

Voice Lift

The BMA 360 FiBeam and DsBeam technologies enable a 12 dB increase in gain before feedback compared to an omni mic.

Voice Lift is further enhanced with the patented DARE™ Feedback Eliminator, found on CONVERGE® Pro 2 DSP Mixers. This technology provides unsurpassed removal of feedback and ringing--giving an additional boost of up to 8 dB to the total system gain.

The amazing sound of FiBeam and DsBeam, combined with the superior CONVERGE Pro 2 Feedback Eliminator, creates the industry's absolute best Voice Lift system provided by any ceiling mounted microphone, including beamforming microphone arrays.

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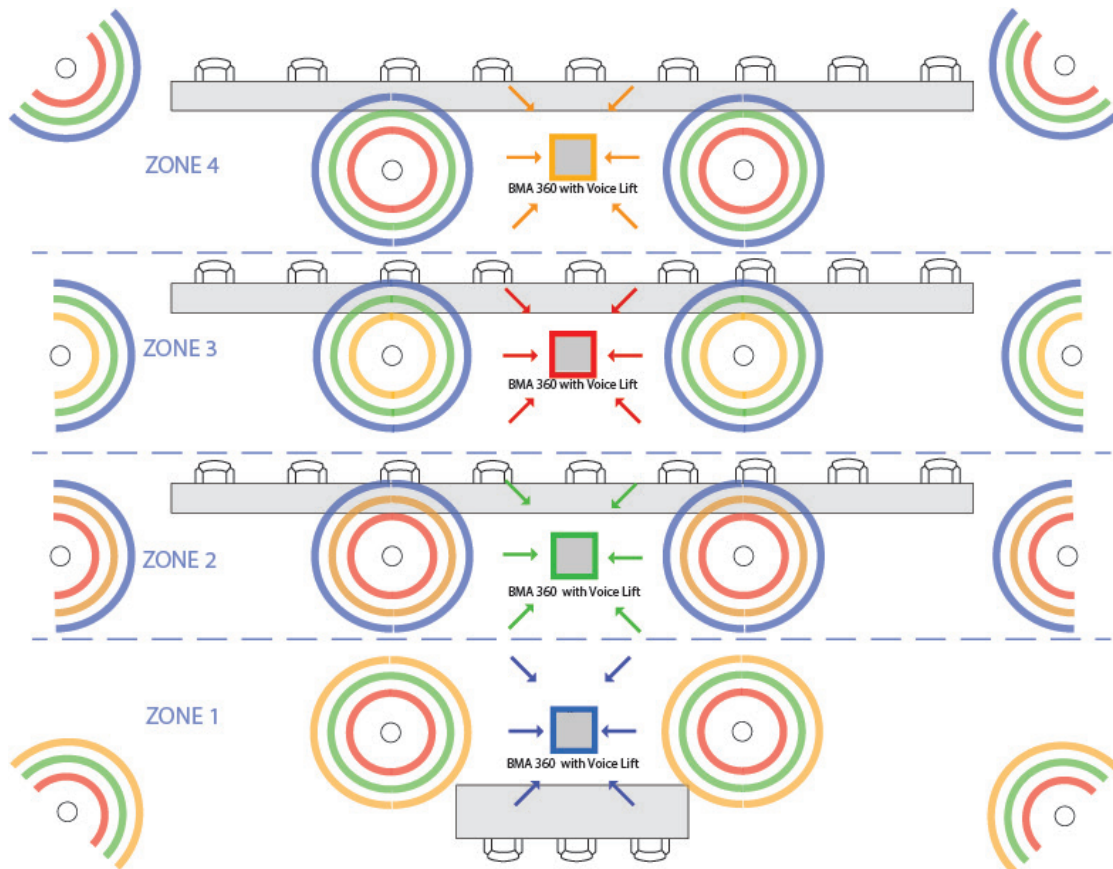
The BMA 360 can switch on as many as two beams at one time, which enables better pickup of local presenters that are speaking at the same time.

To help ensure the very best possible design of a ClearOne Voice Lift system, a BMA 360 Voice Lift Design Guide, a BMA 5&, 3&, HFQHZQFYTW FSI F '2&)&7* (TS)LZWFYNTS ,ZNIJ FWJ F[FNQFG

These supporting documents show how to properly design and setup a BMA 360 Voice Lift system--helping to achieve the very best-sounding installation.

