

Polk Audio SR104-DVC

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Every time we contact our friends at Polk Audio, we tend to ask them for something special, something fantastic, something... for us to play with. With a single phone call to Polk Audio's marketing mastermind Paul DiComo (affectionately known as "The Godfather"), our request is quickly granted and a product is sent on its way.

Within a few days a 28lb. carton arrived containing one of Polk Audio's new SR-series 10-inch dual voice coil subwoofers. DiComo even warned us that this big brute has caused a few sore backs, as he personally worked up a sweat packing this monster up for us – we can understand why. This woofer chimes in at an incredible 26.5lbs. – not for the faint of heart by any means.

DiComo says the SR104 (also available in 12-inch sizes and in single and dual voice arrangements) is designed for people looking for sound quality with the capability of getting very loud. This isn't, based on the specs, an SQL driver, but more of an SQ driver with extreme excursion capabilities – 0.64 inches each way to be exact. Sound Quality eh? We'll be the judge of that.

OUT OF THE BOX

The woofer is based on a custom cast aluminum frame. The frame is a massive vertical design that reaches almost all the way to the bottom of the enormous double-stacked magnet assembly. The basket is

finished with a textured dark grey powder coat and Polk was kind/smart enough to include a one-piece foam rubber mounting gasket. You would be stunned at how many subwoofers aren't sealed properly into their enclosures. The woofer requires a mounting depth of just a hair over 7 inches and thankfully uses a conventional 8-hole mounting system on standard spacing.

Moving down the assembly shows that Polk spared no expense in designing this woofer. A custom 'panel' on the side of the woofer provides a central location for all the electrical connections – two positive and two negative. The panel features 2.5mm hex head set screws and the block will accept 8awg cable.

On the three remaining sides of the basket are very cool looking cooling vents. These not only allow hot air to escape from the outside of the voice coil, but they also release air pressure beneath the spider to improve linearity. Given the excursion capabilities of the driver, this is quite important.

At the base of the basket are the aforementioned ceramic magnets. The magnets measure 0.7 inches in height by 7 inches in width, and yes, there are two of them. This translates to a 16lb. motor assembly. On the top side of the magnets is a stamped steel top plate. The bottom plate is forged steel that has been polished then chromed. A 0.78-inch vent was machined out of the center of the bottom plate and a diffuser vent was affixed below.

Back at the top of the woofer, we find a Nitrile Butyl rubber surround that was created specifically for this driver. It features a tall roll design with vertical sides and comes flush with the ABS upper cone. The shape of the cone is described as having 'catenary geometry' in that it mimics the exact shape of hyperbolic cosine. What does that mean in terms of performance? The shape of the cone itself adds significant strength and damping for uncoloured and pure sonic performance.

At the base of the cone is a 2.5-inch diameter glass epoxy voice coil former with a length of 40mm. A 4-layer voice coil made of large gauge aluminum provides excellent power handling while not adding significant mass to the assembly. The former is attached to the cone and spider with a coupling ring for added strength. The spiders (yes, two of them) are made from Conex and feature a progressive profile. Interestingly, the profile of one spider mirrors that of the other – they call this inverse orientation and it helps to cancel out unwanted resonances. The spiders are massive, measuring just under 8.5 inches in diameter. This driver certainly has the tools to move a lot of air – let's check out its performance.

IN THE LAB

I broke in the SR104-DVC for eight hours using a 30Hz sine wave at 12V before taking a full set of Thiel-Small parameter measurements to compare >>

to the specs provided to me by "The Godfather." The tinsel leads on the SR104 run parallel to the cone before curving downwards at the top to run down to the connection plate on the basket. While breaking in the woofer, I could hear some very minor tinsel lead slap from the bottom. This is minimal and would be masked when the driver was installed in an enclosure. It is also worth noting that this is a pre-production sample – I had to peel the Polk engineering sample number sticker off before I took care of the photography.

Based on my findings, the factory specs very closely match the information I measured. Even better than that, Polk audio recommends that this driver be used in a 0.88 cubic foot enclosure for competition-grade bass performance. Our numbers show a sealed enclosure with a net volume of 0.811 will result in an optimally damped system with a Q of 0.707. Lucky for me, I have a perfect enclosure in the test lab. This system should provide a -3dB point of 46.75Hz and a group delay of just under 6mSec around 30Hz for great performance – again I'll let the listening tests be the final judgment on all that.

