

New Directions In Loudspeaker Design

IC² (IC Squared) digitally steerable loudspeaker modules and arrays provide an elegant solution to long standing acoustical problems by combining the advantages of point source design with the control and flexibility of digitally steered array technology. Individual driver control maximizes the acoustical advantages of this design. The result is unsurpassed vertical pattern control – essential for delivering intelligible speech in reverberant spaces. IC Squared beams can be steered up or down while the stack or array remains vertical.

IC Squared arrays are powerful and versatile. Their four 8-inch audiophile quality low frequency transducers and four 1-inch throat Titanium Nitride coated HF drivers produce surprisingly high sound levels. The array modules can be used as a stand alone high performance loudspeaker, in small arrays when additional control and output are needed or flown in large multi-cabinet arrays when even more output and control are needed.

IC²-FR loudspeaker modules are designed for permanent installations and include integral flying hardware.

Transparent Solutions

- Sports Arenas
- Band Shells
- Performing Arts Centers
- Houses of Worship.
- Museums: lobbies, galleries, etc.
- Stadiums
- Any environment where enjoyable music and/or intelligible speech are critical

Adaptable, Invisible

Digital beam steering puts the output of IC²-FR arrays where it belongs: on the audience, not walls or ceilings. Computer software lets you shape the array's output and aim it up or down. Meanwhile, the line array can be dead hung or mounted flat against the wall. There is no need to alter the array's straight line shape or to mount it away from the wall where it interferes with sight lines.

Powerful, Accurate, Musical

Iconyx transparent technology controls sound with DSP intelligence, not cumbersome brute-force techniques. Multi-channel class D digital amplifiers with Integral DSP engines control every single array element with programmable precision.

Portable, Scalable, Versatile

Iconyx IC²-FR arrays are engineered for permanent installations with a hardware system that makes installation simple. When full range musical output is important to the program, matching dual 12-inch subwoofers can be added to the stack or array.

One-Touch Presets, Intuitive Software



RHAON empowered IC²-FR arrays also provide a full set of remote control and supervision functions, along with the ability to store up to ten preset configurations in memory. The presets adapt the arrays coverage for different events and audience sizes. For more complex situations, Iconyx BeamWare software makes it easy to shape the array's coverage to the audience area.

Digitally Steerable Line Arrays



IC²-FR

 (IC Squared - FR)


Digitally Steerable Array Technology

Provides computer control of a vertical array's sonic output, eliminating the need for curved and "J" arrays.

Self-Powered

Integral DSP controlled, 8-channel class D digital amplifiers provide 60 Hz to 20 kHz performance.

Powerful

131 dB peak SPL from a single cabinet - and even higher levels from multi-cabinet arrays.

Great Versatility

Use as a stand-alone loudspeaker or as a line array module in ground stacked or flown line arrays.

Advanced Transducers

Audiophile quality transducers provide outstanding performance.

Natural Speech, Enjoyable Music - Anywhere



IC²-FR dual stack with dual subwoofers

"Up close and personal" communication happens when sound arriving directly from the source, whether it's a live person or a loudspeaker, is much louder than sound that's reflected off the walls, windows, floor and ceiling. As you move farther away from the loudspeaker the direct sound loses volume faster than the reflected sound. In very reverberant spaces, it can be hard to understand someone speaking in a normal tone of voice more than a couple of arms lengths away.

IC²-FR arrays produce tightly focused, precisely aimed beams of acoustic energy that retain their intensity over long distances. Because most of the highly directional sound from an IC²-FR array is focused on the listeners, very little is left to bounce around the room and confuse the ears. That's how IC²-FR arrays let you sit hundreds of feet away from the speaker or musicians and still hear words and music as if they were right "in your face".

Many venues need the energy and excitement of live music as well as clear communication via the spoken word. IC Squared excels in both roles, with a unique combination of precise control and abundant acoustical power. Each IC²-FR module has 2000 Watts of pure digital amplification. To turn electrical power into accurate, natural, exciting sound, IC²-FR uses four 8-inch cone drivers with high-energy magnets along with four 1-inch exit Titanium Nitrate HF drivers with neodymium magnets for superior efficiency.



IC²-FR four module line array

With its highly efficient amplifiers, advanced transducers and precisely focused output, IC²-FR arrays produce impressive peak SPL levels and project the energy throughout the entire listening area, with intimate detail and exciting impact.

IC²-FR uses complex software and individual DSP control over each array element to focus sound without bulky horns or boxes that block sight lines. IC²-FR digitally controlled arrays give you the power, accuracy and flexibility to handle reverberant spaces of all shapes and sizes. Advanced DSP software shapes and aims up to four beams from each module.

