BOENICKE W8

LOUDSPEAKERS

When he started building speakers more than 20 years ago, Swiss recording engineer Sven Boenicke had absolutely no intention of building conventional loudspeakers.

'*In today's hifi market with an overwhelming number of brands (some say 20,000 worldwide!), the question is: Does anyone need so many?*' Boenicke writes on his website: '*And does it make sense to repeat again and again what has been 'invented' and built thousands of times before? Applied to the realm of loudspeaker building, we clearly think that it makes no sense yet again to build a bass-reflex box made from MDF, damp it with foam, put a dome tweeter and one or two cone-drivers on the perpendicular front baffle, coat the box with plastic (lacquer), mount spikes and have a standard crossover network…*'

So right from the outset Boenicke aimed to be different to all those 20,000 other loudspeaker manufacturers… and it must be said that his W8 is certainly different.

THE EQUIPMENT

The side-firing woofer on the Boenicke W8 is a Tang Band model with a rated diameter of 165mm, a moving diameter of 140mm, a Thiele-Small diameter of 120mm and an actual cone diameter of 105mm. It's run as a full-range driver, so there's no low-pass filter in the crossover network for it: essentially, it's as if you're connecting the terminals of this woofer directly to the output terminals of your amplifier. The output from the rear of this driver is routed to a port on the rear of the cabinet via a labyrinth, about which more later.

As you can see from the photographs, there are two drivers on the front baffle, the lower of which is made by Tang Band, has a paper cone and is rated as having a nominal diameter of 100mm. My measurements put the moving diameter of this driver at 90mm, the Thiele/Small diameter at 82mm and the actual cone diameter at 70mm. The strange protuberance you can see at the centre of this driver is a wooden phase plug. Unlike most such phase plugs, whose ends are mostly curved into a dome or bullet-head shape, the top of Boenicke's phase plug is completely flat, though the edge where it joins the side of the plug is beautifully rounded-off.

The crossover arrangement for this Tang Band driver is also unusual, because although it's protected from being overdriven by low-frequency information by a first-order filter, this driver, too, is allowed to operate 'way into the high frequencies—there is no high-frequency roll-off. The side-firing bass drivers are recessed into the cabinet and surrounded by a wide band of black neoprene-like material that's 40mm wide. I found this to be quite eye-catching and attractive—even if it did make the drivers seem larger than they actually are.

The topmost driver mounted on the baffle is a Fountek F85 wide-range 75mm unit, whose 52mm diameter cone is made from aluminium and driven (in combination with a ferrite magnet) by a copper voice coil that's 20mm in diameter. Fountek rates the F85 with a frequency response that extends beyond 20kHz, so the W8 has no tweeter… well, no tweeter as such. There *is* a tweeter mounted on the rear of the speaker (a Manacor DT-25N with the 'N' indicating that it has a neodymium magnet) but since, due to its location, it cannot provide direct radiation, it is presumably intended either deliver 'ambience' and/or reflected sound to add to the forward and sideways output from the F85. The DT-25N tweeter is a high-quality 25mm diameter silk soft-dome design.

For those interested in the provenance of the drivers Boenicke is using, Tang Band is a Taiwanese company that once manufactured its products in Taiwan, but moved production to China a few years ago. Fountek is entirely a Chinese company.

Manacor International is a German company that makes products in many different countries around the world, including China. Mundorf (which makes the crossover components that are mentioned in the following paragraph) is headquartered in Köln, Germany.

The crossover network uses high-quality Mundorf capacitors (a trio of them), two air-cored inductors (not cross-mounted, but spaced sufficiently far apart to ensure that there can be no magnetic interaction between them) and a single 10W resistor. All components are hard-wired together with single-strand wire and glued to a small section of MDF that's fixed inside the cabinet. The input leads to the crossover terminate at their other end to a single pair of WBT-0703 Cu NextGen speaker terminals that are mounted on a small metal plate that identified my review sample speakers as 'Serial: 025'.

