walker's.

The NAD C 298 stereo power amplifier is based on the Purifi Eigentakt class-D amplifier module, the most recent brainchild of Bruno Putzeys and Lars Risbo. The C 298's design incorporates feedback to achieve a linear and accurate transfer function, an approach espoused by Peter Walker, although the Purifi guys are using an approach to amplification—class-D—that even advanced thinkers in Walker's time may not have been aware of.[2] So, let us not obsess about "how" the amplifier does its job and focus on how well it does it, technically (Cue JA!) and how well it plays music.

The amp arrives

Even as I was reviewing the NAD M33 Streaming Integrated Amplifier last year,[3] it seemed obvious that NAD would soon release a stereo power amplifier using the same Purifi technology. I wrote that the M33 has "a switch to bridge the two channels into a >700W mono monster, and the line outputs allow you to add an external matching amp or two. (Do you think that NAD has something like that in the works?)" But no, the next amp NAD introduced with the Purifi technology was the M27's successor, the M28, a seven-channel power amp. (See sidebar, p.105.) The M33 and the M28 are, as indicated by their common prefix, members of NAD's generous and stylish Masters Series.

When it arrived, NAD's two-channel Purifi-based power amplifier was observably not in the Masters Series but rather their more affordable, less luxurious "C" (for "Classic") series. The C 298 employs the same Eigentakt modules used in the M33 and M28, "but the power supply and input circuitry is specific to the C 298." The C 298 is heavy for a class-D amp, at about 25lb. Its appearance is plain but clean, and the amp seems well-constructed.

The front panel bears only a Standby button and two small LEDs. When you connect the AC cable and rock the main power rocker switch on the rear—nothing seems to happen. Press the front panel button, though, and after a few seconds' delay, a relay clicks as the LED above the Standby button blinks in amber. In a few more seconds, the LED turns blue and the amp is ready to make music. The slightly larger LED to the right of the Standby button lights blue if the amp is in bridged mode.

There is more going on in the back: both XLR and RCA inputs for each channel with toggle switches to select them; a pair of RCA line outputs to permit daisy-chaining the input to additional amps; a toggle to select fixed or variable gain; a gain control; and a control for the sensitivity of the Auto-Sense function. Above these connectors is a grounding lug to help remove ground-loop hum. Next is a mini-USB port for servicing, a 12V trigger input and output, and a bridged-mode switch that's intentionally hard to get at. Finally, there

1 The quote is from *Wireless World*, December 1975.—Editor

2 Class-D amplification was invented in the 1950s, and by the mid-'60s there was even a commercial product from Sinclair Radionics, which put out a whopping 2.5W. It's likely true, though, that most designers in the hi-fi space weren't aware of it.—Editor

3 See stereophile.com/content/nad-masters-series-m33-streaming-integrated-amplifier.

are two pairs of sturdy, multiway speaker terminals, that power rocker, an AC fuse holder, and an IEC receptacle.

Standard bridging strategies are verboten with Purifi amp modules since neither output terminal is at ground potential and should never be connected to an external ground. Unlike regular bridged amplifiers, where the output is taken from the left and right positive terminals, NAD uses the left positive and right negative terminals and cautions against connecting subwoofers, switches, or headphone adapters with common ground connections. Safety is a good reason for the bridging switch to be inconvenient.

If one uses the C 298 in a multichannel system or to power active multiway speakers or if one wants to mix bridged and stereo C 298s with other amps, it's necessary to adjust the gain—hence the C 298's gain-control knob, which allows you to select gain between 8.5dB and 28.5dB in stereo and between 14.5dB and 34.5dB bridged. NAD could improve this very useful feature by providing a visible index mark on the tiny knob.

Context and listening

Although my system is multichannel, there is no processor or preamplifier. The output of the DACs drives the power amps directly via balanced connections. I used the NAD's XLR inputs in both stereo and bridged modes. When playing two-channel music, I used fixed gain. Fixed gain in stereo mode (28.6dB) also worked when playing multichannel with one C 298 powering the front L/R speakers. However, to use a pair of bridged C 298 amps, my options were to use fixed gain and adjust the channel balance in JRiver or the DAC or to use variable gain to match the other channels. The character of the amp remained constant across all these permutations.