IC²-FR array modules can be used alone, stacked one or two high on either one or two of their matching IC212S-FR dual 12-inch subwoofers or flown in large vertical line arrays. Their integral flying hardware supports arrays having as many as 20 cabinets.

Preset array configurations adapt the system to different events and size audiences at the touch of a button..



IC Squared Fly Bar



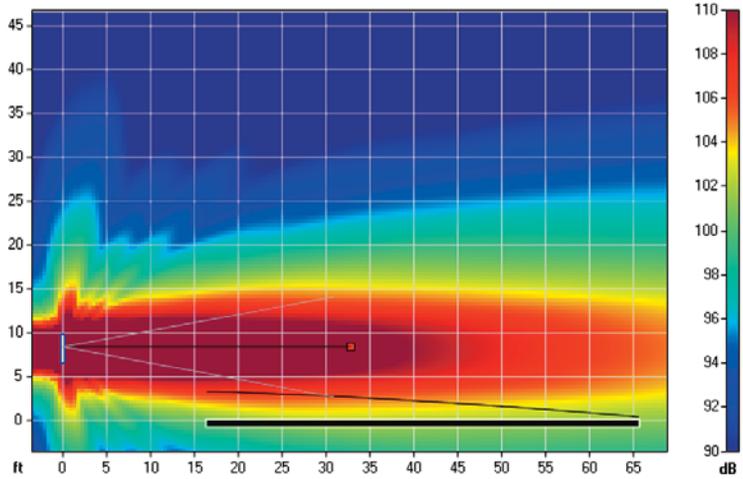
Fly Bar installed on IC²-FR

Powerful Algorithms, Intuitive Interface

The software algorithms that shape and aim the output of an IC² array are complex, but the user interface is intuitively simple. Our BeamWare software, an integral part of RHAON, lets you model the audience area, then drag and drop beams until coverage is optimized. BeamWare then calculates a set of FIR (Finite Infinite Response) filters that control the array 's beams. At installation time, simply download the full set of FIR filters from your computer to the IC Squared modules over the Ethernet network.

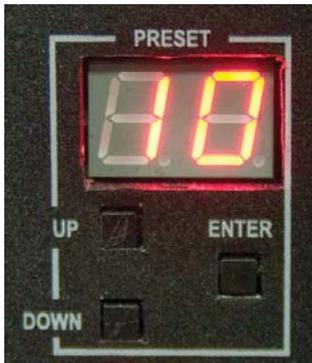
The beams can be easily adjusted from your computer after the IC Squared array is installed.

RHAON also allows you to adjust the output level, EQ, high and low frequency shelving, muting and delay of IC Squared arrays from your computer.



Typical BeamWare display

Multiple Presets, Easy Selection



IC Squared can store up to 10 different configurations in the loudspeakers DSP memory. For example, you might optimize one configuration for small events on the main audience area, and another for larger occasions with listeners in the balcony.

Once the configurations are stored, it's easy to switch from one to another.

Up/Down buttons and a

readout on the rear panel allow an operator to scroll through the available presets. This function can also be performed remotely from the central control computer or by means of a remote control panel if a central computer is not being used.

Advanced DSP Processor / Amplifier

The brain of each IC² module is the 8-channel DSP processor / amplifier developed specifically for Iconyx. It not only performs the complex digital signal processing needed to shape and aim the beams without creating side lobes, but also provided 8 channels of Class D digital amplification. Its audiophile, high-current output section and integral DSP engine control each high-performance coaxial transducer with total precision.

The eight 250 Watts RMS Class D digital amplifiers are lightweight, efficient and cool: no fan noise. Fully regulated switching power supplies operate from 90 to 260 Volts, 50/60 Hz AC.

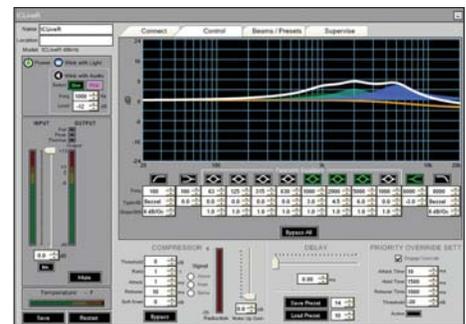
Multiple Input Options

IC Squared arrays offer a variety of input options. Dual analog inputs are standard equipment along with a choice of two digital inputs; either multi-channel digital audio signal distribution via CobraNet over the Ethernet network or a serial AES/EBU digital audio line.