As for the cabinet itself, it's a work of art… even if the artist is the programmer of a triple-axis computerised numerically controlled (CNC) router. You see, unlike most wooden cabinets, which are made of wood that has been shredded into tiny particles which are then soaked in glue and squeezed together into the shape of a board (a material also known as particle board, or what manufacturers prefer to call MDF… medium density fibreboard), the cabinet of the Boenicke W8 is carved from a real tree. Indeed you can even specify what type of tree you'd like it to be carved from: walnut, oak, ash or cherry.

What Boenicke does to create the cabinet is get two solid slabs of real wood into which it 'carves' (all the work is actually done by a CNC router, as noted above) a labyrinth of valleys and depressions, with the same valleys and depressions mirror-image-carved into the other slab of wood. These two mirror-imaged pre-carved slabs are then glued together (look carefully and you can just make out the fine join that runs around the centre of the cabinets) upon which those valleys and depressions become individual enclosures behind drivers or, in the case of the side-firing woofer, a 'tube' leading to a small rectangular (94×45mm) port located low down on the rear baffle.

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Boenicke's website doesn't specify the frequency response of the standard W8 design, nor does it specify the sensitivity, or the minimum impedance. What it does say is that the W8's sensitivity '*varies between 84dBSPL and 88dBSPL/w/m depending on frequency*' and that the nominal impedance is 4Ω. It also doesn't mention the size or weight of the speakers. The local Australian distributor's website is more informative about cabinet dimensions and weight (776×114×260mm and 10.5kg) but rather confusingly says the sensitivity is 87dBSPL/watt/m.

The very light weight of the W8s will no doubt come as a surprise to you—considering the speakers are made from solid wood—but it certainly didn't to me, because I had already found it very easy to carry both speakers at once—those curved bass reflex ports make great carrying handles!—when I was moving them from room to room. Presumably the weight varies depending on what type of wood the cabinet is made from, but neither Boenicke nor Audio Magic make mention of any such variations.

What both companies *do* mention is that there are three versions of the Boenicke W8, including a 'Standard' version, which is the one I received for review. The two other versions are the W8 SE and W8 SE+. Full details about the differences between these two and the 'Standard' W8 reviewed here can be found on Boenicke's website.

Although the W8s are not particularly tall, their height, combined with their small footprint, light weight and the fact that three of the drivers are near the top of the cabinet, mean that the centre-of-gravity (COG) is rather high. I initially presumed that the outrigger feet that are supplied with the speakers were to help stabilise the cabinets so they can't be easily tipped over… and they do help stabilise the cabinets, but not, it must be said, by much, so even with the feet fitted you'd still have to exhibit some care if you have boisterous animals or children. So it would appear that the outrigger feet serve some other purpose.

As for the design of these feet, I didn't know what to make of it, because the design and implementation are quite strange. The outrigger itself comprises two pieces of metal that are screwed together. One section has screw threads that allow you to screw in two adjustable feet. The other section acts as a kind of 'rectangular key' that slots into a

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matching rectangular void at the bottom of the W8's cabinet. What confused me is that the size of the 'key' of metal and the void are different, so the 'key' is very loose and 'rattly' when it's inside the void. If you want to hang some numbers on that observation, the 'key' is 88mm wide and the slot is 92mm wide… a 4mm difference. The key is 10mm thick; the slot is 11mm high. There is a third screwed foot, but this foot screws into a threaded receptacle in the base of the speaker itself, in the centre towards the front, and it is a very tight fit.

IN USE AND LISTENING SESSIONS

As with all loudspeakers, it is essential they be placed correctly in your room if they are to provide optimum performance, and the Boenicke W8s are no exception… except that the side-firing woofers and rear-firing tweeters mean that small differences in position will make greater sonic differences than would be the case when positioning more conventional front-firing speakers.

