MICHAEL FREMER

CH Precision M1.1

POWER AMPLIFIER

CH Precision's massive, versatile, technologically sophisticated, 165lb M1.1 power amplifier ($54,000 configured for stereo) can easily crush your foot if you're not careful when installing it. But the more important consideration is this: Can this cool gray techno-square sing and dance without stepping on its *own* feet?

Unlike their playfully mischievous neighbor darTZeel, whose corporate sense of humor runs so deep that the LCD readout on their NHB-18NS preamp displays the messages *foreplay* and *climaxed* when working its on/off switch, Swiss manufacturer CH Precision is all business. Founded by Florian Cossy and Thierry Heeb (hence the company name—although, coincidentally, CH also stands for Confoederatio Helvetica, the Latin abbreviation for Swiss Confederation), CH Precision is a relatively young company, though the founders have a long history in high-performance audio beginning in the 1990s with their work for Goldmund. The two left that company to form OEM Anagram Technologies, which quickly established a fine reputation for its DACs, among other products. In 2009, with the encouragement of a group of distributors, the partners founded CH Precision.

The manner in which a company handles their "legacy" customers tells you a great deal.

Modular design

Like all CH Precision products, the M1.1 is an unusually flexible design—so much so that, although you wouldn't know it from the headline, I reviewed two of them, as monoblocks. Each M1.1 contains two power amplifiers and can be configured in any of five different modes. The simplest of these—and the only one that requires just a single M1.1—is stereo mode, in which the M1.1 outputs 350Wpc into 4 ohms. But because each M1.1 is shipped with only a single input card, stereo mode requires the purchase of a second card ($2000).

After that, there are four different ways of using a *pair* of M1.1s:

- Monaural mode, which uses only one output section per amp, yet which diverts to that board the entire output of the amp's massive power transformer. In this mode, the M1.1 can deliver up to 350W into 4 ohms.
- Bridged mode, in which both output sections per chassis operate together as a single balanced amplifier, outputting up to 1200W into 4 ohms.
- Passive bi-amplification mode, in which the two output

sections per chassis separately drive the two pairs of input terminals on a bi-amplifiable speaker. Interestingly, in this mode, feedback and gain can be independently adjusted for each pair of terminals, to more precisely match the individual speaker segment's efficiency and sonic characteristics.

Active bi-amplification mode, which also requires the purchase of an additional input board—for each amp—and allows the use of an external crossover. As in passive bi-amplification mode, feedback and gain can be independently adjusted for each pair of speaker terminals.

The modular design allows end users to order an M1.1 with a single analog input board for both monaural and passive bi-amplification use, and later add a second analog input board for active bi-amplification mode or, if times get tough, sell one amp and add the second input card to create a stereo amplifier. Speaking of tough times, a pair of M1.1s configured as monoblocks (with a single input board each) costs $104,000.

The M1.1 was created in June of 2018, as an upgrade from their M1 power amp. For the new model, the single 100,000µF power capacitor of the original was replace by a pair of "monstrous" (according to the CH website) 120,000µF ultralow-ESR/ESL capacitors, for a total storage capacity of 240,000µF per chassis. This upgrade brought about a $3000 price increase from the old model to the new; for the same $3000, CH will ship the upgraded parts to the customer's home and, for no additional charge, send a technician to perform the install. The manner in which a company handles their "legacy" customers tells you a great deal.

The power supply, occupying most of the chassis interior, features a massive 2200VA transformer that's magnetically and electrostatically shielded and mounted on vibration-reducing blocks. The analog stages feature discrete components only and the shortest possible signal paths. No capacitors are in the signal path, nor does the circuit use output relays.

The JFET-based, fully differential input stage runs in class-A, while each output stage, featuring six pairs of complementary output devices, is biased for class-AB. CH Precision uses OnSemiconductor's ThermalTrak devices, which make possible the precise monitoring of the operating temperature of each transistor's circuit or silicon die, in order to keep output-stage bias as constant as possible—independent of ambient temperature or the demands placed on the circuit by varying music signals. CH claims that the M1.1's class-AB design, using their patent-pending circuitry, outperforms a typical class-A biased amplifier. Claimed frequency response is wideband: DC to 450kHz (-3dB) at 1W—which in the words of the old British comedy duo Flanders and Swan, in their "Song of Reproduction," "should please any passing bat!"

