

AUDIO CONFERENCING

CONVERGE® Pro 2 128

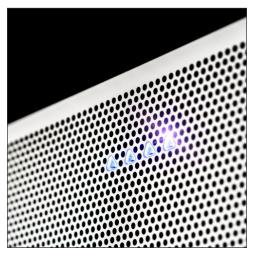


CONVERGE Pro 2 is the industry's most advanced professional audio DSP platform for conferencing and sound reinforcement applications. It outperforms in any size room, audio environment, and application.

- > Built-in Native Camera Tracking for ClearOne Unite cameras and many 3rd party cameras using RS-232 and Ethernet VISCA over IP.
- > 12 mic/line inputs with AEC.
- > Built-in USB for PC-based conferencing.
- > Configure and manage entire system with New CONSOLE® software, Auto-discovery of devices, MatrixView[™] for entire system, FlowView[™] for visualized audio signal paths and System monitoring and troubleshooting.
- > DARE[™] feedback elimination.
- > Advanced microphone gating.
- > Standalone and daisy-chained system.
- > Expansion bus "C-Link" with 150 channels.
- > Stack up units up to 144 Mic/Line inputs.
- > Reduced footprint and power consumption.
- > Next-gen Acoustic Echo Cancellation processing.
- > "P-Link" bus to connect peripheral devices.
- > Flexible control options include Touch-Panel Controller with tabletop and wall mount options, Dialer app for Windows, Mac, iOS, Android, and 3rd party control modules.
- > Acoustic Intelligence with faster convergence.
- > Distributed Echo Cancellation® on every mic input.
- > Noise Cancellation with Adaptive-Ambience.



Everything you need The 128 model mixer has 12 inputs with AEC, 8 outputs, USB audio; GPIO, RS-232, IP control interfaces; and P-Link and C-Link expansion buses.



Easy Integration

Daisy-chain the CONVERGE Pro 2 with the BMA 360, DIALOG[®] 20 2-Channel Wireless Microphone System, and other peripheral devices through P-Link.

APPLICATIONS

- PC-based Conferencing
- Unified Communications
- Sound Reinforcement
- Video codec-based
 Conferencing
- Lecture halls
 Courtrooms
 Telemedicine theaters

WORKSPACES

Training rooms

Conference rooms

- Auditoriums
 - Board rooms
 - Huddle rooms



DSP MIXERS

AUDIO CONFERENCING

CONVERGE® Pro 2 128

PART NUMBER	• 910-3200-001
CAMERA TRACKING	 Supported Cameras: Unite 150, Unite 200, Unite 160, Unite 260 (One Camera per DSP) Communication Protocol: VISCA Communication options: Serial (RS-232) or Ethernet (VISCA over IP)
MIC/LINE INPUTS & OUTPUTS	 Inputs: Balanced audio inputs, 3.81 mm Black color Phoenix/Euroblock type male header, Push-on miniterminal block Outputs: Balanced audio outputs, 3.81 mm Black color Phoenix/Euroblock type male header, Push-on miniterminal block Frequency Response: 20 Hz – 22 kHz @ +4 dBu, +/- 0.5 dBu EIN (Equivalent Input Noise): 20 kHz BW, max gain, Rs = 150 Ω, -126 dBu THD + N (Total Harmonic Distortion + Noise): 20 Hz – 22 kHz @ +4 dBu, line level, 0.006 % 20 Hz – 22 kHz @ -56 dBu, mic level, < 0.04 % Dynamic Range: 20 Hz – 20 kHz @ 0 dB, > 105 dB Crosstalk (Mic/Line): Channel to Channel, stimulus at 20 dBu to receptor at -56 dBu, 1 kHz, < -98 dB Input Impedance: Balanced (line to ground), 2,2 kΩ, 1 % Nominal Input Level: -65 dBu to 20 dBu Phantom Power: 48 V, Impedance 6.81 kΩ Output Impedance: Balanced (line to ground), 95 Ω, 1 % Output Level: 0 dBu (Nominal), 20 dBu (Max), -40 dBu (Selectable)
USB AUDIO	 Port Type: USB-B connector Audio: Digital Audio, 2 x 2 bi-directional channels Sample Rate: 48 kHz Sample Bit Depth: 24-Bit Compatible: USB 2.0, USB 3.0
ETHERNET	 Port Type: RJ-45, 10/100 Mbps Ethernet Network, Auto Negotiation IP address: IPv4 (IPv6 upgradeable through future s/w, f/w upgrade)
C-LINK EXPANSION BUS	 Ports Type: RJ-45 (Cat 5e or Cat 6) C-Link In & Out: Proprietary Expansion Bus Audio: 150 Expansion channels Cable: Solid core, factory terminated Cat 5e or 6 cable Distance: Up to 80 ' (24 M)
P-LINK PERIPHERAL BUS	 Ports Type: RJ-45 (Cat 5e or Cat 6) P-Link In & Out: Proprietary Peripheral Bus PoE In: P-Link In Port PoE 802.3 af Mode B, Midspan Power on "spare pairs" 4, 5 and 7, 8 Input voltage range: 48 V to 56 V Audio: Up to 3 Beamforming Microphone Array 2 units + up to 3 DIALOG 20 Wireless Receiver units + Up to 3 USB Expander units + Up to 3 GPIO Expander units Cable: Solid core, factory terminated Cat 5e or 6 cable Distance: Up to 200' (60 M)
RS-232	 Port Type: DB9 Female Settings: 9600/19200/38400/57600/115200 Baud; Serial Echo; Flow Control Support: Serial commands



