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BRIAN DAMKROGER

Simaudio Moon Evolution 880M

MONOBLOCK POWER AMPLIFIER

In the September 2005 issue (Vol.28 No.9, www.stereophile.com/solidpoweramps/905sim/index.html), I reviewed Simaudio's first reference-quality power amplifier: the 1000W, 220-lb Moon Rock monoblock ($37,000/pair). At the time, the Rock was a dramatic departure for Simaudio, then primarily known as a maker of midpriced gear that was good for the money. I found a lot to like about the Rock, concluding that while it wasn't quite up to the standard of the best superamps of the time, it was very good—and, for Simaudio, an admirable first shot at the state of the art.

Since that time, Simaudio has launched and filled out its Moon Evolution line, in the process moving steadily upmarket. That Simaudio has taken that move seriously has been proven by such Moon Evolution models as the Andromeda CD player, the P-8 preamp, and the W-8 power amp, which have set new performance standards and won rave reviews. The Moon line kept growing and getting stronger, leaving only one thing missing: a big-time, big-power, big-money, big-*everything* reference power amplifier. And in January 2011, that void was filled by the …

SPECIFICATIONS

Description Solid-state monoblock power amplifier. Inputs: 1 unbalanced (RCA), 1 balanced (XLR). Outputs: 2 pairs binding posts. Rated power output: 800W into 8 ohms (29dBW), 1600W into 4 ohms (29dBW). Voltage gain: 31dB. Maximum output voltage: 80V. Maximum output current: 100A peak, 42A continuous. Frequency response: 10Hz–200kHz, +0/–3dB. Signal/noise: >106dB at full power. THD: <0.015%, 20Hz–20kHz at 1W. Input impedance: 47.5k ohms. Input sensitivity: 2.25V for full output. Output impedance: 0.004 ohm. Damping factor: 2000. Slew rate: 70V/µs. Power consumption at idle: 48W.
Dimensions 18.75" (475mm) W by 7.5" (190mm) H by 16.5" (420mm) D. Shipping weight: 92 lbs (42kg).
Serial numbers of units reviewed L6311636, L6311639.
Price $42,000/pair. Approximate number of dealers: 95. Warranty: 1 year, parts & labor, transferable.
Manufacturer Simaudio, 1345 Newton Road, Boucherville, Quebec, J4B 5H2, Canada. Tel: (450) 449-2212. Fax: (450) 449-9947. www.simaudio.com.

The 880M's power supply is based on two massive toroidal transformers.

Moon Evolution 880M

Unlike the Moon Rock, the product of a very short development cycle to service an urgent market niche, the Moon Evolution 880M was developed and refined over a period of years, according to Simaudio's Lionel Goodfield. "Don't get me wrong," he told me; "the Rocks were good amps in spite of the short development time . . . we've got really good engineers. But we spent years perfecting the 880Ms. They really show what we can do."

The 880M is based on principles and circuitry similar to those seen in Simaudio's smaller Moon Evolution amps, here scaled up to such numbers as: 32 output devices (Moon bipolar transistors custom-made to Simaudio's specs), 260,000µF of power-supply capacitance, maximum outputs of 80V and 100A, and, of course, power outputs of 800W into 8 ohms or 1600W into 4 ohms. The rest of the 880M's specs are equally impressive–including a shipping weight of 92 lbs. Each amp is packaged in a heavy-duty flight case, which makes handling and unpacking it much easier than having to power-lift it out of a deep cardboard box.

