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AUDIO REVIEWS

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JULY 2005



# DARTZEEL

## NHB-108 MODEL ONE

**Reviewer:** Mike Malinowski

**Source:** Walker Proscenium Gold turntable; Walker Reference phono preamp; Clearaudio Reference Wood cartridge; Magic Diamond cartridge

**Preamp:** VTL 7.5 Reference

**Amp:** VTL S-400; *darTZeel NHB-108* [on review]

**Speakers:** Wilson X-2 Alexandria

**Cables:** Speaker Cables - Transparent Opus, Omega Mikro Ebony; Interconnect to amp - Transparent XL w/MM; interconnect phono to pre - Omega Mikro

**Stands:** Michael Green racks, VPI phono stand, Zoethecus

**Powerline conditioning:** Furman Balanced Power, Walker Audio Velocitor, PS Audio 300

**Sundry accessories:** Valid Points resonance control discs; ASC tube traps; Echo Buster absorbent and diffuser panels; Argent Room Lens; separate 90-amp sub panel feeding five dedicated cryo'd outlets; Loricraft Model 4 record cleaner

**Room size:** 22' x 17' x 8' (double sheetrock on 2"x 6" framing in basement)

**Review Component Retail:** \$18,181



### Introduction

Products that attempt to place themselves as a SOTA contender usually generate a buzz and often, controversy. Case in point? The darTZeel NHB-108. Its reputation includes being a *tube-sounding* solid-state amp with spectacular holographic presentation, sweet harmonic richness - possibly a world beater. Others claim it's perhaps too expensive and underpowered to be a true statement amp.

The answer? The amp is indeed something special in design, construction and performance. And yes, it is somewhat controversial. Let the journey begin. At first glance, the amp appears rather unimposing. A set of adjustment tools and suction cups for removing the top are packed with the amp. Viewed next to other super amps, the darTZeel would not call attention to itself. Compared to a Halcro, Levinson, Krell or VTL, the darTZeel is diminutive. Compared to a Wavac or Viva, it lacks their exotic and universally valid cosmetics. It's a bit a case of David vs. Goliath. Looks however can be deceiving. This understated Swiss beauty proves the adage that size doesn't matter. The *Never Heard Before* NHB 108 is one man's 20-year obsession to build what he considers the ultimate amplifier. Did he succeed? Pretty darn close as we shall see.



### The design

From the well-written and informative technical manual and discussions with the importer, the passion of Hervé Delétraz becomes evident. All design criteria were based on sonics and essentially with zero regard to cost. The exterior combines a thick gold-anodized faceplate with red heat sinks and a smoked-glass top plate. This hand-made amp is constructed with meticulous and fastidious attention to detail. All case elements are CNC machined from a billet of aluminium alloy to maintain rigidity and low resonance. The case contains three modules, the mother plate, the transformer platform and heat-sink modules, all assembled with stainless steel screws. The 108 features a 20mm false bottom machined from the billet and a 5mm bottom plate that form a sandwich to eliminate electromagnetic field influences, an added bonus the extreme rigidity of the chassis. This is one serious piece of equipment. Hervé Delétraz claims component lifespan of 40 to 50 years.

Hervé takes the dual mono design to its limits within the confines imposed by a single-chassis stereo amp. Left and right channels and their individual power supplies are all isolated from each other. darTZeel claims that regardless of chassis, an amp is either true dual mono or not. No marketing hype here. Transformer and audio circuits are all mounted on different suspensions, each tuned to eliminate different resonant frequencies.

All sections are first aligned, set with cotter pins and then tightly coupled to the chassis. Nothing has been taken for granted in the design. The entire chassis and sub chassis are tuned to control medium and high vibrations for tonal accuracy. The external feet, radial to the center of gravity, damp low frequencies to complement the internal suspension of the active components. Had one first seen this amp at a show, one might assume that the smoked glass top was a special show feature to display the interior electronics. You'd be wrong. As you will learn over and over here, nothing is for show. It's all for the sound. Hervé chose glass for its sonic advantages: *"Its crystalline inert structure combined with the rubber foam seal functions as an internal noise killer. And contrary to metal, glass is totally transparent to magnetic fields, thus avoiding the inherent magnetic loop that metal would induce over the power supply transformers. Last but not least, the internal housing is much less polluted by magnetic ghosts."*

I promised myself not to use the obvious and proverbial comparison. Alas, it's unavoidably true. This thing *is* built with the precision of a Swiss watch. With that out of the way, we can proceed.