A DSP-based protection system, operating at a sampling rate of approximately 100kHz, monitors output voltage and current. An abnormal condition immediately shuts down the amplifier to protect the loudspeakers in the event of a short circuit, or a disconnected speaker, or an over-temperature heat sink or over-temperature output transistors—all accomplished without relays.

Built using pin assembly, the M1.1's chassis of high-grade aluminum alloy conceals the front-, top-, and side-panel fastening screws, producing smooth joints between metal parts, while the solid steel baseplate provides a firm mechanical foundation and effective magnetic shielding. Despite its high mass, the M1.1 can, if necessary, be spiked and vertically stacked using an ingenious engineered-in system similar to that in other CH products.

Though at first glance the M1.1's industrial design appears square and austere, a closer examination reveals a satiny finish that's luxurious to the touch and visually quite pleasing, in an understated way. Again, the look is quite the opposite of the fanciful industrial design of my even-more-costly reference amps, the darTZeel NHB-458 monoblock (170,000 Swiss francs/pair).

Complex yet user-friendly setup

Each M1.1 requires two AC cords: A 20A IEC jack supplies power to the aforementioned 2200VA toroidal transformer, while a 15A jack connects to a second toroidal transformer, which powers the small-signal stages as well as the amp's digital functions (front panel display, microcontroller, and DSP features). (A third toroidal transformer that draws only 1W insures "green" operation when the amp is in standby mode.)

Once the amps are in place—hopefully accomplished without injury—an ingenious footer/spike system is used to level the chassis and help draw away mechanical vibrations. The M1.1's rear panel includes the above-mentioned two AC sockets plus two pairs of Argento Audio speaker terminals. The input board features two single-ended jacks—one RCA, one BNC—and an XLR socket for balanced input, as well as an XLR balanced "pass through" output in case the user wishes to "daisy chain" multiple M1.1s. The rear panel also includes separate grounding jacks for analog and digital circuitry—two for the former, one for the latter, all banana

SPECIFICATIONS

Description Solid-state, class-AB, dual-channel, configurable, modular power amplifier. Inputs: 1 balanced XLR, one single-ended RCA, one single-ended BNC, USB port, Ethernet port. Outputs: XLR balanced output (pass through for daisy-chaining), 2 pairs of speaker binding posts. Power output (as configured for review): 350W into 4 ohms, 600W into 2 ohms, 1100W into 1 ohm. Frequency response: DC to 450kHz (-3dB) at 1 watt. THD+Noise: < 0.01% (1kHz signal, BW 20Hz-20kHz, 10W under 8 ohms, (all modes) with 100% global feedback. SNR (A weighted): > 115dB. Input impedance: single-ended 47K ohm RCA, 300-ohm BNC. Balanced: 94k ohms. **Dimensions** 17.32" (440mm) W by 10.43" (265mm) H by 17.32" (440mm) D. Weight: 165.3lb (75kg). **Finish** Silver. **Serial number of unit reviewed** 15010500/01. **Price** $104,000/pair (as configured for review), $54,000 (single amp configured for stereo). Approximate number of dealers: 7. Warranty: Three years, parts and labor. **Manufacturer** CH Precision Sàrl, ZI Le Trési 6D, 1028 Préverenges, Switzerland. Tel: (41) (0)21-701-9040. Fax: (41) (0)21-701-9041. Web: www.ch-precision.com.

sockets—in addition to a USB port for software updates and an Ethernet port to facilitate network operating system control via the CH app.

A series of small, vertically stacked pushbuttons adjacent to the generously sized color LED screen controls all functionality and adjustability. It's a complicated but logically arranged menu system, made easier to use if you're familiar with the similar ones used in the company's other products, including the CH Precision P1 phono preamp, which I own. In most cases, setup will no doubt be performed by the dealer, though it's still a good idea to understand and learn the menu system. A virtual meter monitors power output.

The M1.1's maximum gain can be adjusted in 0.5dB steps over a 24dB range, to better match loudspeaker sensitivity and room size. And, as noted above, when the amp is used in bi-amping mode, gain for each driver segment can be independently adjusted. The amp's output stage can be adjusted in 10% steps to change the percentage of global *vs* local feedback, from 0% local-only feedback to 100% global-only feedback; this allows users to control the amplifier's damping factor to precisely fine-tune bass performance and can be done on the fly, either from the front panel or, once the amp is network-connected, via CH's Android-based app.

