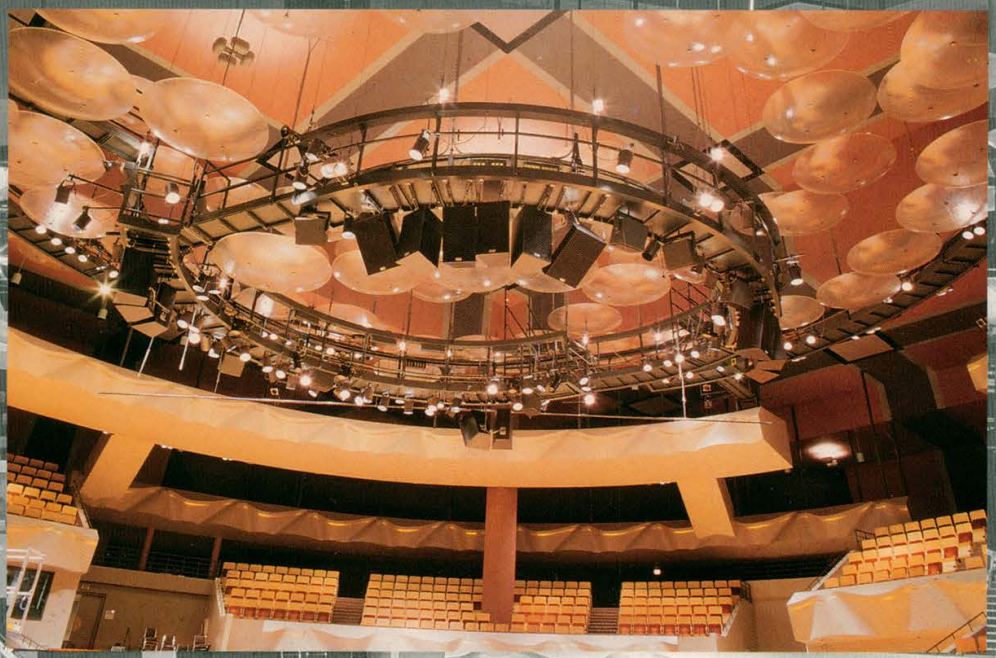
Virtual Array Series
Industrial Systems



KF300is • KF600i • KF650is • KF691i • KF695is

GROUP C

EAW
EASTERN ACOUSTIC WORKS

Virtual Array Technology
15 Years of Innovation

In 1986, EAW engineers revolutionized the touring concert sound industry with the introduction of the KF850, the first Virtual Array® loudspeaker system. The development of VA® Technology is driven by Kenton G. Forsythe's vision of a total solution to the problems of live sound reinforcement. As advances in component materials, measurement instruments and manufacturing methods turn radical concepts into practical products, VA Technology continues to be the choice of leading audio professionals around the world.

Those professionals may work with Eric Clapton, George Strait, The Spin Doctors or other international concert attractions. They may be part of world-renowned organizations including the New York Philharmonic and the Metropolitan Opera or Fortune 500 corporations. Their clients may be Broadway production companies, nightclub impresarios or world-class theme park developers. Acceptance by audio innovators across this wide range of applications is testimony to the fundamental correctness of Virtual Array engineering principles and the power of the VA design process.

UNCOMPROMISING ENGINEERING AND CONSTRUCTION

Complex asymmetrical fourth-order equalized network: crossovers are outside the vocal range.

Integral flying points top & bottom

Resonance-damping structural foam reinforces the midband horn flare.

Carbon-fiber midrange cone with constant-directivity horn/ displacement plug.

HF and midbass horns have identical 90° CD coverage.

Bi-tuned enclosure optimizes woofer response and efficiency.

The KF300is needs no dynamic effects for reliable full range high power operation.

True three-way KF300is has the same footprint as two-way compact systems.