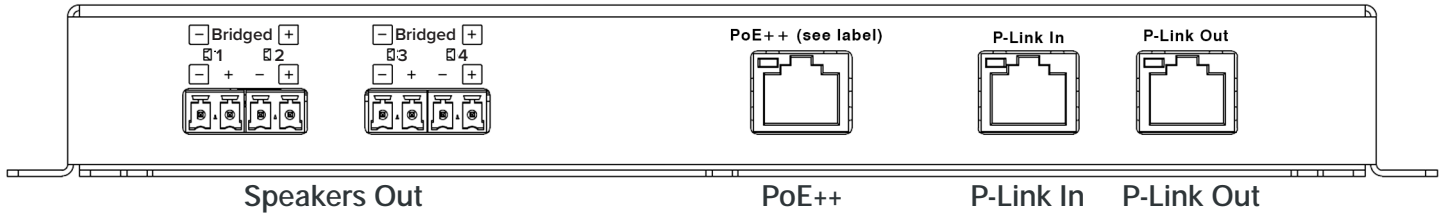
Multi-Zone Voice Lift Example

This example shows that the speaker audio in each zone is the mix of all of the audio minus the audio from that zone. This "mix-minus" audio routing is a key component that enables BMA 360 multi-zone Voice Lift.



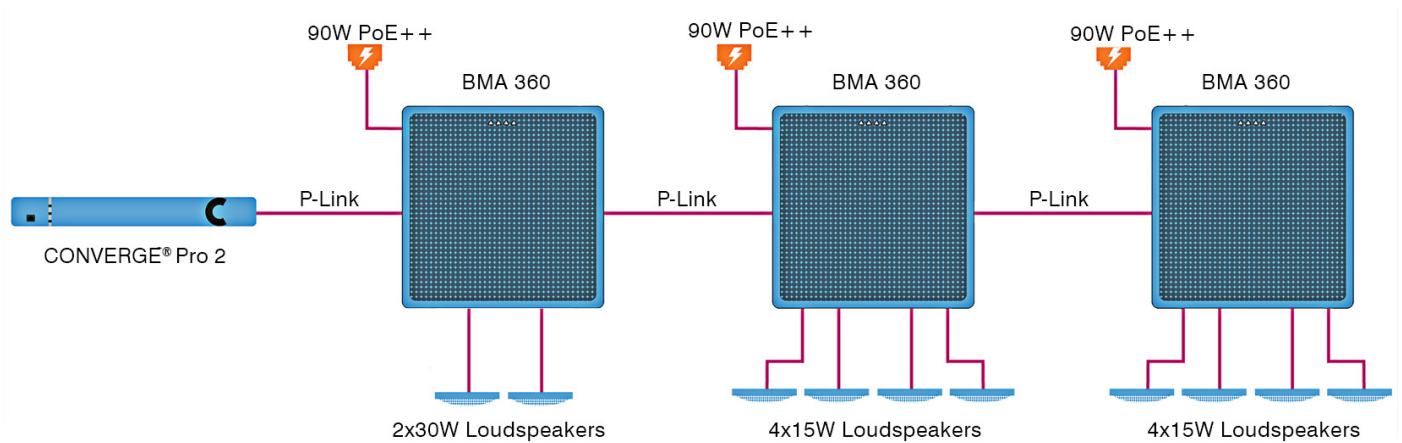
MICROPHONES

Connections



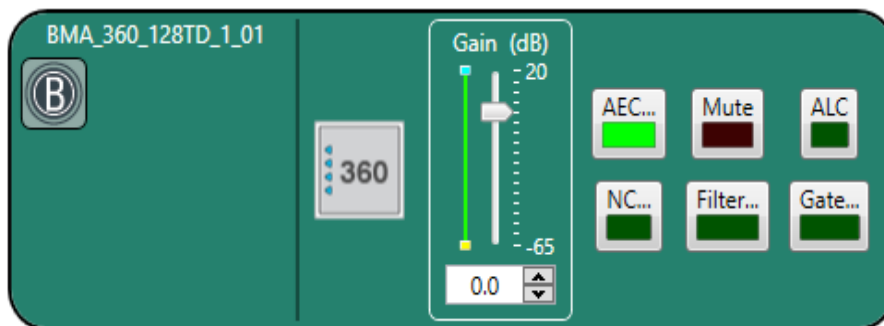
System Diagram

Three daisy-chained BMA 360 microphone arrays, with 2x30W and 4x15W speaker configurations, connected to a CONVERGE Pro 2 DSP.



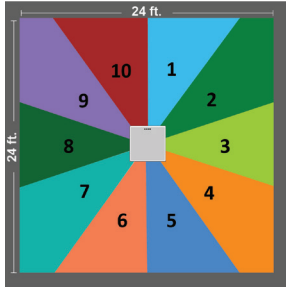
Configuration

BMA 360 Configuration with ClearOne's CONSOLE AI software.



