

# ***ClearOne***<sup>®</sup>

## **Beamforming Microphone Array**

Group Microphone for Professional Conferencing

## **INSTALLATION GUIDE**



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## **BEAMFORMING MICROPHONE ARRAY INSTALLATION GUIDE**

### **CLEARONE DOCUMENT**

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# Chapter 1: Getting Started

Congratulations on purchasing your Beamforming Microphone Array. The Beamforming Microphone Array is a 24-microphone device with beamforming and adaptive steering technology designed specifically for use with the CONVERGE® Pro products: 880, 840T, 880T, 880TA, and the COLLABORATE Pro media appliances.

The Beamforming Microphone Array connects with the CONVERGE Pro through an Expansion Bus (E-bus) port: 3 arrays per supported CONVERGE Pro and up to 16 Beamforming Microphone Arrays can be daisy-chained in the site. The power for the Beamforming Microphone Array is supplied through a Power-Over-Ethernet (PoE) connection.

The Beamforming Microphone Array supports use in ceiling-mounted and wall mounted modes, leaving the conference room table area free of clutter, as well as a standard table-top mode.

- » **IMPORTANT:** The Beamforming Microphone Array only can be used with CONVERGE Pro systems operating at version 4.X software and firmware or later.

Instructions for updating CONVERGE Pro firmware and Beamforming Microphone Array firmware are included in the Beamforming Microphone Array Quick-Start Guide which is found on the ClearOne website at:

**[http://www.clearone.com/resources#professional\\_microphones](http://www.clearone.com/resources#professional_microphones)**

This guide covers the steps followed to mount the Beamforming Microphone Array in a solid ceiling, drop-ceiling and wall mount. This guide can also be downloaded from the ClearOne website at:

**[http://www.clearone.com/resources#professional\\_microphones](http://www.clearone.com/resources#professional_microphones)**

## SKU'S USED

The following assemblies or kits may be used in the Beamforming Microphone Array installation:

- 910-001-003 (white) or 910-001-003-B (black) Beamforming Microphone Array for CONVERGE Pro or COLLABORATE Room Pro.
- 910-001-004 PoE Power Supply and Cable Kit for Beamforming Microphone Array. Contains power supply, one AC power cable and two 25-foot CAT5E RJ45 plenum cables. (One used as the PoE cable and the other as an E-bus cable) If a PoE kit is not obtained, installers will need to provide their own PoE unit and all cables.
- 910-001-005-12/24/36/48 (white) or 910-001-005-12/24-B (black) Ceiling Mounting Kit with 12/24/36/48" Suspension Column for Beamforming Microphone Array
- 910-001-006 (white) or 910-001-006-B (black) Wall Mounting Kit for Beamforming Microphone Array

## CONNECTIONS

The following section illustrates the connections made in a sample Beamforming Microphone Array installation on a site.

### POWERING THE BEAMFORMING MICROPHONE ARRAY

Powering the Beamforming Microphone Array can be through a standard Power-over-Ethernet (PoE) switch or through an external PoE power supply. Use the appropriate AC cord to connect the PoE power supply to the AC power. Then plug the PoE cable into the LAN+DC connection on the power supply. Route the PoE cable where it can be fed through the ceiling mount assembly, wall mount or to the conference table with the Beamforming Microphone Array. The following illustration shows the cable connections with the PoE Power Supply.

Power Over Ethernet (PoE) Power Supply  
(Front and Back Views)

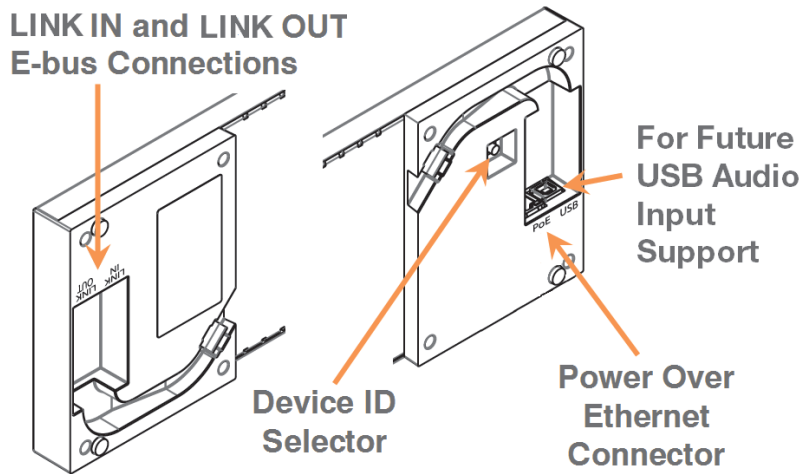


- » NOTE: The PoE connection is only for power, not control. Power must be supplied to individual units; no daisy-chain power is allowed.

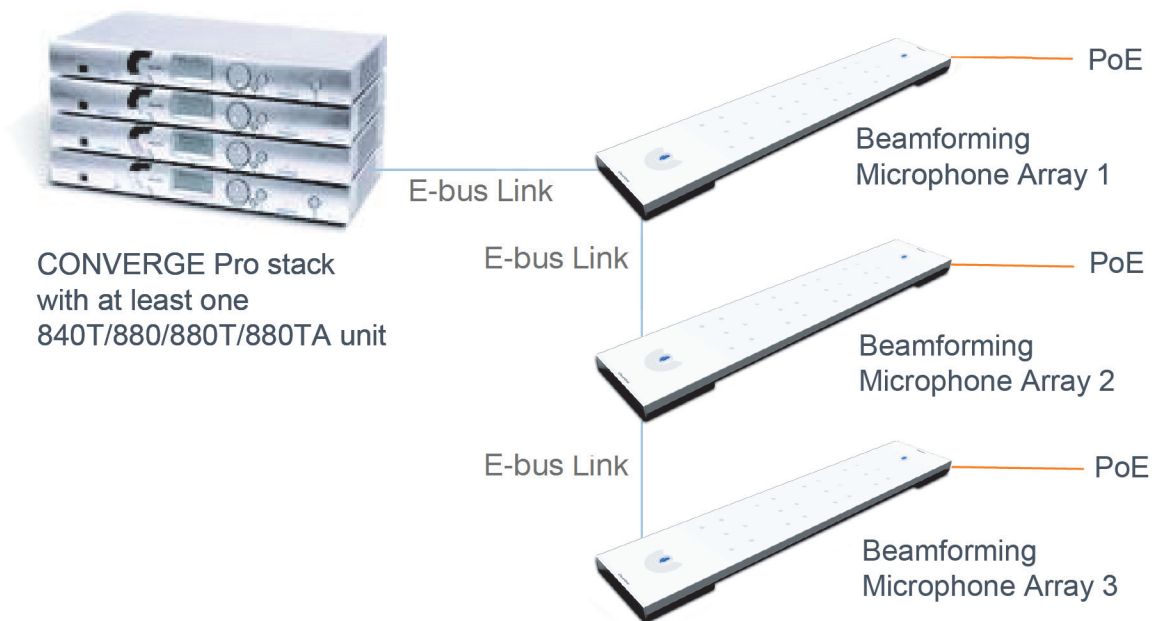
### E-BUS CONNECTIONS

The Beamforming Microphone Array units are connected to the CONVERGE Pro stack via the LINK IN and LINK OUT E-bus connections using CAT5E RJ45 cables.

- » NOTE: Firmware upgrades and Beamforming Microphone Array operation are performed via the E-bus connection. Plugging the PoE cable into the E-bus connections may cause damage to the Beamforming Microphone Array.



- » NOTE: One or two E-bus connections are required depending on where in the stack the Beamforming Microphone Array is placed. Only one E-bus cable, LINK IN, is required if the array is the end of the stack; two are needed if the stack continues to another array or CONVERGE Pro unit (LINK IN and LINK OUT).



The Beamforming Microphone Array is connected to the CONVERGE Pro and to other Beamforming Microphone Array units via the E-bus in the same way as multiple CONVERGE Pro units are connected together. Each unit has a LINK IN and LINK OUT connection which allows the units to be “chained” together with the LINK OUT of one unit connecting to the LINK IN of the next unit.

The steps in connecting the Beamforming Microphone Array are covered in the Beamforming Microphone Array Quick-Start Guide. Instructions for configuring the Beamforming Microphone Array are included in the CONVERGE Console version online help.