INNOVATIVE TECHNIQUES REALIZE THE VA CONCEPT

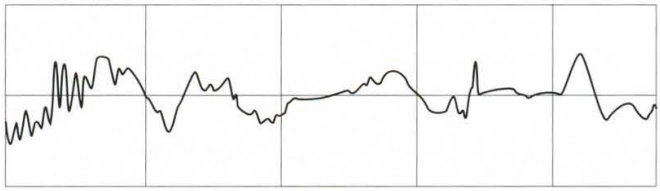
The trapezoidal shape of VA systems is seen everywhere today, but it is seldom matched by the consistent horizontal coverage required for true arrayability. Achieving that objective requires the unique design innovations inside each VA system – advances that cannot be copied as easily as enclosure angles. They range from collapsible fiberglass molds and foam-reinforced wood ply horn flares to displacement plugs, complex computer-optimized crossovers and patent-pending ARC Acoustical Refraction Control devices. This unceasing attention to detail produces the audible refinement and predictable performance of VA systems.

PURPOSE-DESIGNED PRODUCTS

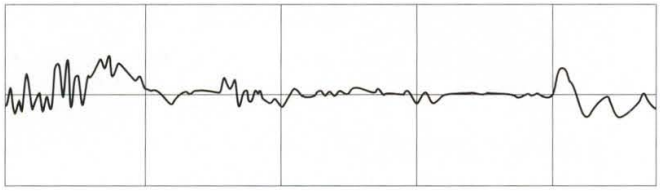
Each product in the Virtual Array Series brings VA design principles to bear on a specific group of applications, on a specific scale. Rather than create one or two products that are capable of "acceptable" performance over a broad range of applications, EAW engineers have optimized each VA system to solve a relatively narrow set of problems as completely as current technology allows.

COMPLEX INTEGRATED SYSTEMS

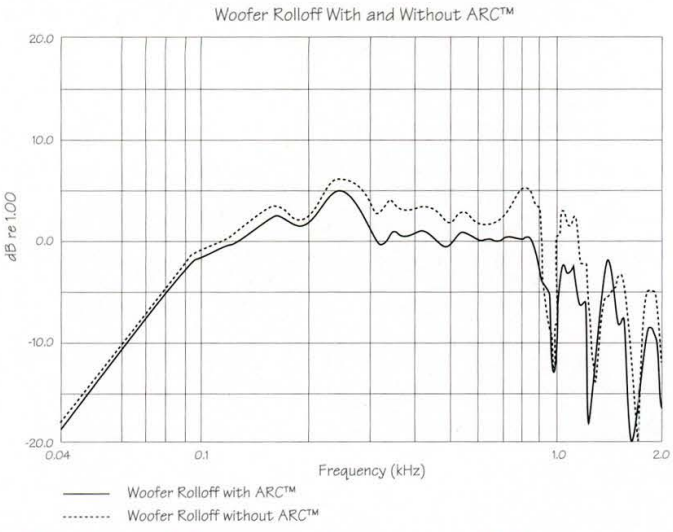
One look inside a KF300isR *(see left)* shows the gulf that separates VA engineering from typical "drivers in a box" design. Enclosure and sub-enclosures, transducers, air-coupling techniques, crossovers, electronics, hardware – every aspect of the total loudspeaker system has been optimized to perform superbly within a defined range and scale of applications. Of course, complexity is not an end, merely a means. Our constant goal is to realize the revolutionary objective put forward by Kenton G. Forsythe twenty years ago: loudspeaker systems that deliver consistent arrayability, exceptional efficiency and maximum output with minimum distortion.



Energy vs. Time graph shows how reflections from the woofer cavity can blur the transient response of the HF horn/driver.



The ARC device absorbs the refracted/reflected HF energy, allowing transient detail to emerge with total clarity.



Above the woofer's crossover frequency, the ARC acoustical filter absorbs cone distortion products that neither passive nor active crossovers can eliminate.

SYSTEMS OPTIMIZED FOR DIVERSE APPLICATIONS

The KF600 Series is the most versatile expression of VA design principles, with four full range systems. The KF650is produces 60° horizontal and 40° vertical dispersion, using a specially-designed 1000 Watt (AES) 15 in. woofer, a 10 in. midrange cone, and EAW's CD5001 2 in. exit compression driver. For wider coverage applications, the KF695is integrates the same transducers with an enclosure and horn flares optimized for 90° horizontal dispersion. The KF600i and KF691i offer 60° and 90° coverage respectively with a 1 in. exit HF driver and a 600 Watt low frequency section. Compatible SB Series subwoofers, including the SB600, SB625 and SB250, extend full power bandwidth to 31 Hz.