DSP MIXERS

AUDIO CONFERENCING

CONVERGE® Pro 2 128

GPIO	 Port Type: 5.08 mm Green color Phoenix/Euroblock type male header Support: Control, Status, Variable Voltage Control Power Pin: 5 VDC @ 350 mA Power Source Pin 1 to 4: Open Collector Outputs: 40 VDC @ 250 mA Active Outputs (Source/Sink): 5 VDC @ 25 mA Logic Inputs: 40.2 kΩ pull up Variable Voltage Control Inputs: 5VDC max Ground Pin: GND
USB CONTROL	 Port Type: USB-B connector Location: Front Panel Compatible: USB 2.0, USB 3.0
LEDs	 Location: Front Panel Status LED: Off: Unit still initializing Blue - Fast Blinking: Stack Syncing in progress Blue - Slow Blinking: Unit not configured Blue - Solid: Configured unit Red - Fast Blinking: Stack Sync error Locate LED: Blue - Blinking: Unit "Locate" command received Power LED: Blue - Solid: Unit is powered on
TOUCH SENSOR	 Sensor Type: Capacitive Touch Button Location: Front Panel
POWER & THERMAL	 Port Type: AC Inlet Mains Voltage: 100-240 VAC, 50/60 Hz Power Consumption: 50 Watts Typical Thermal: 170 BTU/Hr Typical Operating Temperature: 14 °F (-10 °C) to 104 °F (40 °C) Ambient Temperature
DIMENSION & WEIGHT	 RU size: 1 RU Width x Depth x Height: Without rack-ears: 17 x 10.7 x 1.7 " (431 x 273 x 44 mm) With rack-ears: 19 x 10.7 x 1.7 " (483 x 273 x 44 mm) Unit Weight: 9.3 lbs (4.2 Kg) (Approximately)

Shipping Weight: 13.8 lbs (6.3 Kg) (Approximately)





CONVERGE® Pro 2 128

• Power Cord: 6 ' (1.8 M), Grounded, Qty 1

- Input Connectors: Terminal Block Connector, 4 Position (Orange), Qty 12
- Output Connectors: Terminal Block Connector, 3 Position (Black), Qty 8
- GPIO Connector: Terminal Block Connector, 6 Position (Green), Qty 1
- C-Link Cable: RJ-45 To RJ-45 Cable, 18 " (45.7 cm), Qty 1
- USB Cable: USB Type A to Type B, 6 ' (1.8 M), Qty 1
- Rack Ears: Pre-installed, Qty 2
- Screw/Washer Kit: Rack Decor, Qty 4

SALES AND INQUIRIES

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PROFESSIONAL CAMERAS

VISUAL COLLABORATION

UNITE® 160 4K Camera



Professional grade 4K USB PTZ camera for conference rooms, web conferencing UC applications and more.