## Chapter 2: Ceiling Mount Installation

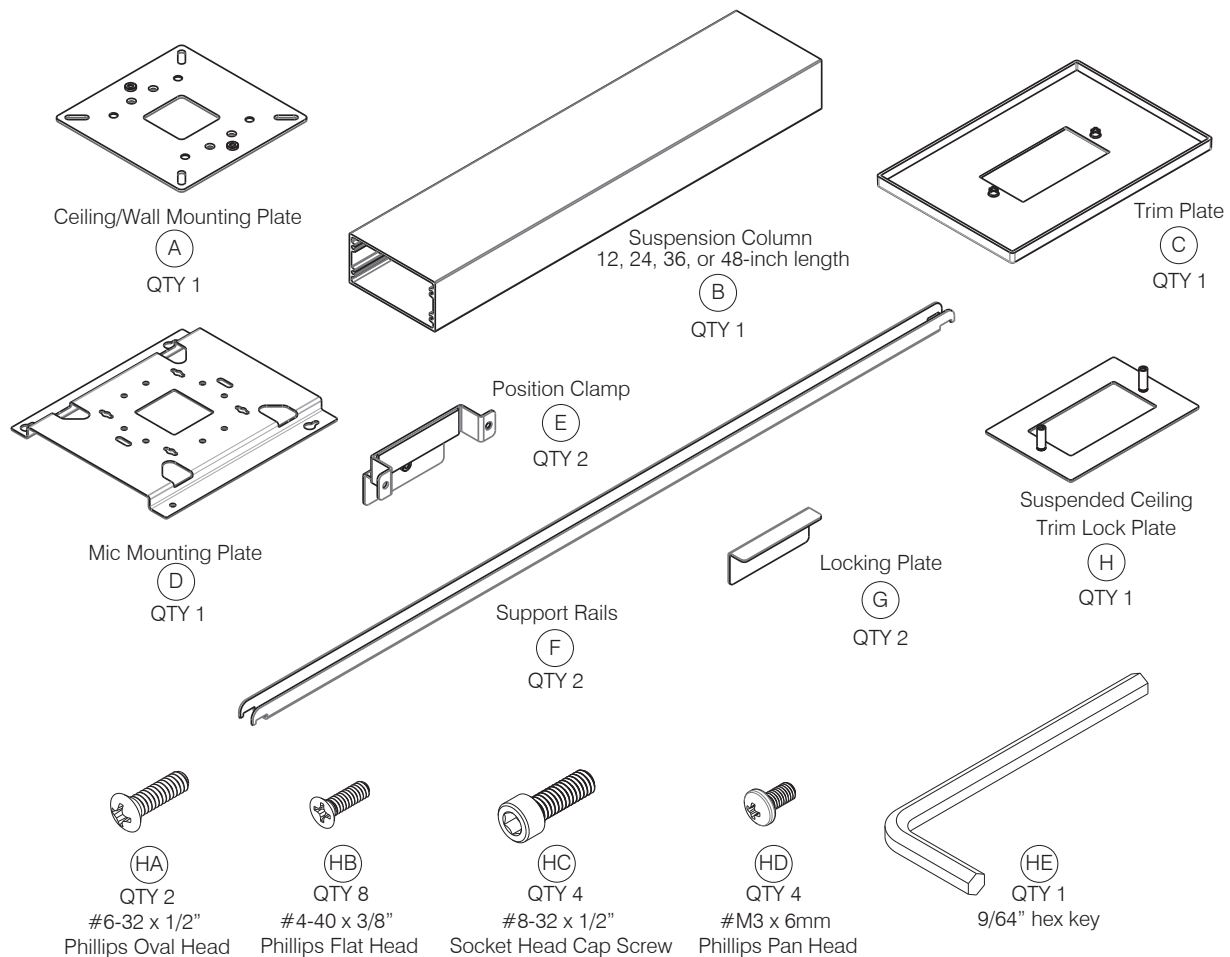
Once you have verified all the firmware updates and necessary connections made while executing the tasks outlined in the Beamforming Microphone Array Quick-Start Guide, you can proceed to the actual installation of the Beamforming Microphone Array using the Ceiling Mounting Kit.

This section details two types of ceiling mounts:

- Mounting to Solid Ceiling or Flush Mounted Junction Box
- Mounting to Suspended Ceiling

### PARTS RECEIVED

The following parts are delivered with the Ceiling Mounting Kit and will be used for installation of the Beamforming Microphone Array.



The parts received include parts for mounting in either a solid or drop-ceiling with or without a junction box. Verify that you have all the parts required to complete your installation.

When you open the shipping package(s) for the first time, please check that all items purchased are included. If any of the items (according to your customer order) are missing or damaged, contact your ClearOne distributor immediately.

## TOOLS REQUIRED

The following tools are required for installation of the Beamforming Microphone Array.



Drywall saw for cutting hole in solid ceiling,

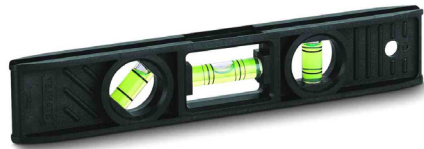


Razor knife for cutting hole in suspended ceiling tile.

#1 Phillips screwdriver.



Electric or portable drill



Level



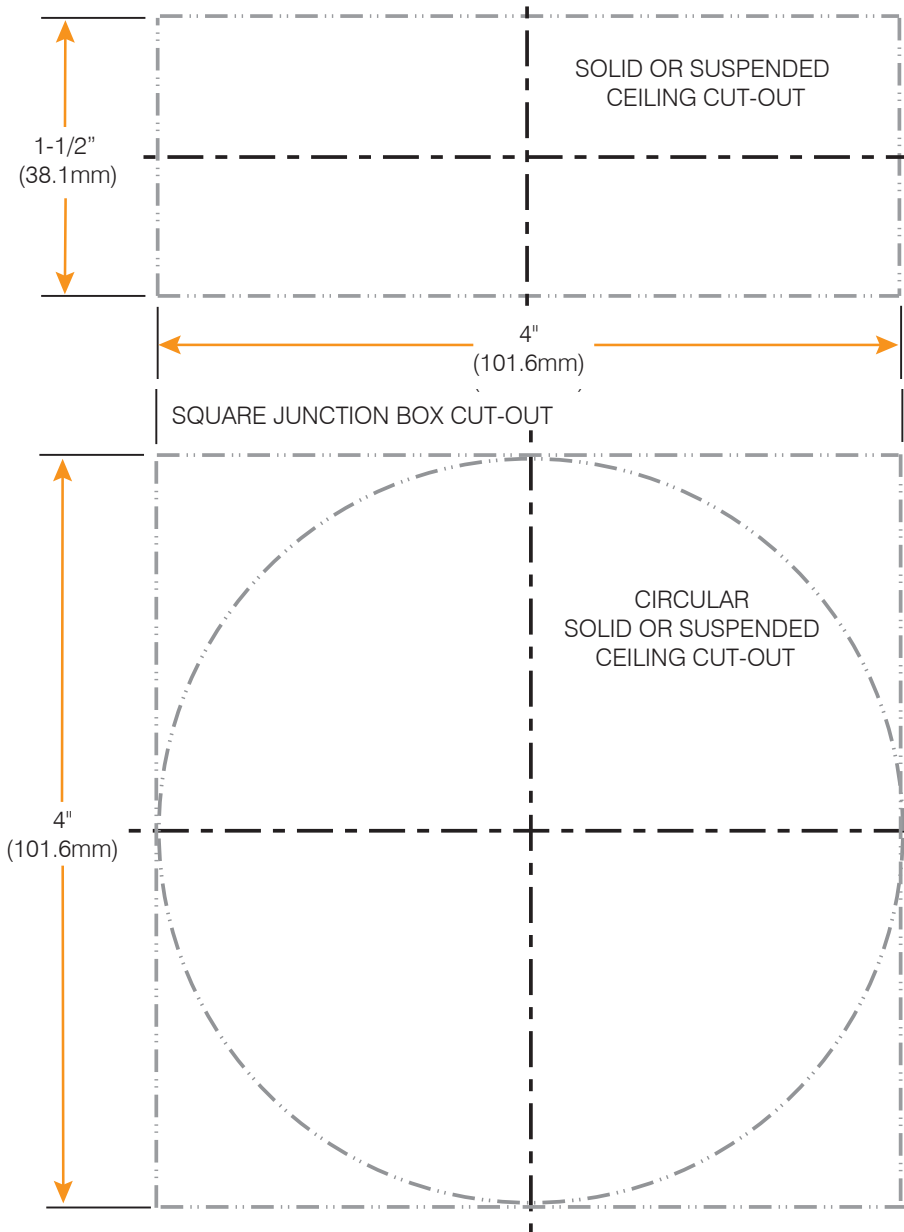
Drill bits appropriate to fastener type

Wall fasteners are not provided and must be appropriate to the wall material



## MOUNTING PREPARATIONS

Use the following cutout dimensions for the type of mounting:



**This page can be used as a template for the cut-out.**

- » NOTE: The included Trim Plate is to cover the mounting and cutout so be sure to not exceed the Trim Plate dimensions.