POWERING CONFIGURATIONS

A switch on the input panel allows the KF650is and KF695is to be operated in either bi-amp or tri-amp mode. The standard KF600i and KF691i are tri-amp only – special order bi-amp (ix) and full range passive (ifx) versions are also available. EAW MX Series CCEP™ crossovers are factory-set to operate specific KF600 Series systems in bi-amp or tri-amp mode, with or without subwoofers. Asymmetrically sloped fourth order crossover filters, phase compensation, overload protection and CD horn EQ are all optimized for particular system combinations.

HARDWARE CONFIGURATIONS

KF600 Series systems are constructed of void-free 18-ply Baltic birch, with a foam-backed vinyl coated perforated steel grill. Any model or powering configuration can be ordered with R ("Road") hardware, including recessed handles, caster pallet mounting hardware, multi-pin connectors, and three aircraft-style flying points top and bottom. P (Permanent) systems are configured for permanent installation, without handles or caster mounts, with heavy-duty barrier strip input connectors, and with reinforced hanging attachment points top and bottom.

EAW MX Series Closely Coupled Electronic Processors™ are preset at the factory for specific Virtual Array Series systems.

WEATHERPROOFING

For long term reliability in outdoor use, all Virtual Array Series systems may be specially ordered in WP ("weather-proof") versions, with a moisture sealed interior, special adhesives, fiberglass exterior and a 10,000 square-per-inch stainless steel mesh water vapor barrier screen, which has proven to be acoustically transparent in tests.

KF300is
Compact VA System

The trapezoidal SB330 is designed to array seamlessly with two KF300is full range systems.

SMALL FOOTPRINT, BIG IDEA

When the KF300 was introduced in 1989, a true three-way system with horn-loaded mid- and high-frequency sections, in an enclosure under 3 cubic feet, was unheard of. Today, Kenton Forsythe's revolutionary concept can be heard in prestigious concert halls, Broadway theaters and in corporate events around the world. Its compact footprint is the same as conventional two-way designs. Yet it delivers all the benefits of true three-way VA design: higher output, lower distortion, consistent pattern control and true arrayability.

UNCOLORED MIDRANGE

In the typical two-way compact system, the crossover point is located right in the middle of the vocal range. Unfortunately, this is where the ear is most sensitive to the problems caused by this awkward arrangement: phase-response anomalies in the transition region, power response peaks and dips (that can't be equalized away), excessive distortion. The KF300is avoids all of these shortcomings by reproducing the entire midband with a single carbon fiber 6.5" cone, loaded with EAW's unique horn flare/displacement plug design.

UNPROCESSED SOUND

HF drivers in two-way compact systems operate below their optimum range, requiring active electronic protection. The true three-way KF300is doesn't need sophisticated dynamic effects, or any active electronics – it provides better performance in full range passive mode than comparably-sized "active only" systems. It can also be bi-amplified with a Closely Coupled Electronic Processor providing complex fourth-order crossovers, CD horn equalization, phase compensation and band-specific limiting to prevent amplifier clipping. In either mode, sound character remains consistent up to the maximum output level of 128 dB SPL.

ROBUST LOW FREQUENCY OUTPUT

The purpose-designed 12" woofer has a flat wire wound voice coil and massive, optimally aligned magnet structures. A bi-vented low frequency subenclosure further enhances this driver's exceptional efficiency and produces flat frequency response from 60 – 18,000 Hz. This surprisingly deep bass response allows the KF300is to be used as a full range system in many applications.

The Star Theater at the Debbie Reynolds Hollywood Hotel in Las Vegas uses a KF300i/SB330 array as the center cluster between two EAW MH662/BV535i arrays.

ARRAYABLE SUBWOOFER SYSTEM

The SB330 Virtual Array Subwoofer is specifically designed to form horizontal arrays with a pair of KF300is full range systems. It extends full power bandwidth to below 35 Hz. In addition, the trapezoidal enclosure has been designed to match the horizontal coverage angles of the KF300is mid- and high-frequency horns.

HARDWARE CONFIGURATIONS

The KF300isR ("Road") configuration is designed for portable applications, with recessed handles, integral stand mount, multi-pin connectors and three aircraft-style hanging points top and bottom. For fixed installations, the KF300isP ("Permanent") version is available without handles or stand mount, with heavy-duty barrier strip connectors, and with top and bottom reinforced hanging points. Both configurations include a vinyl-coated perforated steel grill. "Weatherproof" WP configurations are available on special order (see previous page for details).