- > 4K Ultra HD video, 12x optical zoom, capability to capture all participants in the room.
- > Transforms any meeting room into a professional grade video collaboration room.
- > Control the camera's functions via IR remote, RS-232, or UVC protocol.
- Super-high SNR with advanced 2D and 3D noise reduction.
- > Compatible with popular applications such as Zoom, WebEx, Google[®] Meet[™], and more.



Smart Face Tracking or Auto Framing Al processing optionally tracks an individual or frames an entire group for perfect framing and focus.



Multiple Control Options Control the camera via the IR remote, or through UVC and UAC protocols.

APPLICATIONS:

- Camera Tracking for Lecture Capture
- Web Conferencing
- Unified Communications

WORKSPACES:

- Conference Rooms
- Executive Offices
- Training Centers
- Classrooms





PROFESSIONAL CAMERAS

VISUAL COLLABORATION

Different Tracking Modes



Auto Framing

Detects participant or group participants and automatically frames the image.

Smart Face Tracking

Ideal to follow only the person who is moving. The moving person being tracked doesn't have to be the speaker. It is possible to change the person during the connection.



Great Ideas Need to be Seen™

PROFESSIONAL CAMERAS

UNITE® 160 4K Camera

Camera

- Video System:
 - •2160p30
 - •1080p30
 - •1080p25
 - •720p30
 - •720p25
- Sensor: 1/2.5 inch, CMOS
- Effective Pixels: 8.51 Million
- Scanning Mode: Progressive
- •Lens: 12x maximum zoom, Focal length: 4.4 mm -52.8 mm, F1.8 - F2.6
- Minimal Illumination: 0.5 Lux @ (F1.8, AGC ON)
- Shutter: 1/30s 1/10000s
- White Balance: Automatic, indoor, outdoor, onebutton, manual, specified color
- Backlight Compensation: Supported
- Digital Noise Reduction: 2D & 3D
- Video S/N: ≥55dB
- •Horizontal Angle of View: 71°-8.2°
- •Vertical Angle of View: 42.7°-4.5°
- •Horizontal Rotation Range: ±170°
- Vertical Rotation Range: -30° +90°
- •Pan Speed Range: 2.7° 35.7°/s
- Tilt Speed Range: 2.7° 31.5°/s
- •H & V Flip: Supported
- Image Freezing: Supported
- •Number of Presets: 255
- Flexible Installation: Standard mount, upside-down
 mount

Input/Output Interface

- •Audio Interface: 3.5 mm connector, Line In
- •USB Interface: 1 way, USB 3.0, Type C Socket
- •1 x RS232: 8pin Min DIN; Max. Distance: 30 m; Protocol: VISCA/Pelco-D/Pelco-P
- •1 x RS485: 2pin phoenix port; Max. Distance: 1200 m; Protocol: VISCA/Pelco-D/Pelco-P

USB Features

- Operating Systems: Windows 7 and later
- Color System: YUY2 / MJPEG
- USB 2.0: 720P30 maximum NOTE: Use of USB 2.0 downgrades video quality. ClearOne does not recommended USB 2.0 extenders
- •USB Video Communication: UVC 1.1
- •Audio on USB: Supported
- •UVC PTZ: Supported

Power

- Power Jack: JEITA type (DC In 12V)
- Input Voltage: DC 12V
- Current Consumption: 1.0A (max)
- Power Consumption: 12W (max)

Environmental

- Operating Temperature: 14°F–104°F (-10°C 40°C)
- Storage Temperature: -40°F 140°F (-40°C 60°C)
- •MTBF: >30000h

Mechanical

- Dimensions: 5.67" x 5.67" x 6.61" (143.88mm x 144mm x 168.25mm)
- •Weight: 3.5lb (1.6Kg)

Part Number

•910-2100-012

Optional Accessories

- •910-2100-104: Wall Mount for UNITE 150 Camera
- •910-2100-204: Ceiling Mount for UNITE 150 Camera
- •910-3200-702-30: USB 3.0 cable