The first thing you need to establish is whether you like the bass response better when the side-firing woofers are facing each other, or when they're facing away from each other. This will require much shifting of the speakers, but this won't be a problem, due to the light weight of the cabinets making the process very easy. If it's of any help to you, I found that the W8s performed best with the bass drivers facing inwards in the three room layouts I tried, but room acoustics are variable, so your mileage may vary, as they say…

Once you have established the bass driver orientation you most prefer, you'll then need to hear the differences in sound when the speakers are close to a rear wall or further away from it.

These differences will be influenced not only by the distance between the wall and the cabinet, but also by how absorptive that rear wall is. If it's made of brick, or glass, or concrete, for example, you're going to get a whole lot more high-frequency 'splash' from that rear-firing tweeter than if it's made of some other material. And if you have drapes or bookshelves behind the speakers, moving the speakers nearer or closer won't have nearly the same effect. Note, however, that moving the speakers closer to, or further from, rear and/or side walls will also affect the volume level and extension of the W8s' low frequencies.

I have to admit that I had a great deal of difficulty positioning these speakers. My problem—if you'd call it a problem!—was that they sounded absolutely fabulous no matter where I placed them in the room, yet at the same time they sounded absolutely different in each of those positions… almost as if I were listening to entirely different loudspeakers.

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Obviously a part of this is because of driver orientation, with the bass drivers firing in opposite directions not only to each other, but also all the other drivers fitted to the cabinet, and the front-firing speakers firing in completely the opposite direction to the rear-firing tweeter. However I think the other issue is that because the operating bands of the four drivers overlap each other right across the frequency band (except at the very lowest frequencies), interference patterns are created as the wavefronts from the various drivers interact, and these patterns result not only in frequency response variations but also in tonal variations. The only thing I can be sure of is that the Boenicke W8s sounded like no other speakers I have ever heard before.

You can quite easily prove this to yourself by playing a monophonic signal through the Boenicke W8s. Instead of hearing a solid, mono image directly midway between the speakers, you'll instead hear a soundstage that is still eerily almost stereo-like in its presentation, with images positioned at different places across the stage, depending on the pitch of the instrument and the notes being played. I was so intrigued by this that I did a full 'walk-around' in the room and found that this effect was clearly audible throughout the listening room. At the same time I found that when I was listening from behind the speakers, the rear-firing tweeter meant that the sound quality when I was located behind the speakers was very nearly the same as the sound quality I experienced when I was positioned directly in front of the speakers.

The observations made in the previous paragraph are very positive observations, because it means that not only will the Boenicke W8s sound very good no matter where you place them in the room, they will also sound very good no matter where you place yourself in the room… even if you position yourself behind the speakers. For those listeners with open-plan room layouts, where they might be sitting at either end of the room, or in the middle, this will be a god-send.

As for the sound quality itself, it's very bright and bouncy, and uncannily realistic, with the overall tonal balance favouring the midrange… though if you are sitting on-axis in front of the speakers, there's a bit of treble brilliance mixed in as well. That the sound favours the midrange and treble in this way means the Boenicke W8s do absolutely glorious things to the voices of female vocalists. It's as if the speakers were specifically designed to make their voices sound better than they already are.

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The clarity of the midrange sound is extraordinary as well, with a crispness that lets you hear every lip-sound and every intake of breath, but without the 'sharpness' that affects some loudspeakers.

The bass is full-bodied, with a warm richness that does beautiful things with sound from cello and double-bass and is particularly kind to the baritone voice… James Taylor for one. Just listen to the way the Boenicke W8's deliver Taylor's voice on the opening lines of Suzanne (*Just yesterday morning/they let me know you were gone*) and you'll be trying to see if your music server can queue up a playlist comprised of songs by famous baritones to see how well it can enhance them as well. The only limitation to the bass was one of extension… these speakers don't dig too far down into the depths. Also on the plus side, however, they don't try to fake it: the volume roll-off with decreasing frequency is smooth and controlled, with no doubling audible so, for example, you won't hear a 'false' note playing at C2 (65.4Hz) if the 'real' note is actually at C1 (32.7Hz).

