WHAT'S MISSING MATTERS

By Carsten Barnbeck. Photography: Ingo Schulz

As someone who deals with products on a daily basis, I rub my hands together when the name Audio Note (UK) appears on the horizon. It's not because I'm a passionate fan of the brand—that becomes clear upon closer inspection of the components. It's more about the fact that behind the British company's hi-fi treasures, in our case the AN-E Ltd Field Coil, there are always stories worth telling.

Andy Grove is the most senior of the two developers at Audio Note (UK). We featured his colleague Darko Greguras in FIDELITY 72. Like many of the company's employees, Grove has an interest in music that goes beyond mere listening and hi-fi. When he's not tinkering with new AN models, he picks up an electric guitar. And like anyone who plays their instrument with tube amplifiers, he knows that every detail matters when it comes to guitars: wood, mechanics, construction, amplifier circuitry, etc. Pickups and speakers in particular play a crucial role, as their magnets not only play a massive role in shaping the sound – the interplay of both elements determines the player's dynamic expressive possibilities. This is precisely why metal, blues, and folk guitarists rely on completely different instruments and amps.

This got Andy Grove thinking. Ferrite-based permanent magnets are now widely used in hi-fi speakers. They have unbeatable arguments on their side, as no other material can be magnetized more strongly. They are the "most powerful motors available," and they are the reason why the high average efficiencies of today's speakers were made possible in the first place. There's nothing wrong with that, as it has led to significantly fewer mistakes being made in the search for the right transducer.

But the bright glow of the ferrite drivers also intensifies their shadow, as Andy Grove points out. The interaction between the voice coil and the magnet—both of which form the motor of a driver—is by no means as harmonious and linear as one might commonly imagine. Once in motion, the coil generates its own magnetic field, which interacts colourfully with the permanent magnet. So-called Barkhaus noise, a type of quantization effect, and hysteresis distortion are just the most important of the phenomena one has to contend with. Both have their sonic effects in their names. And you don't have to be a physicist to guess that such effects are more noticeable the more powerful the driver is. Most developers choose the simple workaround: Unwilling to give up the benefits of high efficiency, they compensate for distortion and sometimes even harshness by filtering the crossovers.

This is probably precisely why the Audio Note developer (like many others) prefers alnico magnets, which have less to conceal. They are weaker and produce a cleaner and more relaxed sound, which you can ultimately not only hear but also feel. With this realization in mind, Andy Grove's interest grew in trying out the archetype of all loudspeaker drives: the field coil.
Since it was not yet possible to produce permanent magnets of satisfactory strength in the early 20th century, electric coils were used instead
which, once energized, generate a useful magnetic field. The efficiency of such drivers lags behind that of permanent magnets. But don't be fooled: Raw power figures say little about a system's musical talent. In a normally sized listening room, even exotic, low-power tube amplifiers have everything under control. Power headroom only becomes crucial when an amplifier can't handle the "complex load" that any given loudspeaker represents. Since Audio Note pursues the system approach and always considers loudspeakers in the context of the amplifiers assigned to their "level," such concerns are irrelevant to the British company.

About ten years ago, Andy Grove wanted to put his plans into action.

However, after initial successes, he encountered almost insurmountable obstacles. His early self-made designs made of commercially available structural steel were inefficient and developed unacceptable temperatures.

To his surprise, he couldn't find a metalworker willing to manufacture components from other materials: Bending coil carriers and cover caps, as would have been done 100 years ago, is simply no longer possible with today's metals. All the producers he approached rejected the alternative, casting – far too complex and unaffordable given the expected volumes.

Fortunately, Grove eventually came across a metalworking company in the Black Country, just outside Dudley in the West Midlands, that took the project with a sporting spirit and combined it with its own spirit of research. The company has a long tradition, and some of the metallurgists were interested in "how they used to do things." But the real journey, or rather, the development, was only just beginning.

As Andy Grove told us, the metal experts subsequently imparted to him in-depth knowledge of alloys, their minimum material thicknesses, their respective magnetic interactions, and the optimal handling of all these parameters. During the collaboration, Grove decided to take a shortcut by obtaining samples of the recommended metals and having them milled into shape by a company in the Brighton area. This meant he only had to involve the Welsh company when the costly effort seemed worthwhile. In this way, he gradually worked his way towards the final drivers, tripling the efficiency along the way: while early AN-E Ltd models consumed 45 watts, The current model's power supply voltage is now only 15 watts, eliminating the temperature problems. And before I forget to mention: Not only the bass-midrange is driven via a field coil, but also the tweeter.