Beginning with the single C 298 driving the Revel Studio2's, listening to several familiar selections, I found nothing remarkable, and I mean that in a good way. There should *not* be big, striking differences among high-quality amplifiers of sufficient bandwidth and power. Big differences make me suspicious that something's wrong or that something's not fair. It was reassuring to find that the NAD was fully up to the task, but this does make characterizing an amplifier's sound challenging.

By unexplained providence, there have been two new releases of French chamber/parlor music for piano and cello, both claiming inspiration from Marcel Proust. And yet there is no overlap in the selections, and there's very little overlap

SPECIFICATIONS

Description Stereo power amplifier based on Purifi Eigentakt Amplifier Technology. Inputs: 1 pair RCA (unbalanced), 1 pair XLR (balanced). Input impedance: 56k ohms + 280pF. Outputs: 1 pair RCA (unbalanced), 2 pair multiway loudspeaker binding posts. 12V trigger input and output. Input sensitivity: 1.43V for 185W (fixed-gain stereo mode, into 8 ohms), 3.78V for 340W (fixed-gain bridge mode). Rated output power, stereo: 185Wpc into 8 ohms (22.7dBW), 340Wpc into 4 ohms (22.3dBW); Bridged: 620Wpc into 8 ohms (27.9dBW). IHF dynamic power: 260W into 8 ohms, 490W into 4 ohms, 570W into 2 ohms. Damping factor: >800 (ref. 8 ohms, 20Hz–6.5kHz). Frequency response: 20Hz–20kHz, ±0.2dB, –3dB at 60kHz. Channel separation: >100dB (1kHz), >80dB (10kHz). Signal/noise: >98dB (A-weighted, ref. 1W), >120dB (A-weighted, ref. 185W). THD: <0.005% (1W–185W into 8 and 4 ohms). Power consumption: <0.5W standby.

Dimensions 17.125" (435mm) W × 4.75" (120mm) H × 15.3750 (396mm) D. Weight: 24.7lb (11.2kg). Shipping weight: 30lb (13.6kg).

Finish Black.

Serial number of units reviewed H209C 29801558/9. "Designed and engineered in Canada, Custom manufactured to NAD specifications in China."

Price $1999. Approximate number of dealers: 400. Warranty: 2 years, parts and labor.

Manufacturer NAD Electronics International, 633 Granite Ct., Pickering, Ontario L1W 3K1, Canada. Tel: (905) 831-6555. Web: nadelectronics.com.

in the aesthetic. Although both cellists employ instruments by Stradivarius, the piano on *Proust, Le Concert retrouvé: A Concert at the Ritz during the Belle Époque* (Tanguy de Williencourt, cello; Théotime Langlois de Swarte, piano. Harmonia Mundi HMM 902508, 16/44.1 WAV download) is an 1891 Erard, while the pianist on *Music from Proust's Salons* (Steven Isserlis, cello; Connie Shih, piano. BIS-2522, SACD, 24/96 FLAC download) plays a modern Steinway D. From the first note from the Erard on the HM recording, one is drawn, à la Proust, into a recollection of an earlier time. The instruments are warm-toned, the ambiance is intimate, and the pace is gracious. It feels personal.

Conversely, the sound of the instruments on the BIS recording (even in stereo) is more modern, the space more open, and the pace playful. It feels honest but, compared to the HM, more dynamic and also more distant. The NAD C 298 reveals those differences as two equally convincing perspectives and encourages listening to both for full appreciation.

With the larger ensemble size and dynamics of a modern orchestra, the C 298 is entirely up to the task as single stereo amp. Gianandrea Noseda's Shostakovich series with the LSO is gathering steam from a triumphant version of the Symphony No.8 to a new release of the 9th and 10th symphonies (LSO Live LSO0828, DSD64 download). I think of the 9th as the bigger, brawnier cousin of Prokofiev's "Classical" 1st symphony. Neither the snappy snare drum bursts of the first movement, the deep, weighty brass chords of the Largo, nor the chest-thumping tuttis of the finale prevent this piece from seeming happy and engaging. Still, these characteristics—and also the recording's wide dynamic range—present a challenge to amp and speakers. With either my Revels or the Dynaudios (review on tap), a single C 298 in stereo mode handled it with aplomb, even at high levels. (My wife just slammed the door to the next room!) The NAD gave no indication of stress. It was barely warm to the touch.