A part of this bass warmth might be due to the W8 cabinets acting as very efficient resonators… as one might expect from any solid wood enclosure surrounding an air mass (i.e., almost all stringed instruments). Put your ear up against the wall of any cabinet built by most high-end speaker manufacturers and you'll hear very little in the way of sound. Put your ear up against the cabinet of the Boenicke W8 and it's like listening at the door of a concert hall. No doubt these cabinet vibrations also contribute to the unique sound of these loudspeakers.

One thing the Boenicke W8s are not is efficient. Using the 'Audio Tool' SPL meter app on my mobile phone showed that the Boenicke W8s were about 10dB less efficient than my reference loudspeakers, which their manufacturer rates with an efficiency of 89dBSPL. This means that although I only need to use 16 watts of my amplifier's power into my reference speakers to produce my preferred sound pressure level, I'd have to use 160-watts of power to get the same level from the Boenicke W8s. My amplifier is rated at 200-watts per channel into 8Ω so I was able to comfortably achieve this without running the amplifier into clipping, but it points to the need to use a powerful amplifier to get best results from the W8s. [**Editor's Note**: *In a response to an earlier review of the Boenicke W5s, in which reviewer Daniel Stiel commented on the low efficiency of the W5 design, Sven Boenicke, the designer, advised in an email follow-up to that review that he considered 'proper amplification' for his speakers to be amplifiers that are capable of delivering 1,000-watts per channel into 4Ω loads.*]

CONCLUSION

I really treasured my time reviewing the Boenicke W8s. Their dynamic, lively presentation of any musical material I presented to them made for exciting listening sessions that caused me to re-evaluate what traits I consider most important in a pair of loudspeakers. The fact that the soundfield they created was so totally different from that created by my own speakers, yet at the same time so enjoyable, made me wonder how many different paths might lead to audio nirvana. Sven Boenicke has certainly dared to take a completely different path. Will you? *Ernest Denman*

PRODUCT & CONTACT DETAILS

Brand: Boenicke
Model: W8 (Standard Version)
RRP: $10,908 per pair
Warranty: Five Years
Distributor: Audio Magic Pty Ltd
Address: 23/22 French Avenue
Northcote VIC 3070
T: (03) 9489 5122
E: info@audiomagic.com.au
W: www.audiomagic.com.au

- Compact size
- Sound quality
- Attractive appearance

- Grilles
- Stability

Readers interested in a full technical appraisal of the performance of the Boenicke W8 Loudspeakers should continue on and read the LABORATORY REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

LABORATORY TEST REPORT

Graph 1 shows the frequency response of the Boenicke W8 speakers, as measured using *Newport Test Labs'* standard technique for this test, which involves using pink noise to characterise the low-frequency in-room response of the loudspeaker and gated sine wave techniques to measure the high frequencies, with the two different measurements spliced together (at 1kHz) to show performance across and beyond the audio spectrum. You can see that if we ignore the two sharp high-frequency peaks at 11kHz and 16kHz and the small dips at 28kHz and 35kHz (which we safely can, as they would be inaudible to the human ear) the overall response extends from 42Hz to 40kHz ±5dB. Interestingly, the response 'curve' of the W8 is very, very similar to the response curve of the Boenicke W5, so the two speakers have obviously been 'voiced' to sound the same. The main difference is that the Boenicke W8 has both a more-extended bass response than the Boenicke W5 and also a more-extended high-frequency response than that speaker.