SALES AND INQUIRIES

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VISUAL COLLABORATION

MICROPHONES

BMA 360



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

- > The industry's only 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.
- > 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[™].
- > The BMA 360 Voice Lift feature provides a powerful and simple way to drive multiple mixminus speaker zones allowing everyone in the local room to hear every word.
- > Due to the exceptional performance of the breakthrough technologies, FiBeam and DsBeam, greater Voice Lift gains can be realized that have not been previously possible.
- > The combination of ClearOne's beamforming and feedback cancellation technologies provide up to a 20 dB boost in gain before feedback compared to an omni mic.
- > Further advancements in adaptive steering (think of it as smart switching) provide impeccable coverage of each conference participant as well as simultaneous support for camera tracking and Voice Lift.

APPLICATIONS

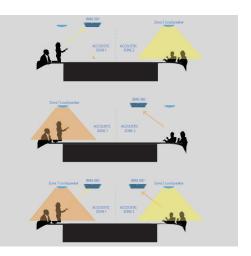
- Audio conferencing
- Video conferencing
- Voice Lift

- > 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, Voice Lift, 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 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.

WORKSPACES

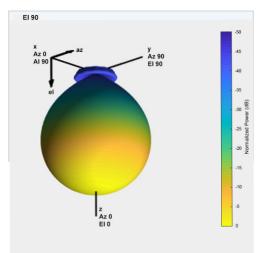
- Conference rooms
- Boardrooms
- Courtrooms
- Classrooms
- Telemedicine theaters

AUDIO CONFERENCING



Voice Lift

Voice Lift provides a powerful and simple way to drive multiple mix-minus speaker zones allowing everyone in the room to hear every word. Due to the exceptional performance of the breakthrough technologies, FiBeam and DsBeam, greater Voice Lift gains can be realized that have not been previously possible.



Deep Sidelobe Beamforming

Deep Sidelobe Beamforming, DsBeam™, provides unparalleled sidelobe depth, below -40 dB, resulting in superior rejection of reverb and noise, even in difficult spaces, for superb clarity and intelligibility.

You're not beanforming unless you're beanforming with ClearOne!™

MICROPHONES

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.

Voice Lift can be configured on up to three BMA 360s per CP2.

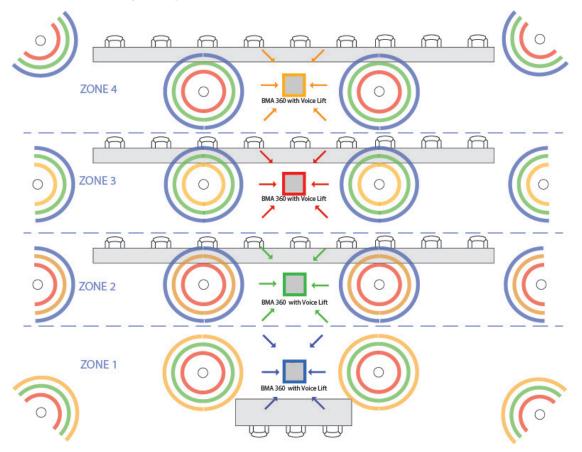
The BMA 360 can switch on as many as two beams at one time, which enables better pickup of local presenters that are speaking at the same time.

To help ensure the very best possible design of a ClearOne Voice Lift system, a BMA 360 Voice Lift Design Guide, a BMA 360 PAG/NAG calculator, and a BMA 360 DARE Configuration Guide are available from clearone.com.

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

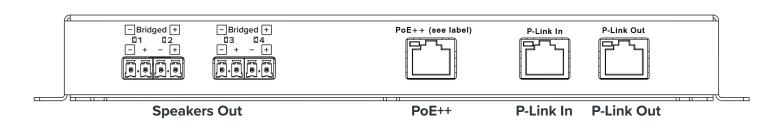
This example shows that the speaker audio in each zone is the mix of all of the audio minus the audio from that zone. This "mix-minus" audio routing is a key component that enables BMA 360 multi-zone Voice Lift.





