KEN MICALLEF

Doshi Audio Evolution Stereo

POWER AMPLIFIER

Nick Doshi is cautiously reserved when he talks about his amplifiers, preferring to let the products speak for themselves. At every show I've heard them at, from Chicago to DC to Munich, they have done exactly that: Every system I've heard featuring a Doshi amp has delivered great sound. When I pressed him as to why, he just smiled.

So it was with a little trepidation that I asked to review the hybrid Doshi Audio Evolution Stereo Amplifier ($24,995), a push-pull, hybrid solid state/tube amplifier that operates its first 50Wpc in class-A into 5 ohms, up to 65Wpc in class-AB.

The amp exhibits the best qualities of a triode, Doshi insisted. "The Doshi Stereo Amplifier is actually *two* very different and highly desirable amplifiers in a single, extraordinary product," the Doshi website states. "While servicing a classic Marantz amplifier, Nick realized that the EL34 tube could be made to exhibit exactly the same electrical characteristics as a 300B."

I asked Nick Doshi about this. "Actually, it was a one-off Marantz 300B amplifier built by Sid Smith"—the legendary Marantz

SPECIFICATIONS

Description Hybrid solid state/tubed class-AB power amplifier. Tube complement: 8 EL34/6CA7 (4 per channel). Analog inputs: One pair single-ended on RCA, one pair balanced on XLR, through a buffer. Outputs: L/R loudspeaker binding posts, optimized for a 5 ohm load. Frequency range: 20Hz–40kHz. Output power: 65Wpc into 5 ohms (16.1dBW). Input impedance: 30k ohms. Output impedance: <1 ohm. Voltage gain: 30dB. S/N ratio: 65dB. Power consumption: 130W. **Dimensions** 18" (457mm) W × 20" (508mm) D × 8" (203mm) H. Weight: 65lb (29.5kg). **Finishes** Aluminum, black anodized, natural anodized. **Serial number of unit reviewed** EVO2083. Manufactured in the US. **Price** $24,995. Approximate number of dealers: 5. Warranty: Three years parts and labor; six months on tubes. **Manufacturer** Doshi Audio, Charlottesville, VA 22901. Tel: (917) 952-2758. Email: info@doshiaudio.com. Web: doshiaudio.com. US distributor: Command Performance AV, 115 Park Ave., Falls Church, VA 22046. Tel: (703) 532-7239. Email: info@commandav.com. Web: commandav.com.

engineer—"to show how a 300B push-pull amp should really be done," Nick answered in an email. "It used 8B output transformers, which piqued my interest. I did some research and saw the similarities in the curves and tried an experiment involving a set of separate screen windings to deliver power from the screens of an EL34/6CA7 tube."

Continuing the narrative from the Doshi Audio site: "Employing an extremely expensive output transformer custom-designed to Doshi's specifications, a discrete, tertiary transformer winding is connected directly to the grids of each output tube. As a result, when used at low power, the Doshi Stereo Amplifier provides sonic and electrical performance identical to a push-pull 300B amplifier!"

I've enjoyed many great triode-based amplifiers over the years. If Doshi's claims about the sound of the Evolution Stereo Amplifier are accurate, I'm all in and all ears.

Class-AB stereo amplifiers are characterized by bias current that determines how much of the amplifier's total power is delivered in class-A. The Doshi Evolution has not one but two notable transitions: It runs class-A up to 50W, and it acts like a triode amplifier for the first 10–12W.

"The Evolution Stereo Amplifier is designed with two sets of push-pull primary windings," Doshi explained. "One set for the plates and one set for the screens. This differs from the standard pentode, triode, or ultralinear operation commonly used. The idea is to load the screens such that the first few watts of output power are the result of screen contribution, and as the screens reach their limit, the plates take over the load. It did not work exactly as I wanted it, but it worked well enough to make for a wonderful, effervescent-sounding amplifier. The goal was to bring out the beauty of a triodelike midrange with power and control.

"Another choice was to use as little feedback [as possible] to achieve this," he added. "The preamplifiers do not use overall feedback, and the amplifiers use very little, 7dB in the case of the stereo amplifier."

