ClearOne.

BMA 360

Contents

Important Safety Information

1. Read and follow all instructions.

2. Keep these instructions.

3. Do not use these devices near water.

4. Clean only with dry cloth.

5. Do not block any ventilation openings. Install in accordance with manufacturer instructions.

6. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

7. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

8. Protect the PoE injector's power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

9. Only use attachments/accessories specified by the manufacturer.

10. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

11. Unplug this apparatus during lightning storms or when unused for long periods of time.

12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

13. Disconnect the apparatus from the AC mains with the mains plug. This plug shall remain readily operable.

14. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in fire or electric shock.

15. This product can interfere with electrical equipment such as tape recorders, TV sets, radios, computers and microwave ovens if placed in close proximity.

16. Class 2 Wiring IS REQUIRED. Only qualified personnel should wire and install.

17. Underwriters Laboratories (UL) requires these safety notifications:

Introduction

The patented BMA 360 is the world's most technologically advanced ceiling tile beamforming mic array, delivering unrivaled audio performance and deployment ease.

The world's first truly wideband, frequency invariant beamforming mic array with uniform gain response across all frequency bands. FiBeam™ technology gives users the ultimate in natural and full fidelity audio across all beams and within a single beam.

The BMA 360 features the following:

- Deep Sidelobe Beamforming, DsBeam™, provides unparalleled sidelobe depth, below -40 dB, resulting in superior rejection of reverb and noise in difficult spaces for superb clarity and intelligibility.
- A dramatically new approach to precision beamforming provides a new beam topology to easily achieve distortion-free, full 360-degree coverage of any room shape and any seating arrangement using ClearOne *Audio Intelligence*™.
- Further advancements in adaptive steering (think of it as smart switching) provide impeccable coverage of each conference participant as well as support for camera tracking.
- 6G Acoustic Echo Cancellation (AEC) delivers unparalleled per-beam full-duplex audio performance. On-board audio algorithms, like noise reduction, filtering, and Automatic Level Control, eliminate the need for per-beam processing in a DSP mixer - requiring fewer DSP mixer resources.
- Built-in, robust power amplifiers, configurable as 4 x 15 Watt or 2 x 30 Watt, provide flexibility for driving loudspeakers.
- ClearOne's breakthrough technologies, FiBeam, DsBeam, and 6G AEC combine to create VividVoice™, a significant advancement for professional conferencing.
- Integrated features significantly reduce system design complexity, simplify installation, consume less rack space, and lower system cost.
- Daisy-chain up to three ceiling tiles via P-Link for divisible rooms or larger conference setups – for simpler wiring and longer distances compared to networked "home run" connections via Ethernet.
- Single workflow for configuration using CONSOLE® AI software. Competing products require practitioners to program multiple system components using different toolsets: Ethernet switches, Ceiling Tiles, DSP mixers, and the Dante Controller.
- Supports three different ceiling grid types: 24 in, 600 mm, and 625 mm. It incorporates a VESA-mount hole pattern that supports pole mounting. Hard-ceiling mount adapter kits are also available.
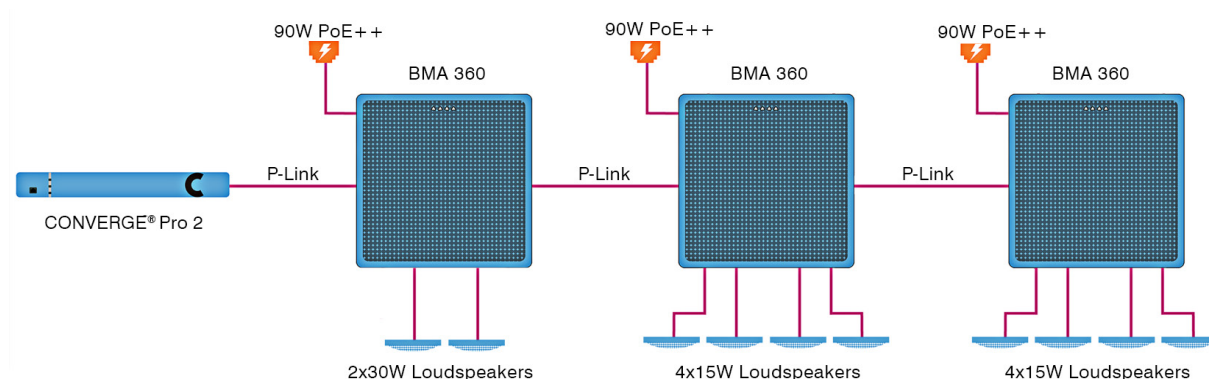
Applications
- Audio conferencing
- Video conferencing

