THE FUTURE OF SMART SOUND:
SYNG LAUNCHES WORLD'S FIRST TRIPHONIC SPEAKER

Introducing Syng, a Pioneer in Revolutionary Audio Tech

Syng, creator of the world's first triphonic speaker, aspires to revolutionize the way people listen to music. Co-founders Christopher Stringer, Damon Way, and Afrooz Family launched the Venice, California-based audio firm in 2018, under the shared vision of shifting passive listening habits into active, multisensory experiences. Today, the company is led by Stringer (CEO/Chief Design Officer), formerly one of Apple's chief industrial designers, and Way (Chief Brand Officer), a serial entrepreneur and seasoned brand builder with ties to DC Shoes and Incase.

With an eye on creating sound for the future, Syng's leadership – backed by an in-house ensemble of 50+ top performers in design and engineering – has stepped into uncharted territory to reinvent high-fidelity speaker technology and unlock a new category of audio – smart sound. The company's flagship product, Cell Alpha, made its official public debut in May 2021 after more than three years of planning and development. Heralded for its groundbreaking strides in innovation, the Cell Alpha is the first all-encompassing audio solution capable of rendering sound for the wide spectrum of content available to today's entertainment consumers – from music and television, to podcasts and webinars, to computer and video games, and much more.

The Cell Alpha's entirely new, object-based sonic architecture can play any format of recorded sound and make it tangible. The pioneering triphonic speaker system combines advanced sound technology software with 3D-printed parts to project audio with unrivaled precision. The end result is high-fidelity sound that is more spacious and immersive than ever before. Using a complementary mobile app called Syng Space, listeners can move, shrink, magnify, and layer the audio in highly imaginative and artistic ways, achieving multisensory experiences that can be likened to "painting" sound in a space.

California-based audio firm, Syng, was born from a desire to transform the human relationship with sound.

The object-based sonic architecture of the Cell Alpha transcends conventional design standards and leverages HP's Multi Jet Fusion 3D printing solutions to produce a functional, durable, beautiful, high-fidelity speaker.

This virtuoso in technological ingenuity unlocks a new niche in audio – smart sound – and provides multisensory sound experiences that engulf listeners in pure rhapsody.

Innovative Design Resonates with New Possibilities in Spatial Sound

The futuristic design of the Cell Alpha is quite distinctive. Roughly measuring 12 inches in both height and diameter, and weighing approximately 13 pounds, the product features a clear plastic, sealed, dual-truncated spheroidal shape. The mirror-like, yet transparent, surface provides a modern aesthetic and offers a glimpse at some of the mesmerizing internal components. The intuitive system can be used either solo or in a multicellular configuration. Ideally, three Cell Alpha speakers should be employed in a space to provide the fullest expression of what Syng calls triphonic audio. According to Stringer, his team's invention is the first product capable of tapping into this unique dimension of spatial sound.

One of the key elements of the Cell Alpha is the Triphone, a three-horned sound projector that resembles a halo as it encircles the middle of the spheroidal speaker. This component consists of three coaxial drivers, mounted at 120-degree angles from each other. The unique driver assembly is what is used to project audio with pinpoint accuracy around a room. Specifically, the Triphone's three beamforming microphones adjust the sound field in response to real-time data that it collects. These sophisticated capabilities include automatic room equalization, wall proximity and direction detection, and multi-Cell geometry calculation.

During early conception phases, Syng's team of audio and design experts established that complex, uninterrupted pathways would allow for sound to travel uninhibited through the triphonic system. However, this integral component would have to be manufactured as a single, seamless part in order to achieve Syng's design objectives. According to Syng's Director of Mechanical Engineering, Yoav Ben-Haim, it was no easy feat to ensure the structural integrity and acoustical performance of such a complicated assembly.

"All of the conventional ways of making those parts had downsides that we wanted to avoid," Ben-Haim explains. "Ultimately, 3D printing proved to be the one method of manufacturing that would allow us to create this component in a singular piece, and to impart it with its various functionalities: six speakers mounted with precise features, 10 pressure seals, complex airways, and unique cosmetics." The prospect of leveraging the agility of digital manufacturing to speed design iteration – and get the product to market faster – also appealed to members of Syng.

HP + Forecast 3D: Synergistic Partners in Additive Manufacturing

Syng's additive manufacturing journey began with its partnership with HP, one of the world's leading technology innovators and industry-leading providers of 3D printing solutions. Backed by decades of research HP has expertise in printing, precision mechanics, systems engineering, data intelligence, software, microfluidics, materials science, design, and digital manufacturing. HP, in turn, introduced Syng to Forecast 3D, suggesting they team up to produce the Triphone element.