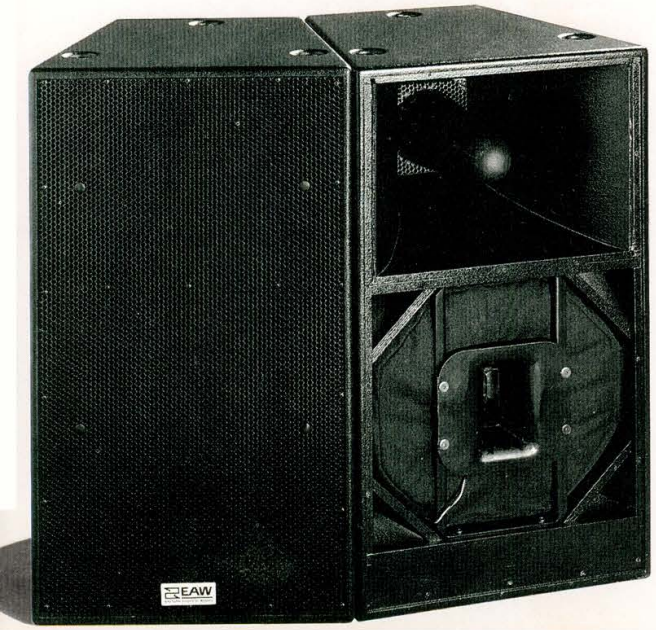
DIRECTIVITY, EFFICIENCY, ARRAYABILITY

The KF600 Series is designed to minimize system size and weight without sacrificing concert-level performance. All four 600 Series systems are centered on the foam-reinforced 3 mm hardwood ply midbass horn flare with displacement plug developed by Kenton G. Forsythe.

The horn-loaded 10" midbass cone is complemented by a 15" woofer, recessed in a vented wave guide cavity, and a ferrofluid-damped 2" compression driver on a CD horn. The KF600 Series achieves ±2.5 dB on-axis response from 75 – 20,000 Hz. The system's power response is equally linear, with tightly defined horizontal coverage over a wide frequency spectrum. This minimizes interference between adjacent systems in horizontal arrays. The KF600 Series includes both 60° and 90° modules, making it easy to design arrays that are precisely tailored to the venue.

TRUE THREE-WAY DESIGN

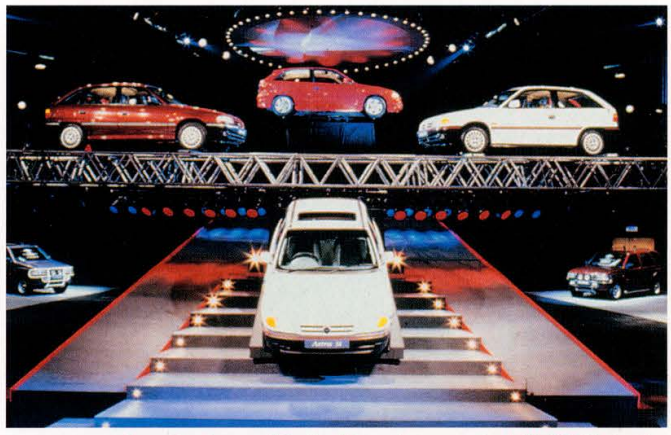
All VA systems are true three-way designs with a horn-loaded midrange subsystem covering the entire vocal range. As a result, they exhibit both significantly lower distortion and more effective pattern control than either two-way systems or quasi-three-way systems with supertweeters or subwoofers added on above or below the basic two-way design.



The KF650is incorporates EAW's latest design innovations, including a proprietary 2" compression driver and the patent-pending ARC Acoustic Refraction Control device.

COMPACT HIGH PERFORMANCE SYSTEMS

The KF650is's peak output is over 132 dB SPL. Yet its enclosure measures only 33.25 in. high, 19.75 in. wide and 19.75 in. deep. A 5,000 Watt system of four KF650is's and four SB600's can easily be transported in a minivan.



London-based Delta Sound concealed KF600i's in the set for this high-impact launch of the Ford Astra.