Developing the corresponding power supplies was a walk in the park compared to that, but that doesn't mean there were no pitfalls. As Andy Grove told us, he initially tried deliberately reduced passive networks. This worked quite well in the lab power supply, but two crucial problems became apparent during field-testing. First, the power grid is unstable: Even slight fluctuations (in this country, the power fluctuates between 220 and 240 watts, depending on the grid load) cause a passive network to deviate from its intended operating parameters. Furthermore, the magnetic field of a coil also produces undesirable effects, which can largely be dissipated using an active power supply. And so Grove and his team developed a voltage generator with its own transformer and all the bells and whistles. To keep the basics simple, they housed everything in a small metal chassis.

As you may know, Audio Note doesn't just develop exceptional hi-fi concepts. Apart from a few exceptions—found in more affordable entry-level models like the Zero series or the Cobra integrated amplifier—the British manufacturer relies almost exclusively on their own components and ingredients. From the transformers to the capacitors to the coils, all elements of AN-E Ltd. are manufactured on-site in Partridge Green. It's a matter of honour that the developers used only the finest components for their top-of-the-line loudspeaker, including the pure silver wiring from the large AN-E series model (SPx). But don't think that the most expensive components were simply screwed into the boxes.

During our visits, we gained insight into the final tuning of the products, which sometimes takes years. And that involves listening, listening, and listening again.

Like Andy Grove, Managing Director Peter Qvortrup is completely uncompromising in this regard. He doesn't just want to listen to music, but to witness the recording in his living room, to understand the ideals and ideas that drove composers and musicians during the creation of a record or CD. He passionately collects shellac and mono recordings, as he believes only the originals convey the original spirit. However, they don't necessarily have to be old productions. During his listening sessions, Qvortrup loves variety; in our presence, he mixed Weill/Brecht's Threepenny Opera, a 1947 recording, with Disturbed's "The Sickness," before immediately following it with some techno and alternative rock.

During our visit about 14 months ago, AN-E Ltd. was driven by what was then the most current iteration of its dining section. Older versions were piled up all over the room, testifying to all the studies and development processes – everything was tried out, every sensible combination tested, until the goosebumps on Grove's and Qvortrup's arms were exactly as they wanted them. The AN-E, of course, went through the same process. Since its basic version, its concept has been repeatedly questioned and continuously improved over the decades.

"Our" AN-E Ltd Field Coil arrived at the editorial office along with a Jinro integrated amplifier, power supplies, and two incredibly heavy stands in the days leading up to the issue's submission. To my astonishment, we spent practically the entire production run moving, testing, and placing it in ever-new positions. Indeed, the British company's loudspeakers are designed "old-school" in the purest sense of the term. This means that the AN-E's medium-sized cabinets are suitable for Maximum performance and speed, and for maximum "liveliness," everything unnecessary, including internal bracing, has been largely omitted.

To get the comparatively compact speaker to work in our medium-sized listening room (approx. 52 m²), it has to be placed close to a wall, ideally near the corners of the room. Since we already knew this basic rule, we were able to identify reasonably suitable positions relatively quickly. Since the placement in the corners resulted in a slightly too large base width, we had to push our sofa back about three-quarters of a meter – then it fit again. From there, the fine-tuning began.

The AN-E Ltd sees itself as a "working speaker." In contrast to many of the current convenience speakers, everything here – placement, amplifier, and cabling – should mesh seamlessly. You don't have to worry about that, because with a speaker of this class, the dealer takes care of it anyway. But even after setup, it can be worthwhile to play with the position inch by inch. And suddenly, there's the moment when everything clicks into place.

Summarizing the sonic prowess of the Field Coils in a few words is as pointless as describing a high-performance sports car as "fast." In fact, after about six weeks with the AN-E Ltd, I can confirm that you feel the decisive factors more than you hear them.

This is especially pronounced when it comes to fast impulses and attacks, such as when a single guitar string is plucked and you suddenly feel like you're touching the guitarist's pick or when a vocal recording appears three-dimensional and incredibly vivid in the room, and you lose all sense that the sound is coming from two beautifully veneered boxes.

The AN-E Ltd acoustically disappears completely into the room. Since Audio Note – as usual – adheres to the two-way concept even with its larger model, the AN-E plays with a timing and musical cohesion that is preserved not only at the listening position, but throughout the room (and beyond). In short: an experience you won't forget.

What was denied to us in the FIDELITY listening room was a direct A/B comparison with an AN-E/SPx – the identical speaker with traditional alnico components. Here I can quote what Andy Grove told us about his first experiences with the field coil: Especially when moving on to the field coil, he didn't notice any major differences at first. At most, he noticed the more intense relaxation of the new drivers. After a very brief comparison with the SPx, it suddenly became clear to him that there was no turning back...