With 34 HP Multi Jet Fusion printers in its digital manufacturing factory, Forecast 3D serves as the official West Coast Experience Center for HP Multi Jet Fusion technology and is one of the largest additive manufacturing service providers in North America. Following the meeting, Syng was sold on Forecast 3D's expansive digital manufacturing capabilities and expertise as well as its proven reputation as a capable, reliable, resourceful, and prompt company that would respond to Syng's needs.
"HP's recommendation is what set us on the path to reach out and ultimately partner with Forecast 3D. The team there was quick to be supportive in the early stages, which helped us make the decision pretty easily," Ben-Haim says. "What appealed to us most was Forecast 3D's knowledge of the HP Multi Jet Fusion process, as well as their capacity to deliver the quantities of parts that we needed."

Throughout product development stages, representatives from Syng, Forecast 3D, and HP worked in close collaboration to optimize the dimensional and visual aesthetics of the 3D-printed component. "The Triphone represents 20% of the speaker. It's a very complex, strong part with a lot of internal cavities," explains Pere Aizcorbe, head of design at Syng. His colleague Camille Zaba, a mechanical engineer, notes further, "We would not have achieved the shape that we needed for this part had we not gone down the additive manufacturing route. Instead, we would have had to make one of the main pieces of our speaker out of multiple parts, which adds cost, complexity, and risk."

"Because this component interfaces with the various subsystems within the product assembly, we had to be diligent in ensuring that all 56 critical dimensions met the design specifications to enable smooth assembly processes downstream," says Isabel Sanz, solutions architect for strategic accounts at HP. Together, HP and Forecast 3D supported a rapid development cycle that allowed for each design iteration to be completed within weeks. Ben-Haim remarks, "Without this support, we would have had to do a significant redesign early on to accommodate conventional manufacturing processes. This would have set back our schedule significantly – probably at least 6 months, because the design would have taken longer, and then we would have had to secure and validate injection molding tools."

The Triphone was made from PA 12, a robust thermoplastic often used to produce high-density parts with balanced property profiles and strong structures. Unlike other 3D printing technologies, the HP Multi Jet Fusion platform prints each layer of new material and agents on top of a previous layer that is still molten. This allows for both layers to fuse completely, which delivers strong, quality, detailed, and functional 3D-printed parts. "HP optimized the printing process for the Syng application while

"HP optimized the printing process for the Syng application while improving the cost, productivity, and yield in production. For example, we extended the build size and optimized the design to maximize productivity by 40%, which reduced the cost-per-part. Also, geometry optimization helped to improve product yield and achieve design tolerances that were suitable for production," Sanz adds.

Zaba points to a specific example where additive manufacturing saved her company considerable time and money. "In the midst of one of our early builds, we had some issues with warpages on the part; the flatness of it. Fortunately, Forecast 3D's swift turnaround times on providing new prototypes allowed us to cut in a new design *during the build*, which would not have been doable with traditional injection molding tools due to the geometry of the component's supporting fins. Even if we had found an alternative design with plastic injection molding, it likely would have taken us another 12 weeks to produce those parts. We not only saved valuable time with Forecast 3D's help, but also tens of thousands of dollars for the tool itself. Also, we were able to validate this new design without having to shut down the assembly line, which would have cost additional resources," she says.

In sum, the 3D printing approach bolstered confidence in the structural integrity of the product architecture in the design and prototyping phase. "Typically, a 3D-printed prototype is used only in the initial stages of the production process," Ben-Haim says. "However, by using 3D printing as our production intent, any learnings about our specific resin collected in the prototype phase were directly transferable to the final production design."

The Value of Tuning into a Client's Needs

According to spokespersons from Syng, the additive manufacturing route helped to make the Cell Alpha's journey to market simpler and easier to manage. "We ultimately achieved a design that far exceeded our original expectations for this initial product rollout," Aizcorbe shares. "Forecast 3D's commitment to produce such a challenging part – which required hundreds of design iterations – was definitely a risk for them in terms of their profit margin. Few companies are as brave as Forecast 3D in that sense."

Aizcorbe feels that Forecast 3D's proactivity and responsiveness were especially helpful during prototyping phases. "The best way to help the design process is to move fast," he affirms. "The team at Forecast 3D was very proactive and quick to turn around the samples that we requested, which allowed us to make changes more swiftly." Zaba agrees that the timeliness of Forecast 3D's work helped to simplify and streamline the product launch. "Additive manufacturing has a nimble quality to it that pairs well with the inherent variability of the design process," she says, adding that Forecast 3D was willing to make the extra effort to provide same-day turnarounds, when feasible. The ease of driving to Forecast 3D's San Diego location to pick up parts as needed is another major pro, according to Zaba, as opposed to waiting for products to be shipped from an overseas manufacturer.

When asked if she would refer Forecast 3D to others, Zaba's response is, "Absolutely!" She adds, "The level of care and respect coming from Forecast 3D was incredible. It was obvious they were doing everything in their power to make this project a success." Aizcorbe concurs. "It's incredibly rewarding to be where we are right now, and we are thankful for their efforts," he says.

As Syng looks to the future, the goal is to continue finding creative and innovative ways to stretch the bounds of what audio can offer to listeners. The numerous advantages of additive manufacturing have set the stage for Syng to really shine in this ever-evolving space.