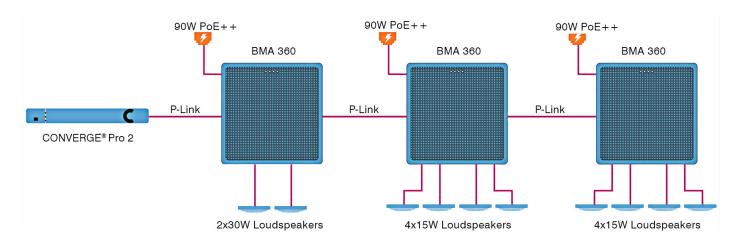
MICROPHONES

Connections



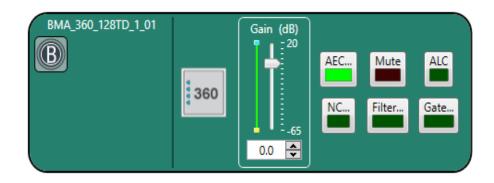
System Diagram

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.



MICROPHONES

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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

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

Rectangular



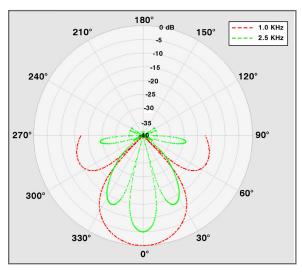
Room size	Beams
10' x 14' to 18' x 22'	6
10' x 16' to 18' x 24'	8
12' x 22' to 20' x 36'	12

Semi-Circle/Classroom



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

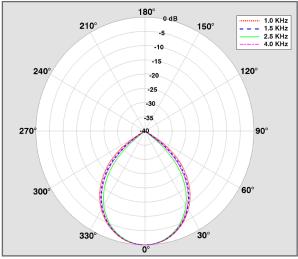
Frequency Invariant and Deep Sidelobe Beamforming



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



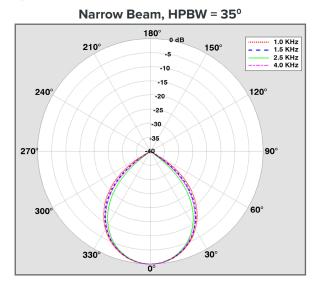
A set of polar plots of the BMA 360 beam performance. These plots show that the pickup pattern is frequency invariant with ultra-low sidelobes below -40 dB.



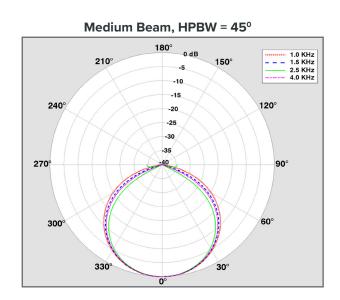
MICROPHONES

Polar Plots (Broadside)

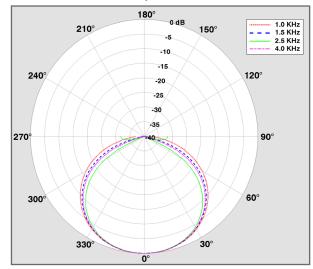
Typical Far Field Performance



AUDIO CONFERENCING



Wide Beam, HPBW = 55°



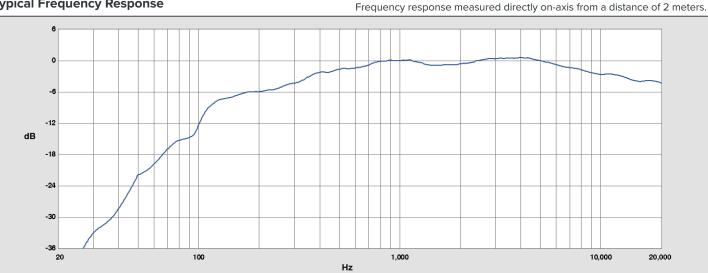
HPBW = Half Power **Beamwidth**

Frequency Response (Broadside)

Typical Frequency Response

Gain response is frequency

invariant for all beamwidths.



MICROPHONES

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
- \bullet 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
- + Output Power: 4x15 W Max, 8 Ω load, or 2x30W, 4 Ω load, 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
- 910-3200-210-1 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

Sales

• 910-3200-208-I BMA 360 INTERNATIONAL

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