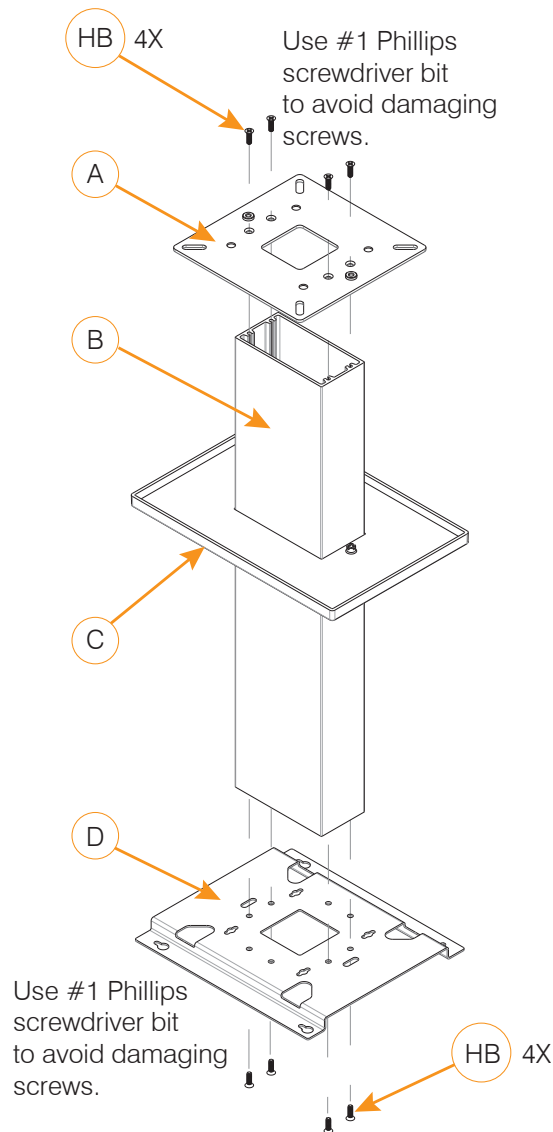
## MOUNTING TO SOLID CEILING OR FLUSH MOUNTED JUNCTION BOX

The following diagram shows how to assemble the parts needed for a suspended mounting of the Beamforming Microphone Array from either a solid ceiling or from a securely fastened junction box. The junction box can be flush to either a solid ceiling or exposed through and flush to an opening in a suspended ceiling.

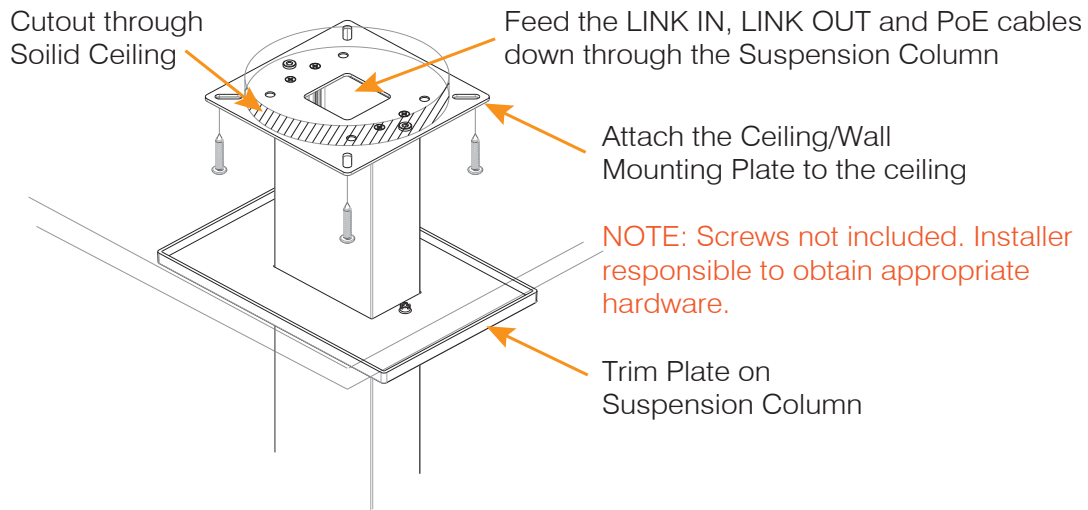
The Ceiling/Wall Mounting Plate attaches to the top of the Suspension Column. (Ignore the short studs on the plate. These are for wall-mount usage.)

The Trim Plate slips up the Suspension Column, then the Mic Mounting Plate attaches to the bottom of the Suspension Column. The Trim Plate will slide up to and attach to the Ceiling/Wall Mounting Plate when the assembly is attached to the solid ceiling or junction box.

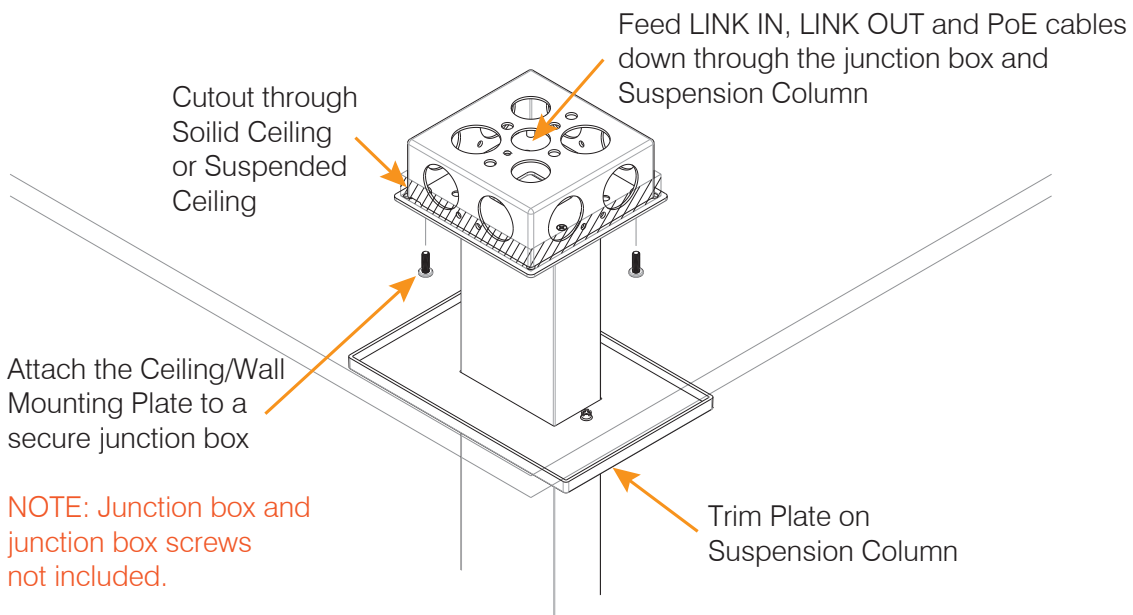
- » **NOTE:** Be certain you have the correct Suspension Column for your installation as determined by your ceiling height. There are SKU's for kits containing a 12-inch or 24-inch Suspension Column in white or black (910-001-005-12, 910-001-005-12-B, 910-001-005-24, or 910-001-005-24-B) and a 36-inch or 48-inch Suspension Column in white only (910-001-005-36 or 910-001-005-48).



Feed the LINK IN, LINK OUT and PoE cables (not shown) down through the assembly, then attach the assembly to the solid ceiling or junction box as shown in the following diagrams.