On voices, too, the C 298 was excellent. For that, I went back to the Qobuz stream of "Sister Rosetta Goes Before Us," sung by Alison Krauss on her album with Robert Plant, *Raising Sand* (Rounder 11661-9075-2, CD). Yeah, same beautiful voice I know but a bit fleshier and with the abiding

MEASUREMENTS

The NAD C 298 can be operated as a conventional stereo amplifier or as a bridged-mono amplifier. (In mono mode, the signal is fed to the left input and the output taken from the left channel's positive binding post and the right channel's negative binding post.) As Kal Rubinson auditioned the NAD both in stereo mode and as a pair of monoblocks, I performed a complete set of measurements in both modes. The C 298 has an output stage operating in class-D, so I inserted an Audio Precision auxiliary AUX-0025 passive low-pass filter between the test load and my Audio Precision SYS2722 system (see the January 2008 "As We See It"[1]). This filter eliminates RF noise that could drive the SYS2722's input circuitry into slew-rate limiting, and I used it for all the tests other than frequency response.

The C 298 has both balanced and single-ended inputs; I performed most of the measurements using the balanced inputs, repeating some tests with the unbalanced inputs. With the amplifier in stereo and fixed-gain modes, I measured a voltage gain of 28.6dB into 8 ohms with both types of inputs. With the amplifier switched to variable-gain mode, the voltage gain could be varied between 9.35dB and 28.5dB. In mono mode, the C 298's gain into 8 ohms was 25.3dB in fixed-gain mode but could be varied between 15.4dB and 34.55dB in the variable-gain mode. The amplifier preserved absolute polarity (ie, was noninverting) with both types of inputs in both stereo and mono modes, as well as from the preamplifier output. The XLR jacks are wired with pin 2 hot.

The input impedance is specified as a high 56k ohms with both types of input. My measurement was close to the specification for the single-ended inputs, at 49k ohms at 20Hz and 1kHz.

1 See stereophile.com/content/measurements-maps-precision.

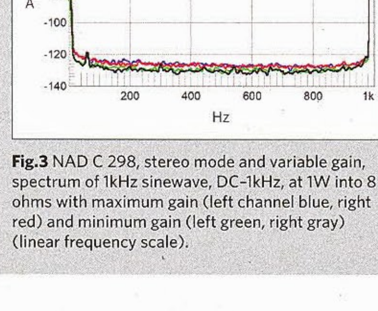


Fig.1 NAD C 298, stereo mode, frequency response at 2.83V into: simulated loudspeaker load (gray), 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), and 2 ohms (green) (0.5dB/vertical div.).

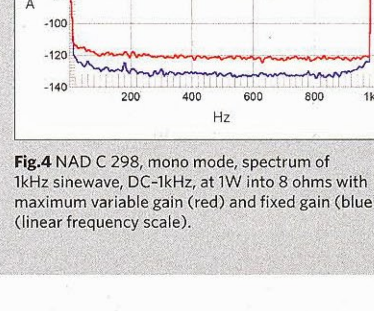
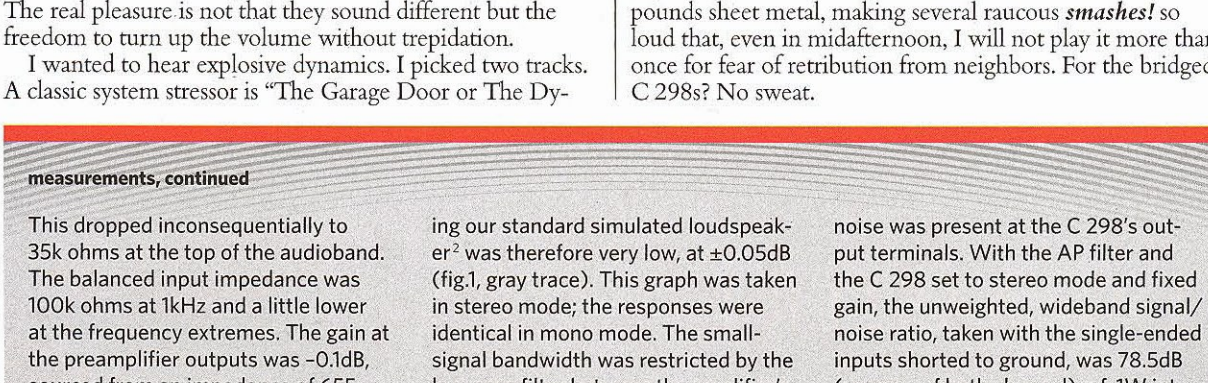


Fig.2 NAD C 298, stereo mode, small-signal, 10kHz squarewave into 8 ohms.