Room Coverage

Full Circle/Square



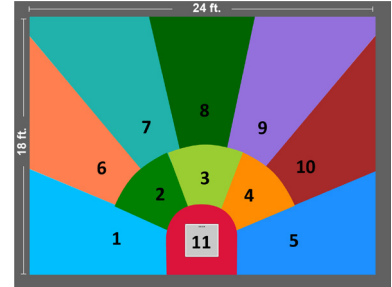
Room size	Beams
10' x 10' to 18' x 18'	6
12' x 12' to 20' x 20'	8
22' x 22' to 24' x 24'	10

Rectangular



Room size	Beams
10' x 14' to 18' x 22'	6
10' x 16' to 18' x 24'	8
12' x 22' to 20' x 36'	12

Semi-Circle/Classroom

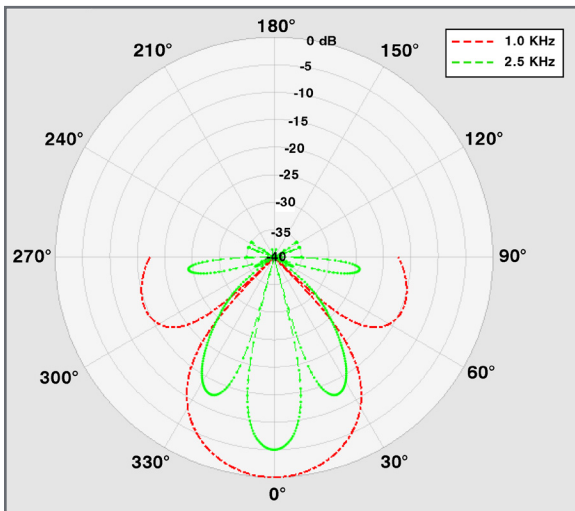


Room size	Beams
16' x 8' to 22' x 16'	6
24' x 18'	11

Note: The example room sizes are based on a 10 ft. ceiling.

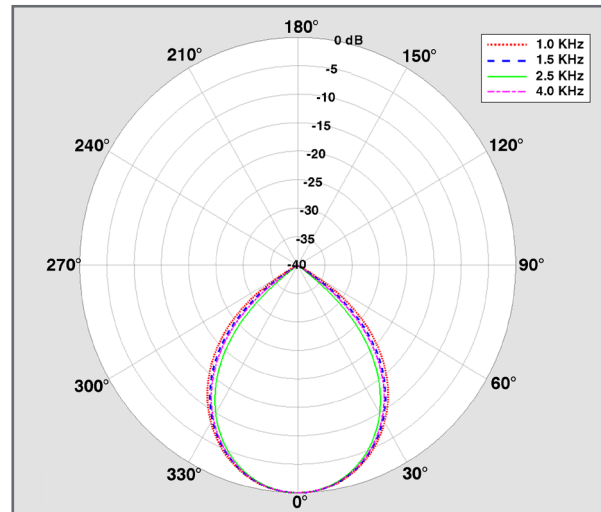
Frequency Invariant and Deep Sidelobe Beamforming

Typical Beamforming



A set of polar plots illustrating a beamformer with gain and coverage that vary with frequency, and that has unwanted large sidelobes.

ClearOne BMA 360 Beamforming with FiBeam and DsBeam



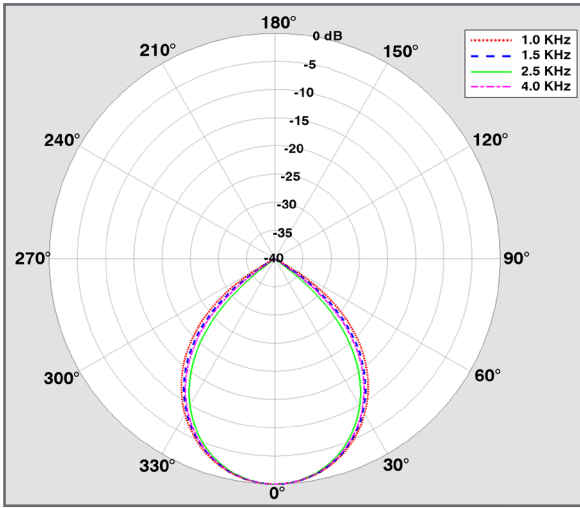
A set of polar plots of the BMA 360 beam performance. These plots show that the pickup pattern is frequency invariant with ultra-low sidelobes below -40 dB.

