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Amina Technologies Spread-Source Loudspeaker Technology Offers Distinct Performance, Decorative and Durability Advantages Over Conventional Speakers

Worldwide VP of Engineering Technologies and VP of Sales for the Americas Keith Vanderkley details how the company's spread-source speakers differ from conventional point-source in their ability to more evenly disperse sound throughout the room, including rooms acoustically challenged by hard surfaces, glass walls and obstructions, and how integrators are applying the speakers with great success to a multitude of performance-demanding indoor, outdoor and marine settings.

Huntingdon, UK – January 23, 2020 – Celebrating 20-years, [Amina Technologies](#) is an innovator and manufacturer of invisible speakers used around the world in a wide variety of 'architecturally-sensitive' settings, from décor-chic retail shops to restaurants and nightclubs, from modest to most opulent residences, and even luxury ships - all where quality sound, space and dispersion is paramount yet the speakers must be completely concealed, not even a seam can be showing.

The basis of the Amina® loudspeaker is its Distributed Mode Loudspeaker (DML) design which makes it unlike any conventional loudspeaker, but rather more like an acoustical instrument. The technology employed is based on Bending Wave Theory, the principle workings of soundboards within instruments, like the strings of a guitar, violin or piano transferring the vibration via a bridge to the soundboard, which in turn projects the sound into the room, radiating evenly in all directions.

With DML, the company's patented electronic neodymium exciters set in motion tens to thousands of tiny sympathetic vibrations all over a planar soundboard. The vibrations excite adjacent air molecules which come together with Amina's tuning and Opti-drive® and Opti-damping® techniques to create full-bodied, omni-directional sound, just like the instrument, filling the room evenly, corner to corner. This 'spread-source' technology differs greatly from cone-driven loudspeakers which are 'point-source' technology.

So how does an AV integrator determine when to opt for spread-source versus point-source? Amina Technologies Worldwide VP of Engineering Technologies and VP of Sales for the Americas Keith Vanderkley says that its helpful to first understand these two properties and how they behave under the laws of physics that govern sound. "The laws don't change - they apply to all forms of sound. It's the way the sound is produced that changes the playing field," said Vanderkley. "Think of standing in a room with a piano being played versus a recording of that piano in a room. The two are experienced completely differently, because the sound is produced through different mediums."

"All loudspeakers are transducers, converting an AC voltage into an analogues acoustic pressure wave that oscillates above and below constant atmospheric pressure, ultimately moving the eardrum in our ears, which causes us to hear sound. It's what happens in-between the two actions that determine how we hear that sound – anywhere from close to original to outside of critical distance (*1) which is unintelligible," added Vanderkley.

"Reflections created by objects, walls, floors, ceilings play a huge role as to how we perceive sound. There is so much that comes into play, that it would take a volume of books to explain," he continued. "The most important objective in sound is to have the listener experience it as close as possible to the original and maintain its intelligibility."

"Traditional speakers (point-source) create a phase dependent wave, converting an AC voltage (phase) into an analogues wave of positive and negative pressure (phase) emanating from one point in time, in space. Reflections that bounce off walls and ceilings arrive back having travelled different distances, and

their phase relationship might not be the same as the original, adding both constructively and destructively to the direct soundwave. This colours the sound, compromising sound quality and intelligibility, especially in mid and far field, where the listener is further away. Additionally, point-source speakers develop the amplitude at the centre of the cone, losing 6 dB of acoustic power (*2) per doubling of distance as it propagates without reflections in the near field,” said Vanderkley.

He continued, “Conversely, spread-source creates a multitude of tiny sympathetic sources radiating from all over the panel; the amplitude, or sound pressure is created as a sum of the spread-out resonations on the panel. Hence the loudest point is not at the source, but at the point where the sum of all vibrations merge together (*3). That’s where a lot of things start to happen that make a large difference.”

“Since the Amina DML panel is spread-source it has no distinct phase, as ‘in time and space’ the sound source is spread out across the planar soundboard. That’s where probability starts to factor in, and most reflections, non-phase, and hence full range, that meet back up with the original wave will sum positive and reinforce the original sound wave. Hence the amplitude/strength of the original signal will be sustained over longer distances by the reinforcement of the reflections across the full bandwidth, and as such, comb-filtering is negated, reaching further whilst maintaining higher intelligibility. This is why DML works well in highly reverberant spaces, such as hard surfaces and glass walls,” claimed Vanderkley.