Fig.3 NAD C 298, stereo mode and variable gain, spectrum of 1kHz sinewave, DC–1kHz, at 1W into 8 ohms with maximum gain (left channel blue, right red) and minimum gain (left green, right gray) (linear frequency scale).

Fig.4 NAD C 298, mono mode, spectrum of 1kHz sinewave, DC–1kHz, at 1W into 8 ohms with maximum variable gain (red) and fixed gain (blue) (linear frequency scale).



HF noise that accompanies it less obtrusive. Bass was big.

A single C 298 was excellent and capable, so why did I insist on getting a pair? Power! As a stereo amp, the NAD is about 2.7dB more powerful than my 100Wpc Benchmark AHB2, but I choose to use it bridged to 370W most of the time for headroom: peace of mind. The bridged NADs are rated at 620W, about 2.25dB higher than bridged AHB2s. The real pleasure is not that they sound different but the freedom to turn up the volume without trepidation.

I wanted to hear explosive dynamics. I picked two tracks. A classic system stressor is "The Garage Door or The Dynamic Range of Real Life" from *Hi-Fi News & Record Review Test Disc III*. JRiver says this track has a dynamic range of 17, but it punches (literally) way above that. Set the opening voice of Mike Skeet to normal voice level, and the crash of the closing door is very loud with a potent low-frequency *bang!* as the door hits the ground. But hang on: After Mike's slightly muffled announcement from the other side, he pounds sheet metal, making several raucous *smashes!* so loud that, even in midafternoon, I will not play it more than once for fear of retribution from neighbors. For the bridged C 298s? No sweat.

measurements, continued

This dropped inconsequentially to 35k ohms at the top of the audioband. The balanced input impedance was 100k ohms at 1kHz and a little lower at the frequency extremes. The gain at the preamplifier outputs was –0.1dB, sourced from an impedance of 655 ohms at 20Hz and 385 ohms at 1kHz and 20kHz.

With the NAD amplifier in stereo mode, I measured a very low output impedance of 0.06 ohms at 20Hz and 1kHz, rising slightly to 0.072 ohms at 20kHz. (These figures include the series impedance of a 6', spaced-pair speaker cable.) The output impedance was only slightly higher in mono mode, at 0.063 ohms at 20Hz and 1kHz, and 0.082 ohms at 20kHz. The modulation of the NAD's frequency response driving our standard simulated loudspeaker[2] was therefore very low, at ±0.05dB (fig.1, gray trace). This graph was taken in stereo mode; the responses were identical in mono mode. The small-signal bandwidth was restricted by the low-pass filter between the amplifier's class-D stage and its output terminals. Into 8 ohms (fig.1, blue trace), the ultrasonic rolloff reached –3dB at 66kHz. This rolloff lengthened the risetimes of a 10kHz squarewave (fig.2). There is a critically damped overshoot on the tops and bottoms of the waveform, but there is no ringing.

Channel separation was superb, at >110dB in both directions below 1kHz and still close to 80dB at 20kHz. Without the auxiliary low-pass filter, 180mV of ultrasonic noise was present at the C 298's output terminals. With the AP filter and the C 298 set to stereo mode and fixed gain, the unweighted, wideband signal/noise ratio, taken with the single-ended inputs shorted to ground, was 78.5dB (average of both channel) ref. 1W into 8 ohms. It improved to 95.1dB when I restricted the measurement to the audioband and to 99dB with an A-weighting filter in circuit.

