

# JBL Professional's Revolutionary D2 Dual Driver

The Heart of the New VTX Series' V25 Line Array

By Mark Frink

JBL Professional's VTX Line Array Series, the next generation of VerTec, was announced at Winter NAMM with the release of the large-format V25 line array that incorporates all-new transducers. At its core is JBL's D2 Dual Driver — a revolutionary compression driver that provides dramatic improvements in high-frequency sound and performance.

**Double Duty** FOH

The D2 Dual-Diaphragm Dual-Voice-Coil Compression Driver overcomes the limitations of conventional compression driver technology — limited high frequency extension due to the mass of the diaphragm and voice coil, as well as distortion characteristics that arise due to dome breakup modes — by employing two mechanisms. Merging two compression drivers into a single, compact transducer with a single acoustical output, the D2 Dual Driver employs two voice coils, each with its own lightweight, polymer, annular ring diaphragm, its own magnet assembly and its own specialized phasing plug. Instead of the large and relatively massive traditional single voice coil metal dome diaphragm of conventional compression drivers, D2 is driven by two light but strong voice coils, two motive "forces" instead of one, acoustically connected to a single exit chamber.

"With two smaller diaphragms and voice coils working on the same acoustical load, the VTX Line Array Series provides high efficiency and SPL, plus increased extreme high-frequency reproduction due to the smaller moving mass of each diaphragm and voice coil," said Paul Bauman, senior manager, Tour Sound, JBL Professional. "The D2 Dual Driver is a radical departure from traditional compression drivers and represents a revolutionary breakthrough in loudspeaker system design."

The two annular polymer diaphragms have the same radiating area as a conventional single dome, while overall output and power handling are dramatically increased due to the lower moving mass and enhanced heat transfer obtained with two separate voice coils. The result is a compact compression driver with dramatically improved efficiency and power handling, smoother, extended high frequency response and significantly lower levels of nonlinear distortion. The dual driver annular ring topology has already proven itself in JBL's VerTec VT4887A over the last five years in the form of the smaller 1-inch diameter 2408H driver.

Validated by objective measurements, D2's performance has also gone through exhaustive subjective listening tests, demonstrating superior sound quality compared to traditional metallic, mono structure drivers. D2 also provides an extreme output advantage over conventional systems, allowing significantly higher array power density.

**Less is More** FOH

Compared to a conventional system, the D2 provides double the number of voice coils and almost triple the power handling, but with a 30 percent reduction in weight. This results in a dramatic increase in pure high frequency sound pressure levels in the same physical footprint. Three D2 drivers are used in the VTX V25 and the power han-

dling of each is 200 watts per AES standard.

Traditional domed compression drivers suffer from several well-known effects. First, the diaphragm's mass causes a 6 dB/octave roll-off above a certain frequency. Stiffness of air in the compression chamber's confines causes an additional 6 dB/octave roll-off at another frequency. HF air resonances in the chamber can cause cancellations in the chamber. Additionally, the voice coil's inductance attenuates HF response above a certain frequency, all combining to cause excessive HF roll-off that must be compensated electronically.

The main idea behind this new type of high-frequency driver is to marry two drivers back to back with a special radial phase plug that feeds their energy towards the center so that it can exit together in one direction. The two back-to-back diaphragms operate in "push-push" mode, each with their own back-to-back phase plug between them. Each phase plug has its own radial channels to direct their energy towards the central opening and then out the driver's exit together, in one direction. (See Fig. 1)

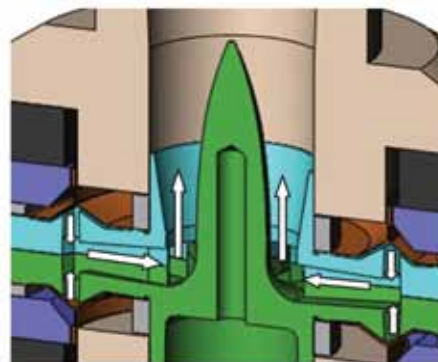


Fig. 1

The phasing plug's slots have a unique pattern arranged diagonally with respect to the ring-diaphragm to provide averaging of the acoustic energy at varying positions to reduce chamber resonances.

The low moving mass of each diaphragm provides improved mass roll-off, and the high damping of the polymer diaphragm ring significantly decreases nonlinear distortion from the usual breakup modes associated with traditional domed diaphragms.

Comparison of the D2, which employs dual 3-inch, 8.2-ohm voice coils, with a traditional competitive titanium domed driver with a 3-inch diameter 4.1-ohm voice coil under plane wave tube measurement conditions to produce identical 149 dB SPL yields impressive results. The dual driver requires half as much power, yields more mid-band energy, is smoother in the last octave and produces far less distortion (See figures 2 and 3).

Prototypes having voice coils with diameters of 1.5-, 1.75- and 2- inches and 1- or 1.5-inch exits have also been developed by JBL. This unique new patent-pending high-frequency compression driver design allows JBL to produce loudspeakers with significantly improved performance and sound quality, with a signature reduction in non-linear effects and noticeably reduced distortion, as well as much higher power handling. Your mother can hear the improvement, and it gets loud enough for your son. **FOH**

