

# PRO AUDIO REVIEW

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from the field

## JBL VERTEC Series Speaker System

by Nick Bailly

JBL has revisited, refined and expanded on line array concepts (see sidebar, "The Physics of Line Arrays", p. 16). The result is the VERTEC series, the centerpiece of which is the VT4889 Three Way Line Array Element. JBL's modern take on classic principles resulted in a simple — but stunningly effective — system for mid-sized to very-large-venue sound reinforcement.

### Features

VERTEC is a contraction of "vertical technology." A VERTEC system is created by coupling multiple VT4889 enclosures vertically. Each VT4889 (\$11,399) contains two 2255H 15-inch dual coil drivers, four 2250H 8-inch midrange drivers coupled to patent-pending radiation boundary integrators (RBIs), and three compact 2435H HF drivers fitted to JBL's WaveFormer devices.

The radiation boundary integrators and the WaveFormer devices are essentially acoustical transformers that ensure acoustical coupling of the various elements within the enclosure, enabling proper summation of the elements for line array use.

The cabinet dimensions are 19.25 inches tall, 21 inches deep and 47.75 inches wide, with the sides angled inwards at 5 degrees, for a trapezoidal shape. This angle allows the array to take a slight bend without disrupting the tightly coupled front panel — an absolute requirement to maintain the all-important line array characteristics described above.

The cabinets are three-way, with the low frequency input rated at a nominal 1,200W (8 ohms per driver), the midrange 1,200W at 8 ohms, and the high frequencies 225W at 16 ohms. Manufacturer figures for maximum peak output are 136 to 146 dB at 1 meter (frequency/bandpass dependent). Horizontal coverage angle is 90 degrees nominal (-6 dB), with vertical coverage dependent on the number and shape of en-

losures in the array.

Besides the acoustics, the biggest selling point for the VERTEC series is its rigging ease. The trapezoidal shape enables the array to curve gently in a convex shape, without the need for ratchet-type tensioning devices at the rear of the array.

All rigging fittings are integrated into the enclosure's design, and using the VT4889-AF Array Frame, up to 18 enclosures can be flown from a single Array Frame (and even a single hanging point if a 2-ton motor is used). Enclosures can also be stacked up to six high by inverting the large array frame, or stacked four high using the VT-4889-SF short frame.

### In Use

The techs at SPL Sound of Vineland, New Jersey were early adopters of the new VERTEC series. I spoke to Steve Ponzetto, co-owner, about his experiences with the system.

**"The linearity and coverage is nearly flawless."**

"Overall, I'd say JBL's engineering department raised the bar with these," Ponzetto said. "It is a simple system, but it is perfect for what I do."

"I've always been interested in line arrays — back to those original JBL models," Ponzetto said. He recently replaced his multibox rig with a set of 16 VT4889s, and has already placed an order for 16 more. Clearly, he has been satisfied with the application of the VERTEC system.



"The linearity and coverage is nearly flawless," he said. "I would compare the sound to a set of studio monitors." Ponzetto said the improved line array directivity creates a coherent stereo image.

"On the previous multibox rig, we tended to over compensate to get a stereo effect," he said. "With these speakers, you can actually hear subtle changes in panning, which really helps give a little depth to the mix, while keeping the program reasonable for the audience on the extreme sides."

According to Ponzetto, the VERTEC's extended coverage is extraordinary. "The close field gets extended to the far field. As you walk away, you get a smaller and more linear drop off in level. In addition to that, you have the ability to be much more radical about pointing down as well as out, which enables you to fly high

and make the set designers happy — as you know, they are always complaining about the speakers getting in the way of the stage.”

Much of SPL's work consists of industrial or corporate work, specifically events at the casinos in Atlantic City. This work means they see a lot of major national acts, but are not with them for the entire tour, making flexibility in array size and rigging a definite help.

“The rigging design is handy, and because it is all self-contained, it is really hard to lose parts,” he said. “The rigid rigging frames — and like I said, the ability to adjust your angle — mean you have a lot of options as to how you fly them,” he said. In fact, several other sound companies' well-publicized events, notably the recent presidential inauguration in Washington, D.C., used VERTEC speakers suspended from single poles, with only two rigging points and a tiny footprint.

## Summary

Although the VERTEC series from JBL is not groundbreaking in its technology, it is a successful example of applying tested concepts to address the needs of professional engineers. Large scale sound reinforcement can be a nightmare balancing act of ease of use, intrusiveness, and, of course quality. JBL's VERTEC series provides a complete solution: foremost organized around fidelity, but making strides in size, flexibility, and use that will likely make it a obvious choice for sound companies looking to take concert systems to the next level.

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## The Physics of Line Arrays

If speaker design was as simple as it looked, those band PA cabinets you made after school from plywood and cones salvaged from a discarded stereo would not have sounded so awful. Speaker design is hardly simple — acoustical engineering is complex, and simple adjustments often lead to major aural changes.

This is especially true as one moves to larger and louder rooms and applications. If speakers didn't interact, creating large venue sound reinforcement systems would simply be a matter of making speaker elements more numerous, but this is not the case. Interference of speakers with each other and with the acoustical environment can quickly make audio unlistenable, with familiar problems such as comb filtering and frequency response skewing, changes in directivity and signal drop-off with distance.

Sound waves follow the laws of wave propagation which predict that, by arranging elements in a tight vertical line, interference between the speakers can be harnessed productively and the resultant line array will take on the characteristics of a single element with cylindrical rather than spherical directivity over some (if not all) of the frequency range.

By confining the acoustic energy to a smaller region of space, sound pressure level does not drop off as rapidly with distance as it would with a spherical radiator operating in free field. An acoustical “horn” works in a similar fashion but horn loading isn't feasible in the deep bass. Because of the long wavelengths involved, the horn would have to be gargantuan to have any effect. At bass wavelengths, a line array is the more practical way to go.

To sum it up, line arrays are particularly effective in large venues because they produce a more or less cylindrical radiation pattern rather than the near-spherical pattern of traditional systems. As a result, a line array is able to “reach deeper” into the audience.

In short, a well-designed line array system can provide a predictable and consistent coverage field with reduced component interaction and comb filtering.

—Nick Baily



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