Of course, the amount of feedback dialed in by the user also affects total harmonic distortion, which can go from less than 0.1% (with 0% global feedback) to less than 0.01% (with 100% global feedback). Signal/noise ratio is claimed to be an excellent 115dB.

The instruction manual for this engineering tour-de-force includes pages of eye-glazing menu trees. Fortunately, most end users will never have to hack their way through those forests. I consulted with CH's American representative Ralph Sorrentino, and we chose monaural configuration, which the instructions say is "optimal for low impedance speakers requiring large amounts of current"—which well describes the Wilson Audio Specialties Alexx loudspeakers—and we began with 20% global feedback. I found that more than 20% global feedback made the bass sound overly tight and constricted somewhat the musical flow of my system; less than 20% feedback pushed the sound beyond *liquid*, into a place that bordered on being soggy: Sorrentino's suggested 20% proved ideal. I ran the M1.1's using their balanced inputs.

I've grown accustomed to your pace

For review purposes, the best way to approach a comparison between a brand-new, highly refined, high-priced, high-performance amp and one with similar qualities that also happens to be your reference of many years—in my case, the darTZeel NHB-458—is to imagine you're never going back to the latter: Pretend you're hooking up with someone new after the break-up of a long-term relationship.

Immediate, direct comparisons are self-defeating. Again, as with significant others, it's best to just *go* with the new experience and enjoy (or not) your new partner on their own terms.

Though the M1.1s weren't brand-new, I let them break in for 24 hours using the Swim mode (continuous, random music selection) of my Sooloos server. Due to review-scheduling issues, I had the amps here for an unusually long time: By the time I started writing, I knew their character well, *and* I'd become accustomed to interacting with them, comfortably so—as in any successful long-term relationship.

At this price point, there ought to be much to like—and

MEASUREMENTS

Because the CH Precision M1.1 is so heavy (165lb), I drove the 45 miles to Michael Fremer's home with my Audio Precision SYS2722 system (see the January 2008 "As We See It"[1]), cables, noninductive power resistors, and analog and digital oscilloscopes, and I set up everything on a table in his garage. Because I knew from experience that the AC outlets in the garage are on a circuit with a 15A breaker, I ran two long extension cables—one for the test gear, one for the amplifier, which has two AC cords—to an outlet in the house that has a 20A circuit.

I performed a full set of measurements with one of the two amplifiers configured as Michael had done for his auditioning: "Monaural" mode, 0dB gain adjust, 20% global negative feedback, and driven via the balanced input. I repeated some of the tests with the high-impedance unbalanced input and with 0% and 100% negative feedback.[2]

Before I test an amplifier, I precondition it with both channels driving a 1kHz tone for an hour at one-third power into 8 ohms, which is the most thermally stressful condition for an amplifier with a class-AB output stage. Because of time constraints, however, I preconditioned the M1.1 for 15 minutes. At the end of that time, the top panel was slightly warm at 82.4°F (28°C); aiming my infrared thermometer through the slots in the top panel at the heatsinks, the temperature was 101.5°F (38.6°C). I continued to monitor temperature, but the amplifier didn't get any warmer throughout the testing.

The voltage gain at 1kHz from the speaker terminals into 8 ohms measured 23.5dB for the balanced input, but, unusually, 6dB higher from the un-

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

2 The CH Precision M1.1 features the same adjustable global negative feedback as the company's I1 integrated amplifier, which Jason Victor Serinus reviewed in February 2019. You can read my measurements of this amplifier at https://tinyurl.com/y6mcavt3.

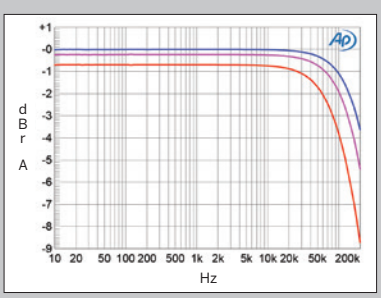

Fig.1 CH Precision M1.1, frequency response at 2.83V into 8 ohms (blue), 4 ohms (magenta), and 2 ohms (red) (1dB/vertical div.).