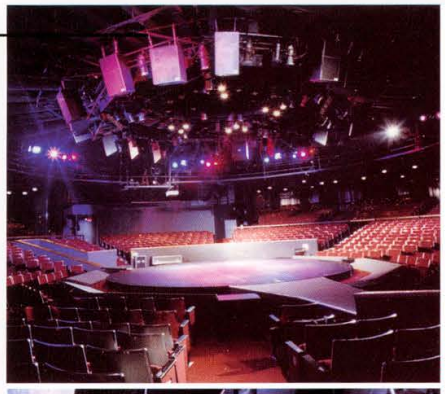
PATENT-PENDING ARC™ TECHNOLOGY

EAW engineers developed Acoustic Refraction Control Technology to enhance transient response and upper octave clarity. The ARC™ device is an acoustically absorbent material contained in an acoustically transparent shell. It is mounted in the woofer cavity directly behind the HF horn. Refracted energy from the HF subsystem is trapped in the material, eliminating unwanted reflections from the woofer and its cavity. The upper octaves become audibly more "transparent."

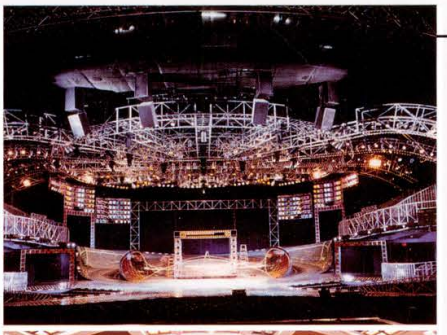
Since all of the ARC device's absorption occurs above the woofer's crossover point, outside its operating band, woofer linearity is also enhanced. Woofer cone distortion harmonics cannot be eliminated by active or passive crossovers, but they are acoustically filtered by the ARC device. ARC technology is the subject of a pending patent application.

Virtual Array Series
Advanced Multimedia Applications

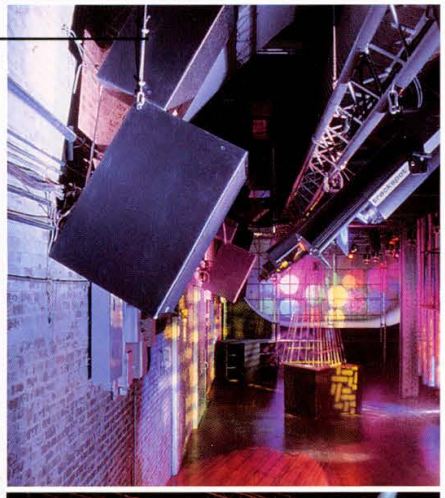
COVER
KF600i/KF691i Array in Boettcher Concert Hall, Denver Performing Arts Center. David L. Adams Associates



Stiver AudioVisual found that the consistent wide-range pattern control of the KF600i facilitated a successful design for Phoenix, AZ's Celebrity Theater.



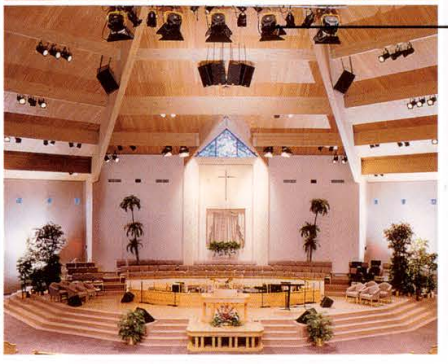
KF300is fill coverage complements the main KF850 VA system in the Las Vegas Hilton's production of *Starlight Express*. Gordon Carmichael, sound designer. Steve Rypka, Technical Director. Specialized Audio Visual, contractor.



Tunnel, part of Manhattan impresario Peter Gatien's after-dark empire, excites its dance floor with KF650is's and SB850's as well as BH882's. Full Tilt Productions, designer. AST Sound, contractor.

The Morton H. Meyerson Symphony Center, Dallas, TX, widely regarded as America's best classical hall. A KF300i cluster descends from the ceiling for "pops" concerts. Dallas Backup, contractor.

Steve Canyon Kennedy chose VA systems such as the KF300is for the Broadway and touring productions of *The Who's Tommy*. Masque Sound & Recording Corporation, contractor.



KF300i's are used for music and speech reinforcement in the main sanctuary of Brownsville Assembly of God, Pensacola, FL. All Pro Sound, designer/installer.

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