MICROPHONES

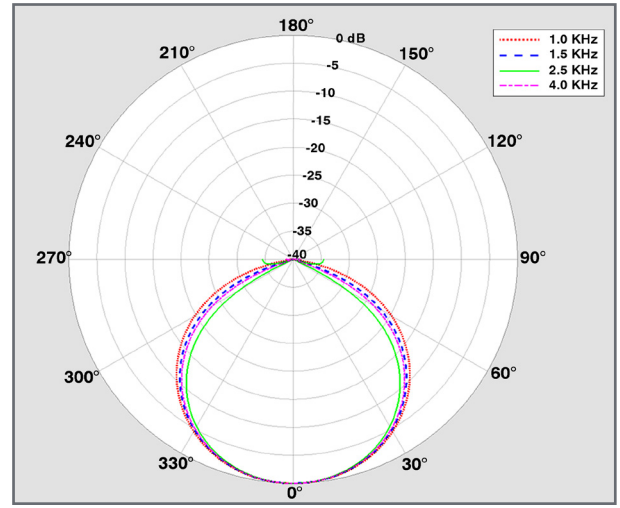
Polar Plots (Broadside)

Typical Far Field Performance

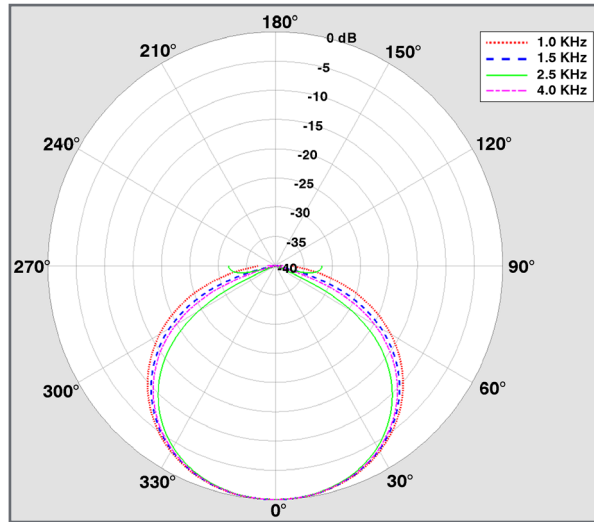
Narrow Beam, HPBW = 35°



Medium Beam, HPBW = 45°



Wide Beam, HPBW = 55°



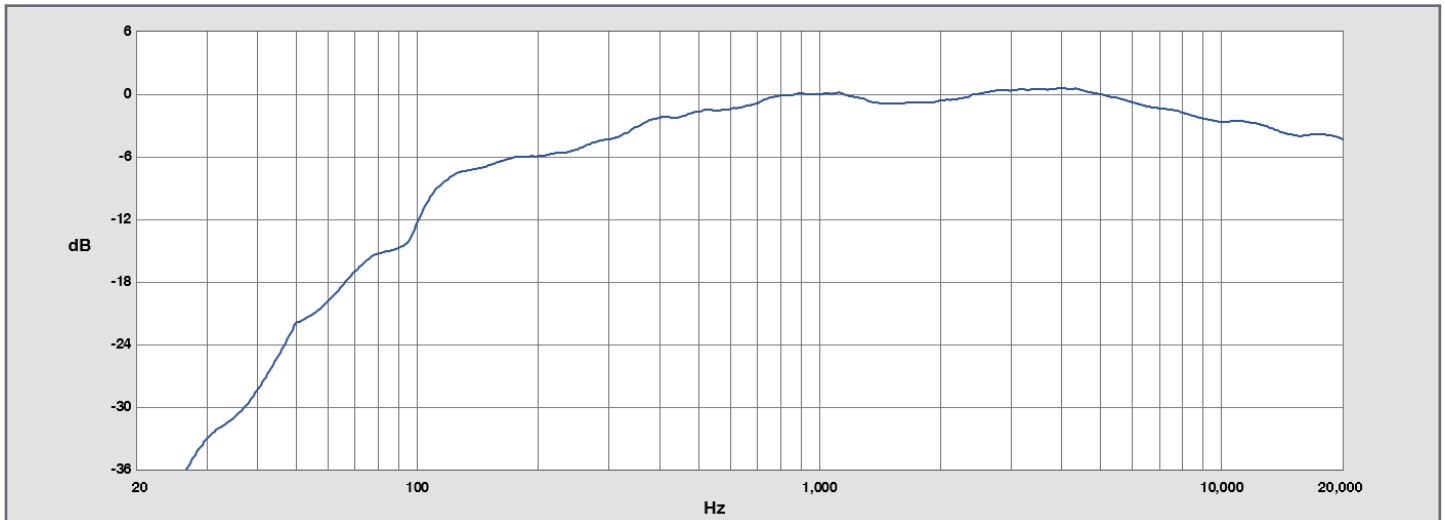
Gain response is frequency invariant for all beamwidths.