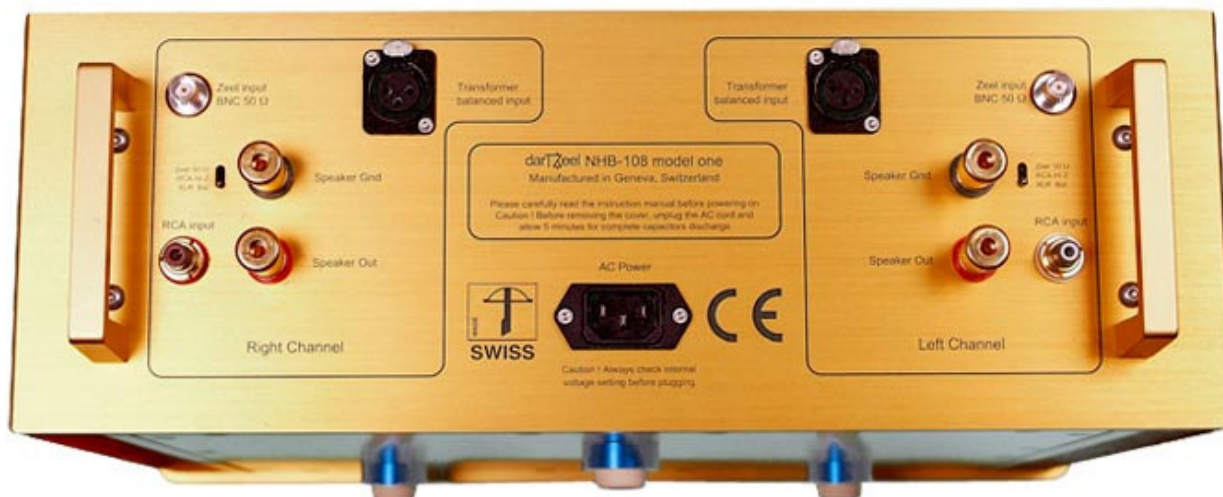
### Physical design

The gold-anodized fascia contains the left and right orange eyes -- fully functional indicators --, a power nose (the on/off switch) and continuing the design metaphor, rack mount handles for ears. It sounds corny but is actually very functional. I wouldn't describe the overall appearance as elegant. However, there is something very interesting about its cute look that gives it a distinctive personality.

The eye indicators display five states of operation:

1. Lights off (eyes shut) either indicate a blown fuse or power down
2. Illuminated (dull orange) means a signal is detected at the inputs
3. Dimmed (half brightness) occurs when the input signal disappears for about a minute
4. Bright flashing indicates clipping
5. Dull flashing signals high DC offset (more on this later)

In a fitting touch of class, each amp carries a gold-plated plaque engraved with the owner's name on the front left corner. The back panel offers the standard XLR and RCA inputs plus the unique Zeel 50Ω input designed to connect to darTZeel's upcoming pre-amp with impressive claims of sonic benefits. In the center resides a standard IEC power inlet. A power cord of apparently conventional design is included.



One assumes that an owner of this amp would fit it with a high-end power cable. I tried three. The Elrod Statement exhibited the most powerful bottom end but was somewhat slow. The Omega Mikro was lightning fast but lacked in the

bottom. This was probably a little unfair and perhaps not entirely safe seeing how the amp's max power rating exceeds the published spec for the Omega. Finally, the cryo-treated Silent Source Signature was perfect, offering 90% of the speed of the Omega and 90% of the weight of the Elrod.

The NHB-108 is rated at 160 watts into four ohms; 100 watts into 8 or 2 ohms. The wide bandwidth design covers 1Hz to 1Mhz +0/-6dB with 1% THD and -- according to darTZeel most importantly -- zero temporal distortion. Internally, close examination shows an amazing attention to detail but for this kind of money, that's expected.



