

Behind the Borg

THE BORG LOUDSPEAKERS MADE SOME OF THE BEST SOUNDS IN MUNICH, SO WHAT IS THE FINKTEAM? ANDREW EVERARD INVESTIGATES



You can't help thinking Essen-based FinkTeam missed a trick with its new *Borg* loudspeakers. Yes, the name comes from *Star Trek*, so surely there's a play on words between the space-villains' wish to assimilate everything in their path, and the stress that speaker designers put on the extensive use of simulation tools in their work?

But then the *Borg* speakers shouldn't work that well either, given the unusual choice of a two-way design with a 10.25in bass/mid unit and a pleated-ribbon AMT tweeter. Anybody with even a passing awareness of the characteristics of such drivers will know that knitting those together will be challenging. However, the bass unit was a given from the early design stages, to develop convincing bass from speakers just over a metre tall. A lot of simulation work was required to bring the design together, including taking that tweeter – which is good for frequencies up to 35kHz – down to a 1.6kHz crossover.

The company says: “a technical challenge is just a design exercise that may take a little longer to solve”, and the sound at the Munich High End show revealed no ‘hole’ in the sound, but rather a smooth roll-off between the two. Angular and forthright the loudspeaker's styling may be, but the presentation was anything but – proving capable of sweetness and integration, plus remarkable levels of detail, while packing a mighty punch when so required. That's partly due to control over the components: the hefty bass unit, with its 3in voice coil, is an in-house design, and the FinkTeam helped Mundorf in the design of the Air Motion Transformer (AMT) treble driver.

The crossover uses substantial components and is hand-wired point-to-point throughout, with a range of options for better integration with the room and the amplifier, including minute but effective adjustments of damping, soundstaging, presence and treble. The *Borg* might be a purist design, but it's also highly practical.

For the team's first domestically acceptable speaker, the *Borg* is highly impressive. Yes, each speaker may weigh a hefty 52kg and costs around €24,000/pair, but it could well find you trying to work out how it would look in your room after an extended demonstration. And while the FinkTeam wasn't unusual in showing new and striking speakers at the show, not all had a comparable effect!

However, the company behind the brand isn't

exactly a stranger to developing speakers that create a buzz at hi-fi shows – it's just that you wouldn't actually know it, as most of its work is ‘behind the scenes’, on behalf of better-known brands. Its development work covers everything from mainstream hi-fi to compact soundbars, Bluetooth speakers and all-in-ones. It also has a substantial presence in the design and integration of in-car systems, where it works with some of the very largest and most prestigious players in the automotive business.

FinkTeam is simply the latest adjunct to one of the world's most sought-after audio design houses, Fink Audio Consulting, which has 30+ years of experience in acoustics, audio electronics, and the sourcing of both components and production. From the initial design through to ensuring the finished product is manufactured consistently, it's all handled from the anonymous-looking building in Essen, using the combined efforts of a close-knit in-house team, some close friends and consultants, and long-established suppliers and manufacturing partners, both in Germany and worldwide. It even maintains a team in Shenzhen, China, to oversee the production sourced for customers.

Many clients would rather you didn't know about this contribution to their products, and much of the work is thus unsung, for reasons of confidentiality. But it's pretty safe to say that if you've heard speakers from some of the better-known UK names, or travelled in some of the biggest-selling cars, you'll have heard Fink design in action.

To give a taster, the company was in at the start of Armour Home's Q Acoustics brand, developing that company's entire much-lauded and affordable speaker range right up to the flagship *Concept 500* floorstanders, and the most recent *Concept 3000i* series, and had a hand in Naim's *Ovator* speakers as well as the drive units used in the Naim for Bentley in-car system. And that really is just scratching the surface, to the point where it's clear that boss Karl-Heinz Fink is somewhat blasé about the annual awards judging: it's usually a pretty safe bet that he'll have several contenders in there somewhere!