Doshi designed his Evolution Stereo Amplifier to use only two active stages to deliver output in excess of 55Wpc. Unusually for a hybrid amplifier, the input stage is solid state and the output stage is tubed; it's usually the other way around. The input/driver stage uses matched Linear Systems dual JFETs. The output stage uses four pairs of EL34 tubes strapped in parallel, which halves the output impedance of the tube, doubles the current capacity, and lowers the dissipation in the tube, increasing tube life.

"Our JFET input/splitter stage drives two pairs of EL34/6CA7 output tubes per channel," Nick wrote in an email. "Although most stereo amplifiers use a single pair of tubes per channel, our four-tube design yields lower output impedance and the ability to master complex loads. As a result, our Evolution Stereo Amplifier can drive virtually any loudspeaker."

What's more, the tubes are much cheaper than 300Bs. "Using a relatively inexpensive EH 6CA7 type means that the overall cost of renewing the tubes is under $300," Doshi wrote.

The amplifier employs Doshi's "Component De-Stressing" methodology, whereby every part is overspecified to optimize reliability, longevity, and sound quality.

"Our Sowter Audio output transformers, for example, are designed for continuous output in excess of 100W at 20Hz, preventing core saturation," Doshi wrote. "Every component of this ampli-

MEASUREMENTS

Nick Doshi, accompanied by Jessie Bentley of Virginia dealer Command Performance AV, picked up the Doshi Evolution Stereo amplifier from Ken Micallef's Greenwich Village apartment and delivered it to me in Brooklyn. They carefully installed the eight numbered Electro-Harmonix 6CA7-EH output tubes, then Nick briefed me on his design philosophy and how to operate the various buttons and switches. As I did with the similar-looking Evolution Monoblock amplifier that Jason Victor Serinus reviewed in May 2021,[1] I left the amplifier powered up for 45 minutes before I started examining the Evolution Stereo's performance on the test bench with my Audio Precision SYS2722 system.[2]

Before doing so, I muted the amplifier and checked the bias current for each of the four paralleled pairs of output tubes using the front-panel display and the four trim pots on the top panel. The manual says that the optimal bias should be "between 190 and 220" on the display. However, after he installed the tubes, Nick Doshi had told me that I should set the bias to "182." I emailed him for clarification, and he confirmed that I should set the bias to "182, as this limits dissipation to 18–19W per EH tube." The trim pots for adjusting bias are very sensitive, so it took me several attempts to achieve the optimal settings. However, even with the trim pot for the left channel's V2 pair at its minimum, the indicated bias was "198" rather than "182." Perhaps one of the tubes was aging faster than the others. Because these were the tubes with which KM had auditioned the amplifier, I continued with the testing.

The Evolution Stereo has both balanced and single-ended inputs, labeled "Buffered" and "DIR.SE," respectively. Doshi recommends using the single-ended inputs, so I performed a full set of measurements with those inputs, repeating some tests with the buffered balanced input. I measured a voltage gain of 31.1dB into 8 ohms with both inputs. Both preserved absolute polarity (ie, were noninverting). The XLR jack is wired with pin 2 hot, the industry standard. The input impedance is specified as 20k ohms balanced and 47k ohms unbalanced. I measured 32k ohms at 20Hz and 1kHz for the single-ended inputs, dropping inconsequentially to 29.6k ohms at 20kHz. The balanced input impedance was 38k ohms from 20Hz to 20kHz, ie, 19k ohms per phase.

The output impedance was 2.1 ohms at all audio frequencies. As a result, the modulation of the Doshi's frequency response driving our standard simulated loudspeaker[3] was meaningful, at ±1.2dB (fig.1, gray trace). The small-signal band-

1 See stereophile.com/content/doshi-audio-evolution-monoblock-power-amplifier.
2 See stereophile.com/content/measurements-maps-precision.
3 See stereophile.com/content/real-life-measurements-page-2.

"The bias settings for the amplifier can be adjusted for a slightly different sound to match system and personal taste."

fier is overbuilt to optimize reliability. The power supply is vastly oversized, so all components run cool, the output transformers similarly so. The chassis utilizes 14ga stainless steel for strength and nonmagnetic properties. A career spent in broadcasting has served to make me keenly aware that reliability is goal #1."

