

# GRAMOPHONE DREAMS

BY HERB REICHERT

**THIS ISSUE:** Herb auditions a headphone amplifier from a new marque, alone and together with that company's own external power supply.

## Iron OOR

I'm deep into audio power amplifiers because they remind me of race car engines. Both power sources are wildly inefficient, converting only a small percentage of their stored energy into work while dissipating the rest as heat and vibration. Mainly though, I love how race car engines *sound*. How they shake the air. Just like amps and speakers.

Audio-frequency power amplifiers take a small input signal—usually less than 1V—apply it to an input impedance of (typically) no less than 10k ohms, and make this tiny eye-blink of power (0.0001W) into a waveform that's many times more powerful, capable in some cases of doing hundreds of watts of speaker-moving work. To grasp the magnitude of this chore, and what I am about to describe, it might be useful to imagine power amplifiers as *energy adders*.

The majority of audio amplifiers I've encountered were built in closed metal boxes (with power cords), and every high school grad knows that energy is conserved: neither gained or lost. Therefore, if we want more energy at the output—if we want the amplifier to *amplify*—then we need to import energy from an outside source (like our household AC line) and store it in something—capacitors—that's engineered to hold and release a rapidly varying stream of energy.

Audio frequency amplifiers are notoriously inefficient. Therefore, amplifiers of the highest fidelity must not only store (by necessity limited) volumes of stable “standing” energy in their capacitors; they

must also have effortless access to a flow of fresh energy through their power cords (to fill and refill those capacitors) *and*, equally important, a direct, low-impedance path to an infinite source of free electrons from our good and gracious Mother Earth.

Importing and outflowing energy with some amount of reliable precision is a messy, variable-plagued business, which is why an audio frequency power amplifier

**With its standard power supply, the OOR preamp emphasized beat, tempo, and pace.**

can only be as effective, linear, and exciting to use as its power supply allows it to be.

### The Ferrum HYPPOS power supply

When I saw my first two-page magazine ad (in our sister magazine *Hi-Fi News*) for the Ferrum HYPPOS “Hybrid Power System,” I smiled and felt validated. The ad looked enticing, and its points were well-stated. I wondered where this Ferrum company came from and how the Ferrum people had the courage to make and market what appeared to be a fully formed hip'n'cool-looking variable-voltage audio *power supply*. They must have known I hated wall warts and that I think switching supplies are bean-counter ruses to save money on transformer iron.

Ferrum's logo is *Fe*, which is the symbol for the element iron and the abbreviation for the Latin word “ferrum”; which is Latin for iron, which, in its usual metallic form, is a rather dense, crystalline substance capable of being magnetized.

The Ferrum HYPPOS Hybrid Power System and Ferrum's matching OOR headphone amp (auditioned below) are both made in Poland by the same company (HEM) that distributes Clarus Cables in Poland and until recently manufactured Mytek products.

On their website, Ferrum Audio says that the HYPPOS is their first product, calling it a “linear/switching hybrid power system” that accepts 110–240V AC in and can output a user-selectable DC voltage from 5V to 30V at up to 6A. It's priced at \$1195.

On their website, Ferrum claims that their hybrid design offers “the best of switching and linear supplies.” Via email, Roy Feldstein of VANA (Ferrum's US distributor) explained Ferrum's choice to make the HYPPOS a hybrid design: “Linear regulators have low ripple and noise as well as fast transient response. Switching power supplies have higher efficiency. Ferrum wanted it all.”

The engineering team at HEM/Ferrum told me in an email that the design of the HYPPOS supply begins with a noise-reducing input filter to clean incoming AC. That's followed by a stepdown transformer, which feeds Schottky diodes and four



4700µf electrolytic capacitors (for smoothing and storage). That's all pretty standard. After that is where it gets interesting.

According to the HEM engineers, "That first linear supply feeds a low-ripple switching supply (SMPS) through a single-stage filter, and there is a two-stage filter on the output of the switching supply. The design and implementation of these input and output filters are critical to the performance of the HYP-SOS. To further reduce noise, the SMPS has a spread-spectrum mode. This mode modulates the switching frequency by 20%. This technique reduces EMI because the spectrum of noise generated by multiple switching frequencies and their harmonics is lower in magnitude than those of a single switching frequency.