HPBW = Half Power Beamwidth

Frequency Response (Broadside)

Typical Frequency Response

Frequency response measured directly on-axis from a distance of 2 meters.



BMA 360

BEAMFORMING FEATURES

- True Frequency Invariant Beamformer: Gain response is unvarying across frequency
- Beamwidths: 35°, 45° and 55° with Frequency Invariance
- Beamforming Range: 100 Hz to 20 KHz
- Deep Sidelobes: Down to 45 dB of depth
- Beam Pointing Accuracy: 0.2 dB
- Dynamic Range: 20 Hz to 20 KHz, > 70 dB
- Number of Beams: 6, 8, 10, 11, or 12
- Room Patterns: Full Circle/Square, Rectangular, Semi-Circle/Classroom
- Coverage Sizes: 24 sizes from small 10 ft x 10 ft up to extra large 36 ft x 20 ft
- Ceiling Height: Configurable with CONSOLE AI from 7 ft to 20 ft

AMPLIFIER OUTPUT

- Type: 5.08 mm Header, Phoenix-type Euroblock
- Audio: 4 channels
- 4 Z Y U Z Y 5 T \ J W] < 2 F] œ Q T F I T W]
- Bridged
- Frequency Response: 20 Hz – 22 kHz, +/- 0.5 dB

CONFIGURATION

- Acoustic Echo Cancellation (AEC) On/Off
- Noise Cancellation (NC) on/off. Range: 6 to 25 dB depth.
- Automatic Level Control (ALC) On/Off
- Gain Adjust
- Mute On/Off

SOFTWARE

- CONSOLE® AI

DIMENSION & WEIGHT

- 24 in: 23.72 x 23.72 x 2.13 in (602.5 x 602.5 x 54.1 mm)
- 600 mm: 592.5 x 592.5 x 54.1 mm (23.33 x 23.33 x 2.13 in)
- Product Weight: 9 lbs (4.1 kg)
- Shipping Weight: 12.85 lbs (5.83 kg)

MOUNTING

- Ceiling Mount: 24 in, 600 & 625 mm drop-ceiling grid
- VESA® Mount ready: 100 mm hole pattern, M4x10 mm

P-LINK PERIPHERAL BUS PORT

- Ports Type: RJ-45
- P-Link In and Out: Proprietary peripheral bus
- P-Link Power

- Cable: Solid core 23AWG, factory terminated Cat6
- Distance
 - Normal distance mode: Up to 200 ft (60 m)
 - Long distance mode: To be supported with a future firmware upgrade.

PoE ++ PORT

- Port Type: RJ45 PoE power
- Power on all pairs
- 56 V 90 W IEEE 802.3bt compliant devices or equivalent, Mode A and B, Midspan
- Cable: Solid core, 23AWG, factory terminated Cat6

PoE REQUIREMENTS

- No speakers: 36 W PoE, connected via P-Link or PoE++
- Speakers: Requires 56 V 90 W IEEE 802.3bt PoE, must be via direct PoE++ port on the BMA 360

POWER SELECTION

- Automatically senses and switches to whichever input port has PoE power

POWER AND THERMAL

- Power Source: PoE injector or equivalent
- Power Consumption:
 - 100-240 VAC, 50/60 Hz
 - 23 Watt typical without speaker amp
 - 55 W at 1/3 power x 4 @ 1kHz
- Thermal: 270 BTU/hr at max power
- Operating Temperature: 14 °F/-10 °C to 104 °F/40 °C ambient temperature

ACCESSORIES

- 910-3200-202 PoE Power supply kit, 36 W
- 910-3200-207 PoE Power supply kit, 70 W
- 910-3200-209 PoE Power supply kit, 90 W
- 910-3200-205-AI Brackets, convert 600 to 625 mm
- 910-3200-208-CB BMA CT Conduit Box

MOUNTS FOR NON-TILE CEILINGS

- 910-3200-210 BMA 360 Surface-Mount Kit 24 in
- 910-3200-210-I BMA 360 Surface-Mount Kit 600 mm
- 910-3200-212 BMA 360 Recessed-Mount Kit 24 in
- 910-3200-212-I BMA 360 Recessed-Mount Kit 600 mm

PART NUMBERS

- 910-3200-208 BMA 360
- 910-3200-208-I BMA 360 INTERNATIONAL

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