The Evolution Stereo Amplifier employs "three-stage" mechanical decoupling technology to minimize resonances. Critical audio circuits are point-to-point wired and mounted on an acoustically isolated subchassis made of 14ga stainless steel, suspended from a top plate of anodized aluminum. All this is mounted on a constrained-layer aluminum platform that floats on four vibration-absorbing feet, mechanically decoupled from the chassis with rubber and Sorbothane.

"The input, regulators, and power supply use circuit boards and the output tubes are wired point-to-point to keep the grid resistors, etc., closest to the tubes," Doshi continued.

Chassis and transformer covers are stainless steel; the rear panel is aluminum as is the front panel and the top plate. Digital control circuitry is supplied by John Chapman of Bent Audio, custom for Doshi Audio. RCA and XLR jacks are by Neutrik. Speaker binding posts are by Cardas.

The Evolution Stereo has both RCA and XLR inputs, but the single-ended (RCA) inputs are preferred. The RCA inputs are the "direct" inputs because "the amplifier input is single ended. The balanced inputs are fed through an op-amp–based balanced-to–single-ended converter. It's an instrumentation op-amp topology and is incredibly transparent, but it counts as another amplification stage. Doshi Audio recommends using the SE inputs if possible for the cleanest signal path."

The input impedance is 30k ohms, "for perfect compatibility with the widest possible range of preamplifiers," the Doshi website states. Still, care should be taken with preamplifier matching. The Doshi Evolution didn't work well with my Shindo Allegro mono, which has a high output impedance for a preamp, rising in the bass due to capacitor coupling. With the Shindo-Doshi combo, the sound was thin, constricted, and bland, with insufficient bass. "The Shindo cannot drive a 30k ohm input impedance without low-frequency attenuation, due to its design," Doshi said. "Provided the preamplifier has a low enough output impedance and a large enough output coupling capacitor (if designed in a 'Classic' tube topology), there will be no issues in matching."

The front of the Evolution Stereo Amplifier includes four small buttons: Power (On or Off), Disp (which turns the display panel on), Mute, and Func. The Func switch steps through the bias settings for each tube pair to facilitate biasing. It also provides access to a timer that indicates how long the tubes have been in use. The Stereo Evolution is not autobiasing, but biasing is simple. The procedure is described below and on p.4 of the user manual.

Around back, alongside the inputs and outputs, a Ground Lift switch enables system optimization. An optically isolated 12V trigger loop enables the amplifier to be powered on and off remotely. The main power switch sits above the IEC receptacle.

On startup, the amp is muted for about a minute. When the mute button is pressed on the front panel, both input and output are shorted, protecting the speakers from any inadvertent cable movements.

In voicing the Evolution Stereo Amplifier, Doshi used speakers

from Wilson, Kharma, Tannoy, ATC, KEF, Franco Serblin, Popori Acoustics—and Joseph Audio, a frequent, sympathetic companion at shows.

Doshi amplifiers are assembled in the company's Charlottesville, Virginia, factory. After prefabricated control boards and cable harnesses are delivered, Doshi handles final assembly, testing, and shipping.

Setup

The Doshi Audio Evolution Stereo Amplifier stands 18" wide × 20" deep × 8" high and weighs 65lb—though as I hauled it up my building's winding staircase and around my apartment, it felt *much* heavier. Once it was unpacked, I wrestled it to the mancave rug that covers the wood plank floor in front of my equipment rack. I placed three large A/V RoomService Equipment Vibration Protectors under the amp: My Greenwich Village building is vulnerable to vibrations caused by moving trucks. The footers scored a big improvement: soundstaging, sense of air, and bass control.

Biasing was straightforward, though good light and decent eyesight are helpful for seeing those small front-panel buttons and especially the small, engraved letters next to the individual tubes.

Doshi described the biasing process. "The front panel has four buttons around the display: Top left, power; top right, mute; bottom left, display on/off; bottom right, function. To activate the display, press the bottom left button. Now the display will stay on until the button is pressed again. Use the function button to step through the five functions: 1—hours elapsed, 2—bias for tube pair V1 (first LED below the window is lit), 3—bias for tube pair V2 (second LED under the window is lit), and so on until the V4 bias. Pressing the button for the sixth time will bring it back to elapsed hours and no LEDs lit up.