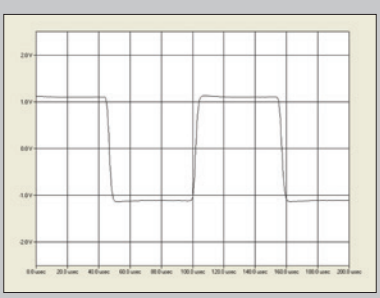

Fig.2 CH Precision M1.1, small-signal 10kHz square-wave into 8 ohms.

nothing to dislike—about a product, and that was the case with the suave, muscular-sounding M1.1s. After some experimentation, it also turned out that the CH amps sounded better plugged directly into the wall socket and not (surprisingly) into AudioQuest's Niagara 7000 AC power conditioner—*and* I preferred AudioQuest's Dragon silver-conductor speaker cables to TARA Labs' Omega SP: points I return to below.

measurements, continued

balanced input. Both inputs preserved absolute polarity (*ie*, were noninverting); the XLR jack is wired with pin 2 hot. The balanced input impedance was a usefully high 90k ohms at 20Hz and 1kHz, dropping inconsequentially to 58k ohms at 20kHz. The unbalanced input impedance was 45k ohms at 20Hz and 1kHz, 21k ohms at 20kHz.

The output impedance with 100% feedback, including a 6'-long, spaced-pair speaker cable, was a low 0.1 ohms across the audioband. With 20% feedback, it rose to 0.24 ohm at low and middle frequencies, and 0.27 ohm at the top of the audioband. But when I started to measure the CH amplifier's small-signal frequency response, I realized that I had left my standard simulated loudspeaker[3] at home. However, this output impedance should result in the modulation of the amplifier's frequency response with this load by close to ±0.25dB. The M1.1's frequency response into 8 ohms (fig.1, blue trace) was flat to 20kHz and down by just 0.5dB at 60kHz; a 10kHz squarewave was therefore reproduced with very short risetimes (fig.2). A 1kHz squarewave was perfectly square (not shown). Though the ultrasonic output rolls off a little earlier into lower impedances, the response into 2 ohms (red trace) was down by just 0.3dB at 20kHz.

The unweighted, wideband signal/noise ratio, taken with the unbalanced

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

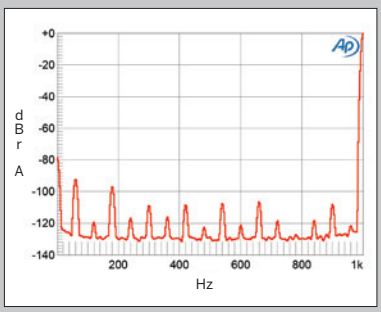

Fig.3 CH Precision M1.1, spectrum, DC–1kHz, ref. 1W into 8 ohms (linear frequency scale).

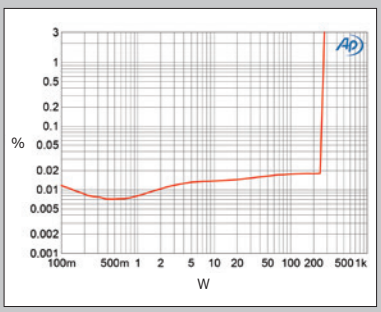

Fig.4 CH Precision M1.1, 20% NFB, distortion (%) *vs* 1kHz continuous output power into 8 ohms.

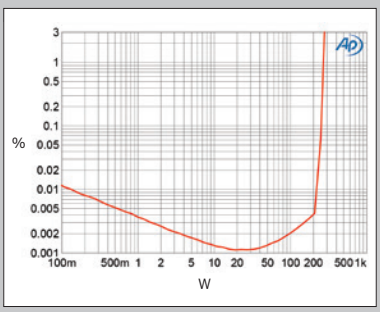

Fig.5 CH Precision M1.1, 100% NFB, distortion (%) *vs* 1kHz continuous output power into 8 ohms.

On the spectrum of bright/fast/lean/analytical *vs* warm/slow/rich/forgiving, the M1.1s were slightly on the latter side, just as the darTZeels are slightly on the former—but neither one veers far from the middle. (Oops: I promised not to compare my new date to my "ex"—but you probably know how *that* goes!)

The M1.1s' powerful bass grip and remarkable *slam* were immediately noticeable on guitarist Anthony Wilson's easy-to-recommend self-released *Songs and Photographs* (Goat Hill GHR-005). As co-producer Joe Harley quipped when I first told him how much I enjoyed the record's bottom end, "Jay [Bellerose] really likes to hit that kick drum *hard*!"