Workspaces
- Conference rooms
- Boardrooms
- Courtrooms
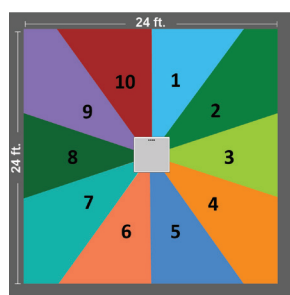- Classrooms
- Telemedicine theaters

System Diagram

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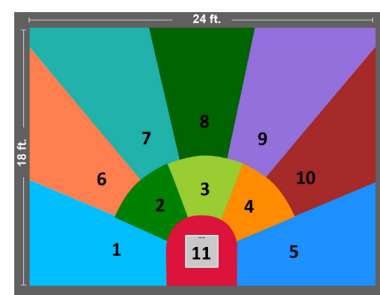

Room Coverage

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.

Deep Sidelobe Beamforming

This polar plot illustrates a beamformer with gain and coverage that varies with frequency.

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.
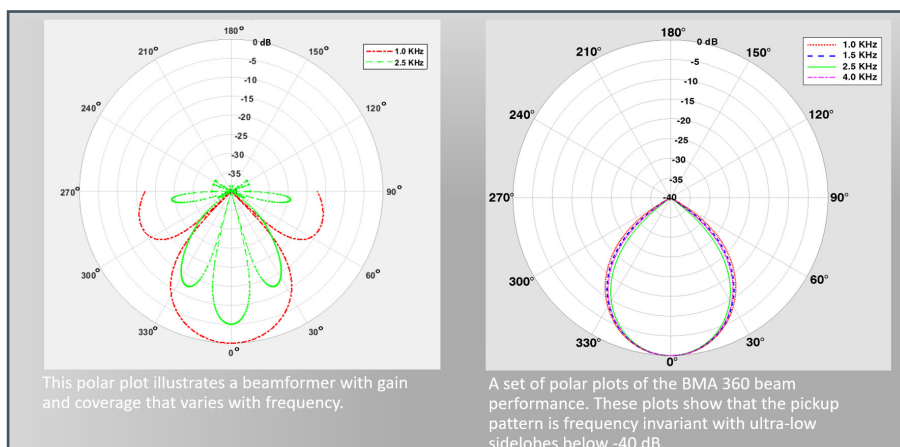
Operating and System Requirements

System Power and Thermal

- Power Source: PoE injector
- Power Consumption:
- 100-240VAC, 50/60 Hz
- 23 Watt typical without speaker amp

- 55W 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.

Supported Operating Systems for CONSOLE AI software

- Windows 8, Windows 10

Minimum System Requirements

- Intel or AMD 6 with 1GHz or higher recommended
- 2GB RAM (or higher recommended)
- 500MB hard disk space (additional space is required to store site files and other project files)
- Administrator permission to install and run the software
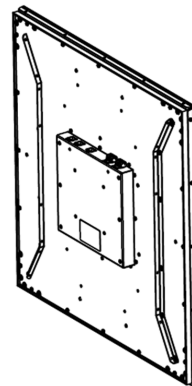
System Part Number

BMA 360: 910-3200-208

BMA 360 INTERNATIONAL: 910-3200-208-I

Setup

Step 1: Unpack the BMA 360

Inspect it carefully. If the shipment shows obvious signs of damage, retain the original box and packing material for inspection by the carrier. **Contact the carrier immediately.** ClearOne is not responsible for product damage incurred during shipment.