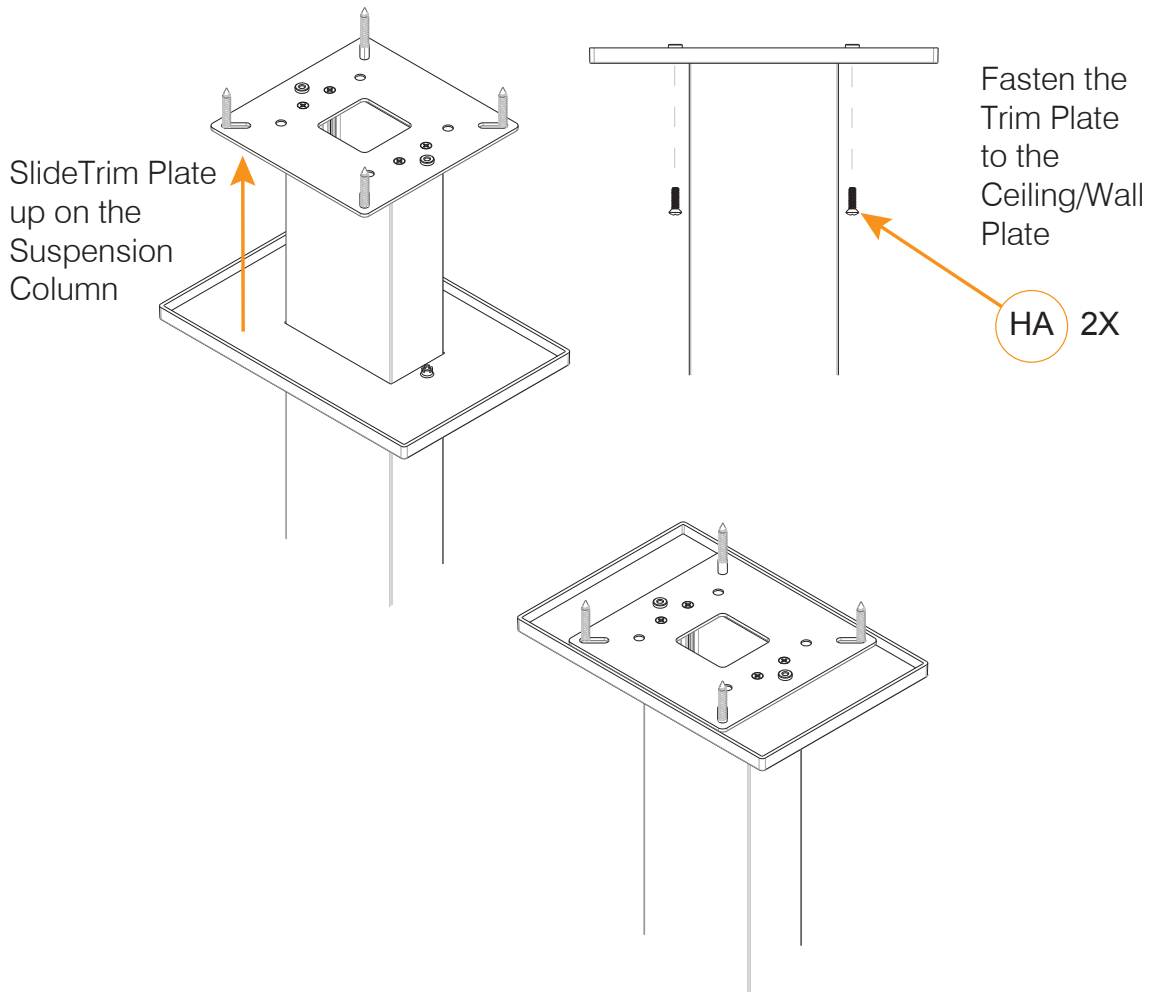


- » **IMPORTANT:** The standard junction box used is 4" square (101.6mm) with the screw holes in the corners spaced 4.77" (.121.2mm) diagonally corner-to-corner.

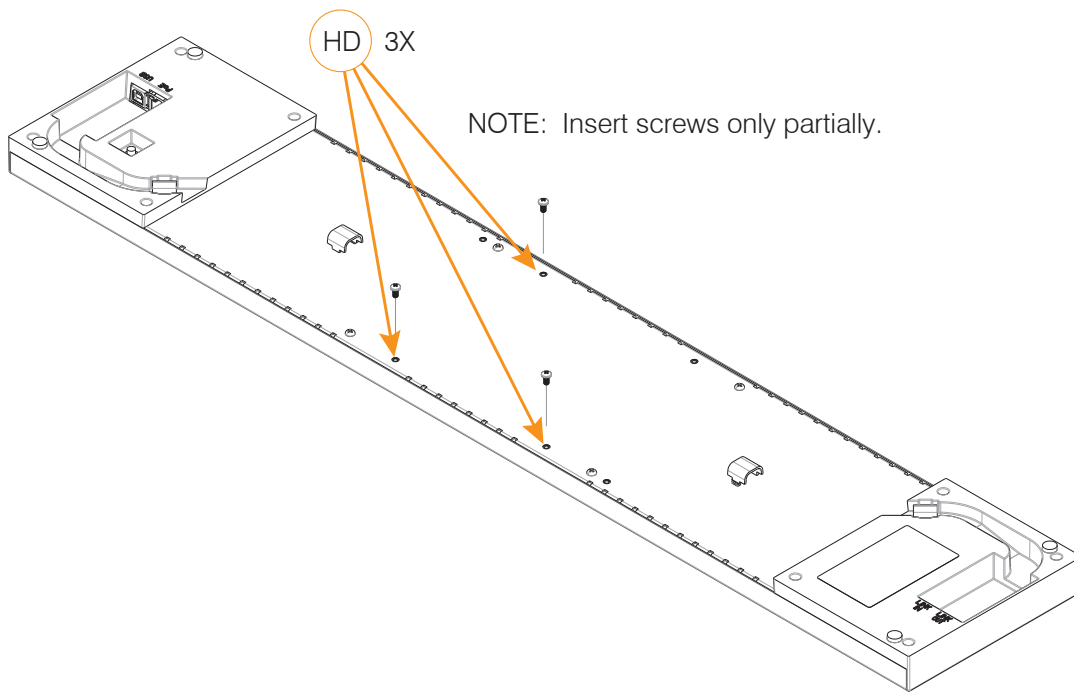


- » **IMPORTANT:** The installer is responsible to be sure the Beamforming Microphone Array is firmly attached to sturdy support (studs, a junction box attached to the structure, or other mounting hardware) to hold the weight of the Beamforming Microphone Array and its mounting hardware.

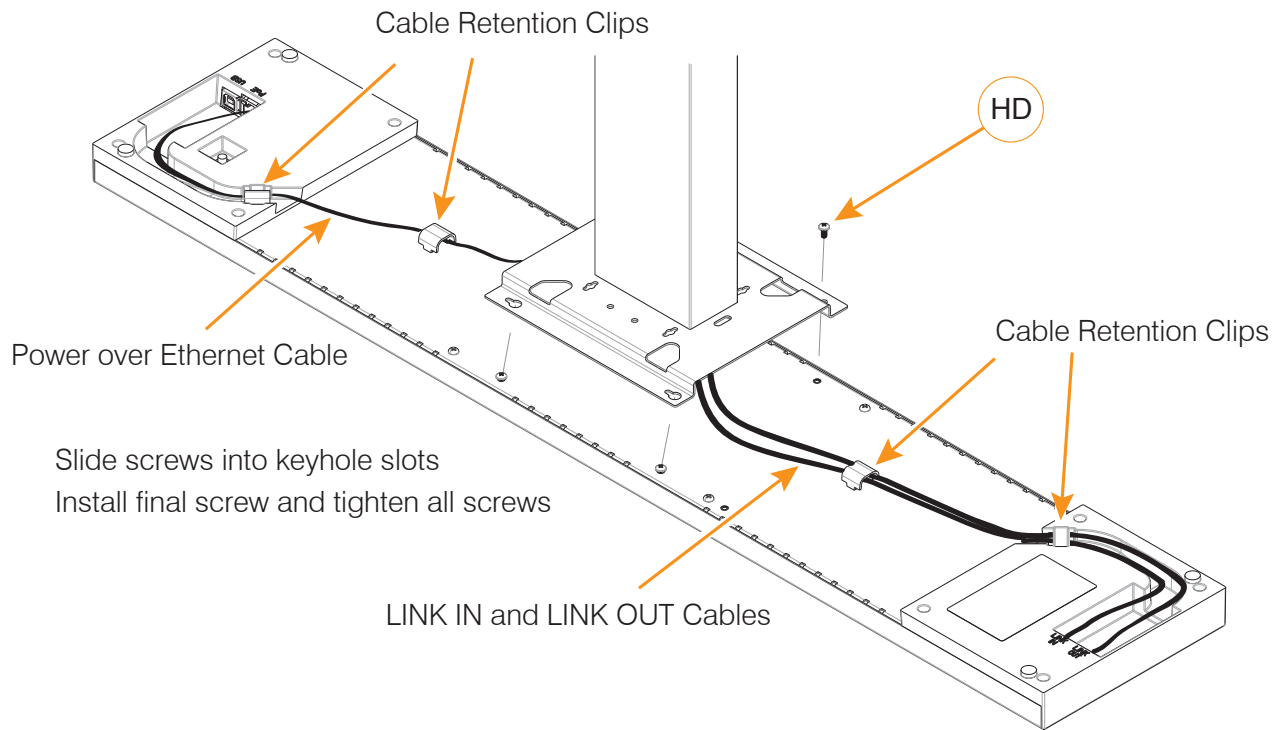
After the Suspension Column and Ceiling/Wall Plate are attached to the ceiling or junction box and the Link IN, Link OUT and PoE cables are fed down through the Suspension Column, slide the Trim Plate up the column and secure it to the Wall/Ceiling plate.



Prepare the Beamforming Microphone Array for attachment to the Suspension Column by partially inserting the screws. There are three slotted keyholes big enough for screw heads to pass through and one hole that is not slotted. Partially insert screws into the Beamforming Microphone Array corresponding to the slotted keyholes in the Mic Mounting Plate.