The M1.1s' powerful bass grip and remarkable slam were immediately noticeable.

And boy, does he ever, especially on tracks like "Song From a Dream." Yet through the M1.1s, the impressive weight was accompanied by precise attack, generous but well-controlled sustain, and rapid decay, so the well-textured drum sound surprised me as it should have—like a depth charge—without sounding overripe, losing its grip, or hanging around too long. Each kick drum hit moved notable amounts of air—more than I remember hearing or *feeling* with my former partner.

That album was among the first I played after installing the CH Precision amps. The overall presentation—strong bottom yet well-articulated transients on Wilson's guitar—had me pulling out other records with noticeably powerful bass, like *Ella Fitzgerald Sings the Rodgers and Hart Song Book* (ORG/Verve MG VS-64022), recorded in stereo in 1956. There's a powerful and surprising kick drum on the playful "You Took Advantage of Me," and through the M1.1s, it didn't disappoint.

Ella's vocals, probably recorded using a "tippy"-sounding ribbon microphone, took on a smoother, creamier tonality than I expected, combined with an enjoyably solid, three-dimensional vocal image. The slightly edgy string sound—surely a product of those same mikes—had a sweeter, more sonorous luster than I'd expected: That, too, was a pleasant surprise.

From there it was on to the superb Electric Recording Company reissue of Elgar's Cello Concerto with soloist Jacqueline Du Pré and Sir John Barbirolli conducting the LSO (EMI/ERC ASD 655/ERC 044). Here's where the M1.1s demonstrated the sort of rich, generous midrange I associate more with tube amps than with solid-state ones. Yet that richness didn't obscure the clarity of the bow strikes, or the juxtaposition of the cello's solid, three-dimensional image in front of the equally well-presented orchestra. And when the brass entered on the orchestra's dramatic first statement of the heart-tugging theme, they had sufficient metal *bite* to sound convincing.

Some solid-state amps known for sweetness and an overall warm presentation can sound muffled and overly smooth in passages where the recording or instrumentation calls for bite and edge. In my system, the M1.1s produced a generally warm picture (compared to my ex), but they

measurements, continued

input shorted to ground and ref. 1W into 8 ohms, was 76.4dB, improving to 83.6dB with the measurement bandwidth restricted to 22Hz–22kHz and to 89.3dB with an A-weighting filter in circuit. Spectral analysis of the low-frequency noise floor (fig.3) indicated that there were AC power-supply–related spuriae at 60Hz and its odd-order harmonics, these presumably due to magnetic interference from the huge power transformer. Other than the spectral components at 60Hz and 180Hz, which were at a still-low –93dB and –97dB, these spuriae all lay close to –110dB (0.0003%), and the random noise-floor components were all extremely low in level.

When I started testing the amplifier's output power, I fed the balanced input at 1kHz tone at 188mV, which resulted in exactly 1W into 8 ohms; the M1.1's meter read 2.3W.[4] In its mono mode, the CH M1.1's maximum output is specified as 200W into 8 ohms (23dBW), 350W into 4 ohms (22.4dBW), and 600W into 2 ohms (21.8dBW). With clipping defined as when the THD+noise in the output reaches 1% and with the M1.1 set to 20% feedback, I measured a clipping power of 260W into 8 ohms (24.15dBW, fig.4). Increasing the feedback to 100% gave the same clipping power (fig.5), but the distortion is very much lower at all powers below 200W into 8 ohms. Into 4 ohms I measured 440W (23.4dBW, fig.6) and into 2 ohms 700W (22.4dBW, fig.7). I don't hold the wall voltage constant during these tests; it dropped from 122.5V

4 CH Precision says the meter on the M1.1 shows peak power, not RMS power; the rest of the discrepancy they attribute to a measuring technique that avoids adding components in series with the output signal.

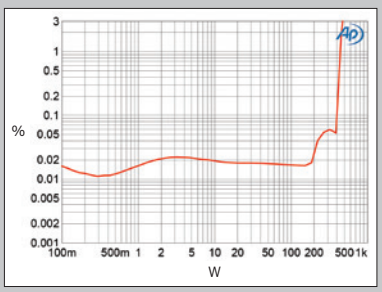

Fig.6 CH Precision M1.1, 20% NFB, distortion (%) *vs* 1kHz continuous output power into 4 ohms.