Indeed, it's safe to say that, while some clients like to keep a behind the scenes contribution secret, for others Fink design input has become something of a badge of honour, so many plaudits have the

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company's designs received over the years.

With all that going on, you'd expect Fink Audio Consulting to understand and appreciate everything there is to know about speaker design. But company founder and principal Karl-Heinz Fink won't have that: instead he says the secret is in knowing the right questions to ask, then finding and understanding the tools required to find the answers. (And then investigating all the other questions those results have a habit of throwing up!)

More to the point, he says that simply kitting yourself out with all the latest measurement technology isn't the answer, either: 'It's not about having the right equipment – anyone can buy that: it's more to do with knowing the questions to ask, interpreting the answers, and constantly learning and investigating.'

Yes, there's expertise, but what drives the way Fink Audio Consulting works isn't genius, but curiosity. That's as true whether carrying out 'what if?' exercises on the basic functionality of a drive unit or tuning and refining the way drivers interact with the enclosures in which they have to work, be they conventional speaker cabinets or the passenger compartment of a car. As Fink puts it: "We may not know all the answers yet, but we think we know the right questions to ask, and have the tools to find the right solutions."

And that intimate knowledge of the tools at their disposal, honed over years of experience, plays a major part in the way the company works. It makes extensive use of the Klippel measurement system to investigate drivers and even their component parts, and indeed was using laser measurement even before that company introduced its off-the-shelf system (although Fink says that scanning system: "was fine for measuring, but it couldn't tell you how to solve the problems you found.")

Then it was a case of making lots of prototypes, and measuring them using the available tools. These days one of the main weapons in the Fink arsenal is the extensive use of computer simulation tools.

Fink says: "These days computer modelling lets you simulate materials – for example a polypropylene cone needs one shape, a metal one another – unlike in the old days where we chose a shape and then tried different materials. The choice of material isn't the complete answer, but adjusting shape and materials works well to come up with the best solution. That's why I say I am lazy. I don't want to do the same thing many times when we can simulate and design right the first time!"

Fink continues about drive unit design "The core

point is that every speaker is modal," that is having certain frequencies at which it performs less than optimally, "So you have to decide whether to live with those modes or work with them, by tweaking the modes to a different frequency range."

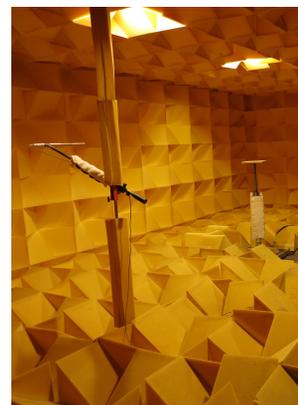
"What could be an advantage in a certain frequency band may not have a benefit on-axis, but only appear off-axis. It's an industry myth that every mode needs to be cured by damping: do that and you just get overlapping low-Q modes. Our way of thinking is to work with the modes: for example, many say that polypropylene, with its high damping characteristics, is a bad material for speaker cones, but we simply design using its characteristics."

"In our work for automotive clients, where millions of drivers have to be made, the advantages are that polypropylene cones are easier to make more consistently in huge volumes than, say, paper-based cones. After all, trees don't grow to an industry standard!"

As well as specialisations in driver design, Fink Audio Consulting also has expertise in electronics design, in the hands of industry veteran Walter Fuchs (a long-time Fink collaborator).

Markus Strunk is the guru when it comes to vibration analysis, able to see using laser scanning that: "cabinet distortion is both apparent and audible, and that signal found 30dB below what driver is doing is the cabinet contribution. Every time you make a change of cabinet material or change design, the speaker changes – the imaging, the balance, and the voicing."