These ratios were affected only slightly by switching the amplifier in stereo mode to variable-gain mode and adjusting the gain from minimum to maximum. This can be seen in fig.3, which shows the spectrum of the low-frequency noise floor with the gain set

2 See stereophile.com/content/real-life-measurements-page-2.

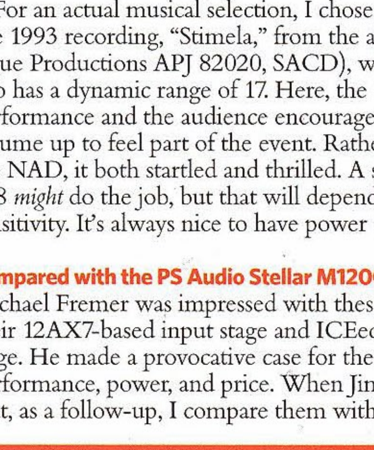


Fig.5 NAD C 298, stereo mode, distortion (%) vs 1kHz continuous output power into 8 ohms.

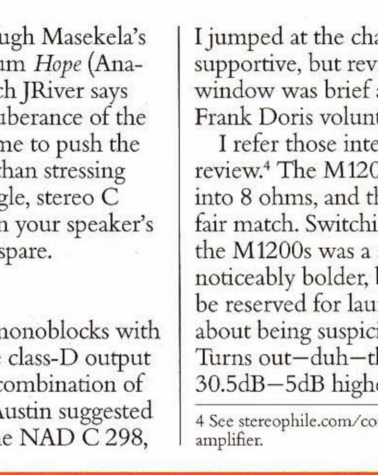


Fig.6 NAD C 298, stereo mode, distortion (%) vs 1kHz continuous output power into 4 ohms.

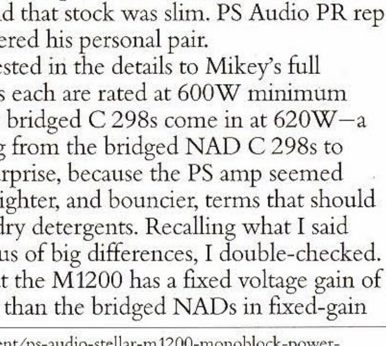


Fig.7 NAD C 298, mono mode, distortion (%) vs 1kHz continuous output power into 8 ohms.

For an actual musical selection, I chose Hugh Masekela's live 1993 recording, "Stimela," from the album *Hope* (Analogue Productions APJ 82020, SACD), which JRiver says also has a dynamic range of 17. Here, the exuberance of the performance and the audience encouraged me to push the volume up to feel part of the event. Rather than stressing the NAD, it both startled and thrilled. A single, stereo C 298 *might* do the job, but that will depend on your speaker's sensitivity. It's always nice to have power to spare.

Compared with the PS Audio Stellar M1200s

Michael Fremer was impressed with these monoblocks with their 12AX7-based input stage and ICEedge class-D output stage. He made a provocative case for their combination of performance, power, and price. When Jim Austin suggested that, as a follow-up, I compare them with the NAD C 298, I jumped at the chance. PS Audio's Paul McGowan was supportive, but review samples were scarce, and our time window was brief and that stock was slim. PS Audio PR rep Frank Doris volunteered his personal pair.

I refer those interested in the details to Mikey's full review.[4] The M1200s each are rated at 600W minimum into 8 ohms, and the bridged C 298s come in at 620W—a fair match. Switching from the bridged NAD C 298s to the M1200s was a surprise, because the PS amp seemed noticeably bolder, brighter, and bouncier, terms that should be reserved for laundry detergents. Recalling what I said about being suspicious of big differences, I double-checked. Turns out—duh—that the M1200 has a fixed voltage gain of 30.5dB—5dB higher than the bridged NADs in fixed-gain

4 See stereophile.com/content/ps-audio-stellar-m1200-monoblock-power-amplifier.

measurements, continued

to its minimum (green and gray traces) and to its maximum (blue and red traces). The only power supply–related component visible in this graph is at 60Hz, but this is negligible at almost –120dB ref. 1W into 8 ohms. With the C 298 set to bridged mono and with the variable gain set to its minimum, the noise floor was identical to what it had been in stereo mode other than no longer having a 60Hz component (fig.4, blue trace). However, increasing the gain to its maximum now raised the noise floor by around 10dB (red trace).