The low-frequency response of the Boenicke W8 was measured by *Newport Test Labs* using a standard near-field technique. You can see that the output of the port (red trace) peaks at 33Hz and has a fairly high Q, being 6dB down at 24Hz and 46Hz. The port's output also appears to have a resonance up around 400Hz. The low-frequency response of the Boenicke W8's side-firing driver (black trace) rolls off smoothly below 100Hz to reach a minima at 35Hz. The response above 100Hz is smooth, with a very slight roll-off. The response of the lower of the two drivers on the front panel is represented by the green trace on Graph 2. You can see that its low-frequency response starts rolling off at around 160Hz, with the approx.

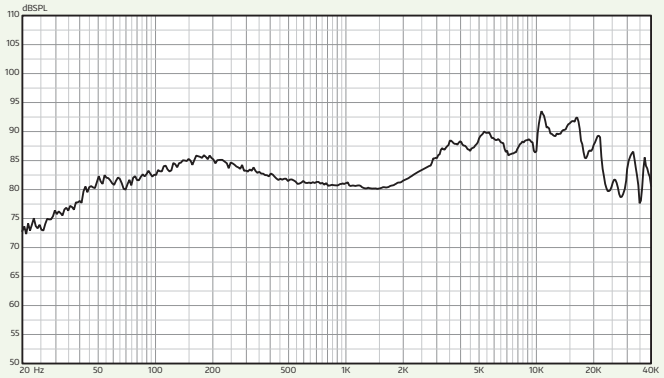
12dB/octave slope below this frequency suggesting that this driver is mounted in a sealed enclosure. As you can see, both the side-firing and front-firing drivers cover much the same frequency range, but have completely different frequency responses individually.

Graph 3, which shows the impedance of the Boenicke W8s, shows that according to the IEC 60268-5 standard it should attract a 'nominal' impedance rating of 4Ω. The impedance is quite unusual, because it only rises above 8Ω between 750Hz and 2.4kHz. Even the resonant peaks reach only 6.3Ω (at 27Hz) and 7Ω (at 58Hz). The wrinkles in the response at around 150Hz suggest some minor cabinet resonances (but the wrinkles in the response at 100Hz and 1kHz are glitches caused by the test instrumentation and should be ignored).

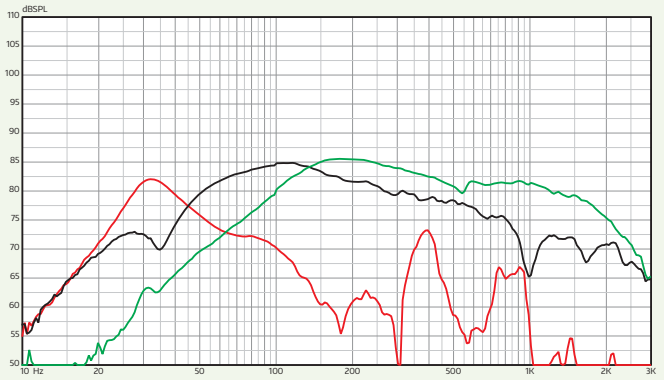
Newport Test Labs measured the sensitivity of the Boenicke W8 speakers as 81.5dBSPL at a distance of one metre, for a 2.83Veq input. This is a very low figure and one that's almost 3dB lower than the minimum figure specified by Boenicke. It is, however, higher than the measurement *Newport Test Labs* made on the smaller Boenicke W5 design, which was measured at 79dBSPL under the same conditions and positioned that design as having the lowest sensitivity of any speaker ever tested by *Newport Test Labs*. The W8's result puts it in a tie for the third-lowest sensitivity ever measured by that lab, but more importantly means you'll need to use considerable amplifier power to drive these speakers to high SPLs in a listening room. However if you use too much power, you will heat the voice coils, reducing efficiency even further and possibly running the risk of damaging one or more of the drivers.

Graph 5 is a composite graph that places the frequency responses shown in Graphs 1, 2 and 4 together, so you can see the 'fit' between them. The pink trace on this graph shows why it's possible to ignore the peaks shown on the gated sinus (blue) trace because this trace essentially shows the response that would be perceived by the human ear… you really don't hear those sharp peaks and dips.