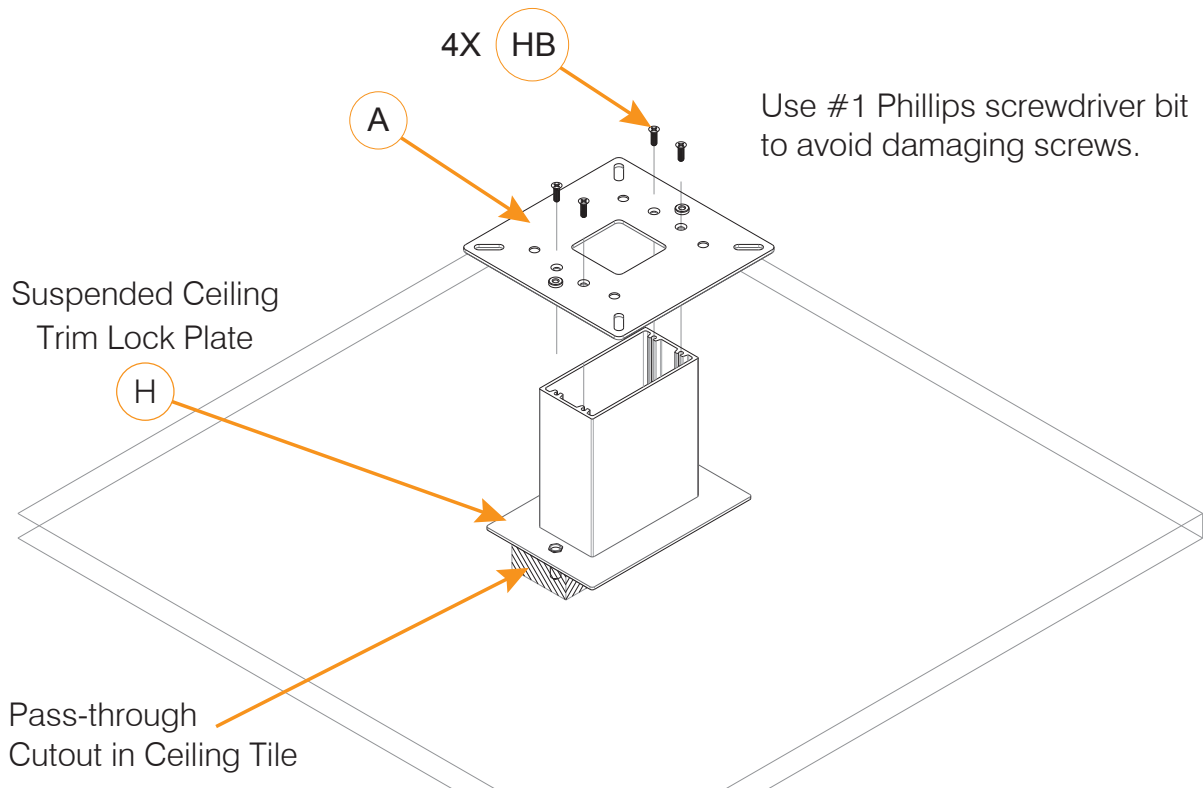


Route the Link IN, Link Out and PoE cables under the Mic Mount Plate and slide the Mic Mount Plate onto the Beamforming Microphone Array over the screws and through the keyhole slots. Then fasten the Beamforming Microphone Array securely in place with the last screw. Tighten all remaining screws. Plug in and secure the cables under the cable retention clips.



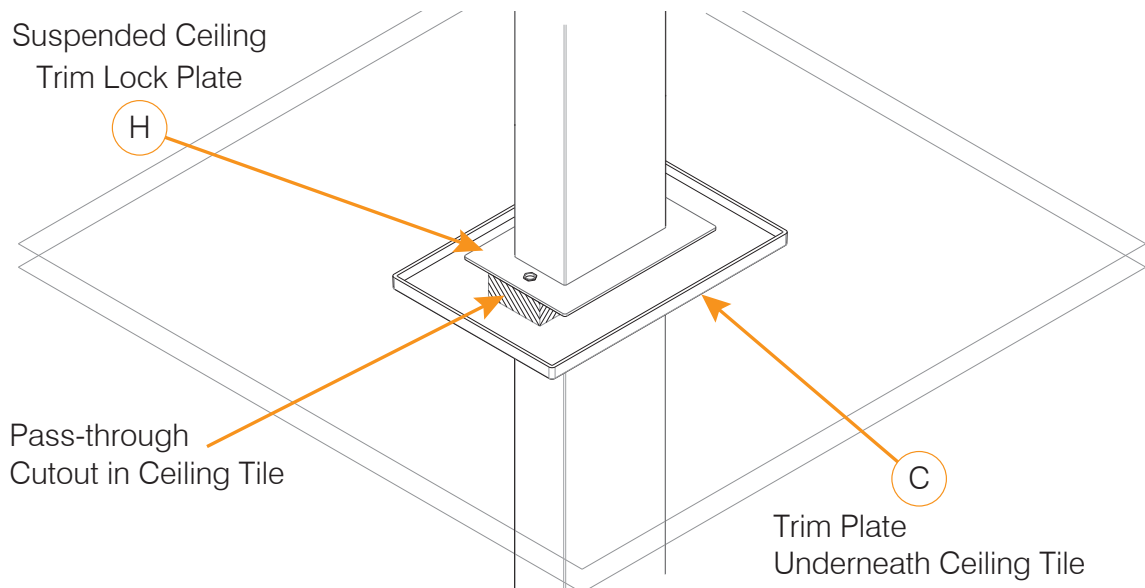
## MOUNTING TO SUSPENDED CEILING

The Ceiling/Wall Mounting Plate attaches to the top of the Suspension Column, then the Suspended Ceiling Trim Lock Plate is slipped on the Suspension Column with the screw hole posts facing downward.



Feed the Suspension Column with the attached Ceiling/Wall Mounting plate down through the Trim Locking plate and then through the ceiling tile cutout.

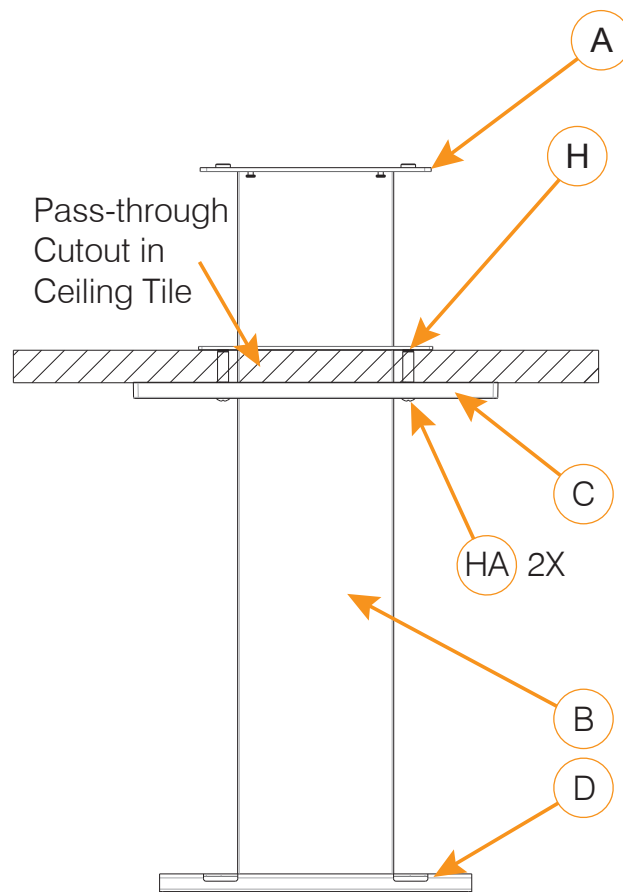
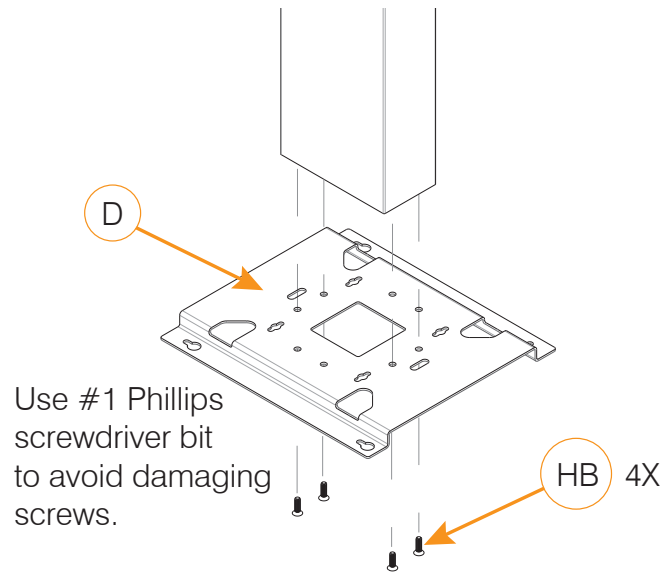
The Trim Plate slips up from underneath the ceiling tile up the Suspension Column, then attaches to the Ceiling Trim Lock Plate through the ceiling tile.