The C 298's rated power in stereo mode is specified as 185Wpc into 8 ohms (22.67dBW) and 340W into 4 ohms (22.3dBW ref. 1W into 8 ohms). The NAD exceeded its specified power into both impedances. With both channels driven and clipping defined as when the THD+noise in the output reaches 1%, the C 298 clipped at 275W into 8 ohms (24.4dBW, fig.5) and at 510W into 4 ohms (fig.6, 24.1dBW). What is extraordinary about these two graphs is that the harmonic distortion reaches 0.0005% or lower at powers between 20W and 180W into 8 ohms and between 40W and 70W into 4 ohms. (Below those regions, the traces in these graphs are dominated by noise.) The C 298 is one of the lowest-distortion amplifiers I have measured, rivaling the less powerful Benchmark AHB2 that KR reviewed in November 2015.[3]

In bridged-mono mode, the NAD's rated power is specified as 620W into 8 ohms (27.9dBW). Again, the C 298 exceeded its specified power, clipping at 980W into 8 ohms (29.9dBW, fig.7). NAD doesn't recommend using the amplifier in mono mode to drive impedances below 8 ohms. Nevertheless, I measured a clipping power of 880W into 4 ohms (26.4dBW, not shown).[4]

I examined how the THD+N percentage in the C 298's output in stereo mode varied with frequency at 14V (equivalent to 24.5W into 8 ohms, 49W into 4 ohms, and 98W into 2 ohms). I tried a higher output level—20V—but the amplifier went into protection mode after a short while driving the higher frequencies at 2 ohms. The distortion into 8 ohms was very low (fig.8, blue and red traces), though it started to rise in the top octave. The distortion hardly rose into 4 ohms (cyan and magenta traces) and only by a little into 2 ohms (green and gray traces).

The NAD amplifier's distortion signature at high power in both stereo and mono modes into 4 ohms was primarily third harmonic (fig.9). (The distortion was below the noise floor at

3 See stereophile.com/content/benchmark-media-systems-ahb2-power-amplifier-measurements.

4 This impressively high power could not however be sustained for more than 30 seconds or so. The owner's manual says that running the C 298 in bridged-mono mode to drive impedances lower than 8 ohms "may cause the amplifier's thermal cut-out to operate if played at high levels." Very likely, a bridged NAD 298 would perform well into loads less than 8 ohms at normal listening levels—and it would then have impressive short-term reserves to draw on for transient power. Indeed, while NAD does not recommend bridged C 298 for use with loads below 8 ohms, it specifies the bridged amp as having an impressive 1100W of "IHF dynamic power" into 4 ohms when bridged.

What's going on? In effect, bridging an amplifier cuts the impedance the amplifier sees in half, so while the amp has more power, it *needs* more power to drive a more difficult load. The same phenomenon is at work in all bridged amplifiers.—Editor

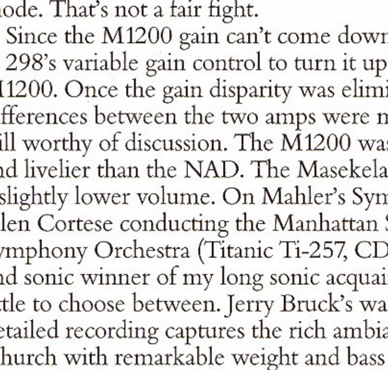


Fig.8 NAD C 298, stereo mode, THD+N (%) vs frequency at 14V into: 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), and 2 ohms (left green, right gray).

Fig.9 NAD C 298, stereo mode, left channel, 1kHz waveform at 200W into 4 ohms, 0.0031% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

Fig.10 NAD C 298, stereo mode, spectrum of 50Hz sinewave, DC–1kHz, at 100W into 8 ohms (left channel blue, right red, linear frequency scale).

mode. That's not a fair fight.

Since the M1200 gain can't come down, I used the C 298's variable gain control to turn it up to match the M1200. Once the gain disparity was eliminated, the sonic differences between the two amps were much smaller but still worthy of discussion. The M1200 was *still* a bit bolder and livelier than the NAD. The Masekela track came alive at a slightly lower volume. On Mahler's Symphony No.6 with Glen Cortese conducting the Manhattan School of Music Symphony Orchestra (Titanic Ti-257, CD), another musical and sonic winner of my long sonic acquaintance, there was little to choose between. Jerry Bruck's warm yet extremely detailed recording captures the rich ambiance of Riverside Church with remarkable weight and bass detail. JRiver tags the last (and my favorite) movement with a dynamic range of 22! The music demands it. (Oh those hammer blows!) There was, again, little to choose from, but if forced to pick nits, I'd say that the bass with the C 298s had a bit more weight while the M1200s offered a tad better bass impact.