"The bias settings for the amplifier can be adjusted for a slightly different sound to match system and personal taste. Typically,

Listening

When choosing material for audio reviews, I use familiar records that test a handful of system parameters. For this review, I pulled out Tord Gustavsen Trio's *Going Places* (ECM Records ECM 7598119), Count Basie's *88 Basie Street* (Analogue Productions APJ 156), *The Master Trio* (Baybridge Records KUX-183-B), Michael Franks's *The Art of Tea* (Reprise Records MS 2230), Tom Petty and the Heartbreakers' *Mojo* (Reprise Records 523971-1), Yussef Kamaal's *Black Focus* (Brownswood Recordings BWOOD0157LP), and the debut album from 1970s UK prog rock quartet U.K. (Polydor/E.G. 2302 080).

The late-1970s album *U.K.*, while not a sonic masterpiece, showcases amazing performances by John Wetton, Bill Bruford, Allan Holdsworth, and Eddie Jobson. The synergy between the Ampsandsound Yosemite preamp and the Doshi Evolution Stereo amp was exceptional, extracting maximum detail from the recording. Most amplifiers define the boundaries of a soundstage; with the Yosemite and the Doshi, I perceived no borders—just a galactic-scale soundstage that seemed to go on forever.

The Art of Tea, a classic '70s vocal jazz record from Michael Franks, possesses tonal warmth, a lush, slightly atmospheric bottom end, and an airy top. The Evolution Stereo extracted the full reverb and decay from Franks's voice, the precise articulation of Wilton Felder's bass, and the delicate textures of Larry Carlton's guitar and John Guerin's cymbals. This resulted in fine clarity, precise image placement, and a CinemaScope-worthy soundstage. The

settings from 170 to 200 on the display are safe to use, with 180–185 being the norm. Lower settings will lean out the sound, and higher settings will fatten it up for a more 'tubey' presentation."

I biased the tubes near 200, which sounded best to my ears. The rest of the system was the J.Sikora Standard Max Supreme turntable, Allnic-H-5500 phono stage, Ampsandsound Yosemite preamplifier—which according to the manufacturer has a modest (for a tubed pre) output impedance in the 300–600 ohm range, depending on what tube is used in the last position—and DeVore Fidelity Super Nine loudspeakers.

measurements, continued

width extended at full level down to 10Hz and up to 100kHz into 8 ohms in the left channel (blue trace) and 70kHz in the right channel (red trace). A small peak centered on 60kHz developed into lower impedances. This was absent in the balanced input's response, which started to roll off above 40kHz, reaching –3dB at 120kHz. The 1kHz squarewave (not shown) was superbly square, but the damped ultrasonic peak in the frequency response traces correlates with damped ringing on the tops and bottoms of a 10kHz squarewave (fig.2).

Channel separation was excellent, at >90dB in both directions below 4kHz and still 80dB at the top of the audioband. The unweighted, wideband signal/noise ratio, taken with the single-ended inputs shorted to ground, was 73.1dB ref. 1W into 8 ohms (average of both channels, which were very similar). This ratio was not affected by the rear-panel ground-lift switch but improved by 1dB when I restricted the measurement to the audioband and by 11dB with an A-weighting filter in circuit. Spectral analysis of the low-frequency noisefloor with the amplifier's rear-panel ground switch set to Ground (fig.3) revealed a low level of random noise but higher levels of AC-supply–related harmonics at 60Hz and its odd-order harmonics. These remained at the same levels with the ground lifted. They are probably

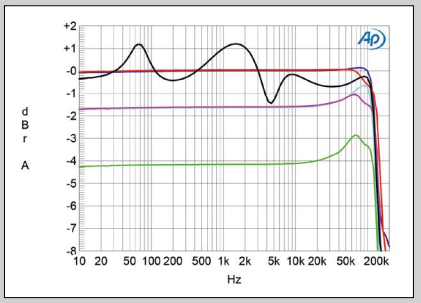

Fig.1 Doshi Evolution Stereo, frequency response at 2.83V into: simulated loudspeaker load (gray), 8 ohms (left channel blue, right red), 4 ohms (left cyan, right magenta), and 2 ohms (green) (1dB/vertical div.).