This sustained energy of DML affords the ability to drive the initial sound source at lower sound levels while maintaining a more evenly spread amplitude throughout the room, even around acoustical obstructions like pillars and furniture, in essence making the object invisible to the ear. The DML speaker radiates 180 x 180 degrees, providing half-sphere full-range dispersion. Increased coverage means fewer sound sources are required, using less power and making DML more efficient than conventional in-walls.

Amina speakers are not designed to take the place of critical listening point-source loudspeakers aimed at a ‘sweet spot’ in a dedicated, acoustically balanced space where the audiophile will enjoy its sonic performance. A properly voiced and time-aligned loudspeaker should indeed provide an incredible sonic experience on-axis, whilst two speakers placed in a stereophonic arrangement can create width, depth and height to create a 3-dimensional sound stage (*4).

Rather, the Amina technology is ideal for applications where quality sound and coverage, concealment, space and protection from elements are key factors. Once installed, covered, and sealed in their own environment, the Amina speakers are impervious to moisture and corrosive elements, and never “go out of fashion.” They change with the décor. Coverings can include wet plaster skim (2mm), stucco, wood, leather, natural or man-made veneers and laminates, making the speakers ideal for residential, commercial, marine settings and more.

Vanderkley reports that integrators are using the Amina speakers not only for whole-house installations such as dining, kitchen, living rooms and hidden home theatre, but also indoor swimming pools, outdoor Lanais, churches, classrooms, cruise ships and yachts, personal wellness rooms and gaming spaces.

“With increased intelligibility, less shadowing, minimal hotspots and no dead-zones, even in corners where intelligent sound is most difficult to achieve, the Amina DML can achieve what conventional speakers cannot. No longer a ‘sweet spot’ in just one location, but rather full-range high definition sound to all with a clarity and openness that is often compared to electrostatic speakers,” claimed Vanderkley.

Amina Line Overview: A Wide Assortment of Completely Invisible Speaker Solutions

Amina has many options to satisfy different applications and sound pressure levels, all engineered and hand-built at its Great Britain workshop. The line consists of:

- The [Mobius-i](#) series, ideal for use behind a wide range of covering materials and level 5 full plaster skim coats, 3 models available.
- The [EDGE-i](#) series designed for drywall, plasterboard and retrofit applications, 3 models available.
- The [ALF](#) (low frequency enhancer) subwoofer series, 3 models available.
- Any of the products can be ordered with a 70/100-volt transformer option for commercial and distributed audio applications.
- Also available are high pass filters (limiters) and backboxes

For information on Amina Technologies please telephone +44(0) 1480 354390 or email sales@aminasound.com.

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About Amina Technologies

UK-based invisible speaker design and manufacturer Amina Technologies has built a solid reputation for the design and manufacture of high-performance panel-based loudspeaker technology rendered completely invisible in application by decorating over. The product is used world-wide in the very best residential, marine and commercial properties. Whilst the company has been developing its 'invisible speakers' for over 20-years, the category is now widely recognized as having real significance in the future of smart homes, where aesthetics is just as important as technology. www.aminasound.com Click on any of these active links to check out our pages on [Facebook](#), [Twitter](#), [Instagram](#) and [YouTube](#)
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(1) Critical distance. The point where the reflections or reverberations overtake the direct sound of the speaker, changing near-field to mid-field to far-field where the reverberant field is 6 to 12dB higher.

(2) Loss over Distance. Inverse Square Law dictates that acoustic energy spreads to 4 times its previous space each time it doubles its distance away from the source. This equates to a loss of 75% of pressure, or a 6dB of loss at each doubling. i.e. 100 dB measured at 1M is 94dB at 2M, 88 dB at 4M and 82 dB at 8M etc. 18 dB is the equivalent to the usual mute on a receiver.

(3) Think of the violin, able to create quite a loud sound. If that sound pressure came from a speaker, the proximity of the player's ear would certainly be deafening to the player. But because the violin is spread source, only a portion of the total amplitude reaches the ear. The final sound pressure is created away from the instrument's body, a culmination of all the instrument's vibrations.

(4) 3-dimensional Soundstage uses amplitude and/or phase differences to place pin-point accurate sound sources within the soundstage, even beyond the physical location of the speakers.