For voices, woodwinds, and other midrange stuff, the M1200 had a slight advantage in clarity, but just as often, the NAD was somewhat more coherent across and deeply within the soundstage. I preferred different amplifiers on different tracks, for different reasons.

These preferences shifted as I switched between the Revel and the Dynaudio speakers, and I often questioned conclusions I had reached before. Throwing the bridged Benchmarks into contention muddied matters further. It has been my go-to amp for a while, and I may be biased toward it as a reference. I think it has more detail across the spectrum than the other amps, but it may not be as even-tempered as the

ASSOCIATED EQUIPMENT

Digital sources Oppo Digital UDP-105 universal disc player; custom Baetis Prodigy-X4i music server running JRiver Media Center v27 and Roon 1.8; exaSound Delta Server running Roon 1.8; exaSound e38 Mark II and Okto DAC8 Pro D/A processors. QNAP TVS-873 NAS.

Preamplifiers None. Source switching with Coleman Audio 7.1SW.

Power amplifiers Benchmark AHB2, PS Audio M1200.

Loudspeakers Revel Ultima2 Studio, Dynaudio Confidence 30.

Cables Digital: AudioQuest Coffee (USB). Interconnects: AudioQuest Earth/DBS balanced, Kubala-Sosna Anticipation (RCA). Speaker: Benchmark Studio&Stage, Canare 4S11 (Blue Jeans Cable). AC: Kubala-Sosna Emotion, SignalCable MagicPower 20A.

Accessories AudioQuest Niagara 5000 and Brick-Wall BrickWall 8RAUD power conditioners, Teddy Pardo 12V PS (for exaSound e38), HDPLEX 400W ATX Linear Power Supply and CyberPower 850PFCLCD AC filter (for the Baetis server).

Listening room 24' L × 14' W × 8' H, furnished with 2 MSR Acoustics Dimension4 SpringTraps in the front corners, 2 Ready Acoustics Chameleon Super Sub Bass Traps to the sides, and moderately sound-absorbing furniture. Front wall has large windows partly covered by fabric drapes and 4"-thick 2' × 4' OC 705 panels. Rear of room opens into a 10' × 7' foyer and a 12' × 8' dining area.—Kalman Rubinson

measurements, continued

lower powers, especially into 8 ohms.) Spectral analysis confirmed that this harmonic was slightly higher in level in the right channel (fig.10, red trace) than the left (blue trace), though at –124dB ref. 100W into 8 ohms (0.00006%), it is negligible. Note the commendable absence of higher-order harmonics in this graph. At the same output voltage into 4 ohms, which is equivalent to 200W, the third harmonic rose to –110dB in the left channel and to a still very low –104dB in the right (not shown). In bridged-mono mode at 100W into 8 ohms, the second and third harmonics both lay at –120dB (0.0001%, fig.11), though the third harmonic rose to –100dB (0.001%) at the same voltage into 4 ohms (not shown).

With an equal mix of 19 and 20kHz tones and the signal peaking at 200W into 4 ohms, intermodulation in stereo mode was extremely low (fig.12). Surprisingly, the higher-order products were even lower in mono mode at 100W into 8 ohms, though the difference product at 1kHz still lay below –120dB (fig.13).

Going back to the days when NAD's amplifiers were designed by the late Björn Erik Edvardsen, I have always been impressed by the company's conservative and competent engineering. The NAD C 298 continues that tradition but, with its "Eigentakt" class-D output modules, sets a new standard for combining very high power with supremely low distortion.—John Atkinson

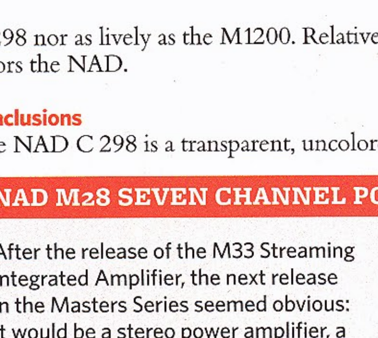


Fig.11 NAD C 298, mono mode, spectrum of 50Hz sinewave, DC–1kHz, at 100W into 8 ohms (linear frequency scale).