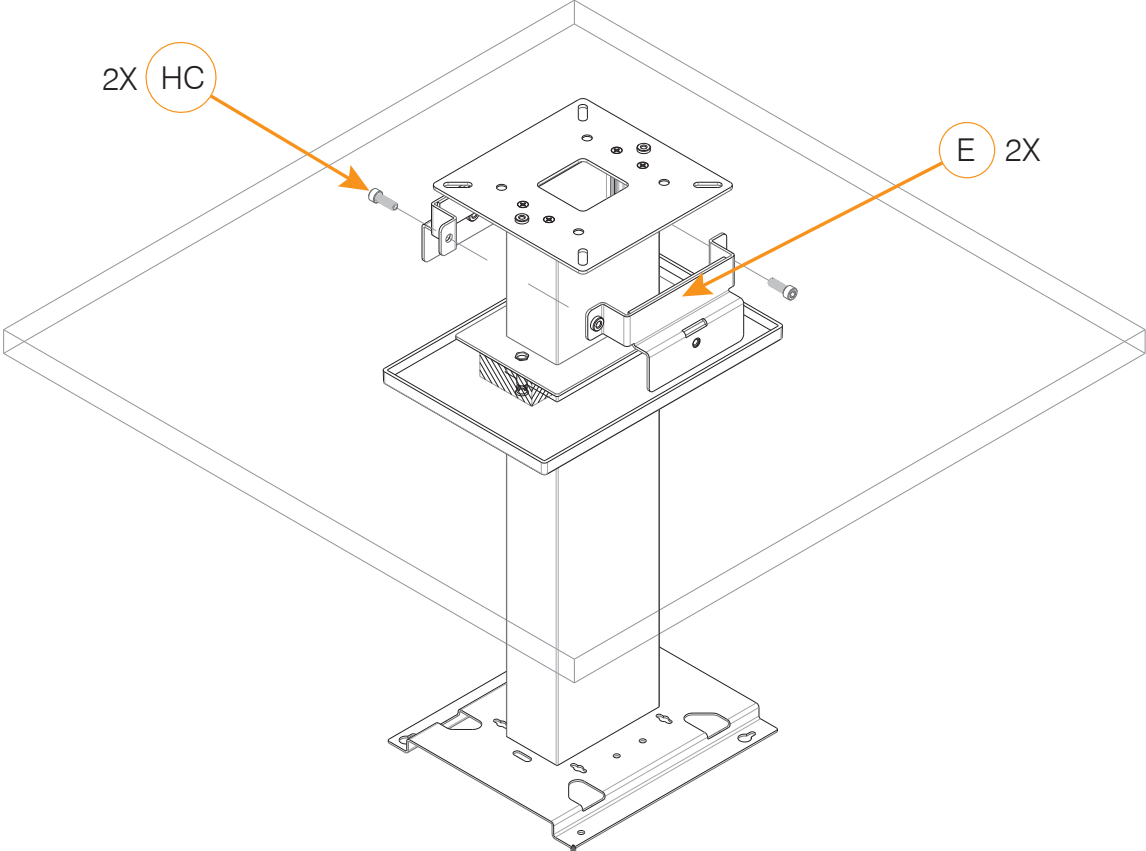


The Mic Mounting Plate attaches to the bottom of the Suspension Column.

- » NOTE: The Mic Mounting Plate can be rotated 90-degrees and then attached for applications where the microphone orientation is rotated from the mounting of the Suspension Column.



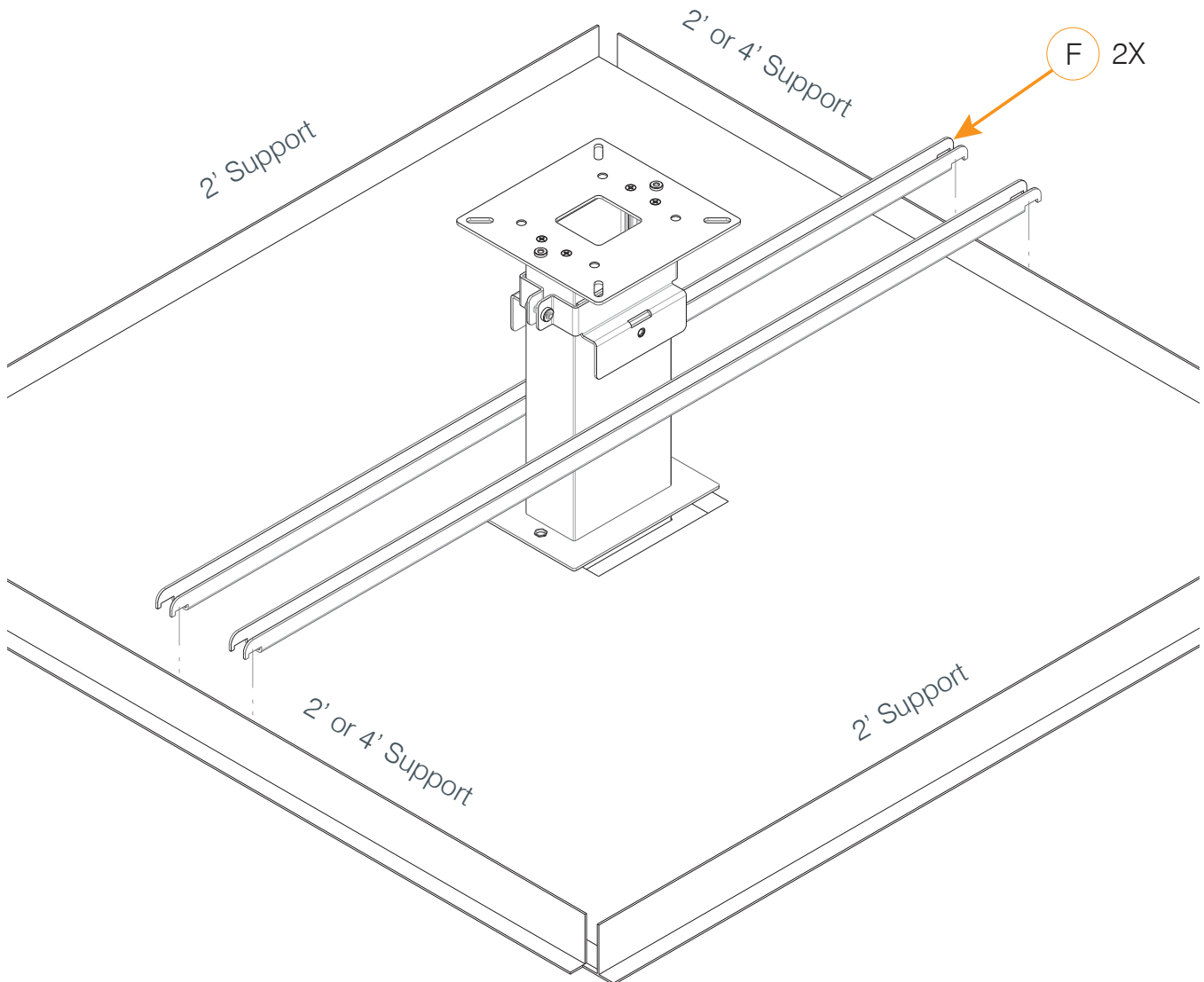
Now you have the unsecured Suspension Column extending through the ceiling tile with the Ceiling Mounting Plate and Suspended Ceiling Trim Lock Plate above the tile, and the Trim Plate and Mic Mounting Plate below the tile. Attach the Position Clamps against the wide sides of the Suspension Column above the ceiling tile. Allow the assembled position clamps to be loose enough to slide up and down for positioning.



Lift the assembly, along with the ceiling tile, into place in the drop-ceiling support framework.

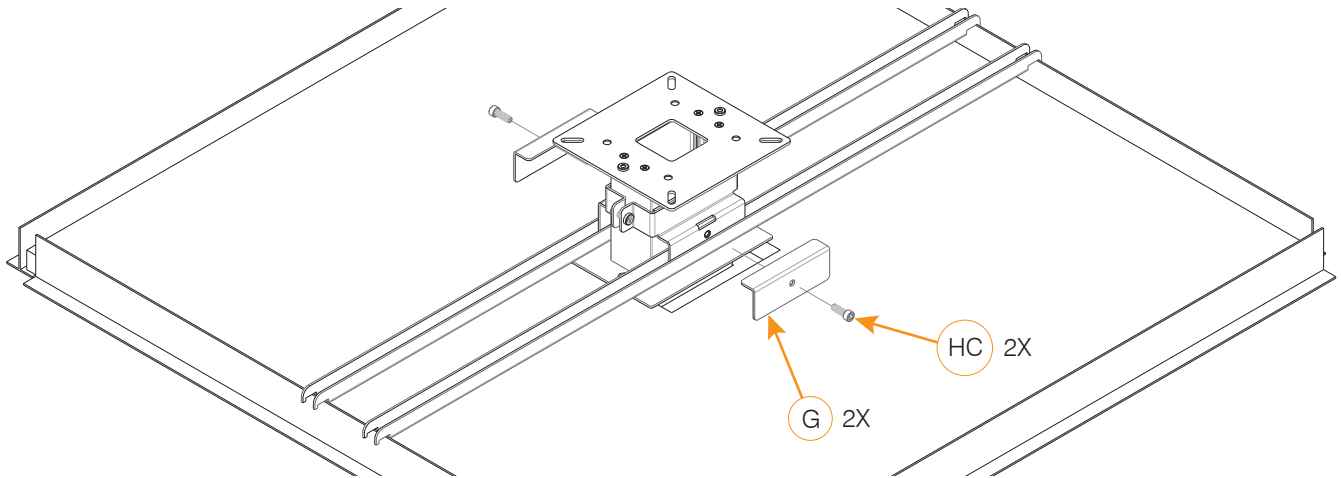
Install the Support Rails in the ceiling over the ceiling tile and supported by the suspended framework. Lower the Position Clamps into the Support Rail channels.