"Following the SMPS is a low-noise linear regulator. This final regulator is a low-dropout design based on an NMOS [negative channel metal oxide semiconductor] transistor. In the context of linear power supplies, the term 'low-dropout' means that the device can regulate the output voltage even if the input voltage is only slightly higher than the output voltage. In the HYP-SOS, the output of the switching supply is less than 1 volt greater than the output voltage of the linear power supply. This attribute increases the efficiency and reduces the heat output of the supply. An ARM-based microprocessor adjusts the duty cycle of the SMPS and the reference voltage of the linear regulator to vary the output voltage. This processor also controls all the other functions of the unit."

The main job of a power amplifier's power supply is to effortlessly deliver constantly varying ratios of voltage and current to a constantly fluctuating load. To that end, the HYP-SOS specifies maximum continuous output current (for voltages below 13.3V) at 6A. For output voltages greater than 13.3V, Ferrum specifies that the DC output current will adjust to equal 80W maximum power. The HYP-SOS weighs 6lb and measures 8.6" wide × 8.1" deep × 2" high. The warranty is for three years.

Obviously, to audition Ferrum's HYP-SOS power supply, I will need to connect it to a component that requires power and that can utilize a remote power supply. On their website, under the heading "Works with!" Ferrum provides a continuously updated "Compatibility list" of the brands and component models the HYP-SOS will service. Currently, this list includes dozens of well-known brands: Arcam, Audio-engine, Auralic, Bel Canto, Cambridge Audio, Chord, Creek, Denon, exaSound, Gold Note, Mytek, Stax, Sonore, Roon, iFi Audio, Musical Fidelity, Naim Audio,

McIntosh, and others.

#### But first, the OOR

I thought it would be wise to start my HYP-SOS auditions by not using it; instead, I spent time listening to Ferrum's second product—the OOR preamp/headphone amplifier (\$1995)—with its standard off-chassis ("wire-wart") power supply.

The headline on the Ferrum webpage for the OOR says "OOR, the only headphone amplifier with a soul." The sales pitch continues farther down in smaller print, "OOR will drive any headphones effortlessly to the max of their potential, while preserving the essence of the music it amplifies."<sup>1</sup> Normally, I am turned off by such website hyperbole, but in the case of these new Ferrum products, I found myself being drawn in. Ferrum's ad writers wrote all the right words. Headphone dedicants like me study recordings like a monk studies ancient texts, seeking the *soul* and *essence* of the music being amplified. The opportunity to audition a top-tier headphone amp with both a standard and optional supply was my chief inspiration for creating this report.

When the HYP-SOS and OOR arrived, besides listening with them, I had a strong desire to know all about the thinking that motivated their design. I asked about the nature of the OOR's circuitry and how the OOR is different than other headphone amplifiers at this price level. HEM Hardware Engineer Maksymilian Matuszak responded. This is an abbreviated version of his email response:

"The input stage of the OOR adjusts gain and volume and is made from fast op-amps with external compensation. After that, there is a unique, discrete-transistor output stage based on low noise BJT [bipolar junction] transistors. It is not class-A; it is rather something between class-A and -AB. It does not use a full-time operational current source, which forces the current through one transistor. Instead, it employs special circuitry, which never turns off either of its two output-steering transistors, which are polarized similarly to class-AB.

"The current through both output transistors is monitored by independent circuits that prevent it from dropping below a predetermined threshold value. The OOR's output stage is linearized by the feedback loop of its discrete current-feedback amplifier, which has about 60kHz of open-loop bandwidth (−3dB) and almost 1MHz of closed-loop bandwidth (−3dB). This wide open-loop bandwidth is not present in [integrated-circuit-based] headphone amplifiers.

"The OOR's entire signal path is DC

coupled and fully balanced. All gain circuitry is fully balanced (even on the RCA input) because the input amplifier is converting the single-ended signal to balanced. Volume regulation is handled by a custom, 4-channel Alps attenuator. To accommodate single-ended output, the signal is converted to single-ended at the RCA outputs."

According to Matuszak, output power into 32 ohms is about ~9.5Wpc balanced. It's ~8.3W into 50 ohms and ~2W into 300 ohms, both balanced.