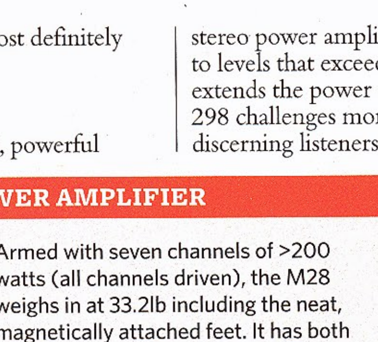


Fig.12 NAD C 298, stereo mode, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 200W peak into 4 ohms (left channel blue, right red, linear frequency scale).

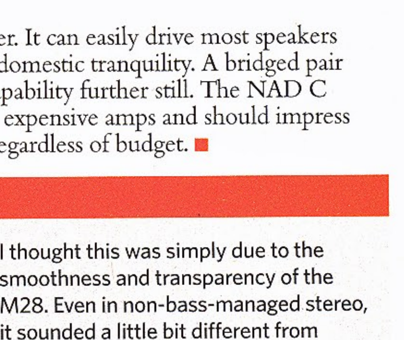


Fig.13 NAD C 298, mono mode, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 100W peak into 8 ohms (linear frequency scale).

C 298 nor as lively as the M1200. Relative cost definitely favors the NAD.

Conclusions

The NAD C 298 is a transparent, uncolored, powerful stereo power amplifier. It can easily drive most speakers to levels that exceed domestic tranquility. A bridged pair extends the power capability further still. The NAD C 298 challenges more expensive amps and should impress discerning listeners regardless of budget. ■

NAD M28 SEVEN CHANNEL POWER AMPLIFIER

After the release of the M33 Streaming Integrated Amplifier, the next release in the Masters Series seemed obvious: It would be a stereo power amplifier, a successor to the nCore-based M22 v2, featuring the same Purifi-based output technology found in the M33.

Instead, NAD announced the seven-channel M28 amplifier ($4999), successor to the nCore-based M27. I welcomed it because the beloved, durable Bryston 9B-ST THX in my Connecticut system had recently blown an internal fuse. Its 20-year warranty was expiring soon, so I decided to send it to Bryston for a checkup and restoration. NAD offered me an M28 for a trial at just the right time. Off went the Bryston[1] and in came the NAD.

As part of the NAD Masters Series, the M28 comes in luxurious packaging and impressively sturdy construction. Armed with seven channels of >200 watts (all channels driven), the M28 weighs in at 33.2lb including the neat, magnetically attached feet. It has both XLR (balanced) and RCA (unbalanced) inputs with switches for each channel, auto-standby and auto-on options, and a 12V trigger input.

I connected the seven balanced outputs of the Marantz AV8805 to the balanced inputs of the M28 and connected the outputs to five main speakers (FR, C, FL, SR, SL) and the front L/R Atmos speakers. I ran a 12V trigger cable to turn it all on or off. The rear L/R Atmos speakers ran from a Parasound Zamp v.3. The powered subs were connected via the DSPeaker Anti-Mode X4 EQ. It all worked together flawlessly.

With the NAD amp in place, I felt that there was a more satisfying integration of the soundfield than before. At first, I thought this was simply due to the smoothness and transparency of the M28. Even in non-bass-managed stereo, it sounded a little bit different from the Bryston: The treble seemed more delicately detailed while the upper low frequencies were a bit better defined. In multichannel, the M28 created a somewhat greater sense of envelopment with both 5.1 and Atmos content.

The M28 shares the same NAD Purifi-Eigentakt amp board as the C 298, and, while I listen to them in different places, I'd say they sound similar.

The NAD M28 is now resident in my system. It is nearly half the weight and draws half the power at idle as its predecessor, but I foresee it remaining there for just as long.—Kal Rubinson

1 Bryston replaced the fuse and updated all channels in the 9B with new output devices. I trust it will serve its new owner as well as it has served me.