Renkus-Heinz Audio Operations Network

RHAON is the first practical system to combine individual loudspeaker control and supervision of self-powered loudspeaker systems with digital audio distribution. RHAON puts you in total control of:

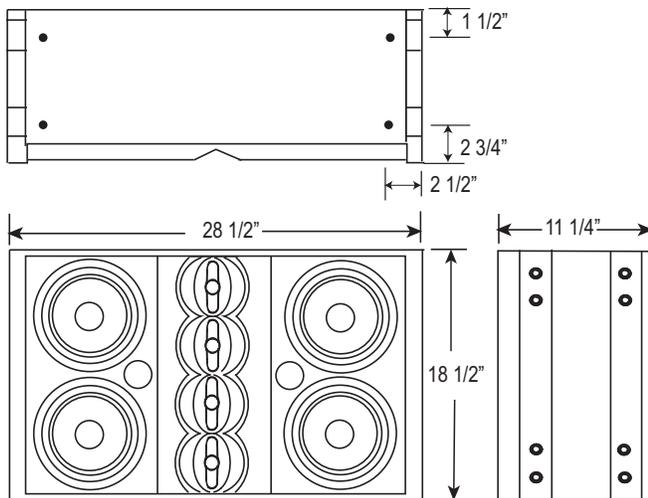
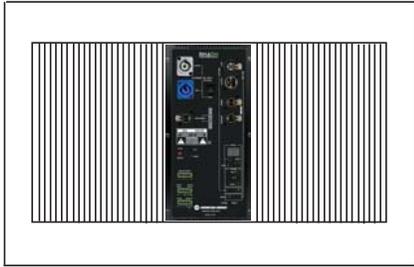
- The shape and aiming of an IC Squared loudspeakers acoustic output.
- A powerful DSP inside each loudspeaker on the Ethernet network that includes eight bands of parametric EQ, high and low frequency shelving filters, input level control, muting and up to 340 ms of delay.
- Monitoring of each loudspeakers critical operating parameters such as signal clipping, amplifier output voltage and current and temperature with automatic alert functions.
- Real time digital audio distribution over standard Ethernet networks using proven CobraNet technology to deliver multiple channels of high quality digital audio over a CAT 5 cable.



Typical RHAON Control window



IC²-FR



IC²-FR Dimensional Drawing

Technical Specifications

- Sensitivity:** 1.0 V (for rated power output)
- Freq. Range:** 60 Hz to 20 kHz
- Max SPL:** 131 dB peak @ 1 meter
(+ 100 dB peak @ 30 meters)
- Horiz. Dispersion:** 120° (90° optional)
- Vert. Opening Angles:** 10° to 80° (computer adjustable)
- Aiming Angle:** adjustable from -30° to +30°
- Beam Control:** Effective down to 800 Hz (Lower when stacked))
- No. Transducers:** Four 8" audiophile quality cone transducers
Four 1" HF titanium nitride compression drivers
- No. Amp. Channels:** 8
- Dimensions:** 18.5" H x 28.5" W x 11.25" D
(47 cm x 72.4 cm x 28.6 cm)
- Weight:** 126 Lbs (58 Kg)
- Power Required:** Universal 90/260 VAC, 50/60Hz. 80 VA Idle;
2000 VA @ rated power output
- Hanging Method:** R-Hang Flying hardware,
Metric #10 attachment points.
- Enclosure:** Finnish Birch with a perforated steel grill
- Inputs:** Analog Audio & AES Inputs: Looping XLR (female in,
male out) and Phoenix 6-pin (looping 3-in, 3-out)
CobraNet: Dual RJ45 connectors (for CAT 5e cable)
- Controls:** Mute button
Up & Down Output Level push buttons
10 dB Input pad (on Analog 1 input)
Push-To-Reset circuit breaker, Preset Selector
- Computer Controls:** Gain, Mute, On/Standby, Input Selection
Compression, 9-Band Parametric EQ,
Shelving & Rolloff Filters, Delay
- Status Indicators:** Power, Signal, Overdrive, Thermal, Mute,
Input Pad, Failure, Digital Readout
- Power Connector:** Powercon locking connector
Finish: Black or white paint
- Network Digital Format:** 16, 20 or 24 bit PCM; 48 or 96 kHz sample rate;
selectable network latency
- DSP/AMPLIFIER Type:** 8-channel, Class D amplifier/DSP processor
- Power Rating:** 250 Watts RMS per channel
- Freq. Range:** + 3, - 3 dB, 60 Hz to 20 kHz
- THD Distortion:** < 0.05% typical
- Hum & Noise:** <100 dB (A weighted)

Note: All analog inputs and outputs comply with AES Standard 45-2005 on interconnecting, grounding and shielding.