- » **NOTE:** The support rails are only long enough to span a 2' ceiling support framework. If that orientation does not orient the Beamforming Microphone Array in the correct axis for your room, you may need to rotate the Mic Mounting plate 90 degrees to orient it correctly.

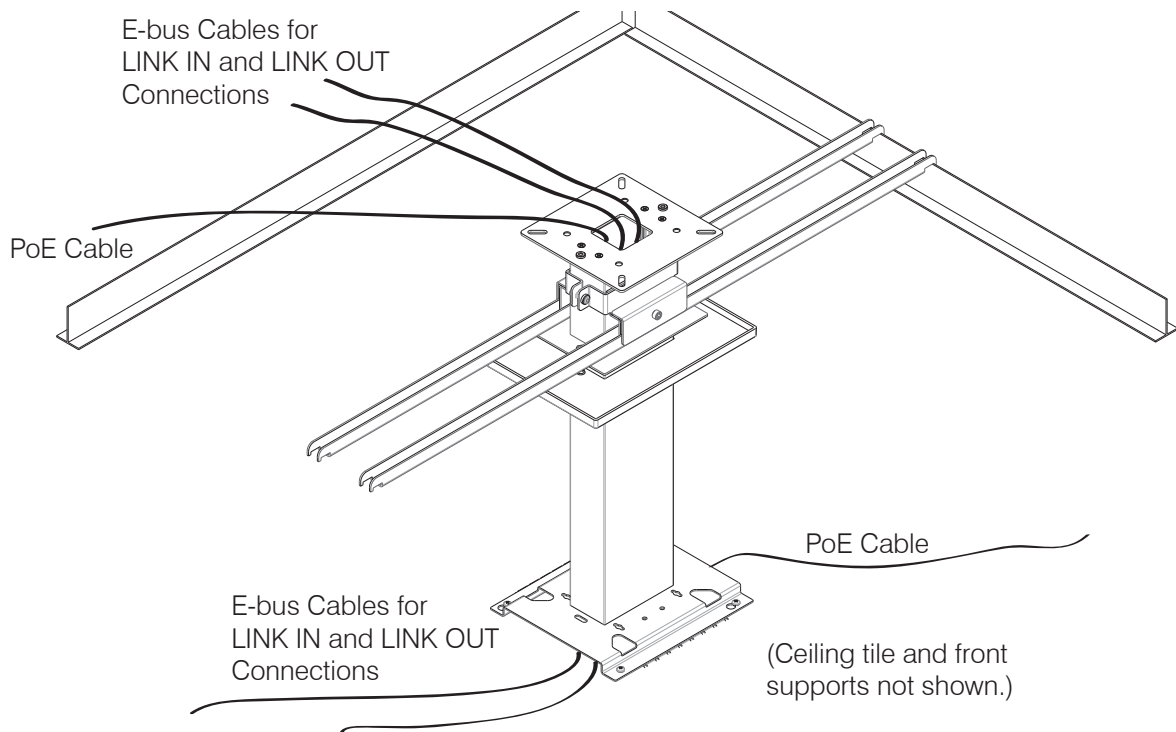


Slide the Suspension Column up or down adjusting it so the Beamforming Microphone Array will be placed approximately 8 feet above the floor.

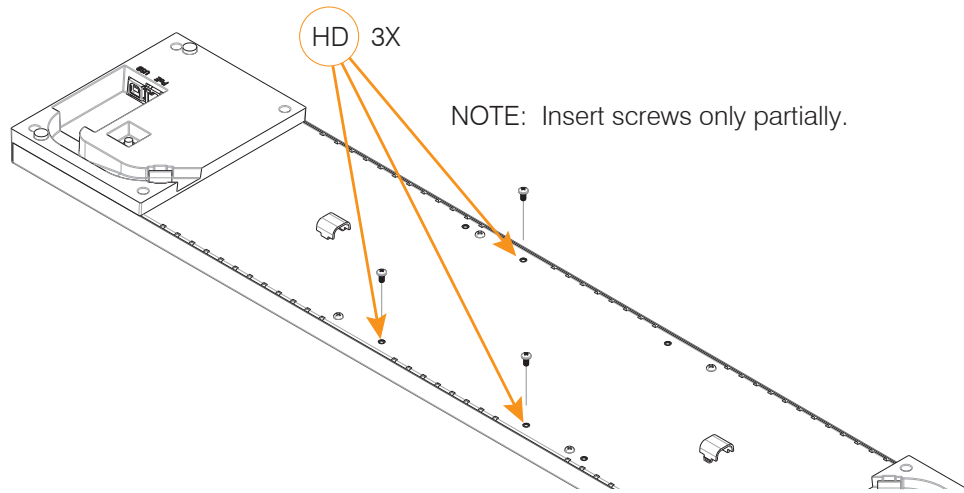
Fully tighten the screws on the position clamps. Attach and tighten a Locking Plate on to each Position Clamp to secure the assembly to the Support Rails.



Pass the E-bus cables for LINK IN and LINK OUT (if needed), and the PoE cable from above the ceiling through the pass-through hole down the Suspension Column and out of the assembly.



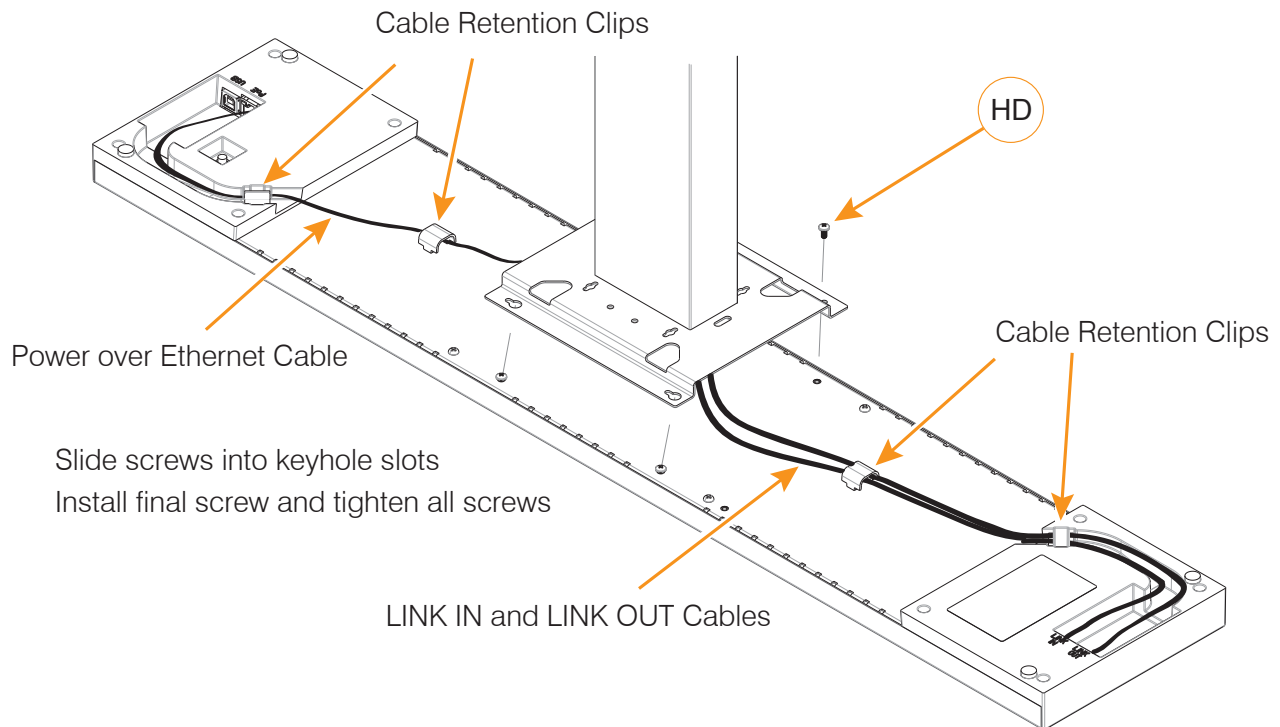
Prepare the Beamforming Microphone Array for attachment to the Suspension Column by partially inserting the screws. There are three slotted keyholes big enough for screw heads to pass through and one hole that is not slotted. Partially insert screws into the Beamforming Microphone Array corresponding to the slotted keyholes in the Mic Mounting Plate.