### History

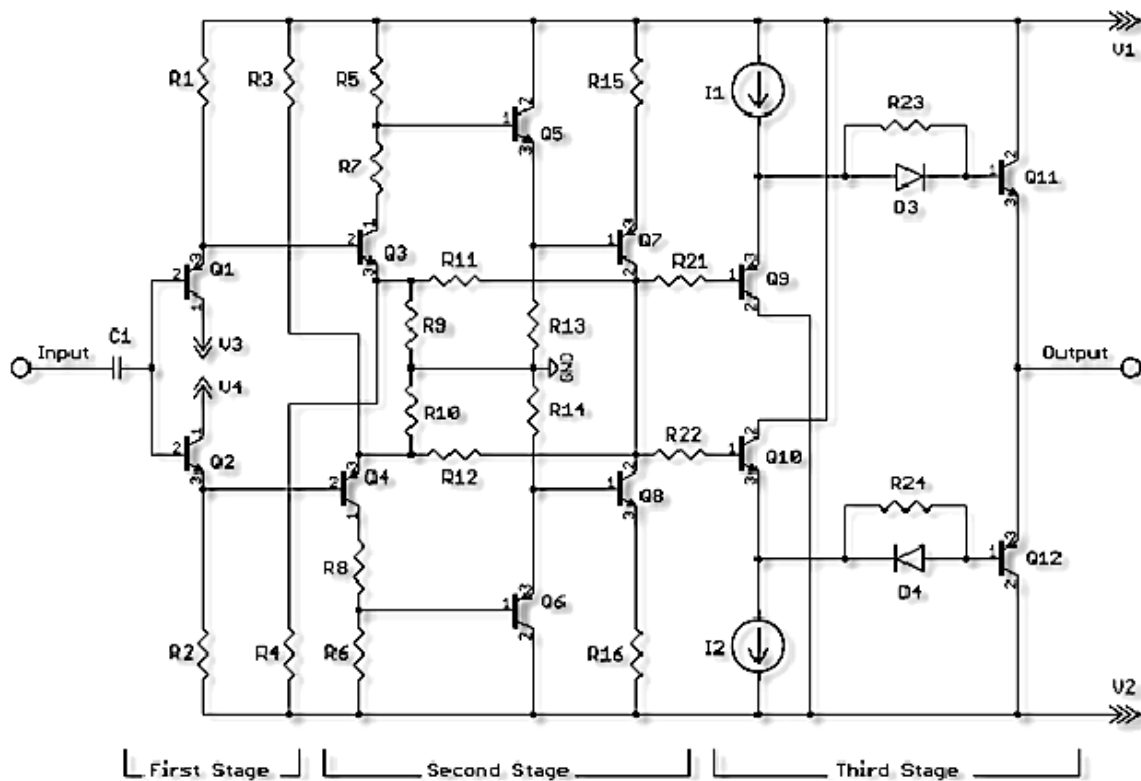
Hervé Delétraz's quest to build the ultimate amp began in the mid 80s with a digital amp design. The component limitations of the era, unpredictable interactions with varying speaker loads and jitter ended his grand digital experiment. The search for the state of the art began again but now in the analog realm. By 1999, the basic amp circuits were finalized and the darTZeel NHB-108 was born. The elimination of global negative feedback was a passion bordering on obsession. To understand the role of feedback in amps, you need to understand Hervé's analysis of distortion not just in amplifiers but in the sound of musical instruments.

Hervé defines distortion as any change in the original signal. A harmonically rich musical instrument exhibits natural harmonics at 20 to 40% of the fundamental. These harmonics are a form of musical distortion. Our designer's point is that natural acoustic music has massive harmonic "distortions" or content. When these are added to the relatively small harmonic distortions of an amp, the non-linear mathematical summation produces incrementally small increases in distortion. According to darTZeel, the elimination of Total Harmonic Distortion (THD) *"...does not seem to be a determinate factor in the accuracy of reproduced sound."* darTZeel postulates that designers who rely on sophisticated designs with tons of op amps, transistors and other electronics -- while at first seeming pure -- add their own electronic signature to detract from the purity of the recorded sound.

Likewise, darTZeel suggests that Intermodulation Distortion (IMD as the combining of frequencies and their harmonics) results in a beating tremolo that produces warming, cooling or drying artifacts depending on the combination. Hervé believes that IMD, like THD, is not musically detrimental and therefore benign *at low levels*. If THD and IMD are not culprits for poor sound according to this view, what is? Transient Intermodulation Distortion (TIM). It *"...occurs when the negative feedback (NFB) loop is in a state of overflow, something that arises more often than you*

might think since the NFB correction always is applied after the phenomenon to be corrected appears. During these very short intervals, the amplifier can produce more than 100% THD and/or IMD." darTZeel prefers to call it Temporal Distortion. This insidious audible distortion screws up amplified sound and is what the NHB-108 seeks to eliminate. By applying several small local negative feedback loops instead of a global loop and extending frequency response to reduce phase shifts, Temporal Distortion (TD) is claimed to have been eliminated.