On the left of the OOR's front panel is a four-pin XLR headphone output; to its right is a 1/4" (6.3mm) output jack followed by a flat knob switch for choosing the RCA or XLR input; that's followed by another knob switch for choosing −4dB, +6dB, or +16dB of balanced gain or, in single-ended mode, −10dB, 0dB, or 10dB of gain. With the Susvara and Abyss headphones, I used balanced at +16dB.

#### Listening to OOR

I began my OOR auditions using its standard wire-wart supply, and because the fully balanced OOR has two rear-panel inputs (RCA and XLR) and two Outputs (XLR and RCA), I used it as a preamp, connecting my record player (via RCA) and my dCS Bartók DAC (via XLR) to the inputs. I connected the OOR's balanced outputs to the Parasound Halo A21+, driving my BFF Falcon Gold Badge LS3/5a loudspeakers.

On the last track, "A Solo (Tombeau)," of the first recording I tried, Paolo Pandolfo's recital of the same name (*A Solo*, 16/44.1 FLAC, Glossa/Tidal), I could hear the hollow, wood-ribbed inners of Pandolfo's viola, which repeatedly gave out growls that sounded like wild creatures.

Using the OOR as a preamp in my reference system allows me to isolate and better assess the sound character of its all-important first stage, switching, and volume control. However those essential components affect or color the sound of my reference system, that is how they will color the sound of the headphone outputs.

Used as a preamp, the OOR reminded me of a middleweight boxer landing quick hard jabs; in music (not boxing), this quality emphasized tempo changes, plucked notes, and short pauses in the performance stream. In my listening notes, I described what I heard as *solid state at its best*. I observed a solid state amplifier dancing, swaying, and darting about rhythmically, like Kentucky clog dancers. The OOR presented recordings with a directness of

<sup>1</sup> ferrum.audio/oor

force and a spirited momentum I rarely encounter with my tube amp alternatives.

I especially enjoyed how the OOR made the Falcons growl, so I switched music genres and played “Coming in on a Wing and a Prayer” performed by the king of grumble’n’growl, Bahaman folk singer-guitarist Joseph Spence, specifically his *Bahaman Folk Guitar: Music of the Bahamas, Vol. 1* (24/96 FLAC Smithsonian Folkways Recordings/Tidal). I love this artist, and I have long enjoyed the direct and unprocessed sound of this recording. It makes me feel “right *there*” with Spence, as though I can see his thumb and fingers on the strings and his head thrown back, vocalizing to the heavens. “Coming in ...” is nothing more than Spence plucking and singing, but with the OOR driving the A21+ it sounded like pirate opera, and then, alternatively, like quick, syncopated British jazz I could dance to. (If you are not familiar with Joseph Spence’s preternatural guitar playing, this album is a good



place to start.)

With its standard power supply, the OOR preamp emphasized beat, tempo, and pace. It presented Spence with an agreeable but slightly grayed transparency that deemphasized (or eliminated) some portion of the richness, air, and harmonic overtones I experience with the Rogue RP-7 preamp or with the dCS Bartók driving the A21+ directly.

I tried the balanced headphone output next, listening to Joseph Spence performing the traditional “Face to Face That I Shall Know Him” and listening with HiFiMan’s Susvara.

Recently, a friend told me that my Falcon Gold Badge LS3/5a loudspeakers sound like headphones. Maybe that explains it: With the Susvara headphones powered by the OOR amplifier, I thought the Susvara sounded like the Falcons powered by the Parasound A21+. That’s a compliment to the OOR.

With Ferrum’s OOR connected to its standard switching supply, the sound (driving the Susvara) was bold and copiously detailed but never delicate, atmospheric, or voluptuous.

Since I discovered it in GD #36, Linear

Tube Audio’s \$6950 Z10e headphone and 10W speaker amp only leaves my system when it has to. It pleases me in so many ways. It has become my daily-driver studio amplifier. The Z10e drives electrostatic headphones (!), and it effectively powers the HiFiMan Susvara from its HI-power output; every other headphone can be driven from its LO-power output. Plus! On top of all that headphone usefulness, the Z10e pleases me *very* well when driving my LS3/5a.

Listening via the Susvara, tracks from my Roon playlists sounded consistently



aware of: JPS Labs Abyss AB-1266 Phi TC. These Joe Skubinski-designed, 47 ohm, 88dB/mW sensitive, planar-magnetic open-back (open-front?) headphones make me say Wow! every time I use them.