Step 2: Install the BMA 360

Connect Speakers

A good time to connect external speakers is before you install the BMA 360 in the ceiling.

With speaker wire (not included), connect external speakers to the Phoenix Euroblock connectors.

⚠️ **Important: Please note the following PoE requirements:**

- No speakers: 36W PoE, connected via P-Link or PoE++
- Speakers: Requires 90W PoE or 70W PoE. Must be connected via direct PoE++ port on the BMA 360.

ClearOne recommends the following PoE power supply kits:

- 36W: ClearOne part number: 910-3200-202
- 70W: ClearOne part number: 910-3200-207
- 90W: ClearOne part number: 910-3200-209

Install the BMA 360 with Seismic Cables

You can mount the BMA 360 in a suspended ceiling, held in place by the standard t-bar grid, with additional 1/8" diameter seismic cables (not included).

For safety, ClearOne recommends attachment at the four points shown.
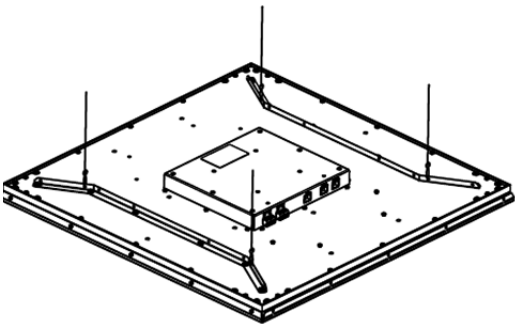
Step 3: Connect the BMA 360

a. Description of Controls and Connection

⚠️ **Warning:**
- Power over Ethernet (PoE) equipment used with a BMA 360 must meet the IEEE 802.3af, 802.3at or 802.3bt standards.
- When speakers are connected, you must provide power via the PoE++ port on the BMA 360.
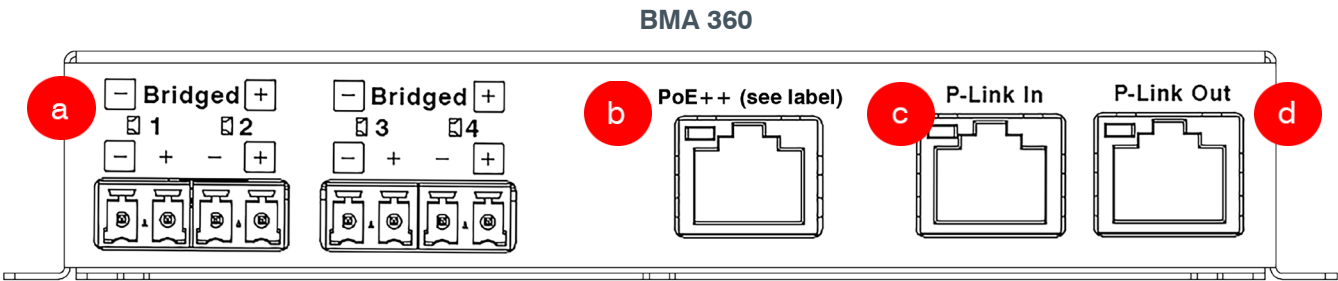
BMA 360