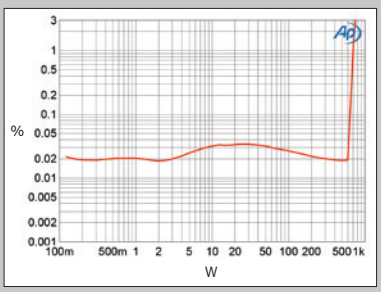

Fig.7 CH Precision M1.1, 20% NFB, distortion (%) *vs* 1kHz continuous output power into 2 ohms.

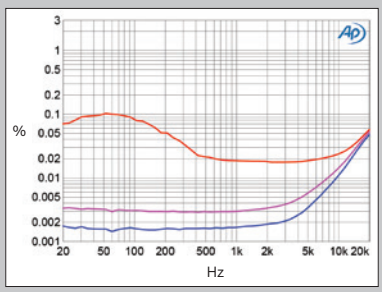

Fig.8 CH Precision M1.1, 100% NFB, THD+N (%) *vs* frequency at 10V into: 8 ohms (blue), 4 ohms (magenta), and 2 ohms (red).

never sounded muffled, nor did I ever long for tone-control correction to shine light on familiar reference recordings. Instead, I fully enjoyed a subtle shift in tonal perspective in which acoustic guitars had more body and less string-transient sound, and handclaps had more flesh and less slap—just two examples.

More to the point, some amplifiers that veer toward the warm and smooth side of the sonic continuum can produce boredom by softening transients, and sometimes by obscuring inner detail in a pleasant fog. The M1.1s *never* went there. You'd be sure of that if you'd been with me to hear them play *Binaural Baroque*, a direct-to-disc binaural recording by the Locrian Ensemble of London (Chasing the Dragon VALDC005). While binaural is best enjoyed via headphones, the presentation through my Wilson Audio Specialties Alexx loudspeakers, driven by the M1.1s, was vividly three-dimensional, especially the Vivaldi Guitar Concerto, which placed guitarist Morgan Szymanski solidly and convincingly in front of the ensemble.

Did the presentation on that Elgar recording, and on other exceptional-sounding, minimally miked recordings, lose a bit of hall reverberation and air, compared to what I was used to? Yes, slightly so—but other attractive sonic qualities were gained in the trade-off.

And there it is: *trade-off*—a theme to which my mind repeatedly returned throughout the review period, as I played familiar records and digital files. Something was lost, something else was gained. And you can be sure that theme re-emerged when I returned my reference amps to the system and again played some of these same recordings.

The M1.1s excelled at making extra rhythmic sense of even very familiar recordings, perhaps in part because they seemed, in a very positive way, to slow down the presentation's pace, which tended to reveal more musical *intent* (don't try to measure that!), without creating a sense of sluggishness. Musical events and notes seemed to linger longer, without overstaying their welcome, and when the music called for extra force and *weight*, the M1.1s delivered.

Why do some amps sound fast and others slow? I don't know, but the ones that are too fast tend to slide across the action, missing the musical crevices, while the ones that are too slow get stuck and fall into them. For its part, the M1.1s dug deeply into the musical action, well-paced and with confident but not excessive grip, and they moved with sufficient speed to deliver rhythm'n'pacing excitement on recordings in all musical genres.

I think you get the rhythmic picture—and the tonal picture: the M1.1s took bright-sounding recordings to a better tonal space, while escorting well-balanced ones to a richer, often more satisfying place.

On the other hand, inevitably, somewhat warm and soft recordings tended to get hopelessly lost in a warm ooze—which is why I preferred these amps when plugged directly into the wall, instead of the AudioQuest Niagara AC conditioner, and when connected to the Wilson Alexxes with AudioQuest Dragons instead of the TARA Labs Omega SP speaker cables. The Niagara 7000 pairs well with the darTZeel amps, as do the transparent but slightly warm TARA Labs cables. But for whatever reason or reasons, plugging the M1.1s into the Niagara took the warm, rich overall presentation to a darker and softer place, as did the TARA Omega SPs. It was a place where the system didn't need to go. (People who claim that cables and AC conditioning don't make a difference are foisting upon the gullible their own brand of snake oil: Regardless of how much or how little you spend, system satisfaction depends on correct

measurements, continued

AC with the amplifier idling to 118.5V AC at the measured clipping power into 2 ohms. The shortfall in maximum output power will not be an issue with typical loudspeakers and rooms, but it did puzzle me.