Before heading out to the car for some listening tests, I decided to take a quick look at the near-field frequency response of the woofer in the 0.8 cubic foot enclosure. Figure 1 shows the amplitude of the driver, and the response is very smooth. Peak output is focused between 60 and 70Hz and it rolls off beneath that point at 12dB per octave. I took an impedance sweep of the enclosure to look for the resonant frequency – it appeared at 48Hz – certainly close enough to the predicted 46.75Hz. With the measurements confirmed, it was time to hit the road.

STRAPPED IN

The SR104 was strapped into the trunk and connected to a DPX1001.1 amplifier set for a 2Ω load – this would put 1,000W available for listening, measurement and abuse. In-car SPL at 1W of power was my first concern. The SR104 produced 102.2dB at 20Hz, 105.2dB at 40Hz, 101.2dB at 60Hz and 101.2dB at 80Hz. I then swept the car for the peak efficiency frequency and let the woofer do its thing. The SR104 produced 128.94dB at 48.5 Hz as measured by my TermLAB USB SPL measurement system.

OK, enough test equipment – time for some real music. Up first was *Amuseum* by James Newton How-

ard. This is a very well recorded track with significant percussion work and excellent mastering. Could the SR104 keep up? Well, this woofer hit so hard, I honestly thought someone had kicked the back of my seat – is that hard enough for you? Consider as well, this is with the woofer strapped into the trunk of a Subaru WRX sedan – with the output blocked by the rear seats – imagine the impact in a hatchback! The SR104 reproduced the bass line with accurate detail on a level I rarely get to experience. Not only is it lightning fast and detailed, but it also offers excellent low frequency extension. To evaluate the low frequency capabilities, I loaded up *Jurassic Lunch* from the Great Fantasy Adventure Album. This track features low frequency rumbles centered around 12-14Hz for the first 30 seconds. If your sub-bass system can't shake the car, it just doesn't go low enough to be called sub-bass. The SR104 had no problem sending pressure waves through the vehicle and produced awesome impact once the T-rex breaks through the trees and starts to roar 30 seconds into the track. Very cool!

For a real-world bass-head experience, I loaded up the Chemical Brothers' *Hey Boy, Hey Girl*. The SR104 was not only able to slam out the synthesized bass line with accuracy and detail, but offered a sense of warmth and size that sounded more like a 15-inch subwoofer. I've always liked the ability for large drivers to move significant amounts of air with low excursion levels, this gives them a very effortless sound – the SR104 shares this trait – but from a small driver, it's an impressive feat!

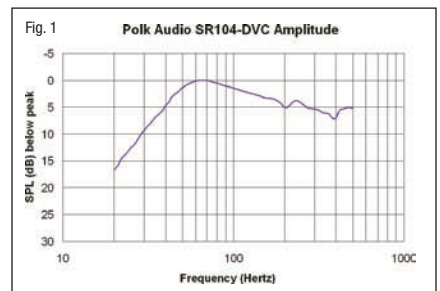
WRAPPING IT UP

How was Polk Audio able to produce a product as impressive as the SR104? DiComo sent me a copy of

the white paper for this sub. Polk spent a great deal of time working on the linearity and symmetry of the driver's suspension and the magnetic field. Polk utilized a Klippel analyzer to make these measurements. A Klippel analyzer will produce a chart that plays magnetic field strength vs driver excursion (called a Force Factor BL graph) and a suspension stiffness vs. driver excursion graph (called a KMS graph). This modeling allows the engineers to evaluate the performance of the driver not only based on Thiel Small parameters, but its performance at high excursion levels as well.

Polk Audio has 22 years of experience designing loudspeakers. Their recent work on the Signature Reference speaker system has proven they've learned a lot over the years. The SR104 shows that there are still companies that care about what music sounds like – not just about how much money they can make.

The SR104 (and I am sure its siblings) is a truly stunning sounding subwoofer and it does everything I'd want from a sub; the SR104 gets loud, plays deep and hits very hard. The enclosure requirements are very reasonable at one cubic foot and the thing looks absolutely great. The SR104 could easily become my new reference subwoofer in the lab – you owe it to yourself to audition this sub! **PAS**



THE SOURCE

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