Figure 1. BMA 360 Back Panel

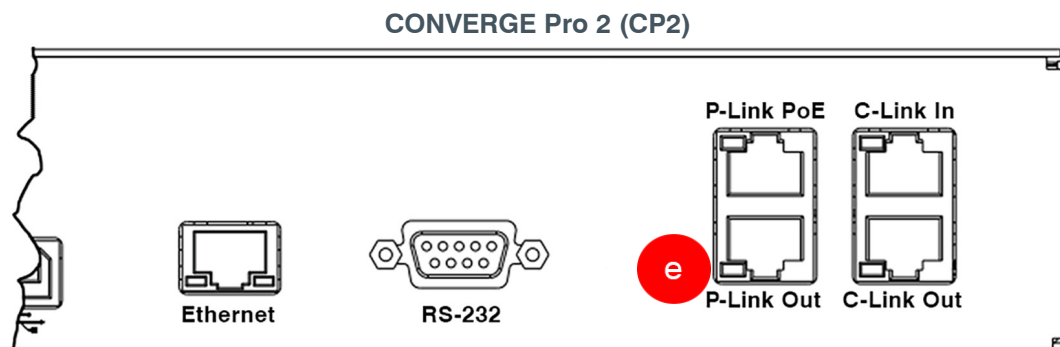|	Description
a	Speakers Out. Four Phoenix Euroblock connectors for external speakers.
b	PoE++: RJ45 connector. Receives up to 90W of power from an external PoE or PoE++ source.
c	P-Link In: RJ45 connector. Receives up to 36W of power, plus audio and control from the CONVERGE Pro 2.
d	P-Link Out: RJ45 connector. Connects to another P-Link device, such as another BMA 360.

CONVERGE Pro 2 (CP2)

Figure 2. CONVERGE Pro 2 Back Panel

Item	Description
e	P-Link Out: RJ45 connector. Connects to the BMA 360.

b. Connect the BMA 360 to Your System

On the BMA 360 back plane, make the following connections:

- If you have not already done so, connect the external speakers to the BMA 360.
- With a CAT6 cable, connect the BMA 360 P-Link In connector to the CP2 P-Link Out connector.
- With a CAT6 cable, connect the BMA 360 PoE++ connector to the PoE injector.
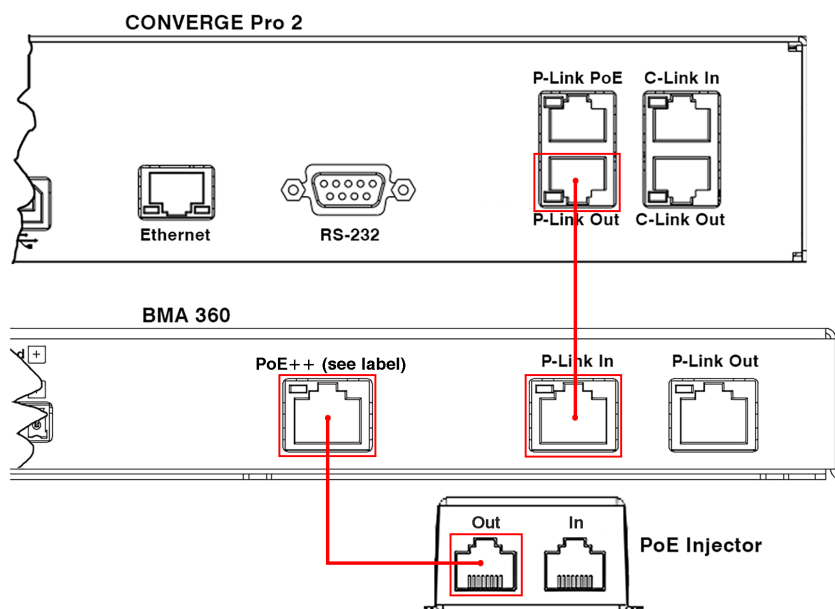
c. Download CONSOLE AI version 7.2.x.x or later, and do the following:

- Follow the directions regarding updates
- Update the BMA 360 firmware
- Add the BMA 360 to the system

Additional information is available in the **_CONSOLE AI User Manual_** at:

www.clearone.com > Support & Training > Resource Library.

Compliance

Details about compliance for the BMA 360 are available online on ClearOne's website (**_www.clearone.com_**) in Support & Training > Resource Library.

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