The 880M is a DC-coupled, fully balanced differential design, and its long incubation in R&D allowed Simaudio to develop and include several new technical features. The circuitry of each 880M begins with a massive power supply built on two 1.3kVA toroidal transformers, a proprietary design unique to Moon, and two banks of soda-can–sized capacitors. Then comes a proprietary combination of topography and components that Simaudio calls its Lynx Technology, whose key features include the absence of any global feedback, no input or output coupling capacitors, short circuit paths, and the creation of an optimal electromagnetic and physical environment for each component. For example, they use four-layer circuit boards with heavy traces of pure copper, not to assign certain functions to particular layers, but to minimize the length of the signal path and ensure that the two sides of the balanced circuit are identical. The components themselves are custom-made to Simaudio's exacting specs or, in the case of COTS (Commercial Off-The-Shelf) parts, top-quality, these are rigorously screened, and hand-matched to ensure consistency from side to side and from amp to amp. The 880M's slew rate is given as 70V/µsec, and even at 800W of output, Simaudio claims total harmonic distortion (THD) of less than 0.04%. John Atkinson's measurements

MEASUREMENTS

Before performing any measurements, I ran one of the Simaudio Moon Evolution 880M amplifiers (serial no. L6311636) for an hour at one-third its specified maximum power of 800W into 8 ohms, thermally the worst case for an amplifier with a class-B output stage. By the end of the hour, the side-mounted heatsinks were way too hot to touch, at 148.5°F (64.8°C). The chassis was cooler, with the top plate measuring 126.4°F (52.4°C), though the aluminum vertical corner pieces were 164.3°F (73.5°C). Though the distortion with the amplifier completely cold was a low 0.00825%, this was predominantly crossover distortion, which will be subjectively disturbing because of its high proportion of high-order harmonics. At the end of the preconditioning period, the distortion had almost halved, to 0.0045%, and the crossover spuriae had disappeared. This suggests that potential purchasers of this amplifier should not audition it until it has warmed up.

I performed a full set of measurements on the amplifier, using *Stereophile*'s loan sample of the top-of-the-line Audio Precision SYS2722 system (see www.ap.com and the January 2008 "As We See It," www.stereophile.com/asweseeit/108aswsi/index.html), using the 880M's balanced input. I repeated some of the tests using the unbalanced input with a shorting plug connecting pins 1 and 3 of the 880M's XLR jack.

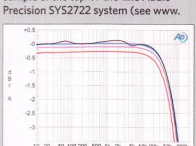

Fig.1 Simaudio Moon Evolution 880M, frequency response at 2.83V into: simulated loudspeaker load (gray), 8 ohms (blue), 4 ohms (magenta), 2 ohms (red) (0.5dB/vertical div.).

The voltage gain into 8 ohms was the same for the balanced and unbalanced inputs, at 31.5dB, which is about 4dB higher than the norm. Both inputs preserved absolute polarity (*ie*, were non-inverting), the XLR jack being wired with pin 2 hot. The input impedance at low and middle frequencies was 23k ohms for both sets of jacks, dropping inconsequentially to 18k ohms at 20kHz. The output impedance (including 6' of speaker cable) was slightly higher than usual for a solid-state design, at 0.125 ohm at 20Hz and 1kHz, rising to 0.132 ohm at 20kHz. Nevertheless, the

Balanced and single-ended inputs; two pairs of output binding posts to facilitate bi-amping/bi-wiring.

will tell the tale, but these are impressive claims for a mega-watt amp with no global negative feedback.

Even more impressive was how effortlessly the 880Ms delivered this performance—after long listening sessions at higher-than-normal levels, they were barely warm to the touch. According to Simaudio, the 880M run in class-A up to 10W, and thereafter in class-AB to its rated output. Simaudio believes that this approach provides the optimal mix of all-out performance and efficiency, and ensures long, trouble-free life by maintaining each amp's components in a cool, thermally stable environment and running them at only a tiny fraction of their rated capacity.

The 880M is physically impressive as well. Although substantial, it's not all that big—but it's Solid with a capital S. Its appearance mirrors those of other Moon Evolution components, with a richly finished case of black-anodized aluminum, and a heavy front panel comprising elegantly curved extrusions of brushed aluminum flanking a black or silver center section. Like the other Moon Evolutions, the 880M is made stable and mechanically grounded by the chassis itself and its precisely positioned, conical feet of hardened steel. Thankfully, small, indented steel pucks are also provided; slip these under the cones to prevent them from impaling your floor or equipment stand.

