**A DEEPER DIVE INTO THE ENGINEERING BEHIND THE X4 Q&A WITH PHIL JONES**

Q: The X4 Nanobass is a bass combo, did you have other instruments in mind when you designed it?

A: At the very beginning, we wanted a tiny amp that could handle any instrument. While being a bass amp it is also much more. With its flat and full frequency range response and high-fidelity tone it is ideal for most instruments. It has become quite popular for a broad range of stringed instruments and players now endorsing it that includes guitar virtuoso John Jorgenson and violinist Andrea Young.

Acoustically, I knew the design would work, as I had meticulously calculated every detail. But bringing it to production was a whole new challenge. Our first priority was to keep it within budget so that it could hit the right price point. We were determined to give the unit a solid feel, so we used the same high-quality covering that we use on our larger models. We use a sprayed epoxy paint for a flawless finish. It is a more expensive method compared to traditional Tolex covering, but we always believe in spending money wisely to deliver the best for our customers. We developed a method using vinyl covering that gave the corners a polished look, so now the X4 has a striking resemblance to our larger models.

Q: What was your original design goal with the X4?

A: Our initial design goal for the X4 was to create a compact amplifier that would truly captivate discerning musicians who prioritize the tone of their instrument, especially in situations where a larger, more powerful amp is not necessary. We envisioned a portable solution that could be easily carried in a backpack, perfect for traveling musicians who need to practice or play in diverse locations, from unplugged rehearsals to impromptu jam sessions. And it was essential for us to achieve exceptional tonal quality, even for bass instruments, without compromising on portability.

Q: Is there anything that surprised you throughout the process of designing and manufacturing the X4 Nanobass?

A: As we decreased the box size, we had to revisit the fundamental laws of speaker design. Efficiency was paramount, so we developed a new driver that incorporates the most powerful neodymium magnets available. We had to use neodymium magnets because even a slight increase in magnet size would have compromised the bass output of the speaker. Using a larger ferrite magnet was not an option, as it would have taken up more precious internal volume. Just to geek out on some tech information: Neodymium magnets, also known as rare earth magnets, are graded based on their maximum energy product (BHmax), which is a measure of their strength. The 'N' in the grade (e.g., N52 or N35) represents the magnet's maximum energy product in Mega-Gauss-Oersteds (MGOe), and it's the most commonly used parameter for comparing neodymium magnet strengths.

The difference in strength between N52 and N35 neodymium magnets can be significant. N52 magnets are the crème de la crème, with a maximum energy product of approximately 52 MGOe, making them the strongest commercially available neodymium magnets. In contrast, N35 magnets have a maximum energy product of around 35 MGOe, which is lower than that of N52 magnets. This means that N52 magnets are a whopping 17 MGOe stronger than N35 magnets, delivering a magnetic field and pull force that's superior in every way. This makes them ideal for applications that demand higher magnetic strength, such as industrial motors, generators, sensors, and high-performance magnetic assemblies. However, it's crucial to note that the actual performance of a magnet in a specific application depends on various factors, including its size, shape, and operating conditions.

There are other design features in the electronics circuits in the X4 Nano are classified but when you hear this amp the first time you will know it is special.

So while the X4 may be small in size, it's packed with advanced materials, cutting-edge manufacturing techniques, and the highest quality components. It's built with the precision of a fine watch, leaving no room for even a pinhole where air could escape. This attention to detail and craftsmanship gives the X4 its performance that punches way above its weight class. It's not just a regular amplifier; it's a true masterpiece of engineering.

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