"With the laser scanner we can measure how much energy is dissipated in the damping, and over what frequency range. The old methods were all about trial and error, with accelerometers attached to the cabinet



FinkTeam measures in a conventional anechoic chamber (above), but also uses a reflective room with 'sails' to control the acoustics



Marcus Strunk, measurement and simulation



The workshop also allows Karl-Heinz Fink (left) to indulge his love of guitars

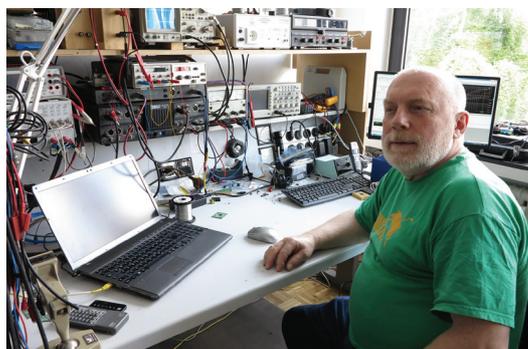
surface, but laser scanning means we can measure more accurately, and see the effect on sound pressure levels.” And this can be done right down to specific places on the cabinet surface, thus indicating where additional damping or bracing may be required.

By dialling out the direct effect of the sound from the drive units, and thus ‘listening’ directly to the cabinet itself (or at least its contribution to the sound), it’s possible to simulate how a cabinet will work before making even a single prototype, using software Strunk has created for the purpose.

Not that the company is lacking when it comes to making prototypes. With its own in-house woodworking facility, under Norbert Theisgens, it can make anything from speaker cabinets to necks and bodies for Karl-Heinz Fink’s ever-growing collection of guitars(!), and will be hand-assembling the new *Borg* speakers (as it did for the company’s previous *WM-3* and *WM-4* models, designed to showcase its abilities in speaker design).

Originally built as a ‘blue sky’ project, these

Electronics expert
Walter Fuchs



precursor large speakers first came to public attention when Ken Ishiwata of Marantz asked to use the initial version for his demonstration at the 2016 Munich High End show. Such was the interest that a plan was hatched to build and sell speakers which appeared in a Fink room at Munich last year – his first appearance at any major show.

This year FinkTeam was back, with the new speaker and a room meticulously treated to bring out the best sound in the notorious acoustics of the show location. Indeed, Fink joked to me that so much attention was paid that the 7.5 ton truck used to bring the much bigger *WM-4*s to the show last year was replaced by one of almost twice the capacity in 2018. (Insert your own joke about heavily treated rooms here!)

That was almost inevitable, given the world-class listening room within the Essen facility, with superb acoustic treatment by Uwe Kemper of W Vier. As well as an analysis tool, it’s also a supremely comfortable room in which to listen, so it often finds itself just playing music. Fink explains: “We wanted ‘true-to-life’ acoustics and a maximum reverberation time of 0.4 seconds (conforming to international standards), with diffusers designed to maintain the high-frequency energy in the room, with a variety of carvings and uneven wooden elements to keep the sound alive.”

Backing this up is a large anechoic chamber, designed to be usable even down to low frequencies, and a reverberation chamber, tiled throughout and with the acoustics controllable using fabric ‘sails’, to allow the total radiated power of a transducer to be captured. There’s also a drive-in bay at ground level that’s essential when working on car acoustics, and when unloading trucks of room treatment!

The *Borg* has been styled by industrial designer Keiron Dunk (of IDA, another long-established Fink collaborator), but the expansion of Fink Audio Consulting into FinkTeam has seen some additions to the line-up. Industry marketing/PR expert Steve Harris (one time boss of Tannoy and Mordaunt-Short) has been involved in the project from the start. David Jefferys, with a CV that includes Armour Home, Tannoy (again), Mordaunt-Short, Hayden Labs and AKG, will be responsible for finding the distributors.

The speaker itself, built in the Essen facility, will start shipping in the coming months. Production quantities will be low initially, but this is by no means a one-off design, and plans are already in hand for further models in the series. Having spent so much time ‘behind the curtains’, it looks like this FinkTeam loudspeaker, with its innovative techniques and design expertise, is all set to take centre stage.