Comparisons from the Present

The Moon Evolution 880M is impressive in terms of technology, specs, design, and workmanship, but the true test of any component is how well it performs when the stylus hits the groove.

After a suitable amount of break-in, during which the amps remained powered up per Simaudio's instructions, I sat down to get a handle on what the 880Ms were and weren't doing in my system. I cued up Georg Solti and Chicago Symphony and Chorus's first recording, from 1972, of Beethoven's Symphony 9 (LP, London CSP-8), one of my "Records To Die For" for this year, which had been spending a lot of time on my turntable.

The first thing that got my attention was how different the 880Ms sounded from the VTLs and Levinsons, both of

measurements, continued

modulation of the amplifier's frequency response by the Ohm's Law interaction between this output impedance and the impedance of our standard simulated loudspeaker (see www.stereophile.com/content/real-life-measurements-page-2) was just ±0.1dB (fig.1, gray trace). The frequency response was flat in the audioband, but with a slight rolloff evident starting just below 20kHz and reaching -3dB at 90kHz. A 10kHz squarewave was reproduced with short risetimes (fig.2), and a 1kHz squarewave had superbly sharp corners (not shown).

The unweighted, wideband signal/noise ratio, ref. 1W into 8 ohms with the input shorted, was 81.8dB, due mainly to some low-level, odd-order harmonics of the AC supply frequency (fig.3). Switching in an A-weighting filter improved the ratio to a good 91.4dB.

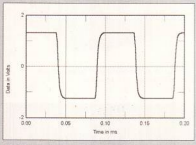

Fig.2 Simaudio Moon Evolution 880M, small-signal 10kHz squarewave into 8 ohms.

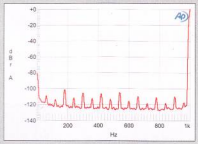

Fig.3 Simaudio Moon Evolution 880M, spectrum of 1kHz sinewave, DC–1kHz, at 1W into 8 ohms (linear frequency scale).

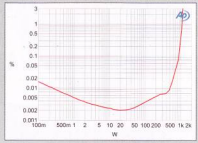

Fig.4 Simaudio Moon Evolution 880M, distortion (%) vs 1kHz continuous output power into 8 ohms.

which I've been using for many years. I know those amps' limitations very well, and am willing to accept them because both are true to the music. Although dramatically different in format and technology, the VTLs and Levinsons—as well as most other top-shelf amps I've heard—provide a similar perspective on a performance.

It surprised me that the 880M's perspective was so different. Having just begun my listening, I wasn't yet prepared to say that it was better or worse, just . . . different. The first thing I noticed was that choristers in the final movement, instruments lower in the mix, the second and third chairs—all the lesser elements of the music—were much more apparent and contributed more to the performance, through the Simaudio. Conversely, first chairs, soloists, and strong melody lines were less prominent. If it hadn't been the same LP of the same recording, I might have suspected that I was listening to two different mixes of the same performance/recording. Whenever I switched from the 880Ms back to the VTLs or Levinsons, it sounded as if spot mikes had been added. The perspective still sounded natural, but different. Those second- and third-chair players, presented so clearly through the 880Ms, commanded much less of my attention.

The more I listened, the more I was struck by the consistency and stability of the 880Ms' soundstage.