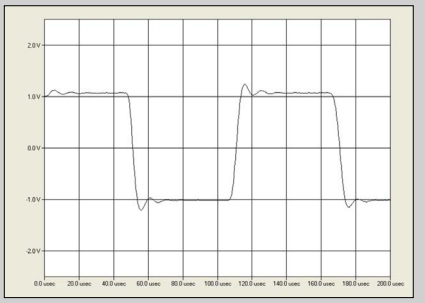

Fig.2 Doshi Evolution Stereo, small-signal, 10kHz squarewave into 8 ohms.

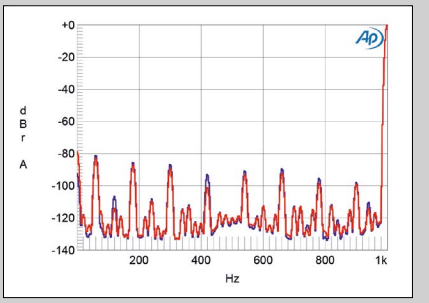

Fig.3 Doshi Evolution Stereo, spectrum of 1kHz sinewave, DC–1kHz, at 1W into 8 ohms with ground I connected (left channel blue, right red) (linear frequency scale).

Doshi sounded pristine and precise without ever turning clinical, operating with superb transparency to the original production—an honest presentation that was pleasing and revealing in similar parts. With some recordings, the treble brightened from a warm amber to slightly silvery, yet this transparency and truthful sound were consistent, reproducible traits of the amplifier.

On Franks's swinging "Popsicle Toes," Joe Sample's Rhodes piano was chewy, John Guerin's two ride cymbals well defined both tonally and dimensionally, in a wide, satisfying soundstage.

On Tom Petty's romping "Jefferson Jericho Blues," the amp's exceptional definition, layering, and contrast in separating the bass drum and bass guitar were stunning.

The Evolution Stereo is clear-headed, dynamic, and frequently revelatory. It frames every record (and associated upstream gear) in its true production milieu. And when the music called for it, as with the punchy dynamics of the Petty track, the amp delivered a powerful kick.

The Evolution Stereo's noisefloor was low, which helped the amplifier uncover previously unheard details. This was brilliantly demonstrated on Yussef Kamaal's "Black Focus," a subtle yet potent mix of brooding keyboards, swift brushwork, and enormous low bass. It seemed to carry the weight of the Atlantic Ocean, yet it maintained the clarity of a cloudless, subzero day.

It seemed to carry the weight of the Atlantic Ocean, yet it maintained the clarity of a cloudless, subzero day.

The Evolution Stereo delivered surprising levels of visceral texture, absolute presence, and stellar dynamics, but to me its sound did not recall a classic SET amplifier. The Evolution Stereo was superbly clear, dynamic, punchy, well-controlled, detailed, and co-

measurements, continued

due to magnetic interference from the power transformer.

The Evolution Stereo's maximum power is specified as 65W into 5 ohms (16.1dBW ref. 1W into 8 ohms). With clipping defined as when the THD+noise in the output reaches 1%, I measured 52W into 8 ohms (17.2dBW, fig.4) and 59W into 4 ohms (14.7dBW, fig.5; I do not have a 5 ohm dummy load). Relaxing the clipping criterion to 3% THD+N increased the maximum powers to 69W into 8 ohms (18.4dBW) and 80W into 4 ohms (16dBW). Tested with a 20kHz signal, the amplifier's output into 8 ohms was 29.5W (14.7dBW) at 1% THD+N and 69W (18.4dBW) at 3% THD+N. The maximum output power measured the same in both channels.

