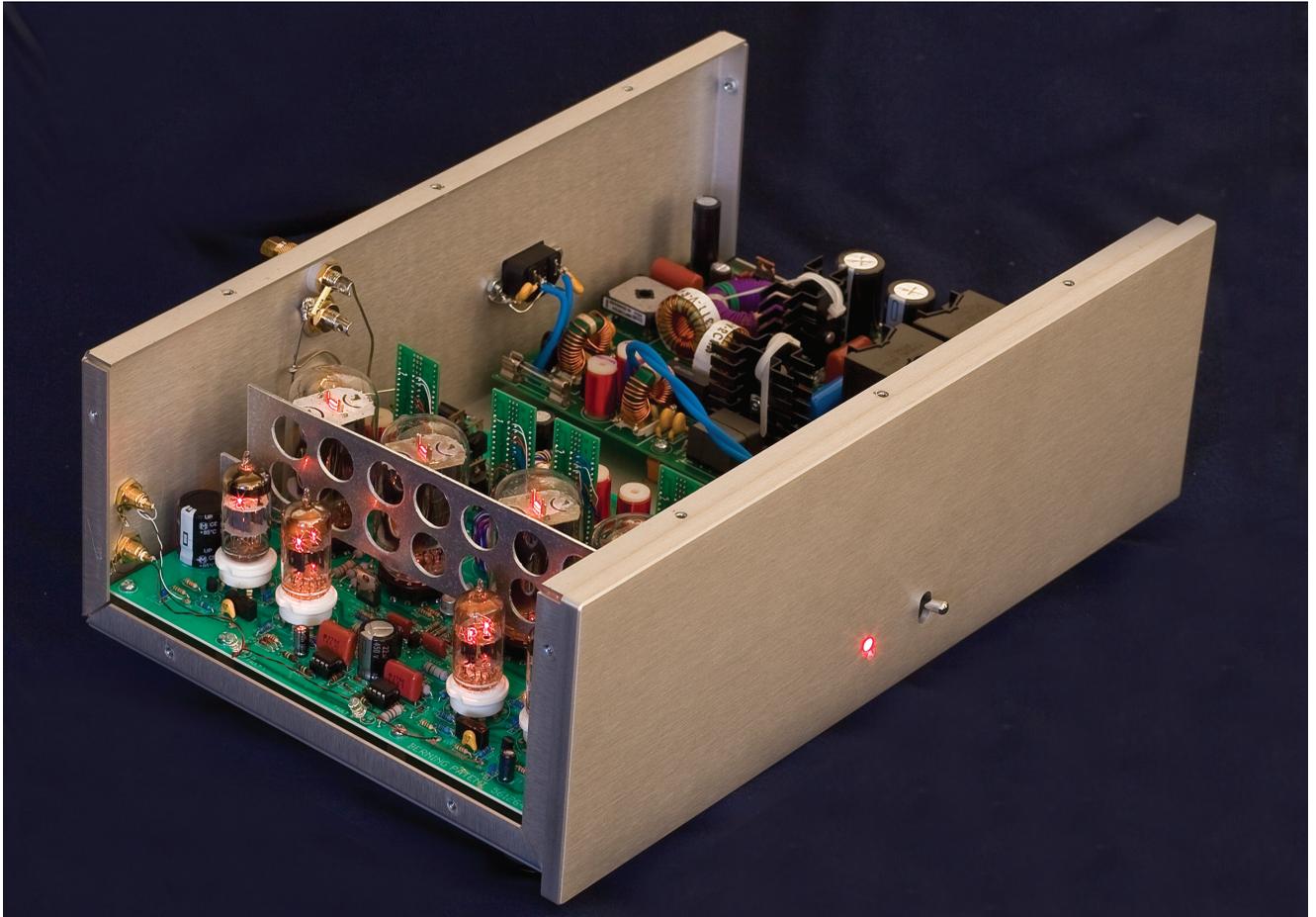


the absolute sound

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David Berning ZH-230 Stereo Power Amplifier

The State of the Art in Medium-Power Amplification

Dick Olsher

In my book, a new product introduction from the creative mind of David Berning is an event, a happening if you will. His designs are far from being yet another twist on a 1950s circuit, which to be perfectly honest is what most of tube audio is all about nowadays. Although the ZOTL technology has been around for over a decade and could be considered mature, it still looks and sounds cutting-edge. It represents David Berning's severing of the Gordian Knot that is a conventional audio output transformer. The output stage is push-pull. The beam power tubes (a pair of 33JV6

per channel) are connected to two full-bridge power converters, which reflect their conductance through a pair of RF transformers (each power converter has its own dedicated transformer) operating at a fixed carrier-frequency to match the impedance between the tubes and loudspeaker. It's fair to say that the ZH-230 represents an update of the venerable ZH-270 (long out of production), albeit at a lower power output. Most notably, the RF carrier-frequency has been increased from 250 to 500kHz and the source impedance has been reduced for increased damping factor.