My first impression was that the 880Ms' soundstage was foreshortened, its leading edge farther back than the other amps', and the rear of its stage more forward. The Levinsons produced a soundstage that was more recessed overall, but seemed deeper. The VTLs created a stage that projected farther forward than did the 880Ms, and had a beguiling way of floating those soloists and lead parts on a cushion of air at the front of the stage. The more I listened, however, the more I was struck by the consistency and stability of the 880Ms' soundstage. The VTLs' open, airy, forward projection and the Levinsons' depth began to seem slightly inconsistent, varying with the musical content and flow. Compared to the 880Ms' unwavering stability, the images projected at the front of the VTLs' stage, or the information at the very back of the Levinsons' stage, seemed to float at times, as if it were only tenuously connected to the rest of the soundstage. Plus, the rear corners of their stages would contract inward at times, matching the 880Ms' performance only at climaxes, when the sheer power of the music would push the rear corners outward; and during the softest passages, when the low-level reflections that defined the side and rear walls of the recording venue would be apparent. There was none of this variability with the 880Ms—the stage was always the same wide, deep, solid, coherent portrayal of the original recording space.

Individual instruments and voices within the 880Ms' soundstage had realistic, tangible body. Midway through Act 2 of Alain Lombard and the Paris Opéra Comique's recording of Delibes's *Lakmé* (LP, Seraphim SIC-6082), shortly after the beginning of side 4, Gerald (Charles Burles) enters and begins a duet with Lakmé (Mady Mesplé). It's one of my favorite scenes in the opera, and one I often use to evaluate how well a component reproduces the details and subtleties that give an image its realistic feel. When a component gets it right, Burles's presence is startling—it feels as if he's in the room with me. The 880Ms passed this test with flying colors, giving Burles a holographic three-dimensionality. Here, too, the 880Ms' sound was more consistent than the other amps', drawing my attention away from Burles to the other, less front-and-center characters, and to details of the recording space.

Matters of Control & Precision

JA will describe the 880M's performance in technical terms, but I suspect that it will measure pretty flat "from DC to light." I've always been aware of the small humps and bumps in the VTL's and Levinson's frequency response, and believed I was accounting for them in comparisons with other equipment.

measurements, continued

The Moon Evolution 880M comfortably exceeded its specified maximum power of 800W/29dBW into 8 ohms, clipping (defined as 1% THD+noise) at 1050W (30.2dBW, fig.4). The AC wall voltage had dropped from 123V with the amplifier idling to 120V with it clipping. However, the 10A fuse on the rear panel blew at the same 1050W into 4 ohms (27.2dBW, fig.5). Clearly, the 880M is not comfortable driving sustained high powers into low impedances with sinewaves—with its much higher crest factor, music will be less demanding than sinewaves, of course—so I didn't test its maximum output into 2 ohms.

The rising shape of the traces below a few tens of watts in figs. 4 and 5 suggests that the measured THD+N percentage is dominated by noise at low powers. I therefore measured how

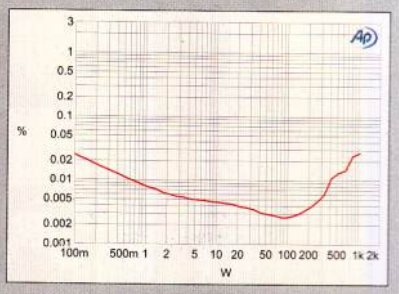

Fig.5 Simaudio Moon Evolution 880M, distortion (%) *vs* 1kHz continuous output power into 4 ohms.

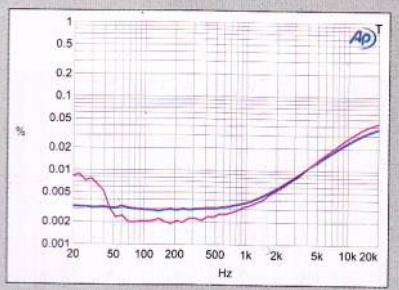

Fig.6 Simaudio Moon Evolution 880M, THD+N (%) *vs* frequency at 12.65V into: 8 ohms (blue), 4 ohms (magenta).