That's great in theory but each solution seems contradictory - high bandwidth requires global feedback; low feedback equals poor frequency response. During his 20-year design period, Hervé feels he pulled it off. The 108 employs zero global feedback and combines it with frequency response to 1MHz. To accomplish this, darTZeel chose bipolar transistors -- ultra linear and fast -- for a straightforward signal path: "In the NHB-108 model one, the audio signal travels through only 6 transistors from input to output, maintaining low THD and IMD level. Without any global NFB, the output stage operates in a fully open loop! The slowest transistors used have a bandwidth of more than 30MHz, much higher than any Mosfet. This extreme intrinsic speed allows total phase respect across the whole audio range without any static or dynamic deformation. In brief, no Temporal Distortion."

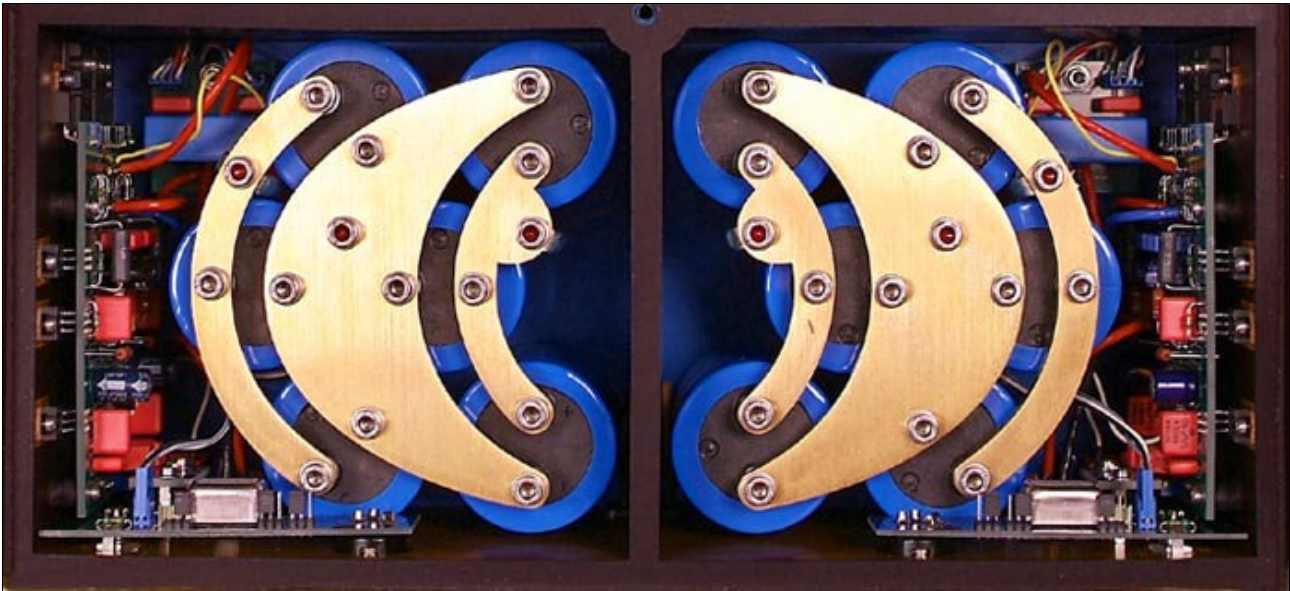


The 108 circuit design is based on three criteria:

- Simplicity
- Purity
- Reliability

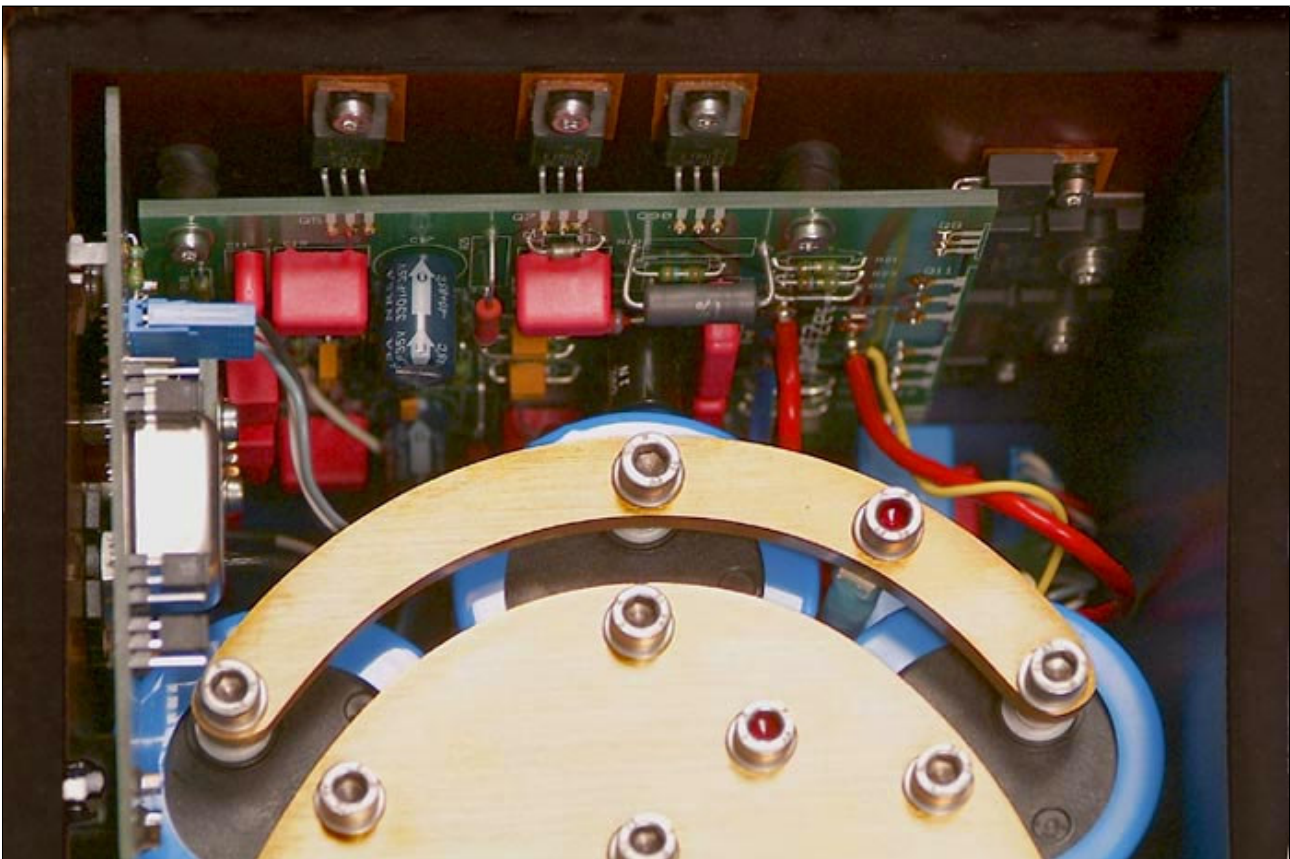
Simplicity was followed by way of only 14 transistors. Fanatical attention to detail extends to internal component layout. Placement of every device relative to input circuits, power supplies, transformers and output devices reflects deliberation to minimize any deleterious effects on the sound. "The internal volume was exploited down to the last cubic centimetre. Output power devices are located less than 10 centimetres from the huge crescent-like bus bars. All the energy coming from the capacitor reservoir can then effortlessly flow to the output bipolar transistors."





Purity was pursued by way of avoiding switches, connectors, fuses or relays except for the XLR inputs in the sign path. There's only one pair of output devices and no current limiting. *"A single, small, local symmetrical DC NFB leads to extremely wide bandwidth without addition of any multi-polar phase shift including the very low frequencies. The use of a very compact printed circuit board reduces track lengths to the strict minimum."*

Reliability: Without the use of exotic components, darTZeel claims 20 - 40 years for component life. Some components such as the power switch have an estimated life of one million on/off cycles. Reliability extends beyond individual parts to the protection of amp and speakers. Hervé eschews the term "protection circuits" in favor of a *supervision* or *monitoring* circuit kept completely outside the signal path. This circuit is analog and uses components selected for longevity. Dubbed the crowbar circuit (essentially a power thyristor), it shorts the power supply by blowing a fuse. Simple and elegant except for the time needed to replace a fuse. It is very unlikely that a tripped thyristor would ever fail. These devices can draw about 1200 amps of peak current while a crowbar operation draws about 300 amperes for a few milliseconds. This huge inrush current exceeds the fuse rating by a factor of 50, hence darTZeel describes their sacrificial demise as "evaporate". That's how quick the fuse melts down when the crowbar circuit activates.





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