EQUIPMENT REPORT - David Berning ZH-230 Stereo Power Amplifier

According to Berning, “the ZOTL is in reality an emulation circuit for an ideal output transformer. It matches impedance just like a transformer, and it is a two-way communication between tubes and speaker as is a conventional transformer. The beauty of it is that the ZOTL does not suffer from the frequency-dependence issues of a transformer that is expected to work over orders of magnitude of frequencies. The ZOTL transformers just operate at a single frequency, and any non-ideal issues with these do not affect the audio response as they are constant and would be like having a constant resistor somewhere in the signal path.” He is quick to emphasize that the two-way communication is a critical design feature. This is the thing that separates the ZOTL from a hybrid amplifier. The ZOTL “should not be considered a tube amp followed by some other kind of output buffer—it is not. By having the two-way communication, the speaker is fully controlled by the output characteristics of the tubes, and that includes all-important damping. This is not the case with the hybrid amplifier that is simply tubes with an output buffer.”

This is one of the few power amps I can easily carry under my arm. That can be explained not only by the lack of a conventional output transformer but also by the absence of a power transformer. There’s no heavy iron here. The power supply is a switching type and incorporates a five-stage power-line filter and surge suppressor. The amplification circuitry is fully balanced. The input signal is AC coupled to a differential phase-splitter, followed by a driver stage. Out of the box, the amp is outfitted with a 12AX7 input and a 12A17 driver. Since the ZH-230 is auto-biasing, these tubes may be changed without having to worry about manual bias-calibration. A 12AT7 or 12AU7 may be substituted for the input tube, while only a 12AU7 may be substituted for the 12A17 driver. The user manual outlines the performance of the amp with various tube types. With the stock tube complement, the feedback is highest, resulting in the lowest output impedance (about 0.6 ohms for an 8-ohm load). The use of lower-gain tube options (e.g., 12AU7 for input and driver) yields the lowest feedback and highest output impedance (2.7 ohms for an 8-ohm load). My preference is to keep the source impedance under 1 ohm to increase the damping factor and minimize load interactions. After an initial stint with the stock tubes, I rolled in (with Berning’s blessing) a quartet of NOS Philips 7062/E180CC. These are computer-grade tubes, similar to a 12A17, but with slightly lower gain and somewhat higher filament current (200 vs. 150mA). These tubes yielded richer, more nuanced harmonic texture, and I can safely recommend the 7062 as a worthwhile upgrade. Note that the 33J6 may not be replaced with a different type. Prior to replacing tubes, be sure to explicitly follow all of the safety precautions outlined in the owner’s manual, as high DC (900V) and high AC voltages (1600V) are present inside the chassis. Since the idle-plate dissipation of the power tubes is only 7.5W and their heaters are operated below the rated voltage, their expected lifetime, according to Berning, is 10,000 hours.

Choice of matching load is always an important consideration for low and moderately powered tube amps. The amp is designed to work with nominal loads in the range of 4 to 16 ohms and, ideally, would appreciate a speaker sensitivity of at least 90dB. My intention all along was to mate the ZH-230 with my Basszilla Platinum Edition Mk.2 DIY speaker, a 96dB-sensitive load that has performed well in the past with such amps. But along the way

I had the opportunity to drive the Salk SongTower and the DALI Helicon 400 Mk.2, both being 4-ohm nominal loads and rated at a sensitivity of 88dB.

To confess, I have undergone a feeding frenzy, a steady diet of low, medium, and high power tube amps for the past 20 years. A natural consequence of a steady exposure to a particular medium is blind acceptance of the underlying paradigm, including all of its limitations. Therefore, what I found instantly startling about the ZH-230 was its superlative transient speed at the point of attack. By contrast, conventional transformer-coupled tube amps appear to round off the leading edge, making transients appear softer and more liquid than the real thing. Pablo Picasso said that art is a lie that makes us realize truth, and in that sense it is perhaps possible to accept and forgive a conventional tube amp’s relative lack of speed. Mellow may be fun, but to my mind, the ZH-230 is a game-changer; it reaches a Goldilocks zone where harmonic textures are neither too hard nor too soft—just natural sounding. It’s a considerable gift, combining it seems to me the best of tube and transistor sound. Control of transient decay was also exemplary. Treble nuances were silky smooth and delicate, yet never aggressive or in your face. The sibilance of inexpensive mikes was reproduced without exaggeration.