Nick Doshi told me that he decided to use just 5dB of global negative feedback when designing the Evolution Stereo's circuit, which is why the distortion rises with increasing power in figs.4 and 5. These graphs were taken with the right channel, because, as you can see from fig.6, which shows how the Doshi amplifier's THD+N percentage varied with frequency at 8V (equivalent to 8W into 8 ohms and 16W into 4 ohms), the distortion was higher in the left channel (blue and green traces) than it was in the right channel (red, gray traces). This may well be a result of the higher bias setting for the left channel's V2

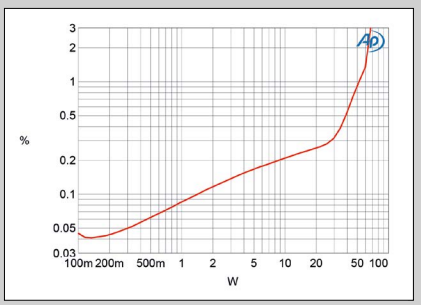

Fig.4 Doshi Evolution Stereo, right channel, distortion (%) vs 1kHz continuous output power into 8 ohms.

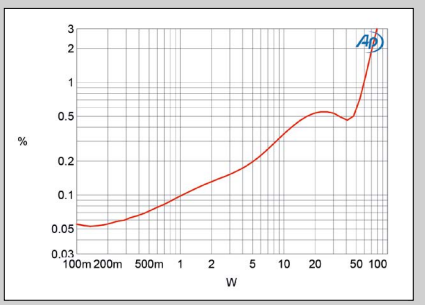

Fig.5 Doshi Evolution Stereo, right channel, distortion (%) vs 1kHz continuous output power into 4 ohms.

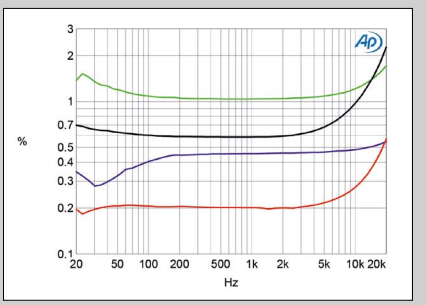

Fig.6 Doshi Evolution Stereo, THD+N (%) vs frequency at 8V into: 8 ohms (left channel blue, right red), 4 ohms (left green, right gray).

herent. It offered the best spatial resolution I've encountered from an amplifier. Its tonal presentation was precise and well-ordered. It was never romantic or soft. It presented music on a wide, cavernous stage that often strode out into my listening space like an actor jumping off the stage and into the audience.

Keeping everything else the same, I switched to the Voxativ Ampeggio loudspeakers. *Now* the Evolution Stereo sounded more like a SET amp. The music retained its finery, detail, texture, and palpability, now with less generous bass and less profound imaging, but with even more presence and precise layering. The Tord Gustavsen Trio was remade, the Ampeggio's focused, fast, full-range driver playing exceptionally well with the Evolution Stereo's low noisefloor and high elucidation factor. The sound practically glowed.

Playing Tower of Power's *In the Slot* with the Evolution Stereo/Voxativ Ampeggio produced similarly striking results. The treble was silvery, not forward but highly informative, and bass was more atmospheric than sculpted in space. The sound was thrilling, palpable, bracing—3D to a degree not heard before in my system. The Voxativ speakers confirmed this amplifier's life force, ample power delivered with controlled grace.

Conclusion

The Doshi Evolution Stereo Amplifier combines the resolution, force, and precision of solid state with the tone, spaciousness, sweetness, and splendor of tubes. It's a splendid performer, one of the best amplifiers I've heard. It has more than a touch of magic. It makes music sing. ■

ASSOCIATED EQUIPMENT

Analog sources J.Sikora Standard Max Supreme turntable with KV9 tonearm and Aidas MC Tru Stone Gold Web cartridge; Benny Audio Odyssey turntable with Benz Micro Gullwing MC cartridge.
Preamplifiers Ampsandsound Yosemite, Rogue RP7, line. Tavish Audio Design Adagio, Manley Chinook, Allnic H-5500, phono.
Power amplifiers Air Tight ATM-1 2024 Edition, Rogue Audio Stereo 100.
Integrated amplifiers Riviera Labs Levante, Unison Research S6 Black Edition.
Loudspeakers DeVore Fidelity Super Nine; Voxativ Ampeggio 2024.
Cables Interconnects: AudioQuest Pegasus and Firebird, Triode Wire Labs Spirit II (RCA), "Spirit 75" S/PDIF (RCA/BNC). Speaker: Auditorium 23 (9'), AudioQuest William Tell Zero (10').
Accessories Pro-Ject VC-S2 ALU, HumminGuru record cleaning machines; AOCISKA soft bristle brush; AudioQuest PQ-707 and IsoTek EVO3 Aquarius power conditioners; Salamander five-tier Archetype rack (2); Pangea audio rack; A/V RoomService Ltd. Equipment Vibration Protectors (EVPs); IKEA Aptitlig bamboo chopping boards (under preamp, power, and integrated amps); mahogany blocks (three to a stack), under IKEA boards.—**Ken Micallef**

measurements, continued

tubes, which I noted earlier. While the distortion rises in the top octave, it does not do so at low frequencies, showing that the output transformer's core is not becoming saturated.