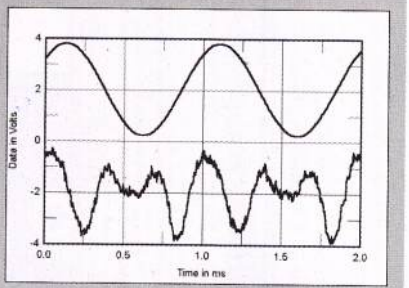

Fig.7 Simaudio Moon Evolution 880M, 1kHz waveform at 35W into 4 ohms, 0.0031% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

Having heard the 880M, I have to admit that I've been listening *around* these irregularities and accepting them as a kind of pseudoreality. Maintaining the consistency of, say, an acoustic piano's sound, or a singer as she varies her pitch and volume, was another area where the 880M sounded different from most other amps I've heard. Gauged against the bar raised by the 880M, other amps—certainly my older but still excellent ones—sounded a little like patchwork, their performance a smooth but subtle composite of slightly different instruments.

From an amp with the 880M's power output and ultra-high damping factor I expect iron-fisted control of a speaker's bottom end and effortless, lightning-fast transients. The Simaudios didn't disappoint. They reproduced low-frequency information with a precision and an effortless nonchalance that belied—or perhaps paid testament to—their superb control of the Sophias' woofers. Certainly the 880M's bottom end was taut and powerful, and notes began and ended crisply, with no timbral or temporal smearing. But it never sounded or felt fast per se. Notes and lines just flowed, without any artifacts or discontinuities that drew attention to themselves. In the Solti recording of Beethoven's 9th, the double basses had the sort of body and choral nature that a group of individual instruments has in a live performance. They didn't sound sharply drawn or imbued with finely etched detail, but instead had the relaxed ease that I hear in the concert hall. They were detailed and precisely located in space, but in a seamless, natural way; they didn't pop out of the background in the hyped-up, over-etched way that's often mistaken for "detail."

One of my favorite recordings for listening to a system's low-frequency reproduction is "Love Her Madly," from the Doors' *L.A. Woman* (LP, Elektra EKS-75011). With very good but not quite sublime components, or even those with deep, powerful bottom ends, the bass in this track will sound good, but will lack the bounce and subtle inner detail that a bass should have. I've heard other amps that give this bass line more raw power and impact than did the 880M, but none that bettered how well it reproduced its unique natural bounce.

The 880M was also superb at reproducing dynamic transients large and small. Again, it didn't sound fast, or as if its transients were unusually emphasized, but simply handled anything I threw at it with beguiling effortlessness. *Friday Night in San Francisco*, a live recording by John McLaughlin, Paco de Lucía, and Al Di Meola (half-speed-mastered LP, Columbia HC 47152), absolutely explodes with dynamic transients, and my favorite cut is the first, "Mediterranean Sundance/Río Ancho." The 880Ms sailed through this test, beautifully reproducing the live feel and crackling excitement of audience and guitarists alike. The tiny microdynamic shadings among the faint echoes of notes decaying into the background were reproduced with clarity. At the other end of the scale, the near-instant snaps from *pppp* to *ffff* had lifelike speed and power, with no sense whatsoever that the 880Ms were working hard.

The Simaudios reproduced low-frequency information with a precision and an effortless nonchalance that paid testament to their superb control of the Sophias' woofers.

That feeling of effortless precision extended up and through the midrange. Voices had a natural feel and timbre, a great example being the quirky, a cappella "Tom's Diner," from Suzanne Vega's classic *Solitude Standing* (LP, A&M SP-5136). Through the Moons, Vega's voice pressurized the air in my room exactly as a live person's voice does. It also had a three-dimensional realism—a sense that there was an actual body behind it, as opposed to a disembodied, two-dimensional voice flattened against the plane described by the speakers' front baffles. I've heard other amps produce a detailed, sharply bounded, even three-dimensional image of Vega's voice, but only the very best

measurements, continued

the THD+N varied with frequency at a level, 12.65V, equivalent to 20W into 8 ohms and 40W into 4 ohms; that way, I could be sure I was looking at actual distortion. The result is shown in fig.6. The THD rises above 1kHz into both 8 ohms (blue trace) and 4 ohms (magenta), presumably due to the circuit's open-loop bandwidth being insufficient to apply the same amount of corrective negative feedback at high frequencies as at low frequencies. Unusually, the midband distortion is actually lower into 4 ohms than into 8 ohms. When I tried plotting the THD against frequency into 2 ohms at 12.65V, the rear-panel fuse again blew. As that was the last of my spare 10A fuses, I replaced it with an 8A fuse and continued testing. Fortunately, no more fuses were blown!