The traces in Figs. 4–7 suggested I examine how the M1.1's percentage of THD+N varied with frequency at 20V, which is equivalent to 50W into 8 ohms, 100W into 4 ohms, and 200W into 2 ohms. With 100% feedback (fig.8), the percentage of THD+N was extremely low into 8 ohms and 4 ohms in the bass and midrange, with the rise in the treble due to the decrease in open-loop voltage gain as the frequency increases. However, into 2 ohms (fig.8, red trace), the amplifier's distortion was 10 times higher in the midrange than it was into 8 ohms and even higher at low frequencies. Repeating the test with 20% feedback, which is how Michael did all his auditioning, the THD+N was higher into 4 and 8 ohms (fig.9, magenta and blue traces) but similar to the 100% feedback behavior into 2 ohms (red trace). Even so, it still lay below 0.1% below 10kHz.

The THD+N waveform with 20% feedback at 100Wpc into 8 ohms (fig.10) indicates that while the distortion was low, at 0.018%, there were higher-order components present. With a low-frequency tone at 100Wpc

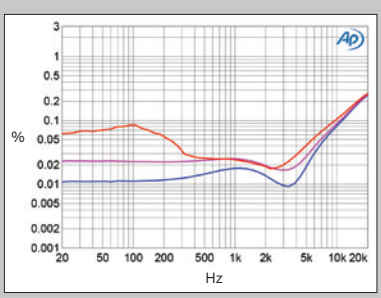

Fig.9 CH Precision M1.1, 20% NFB, THD+N (%) *vs* frequency at 10V into: 8 ohms (blue), 4 ohms (magenta), and 2 ohms (red).

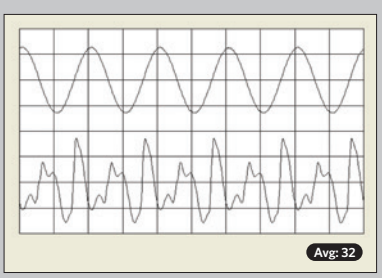

Fig.10 CH Precision M1.1, 20% NFB, 1kHz waveform at 100W into 8 ohms, 0.018% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

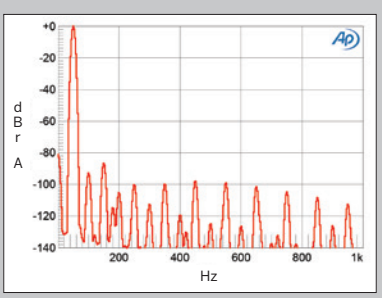

Fig.11 CH Precision M1.1, 20% NFB, spectrum of 50Hz sinewave, DC–1kHz, at 100W into 8 ohms (linear frequency scale).

cable and conditioner choices!)

I've heard and reviewed such cooler sounding (and costly) powerhouse amplifiers as the big Moon by Simaudio 888 monoblocks—amps that deliver greater spatial resolution, and put more speed and sparkle in the air, but that deliver those plusses at the expense of image solidity, textural generosity, and a fully expressed harmonic palette. As with the cable and power conditioner choices described here, those qualities can be addressed with associated component choices—but it's best to choose a component that, straight out of the box, comes close to your sonic ideal. As the M1.1s did for me.

Conclusion

CH Precision's powerful M1.1 is a superbly engineered and built amplifier that can be configured for use in a variety of ways, and in a variety of systems. As I noted above, the review pair remained in mine for a longer than usual time: Once I'd acclimated to their sonic characteristics and, in particular, come to enjoy how they express musical *emotion* and convey musical *meaning*, I was content to let them play for as long as possible.

Yes, a $104,000 pair of monoblocks exists on rarified plane, but for those who can afford it, and who are looking to move up or even sideways, the M1.1 is well worth considering: It can carry a tune and dance without stepping on its own toes—just take care, during the install, that it doesn't crush yours! ■