With so little negative feedback, it's not surprising that the distortion is still relatively high in level; Nick Doshi told me that it would be around 0.3% at moderate powers. Fortunately, the Evolution Stereo's distortion signature into 8 ohms was predominantly the subjectively innocuous second harmonic (fig.7), lying at close to –50dB (0.3%), with the third harmonic around 10dB lower in level (fig.8) and the fourth harmonic at the same level in the left channel (blue trace). With an equal mix of 19 and 20kHz tones and the signal peaking at 15W into 8 ohms (fig.9), the difference product at 1kHz lay at –53dB in the left channel (0.2%, blue trace) and –56dB in the right channel (0.15%, red trace). The higher-order products all lay below –60dB (0.1%), however. The levels of the harmonics and intermodulation products were all 10dB higher with the amplifier driving 4 ohms.

After I finished the testing with KM's tube complement, I replaced the two V2 tubes with new Electro-Harmonix 6CA7-EH tubes I found in the amplifier's packaging. After a 45-minute warmup, I adjusted the bias to "182" for these tubes and repeated the THD+N vs frequency test into 8 ohms. The left channel now offered lower distortion than the right channel, confirming that one or both of the V2 tubes that KM had used for his auditioning must have been past their best.

The Doshi Evolution Stereo's measured behavior is dominated by the circuit's limited use of negative feedback. Even with the better-performing right channel, which I assume is due to that channel's tubes being in better shape than the left channel's, this amplifier is best suited to driving loudspeakers with impedances higher than 4 ohms.—**John Atkinson**

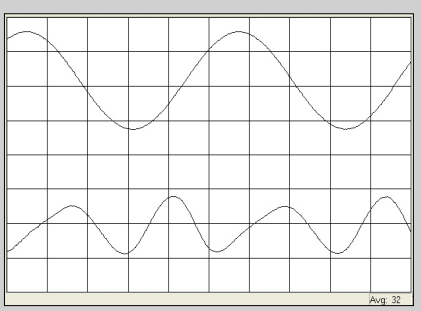

Fig.7 Doshi Evolution Stereo, right channel, 1kHz waveform at 8W into 8 ohms, 0.2% THD+N (top); distortion and noise waveform with fundamental notched out (bottom, not to scale).

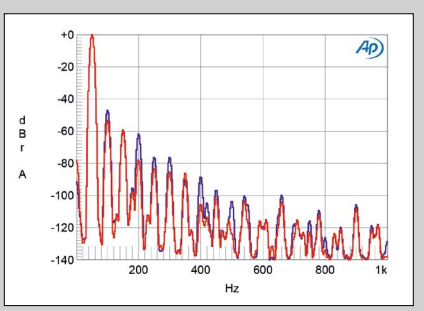

Fig.8 Doshi Evolution Stereo, spectrum of 50Hz sinewave, DC–1kHz, at 15W into 8 ohms (left channel blue, right red) (linear frequency scale).

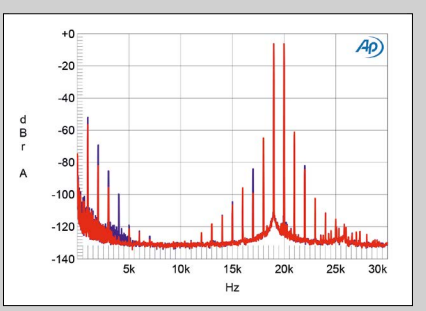

Fig.9 Doshi Evolution Stereo, HF intermodulation spectrum, DC–30kHz, 19+20kHz at 15W peak into 8 ohms (left channel blue, right red) (linear frequency scale).