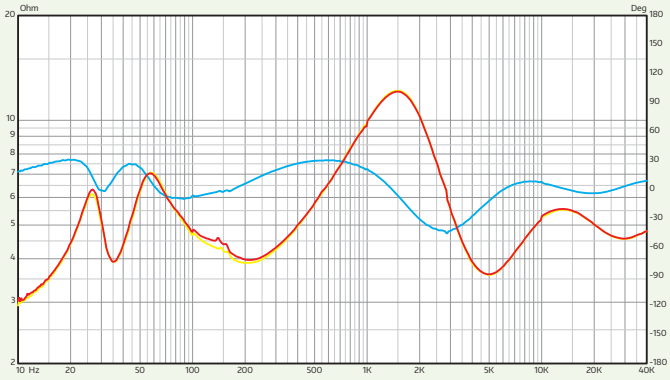
The very low efficiency combined with the low impedance of the Boenicke W8 will make amplifier matching crucial to extracting best performance. I assume one reason for the low efficiency is the considerable bass extension Boenicke has been able to extract from this design: 42Hz is an excellent result for such a small cabinet. Although the frequency response is not the smoothest I have seen, it's certainly acceptably flat at 42Hz to 40kHz ±5dB, particularly considering most of the variation is caused by the increase in output at frequencies higher than 3.2kHz, which is the highest 'G' on a piano keyboard. *Steve Holding*



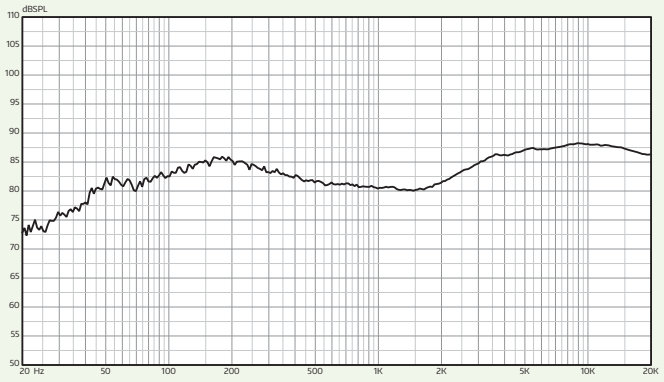
Graph 1. Frequency response. Trace below 1kHz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced (at 1kHz) to the gated high-frequency response.



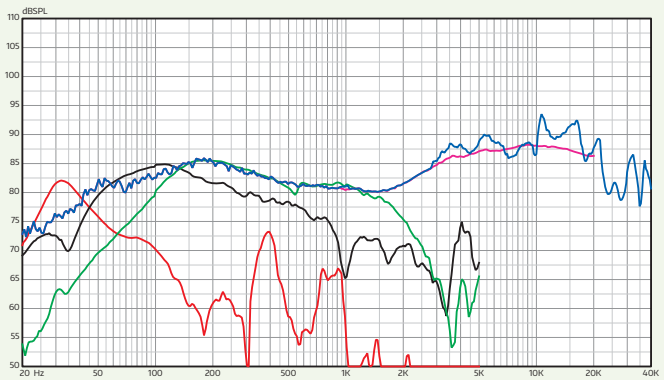
Graph 2. Low frequency response of front-firing bass reflex port (red trace), side-firing woofer (black trace), and front woofer/midrange (green trace). Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas.



Graph 3. Impedance modulus of left (red trace) and right (yellow trace) speakers plus phase (blue trace).



Graph 4. Averaged in-room frequency response using pink noise test stimulus. Trace is the averaged results of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter.



Graph 5. Composite response plot. Red trace is output of bass reflex port. Black trace is anechoic response of side-firing bass driver. Green trace is sine response of front-firing bass/midrange driver. Pink trace is pink noise trace above 900Hz (stopped at 20kHz). Blue trace is spliced lf/hf trace from Graph 1.