ASSOCIATED EQUIPMENT

Analog Sources Continuum Audio Labs Caliburn, & Castellon turntable & stand; TechDAS Air Force V and Rega P8 turntables; SAT CF1-09, Kuzma 4Point and Graham Phantom B 44 tonearms; Lyra Atlas, Atlas SL, Atlas SL mono, Etna and Etna SL, Ortofon MC Century, Anna, A95, Miyajima Labs Infinity (mono) Grado Epoch (mono) Gold Note Donatello Gold and Goldring Ethos.
Digital Sources dCS Vivaldi One SACD player DAC; Lynx Hilo A/D-D/A converter, ROON Nucleus Meridian Digital Media System; Pure Vinyl and Vinyl Studio software.
Preamplification darTZeel NHB-18NS, Ypsilon MC-10L, MC-16L, Consolidated Audio SUTs step-up transformers; Ypsilon VPS-100, CH Precision P1 with X1 PSU.
Power Amplifiers darTZeel NHB-458 monoblocks.
Loudspeakers Wilson Audio Specialties Alexx.
Cables Interconnect: TARA Labs Zero Evolution, Zero and Air Evolution, Analysis Plus Silver Apex, Stealth Sakra & Indra, Luminous Audio Technology Silver Reference, The Chord Company Sarum T SPDIF. Speaker: Audioquest Dragon, TARA Labs Omega EvolutionSP. AC: AudioQuest Dragon, Dynamic Design Neutron SW16 Digital power cord.
Accessories Audioquest Niagara 7000 power conditioners; Oyaide AC wall box & receptacles; ASC Tube Traps; RPG BAD, Skyline & Abffusor panels, Stillpoints Aperture II Room panels, Synergistic Research UEF products (various), Symposium Ultra platform; HRS Signature SXR and Stillpoints ESS stands Finite Elemente Pagode amplifier stands; Audiodharma Cable Cooker; Furutech record demagnetizer; Furutech deStat; Loricraft PRC4 Deluxe, Audiodesksysteme Pro, and Kirmuss Audio KA-RC-1 record-cleaning machines. **—Michael Fremer**

measurements, continued

into 8 ohms (fig.11), the second and third harmonics were the highest in level, at –93dB (0.002%) and –87dB (0.005%), respectively, with many higher-order harmonics visible. Repeating the analysis with 100% feedback (fig.12) kept the third harmonic at the same level, but the second harmonic dropped by 10dB and the higher-order products almost disappeared.

The reduced linearity of the M1.1's circuit at high frequencies meant that when tested with an equal mix of 19 and 20kHz tones, the amplifier produced relatively high levels of intermodulation distortion, even at moderate powers (fig.13). The difference product at 1kHz lay at –66dB (0.05%) with many higher-order products present. This graph was taken with 20% feedback; increasing the feedback to 100% gave a much cleaner spectrum (fig.14).

The CH Precision M1.1 is a powerful amplifier, but its measured performance is heavily dependent on the amount of global negative feedback selected. A measurement freak such as I would choose 100% feedback, but I note that Michael found 20% feedback to be the sweet spot when it came to the M1.1's sound quality. And note that no matter the percentage of feedback, this amplifier is more comfortable driving impedances higher than 2 ohms. **—John Atkinson**

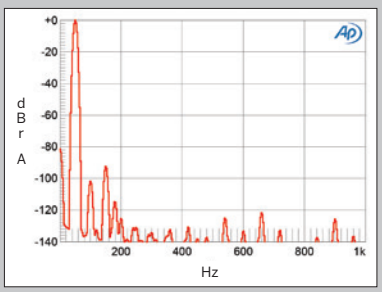

Fig.12 CH Precision M1.1, 100% NFB, spectrum of 50Hz sinewave, DC–1kHz, at 100W into 8 ohms (linear frequency scale).

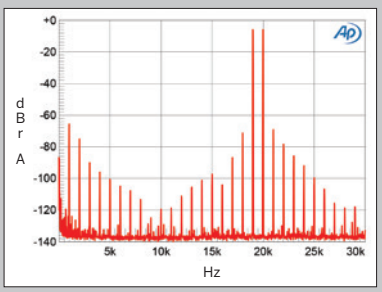

Fig.13 CH Precision M1.1, 20% NFB, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 50W peak into 8 ohms (linear frequency scale).

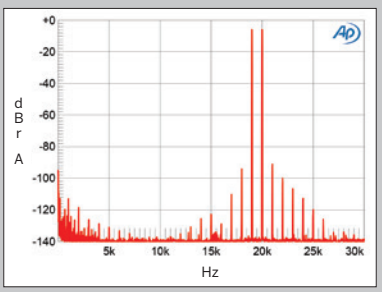

Fig.14 CH Precision M1.1, 100% NFB, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 50W peak into 8 ohms (linear frequency scale).