Once the 880M is fully warmed up, its distortion is predominantly the subjectively innocuous third harmonic (fig.7), followed by the second (fig.8). However, some higher-order harmonics are visible in fig.8, albeit at or below -110dB (0.0003%). Intermodulation distortion was also low, even at high powers (fig.9).

Simaudio's Moon Evolution 880M is a powerhouse of an amplifier, though its ability to drive low impedances does rely on the fact that music has considerably wider dynamic range than do test tones. And it should never be listened to cold.—**John Atkinson**

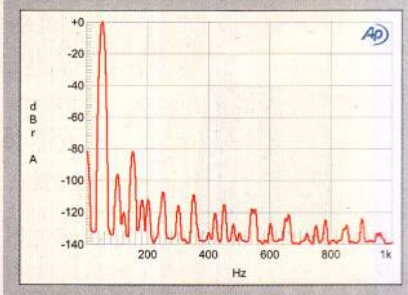

Fig.8 Simaudio Moon Evolution 880M, spectrum of 50Hz sinewave, DC–1kHz, at 300W into 8 ohms (linear frequency scale).

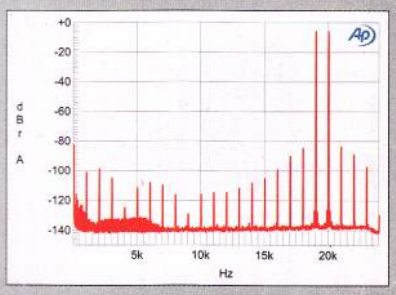

Fig.9 Simaudio Moon Evolution 880M, HF intermodulation spectrum, DC–24kHz, 19+20kHz at 300W peak into 8 ohms (linear frequency scale).

have matched the way the 880Ms translated the electronic signal into such a lifelike, coherent whole.

Comparisons from the Past

The Moon Evolution 880Ms deserve comparison with the very best amps I've heard in my system. VTL's S-400 Reference tubed stereo amp ($20,000 in 2005, reviewed in the December 2005 issue) stood out in my memory, particularly in terms of its ability to portray voices and instruments throughout the midrange. As good as the 880Ms were, and as dimensional and solid as their spatial portrayals of images were, they didn't quite have the refinement, and perhaps not as vivid a tonal palette, as I remembered the big VTL having. The 880Ms were certainly refined and tonally rich in their own right, or compared to the vast majority of top-tier amplifiers out there, but perhaps just a little less so than the S-400. The 880Ms, on the other hand, struck me as being a slightly more balanced overall. Both the VTL and the Simaudios had that effortlessness of sound heard when an amp's capabilities far exceed the demands placed on it.

Another reference point I harked back to while evaluating the 880Ms was my experience with the Halcro dm88 ($39,990/pair in 2006). It's been a while since I've heard the Halcro, but when I reviewed it for the August 2006 issue, it was the best amp I'd heard in my system. In addition to the effortless ease that I found so beguiling in the Moon Evolution 880M, the Halcro had a clarity that was unique among electronic components of any sort. Memories of pleasant experiences have a way of improving with age, so it's likely that I'm now remembering the Halcro a bit too fondly, but I don't think the 880M quite matched it in this sense. It was elusive and hard to put a finger on, but at times I thought I heard just the faintest background texture in the Simaudio's sound. On the other hand, the 880M outperformed the Halcro in at the low end, and in terms of power and precision of dynamic transients. These are all slight differences—I'm splitting hairs among the very best amps I've ever heard.