Normally, I drive the Abyss from the output of my “blown-and-injected” 25W (into 8 ohms) Pass Labs XA-25 loudspeaker amplifier (\$4900). This super-transparent, hyper-dynamic, pure class-A amp really lights up the sound when driving the Phi TC. All I can reasonably ask from the much less expensive OOR is that it dance in the same ballroom with the same

debutantes.

I started my OOR-Abyss auditions with my beloved Huddie Ledbetter singing his *hell*-arious, sarcastic composition “(Ain’t You Glad) The Blood Done Signed My Name” (*Lead Belly Sings Folk Songs – 16/44.1* FLAC, Smithsonian Folkways/Tidal). The sound of Huddie’s voice and guitar was taut, well-defined, and clear as clear can be. Lead Belly’s layered irony was framed by the OOR’s dynamic, articulate, unadorned manner. My only complaint: The normally rich, wet-tongued timbre of Ledbetter’s voice was now a bit dry and gray.

#### OOR + HYPPOS

The moment I switched it on, the HYPPOS’s front-panel screen lit up indicating it recognized the OOR. After about 10 seconds, the display indicated that it was fully stabilized at the correct voltage and current for the OOR amplifier.

I did not realize it, but Roy Feldstein had preprogrammed the HYPPOS for the OOR. Normally, users would be directed by the display to scroll through a long menu-list of products that can mate with the HYPPOS and select the Ferrum OOR or another product of their choice. (Alternatively, the output voltage and polarity can be set manually.)

I started my OOR + HYPPOS auditions playing Lead Belly’s mind-twister, “The Blood Done Signed My Name,” followed by every Joseph Spence guitar recording and cello and gamba recording I could find.

The difference in sound character was

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more spacious, vibrant, and voluptuous with LTA’s Z10e than they did with the much less expensive OOR. The Z10e put some spark’n’glow tube wonder into every recording. The OOR countered with a stronger sense of pace, rhythmic pull, and timing.

In my studio, driving the Susvara, the \$1995 OOR was more vigorous and exciting than the \$3500 Pass Labs HPA-1 headphone amp/preamp but drier and less relaxed-sounding than the Z10e. Of the three, the Pass Labs amp was the most neutral and not-there transparent. The OOR was the most fit and hard-bodied. The LTA was the most nuanced and colorful.

Whenever I want to know what some sound hidden in the backspace of a recording is, whenever I want to make out every lyric in a blues song, whenever I want to know how good a headphone amp *really* is, I use the most accurate transducer I’m

immediately apparent: The HYP-SOS brought new glow, space, and atmospheric vibrancy to everything I played. These enhancements were most recognizable from the upper bass through the top of the female vocal range. Lead Belly got spit back on his tongue. Guitar strings expelled more overtones. The sound felt more relaxed.

If any among you think two roughly electrically equivalent power supplies should sound roughly the same, think again. The OOR's standard wire-wart supply was never expansive, atmospheric, or colorful. Reverb tails felt stunted. Colors appeared muted. With the HYP-SOS powering the OOR, the sound got broader, taller, rounder, more three-dimensional, more brilliant and expansive. The HYP-SOS did not make the sound softer or tubelike; it just mitigated the unnatural hardness of the stock supply and passed more low-signal color and texture information.

Used as a preamp through my Parason-Falcon setup, as well as when powering the HiFiMan Susvara and Abyss Phi TC headphones, the OOR + HYP-SOS combination made the sound feel more *unlimited*. Unconstrained. Musical energy rose and fell with more apparent ease. Best



of all, the HYP-SOS retained most of the switching supply's firm punch and alluring density but delivered it inside a more nuanced and vibrant presentation. Perhaps this is the virtue of hybrid supplies?

#### So folks ...

Maybe this Ferrum HYP-SOS Hybrid Power System will be the start of a whole new category of Recommended Components? Maybe more audiophiles will realize that audio amplification is about *adding* clean, natural energy to signals—and most importantly, that properly energized amplification makes recorded music sound

**If any among you think two roughly electrically equivalent power supplies should sound “roughly” the same, think again.**

denser, more vibrant, and more plausible.

Ferrum's first two products do exactly as their advertising claims: The HYP-SOS + OOR will drive any headphones effortlessly while preserving the soul and essence of the music they amplify. ■

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