The overall presentation possessed a refreshingly low-distortion signature—no tube brightness or glare to complain about.

SPECS & PRICING

Power output (at onset of clipping): 36W (into 4 or 8 ohms)
THD (typical at 30W and 8-ohm load): 0.3% to 0.7%
Frequency response (5W/8 ohms): +0, -0.6dB at 30kHz; 0dB down at 20Hz
Output Impedance: 0.6 to 2.7 ohms, depending on tube complement
Input sensitivity: 0.4V to 0.75V, depending on tube complement and load impedance
Input impedance: 50k ohms
Net weight: 7 kg (15 lbs.)
Dimensions: 30cm x 17cm x 42cm
Price: \$8360

ASSOCIATED EQUIPMENT
DALI Helicon 400 Mk.II, Salk Audio SongTower, Basszilla DIY Platinum Edition Mk2, and MartinLogan Summit X loudspeakers; Kuzma Reference turntable; Kuzma Stogi Reference 313 VTA tonearm; Symphonic Line RG-8 Gold MC phono cartridge; Air Tight ATE-2 phono preamp; SoundTradition Live! MC-10 step-up; Weiss Engineering Jason CD transport and Medea DAC; Concert Fidelity CF-080 and Mystère CA21Iline preamplifiers; FMS Nexus-2 interconnects; FMS Nexus speaker cable

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EQUIPMENT REPORT - David Berning ZH-230 Stereo Power Amplifier

Harmonic colors shone vividly while textures were consistently sweet sounding, smooth, and totally grunge- and grain-free. The harmonic envelope of a solo instrument ebbed and flowed in a relaxed, effortless manner, with richness of tone. By extension there was plenty of low-level detail to behold. But it was all very discreet, without the cheap trick of etching treble transients.

The other attribute that set the Berning apart from the crowd was its immediacy—a lack of veiling that created a strong sensation of being able to reach out and touch image outlines. This combination of speed, control, and immediacy resulted in a level of clarity only a handful of tube amps could match. It was able to generate a cohesive, spacious, fully 3-D soundstage with excellent transparency and fabulous image palpability. Though the latter attributes, which I associate with tube magic, were only fully fleshed out with a tube preamp in the signal chain. I dare say that what you think of the ZH-230 will in large measure depend on the associated preamp. A somewhat romantic-sounding preamp would be ideal; certainly, the *Mystère CA21* worked very well.

While I noted some bass heaviness with the *DALI Helicon*, there were no bass-related issues to report in the context of the *Basszilla*. After all, a 30Wpc tube amp is in heaven when in the company of a 96dB-sensitive speaker. Here the ZH-230 exhibited convincing pitch definition and was capable of thunderous bass output and of fleshing out a convincing orchestral foundation. In particular, the lower mids were characterized by a realistic tonal authority. Quickness in the bass range was at least partly responsible for considerable rhythmic drive, really a prerequisite for toe-tapping musical involvement. Recordings high on boogie

factor were propelled forward with a huge kinetic impulse. Microdynamic nuances were given full scope of expression. This is the realm of feelings and emotions—an arena in which solid-state generally performs poorly. The Berning, without the euphonic guile of a vintage tube amp, did not come across as seductively. So if you're truly addicted to classic tube sensuousness, you most likely will not get your fix here.

The final test for the ZH-230 was to be a date with the *QUAD-57 ESL*. Since the Berning *EA-230*, now long out of production, has been reported as an excellent match for the *QUAD-57 I* was curious to find out how the latest *ZOTL* wunderkind would perform. This turned out to be a magical coupling. Imagine the ZH-230's strengths magnified by electrostatic virtues. In particular, the midrange was most compelling, being pure and dynamically nuanced. The timbre of both male and female vocals was right on. The tonal balance above about 300Hz was fairly neutral with a well balanced midrange, which certainly was not laid-back. Overall, this was the sort of sound that was felicitous with small-scale works and could be enjoyed till the cows came home.

The Berning ZH-230 is the one, the anointed new king. It represents in my estimation the state-of-the-art in medium-power amplification. Let no one doubt the sonic potential of *ZOTL* technology. It delivers a substantial dose of tube magic while avoiding the pitfalls of tube euphonics and textural hyper-liquidity that afflict so many conventional tube amps. Its sound is rich, luxuriant, and dramatic, with a winning combination of transient speed and immediacy. A must audition for anyone serious about reproduced music. **tas**