A Matter of Preamps

It wasn't at all surprising to discover that the best preamp I used with the Moon Evolution 880Ms was the Moon Evolution 850P (review in the works), or that they sounded best when run in balanced mode. The 850P is already so highly regarded for its transparency that I've been warned more than once to "be prepared to go completely through your system, top to bottom," and that "you'll be revamping and rearranging your listening room before you know it." With that sort of sonic microscope, I expected to find more nits to pick with the 880M: accentuations of any minor sonic thumbprints I might hear. On the contrary—combining the 850P with the 880Ms seemed to ameliorate any quibbles I'd had with the latters' sound and, if anything, accentuate its strengths. I've not yet tried to concentrate on the 850P or listen to it with other amplifiers, but pairing these two Moon Evolution models makes me look forward to the experience.

And that leaves us . . .

I found it hard to describe what the Simaudio Moon Evolution 880M was adding to my system's sound. Instead, I ended up identifying and describing what *other* components were adding that the 880M was not—a telling comment on the Moon's performance. Also telling is that the most relevant benchmarks I found for the 880M were the VTL S-400 Reference and the Halcro dm88, two of the very best amps I've heard, and each of which set new a standard for performance. The Moon Evolution 880M now joins that group.

As with any component that sets a new standard of performance, it will be difficult to fully identify the 880M's characteristics until another, *better* component comes along. The 880M wasn't *completely* transparent, nor was it the best amp I've heard in *every* aspect of sound—but its overall balance and consistency of performance are causing me to reconsider the sound of the other excellent amps I've heard.

The Moon Evolution 880M's performance should be outstanding regardless of what other components it's hooked up to.

I did most of my listening with the Moon Evolution combo of 880Ms and 850P preamp—an undeniably synergistic pairing. I also did enough mixing and matching to tell me that the Moon Evolution 880M's performance should be outstanding regardless of what other components it's hooked up to. It's one of the small number of superamps that are in as close orbit around planet Perfection as today's technology permits. The 880M is an excellent design superbly executed, with a professionalism and attention to detail that promise consistently outstanding performance and long, trouble-free life. $42,000 is a lot of money, but competitively priced in the context of the top echelon of high-end amplifiers.

Back in 2001, the Moon Rock was Simaudio's admirable first attempt at a state-of-the-art amplifier, and especially admirable given how short a time it took to design and produce. With the Moon Evolution 880M there are no such caveats—and none needed. It's the big-time, big-money, big-power, big-*everything* amp that the Moon Evolution line has lacked, and a fully fledged state-of-the-art amplifier. Highly and very enthusiastically recommended. ■

ASSOCIATED EQUIPMENT

Digital Sources Audio Research CD-8, Primare CD 31 CD players.
Analog Sources Spiral Groove SG-2 turntable, Centroid tonearm, Lyra Titan i cartridge; VPI TNT HR-X turntable & tonearm, Grado Statement Reference cartridge.
Preamplification Sutherland Engineering Phono Blocks phono stage; Sutherland Engineering Line Blocks, Placette Active, Simaudio Moon Evolution 850P line stages.
Power Amplifiers VTL Ichiban, Mark Levinson No.20.6 (both monoblocks).
Loudspeakers Wilson Audio Specialties Sophia II.
Cables Interconnects and Speaker Cables: Stereovox, Audience Au24e, Nordost Valhalla. AC: Audience Au24, PowerChord-e.
Accessories Audience aR-12TS & aR-2TS power conditioners; FIM 880 AC outlets; Finite Elemente Ceraball, Nordost footers; Finite Elemente Reference, Audio Tools equipment stands; Immedia SPT stylus-cleaning fluid; Zerostat; VPI HW-16.5 record-cleaning machine; VPI, Disc Doctor record-cleaning fluids; Nordost ECO3, Audience Aural Illuminator CD cleaners/treatments; Wally Tools turntable-setup tools.—**Brian Damkroger**