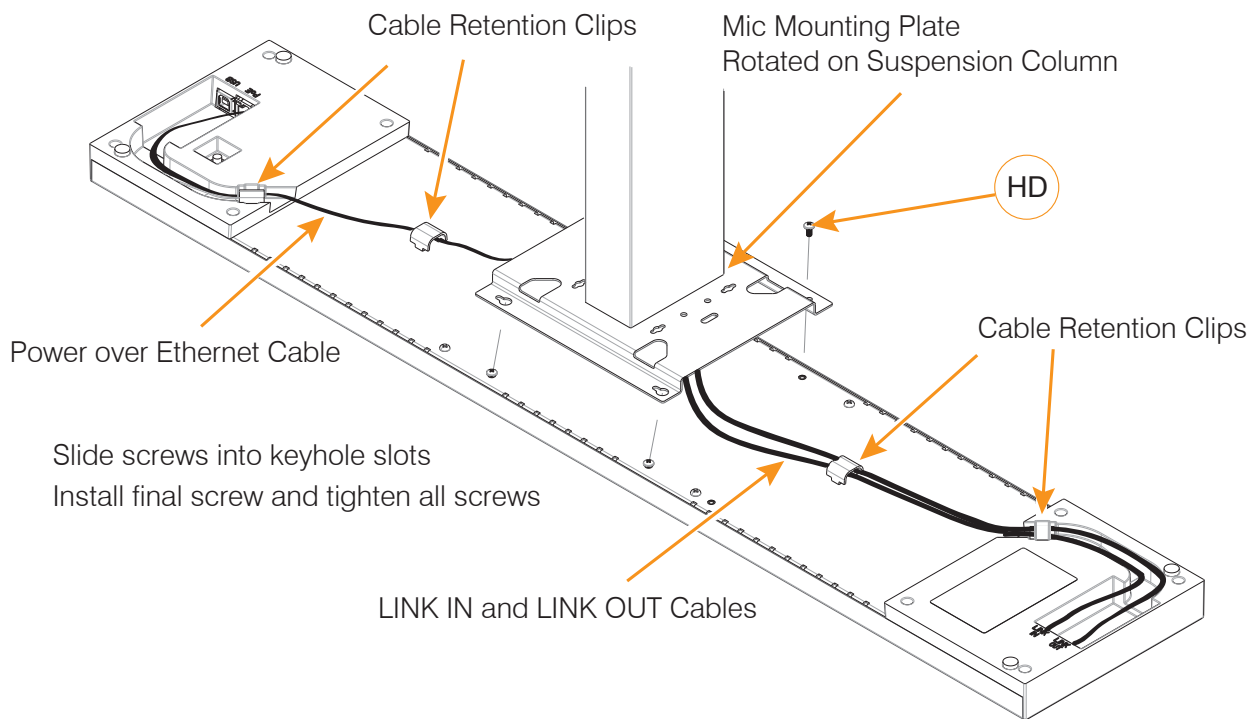


Slide the Beamforming Microphone Array onto the Mic Mounting Plate with the screws passing through the slotted keyholes.

Insert the final holding-screw through the Mic Mounting Plate into the Beamforming Microphone Array. Tighten all screws. Plug in and route the cables through the cable slots and secure them under the Cable Retention Clips provided with the Beamforming Microphone Array.

The following two illustrations show this in both lengthwise and rotated mountings relative to the Suspension Column.





#### ADDITIONAL SAFETY

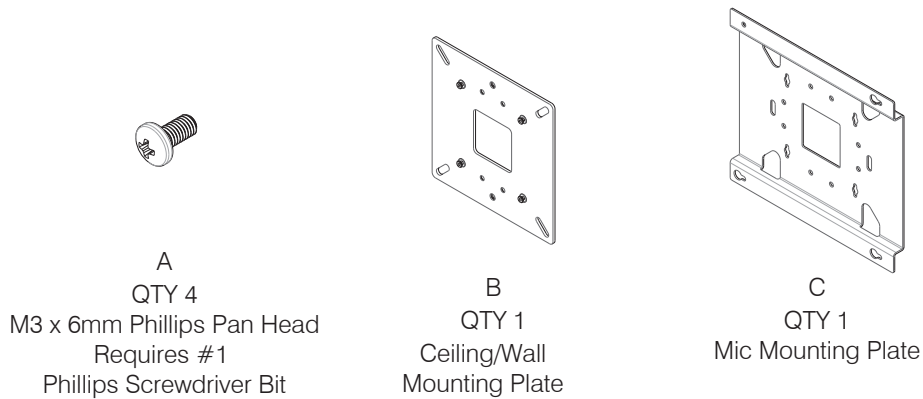
The installer is responsible to be sure the Beamforming Microphone Array is firmly secured so that it does not fall. Safety cables (not provided) can be secured to the building structure then be attached to the corner holes of the Ceiling Plate to prevent the Beamforming Microphone Array from falling in case of accident or earthquake.

## Chapter 3: Wall Mount Installation

Once you have verified all the firmware updates and necessary connections made while executing the tasks outlined in the Beamforming Microphone Array Quick-Start Guide, you can proceed to the actual installation of the Beamforming Microphone Array using the Wall Mounting Kit.

### PARTS RECEIVED

The following parts are delivered with the Wall Mounting Kit and will be used for installation of the Beamforming Microphone Array.

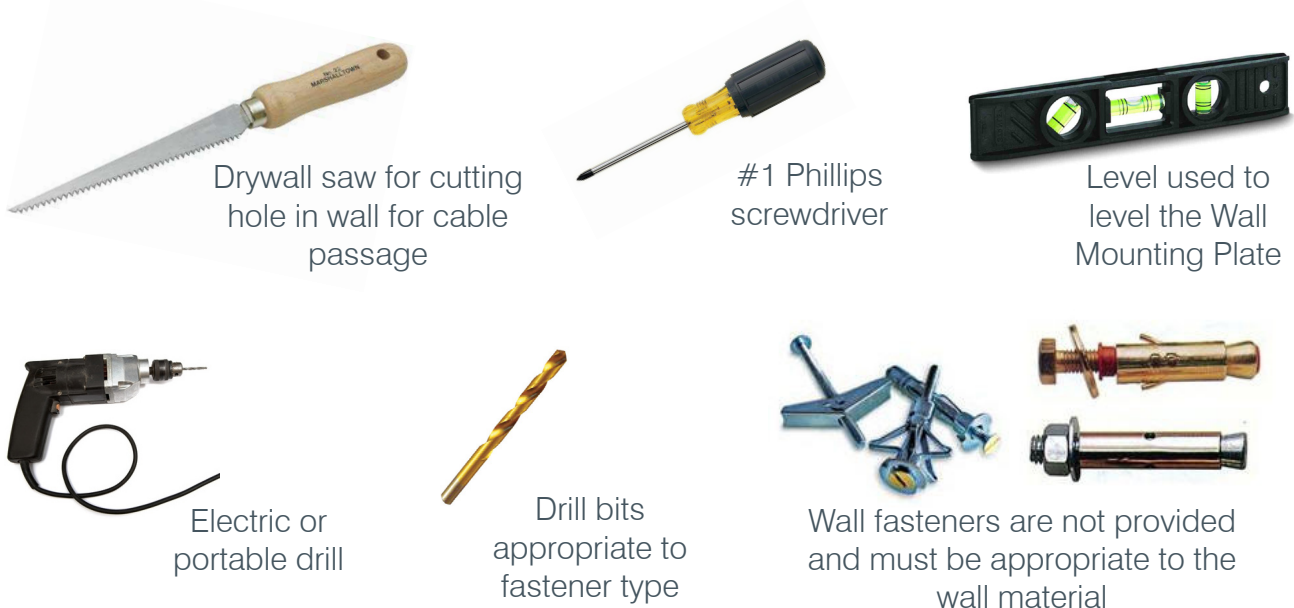


Verify that you have all the parts required to complete your installation.

When you open the shipping package(s) for the first time, please check that all items purchased are included. If any of the items (according to your customer order) are missing or damaged, contact your ClearOne distributor immediately.

### TOOLS REQUIRED

The following tools may be required for Wall Mount installation of the Beamforming Microphone Array. You will also need other tools for installing fasteners (not included in the kit) to hold the Wall Mounting Plate to the wall where the Beamforming Microphone Array is to be installed.

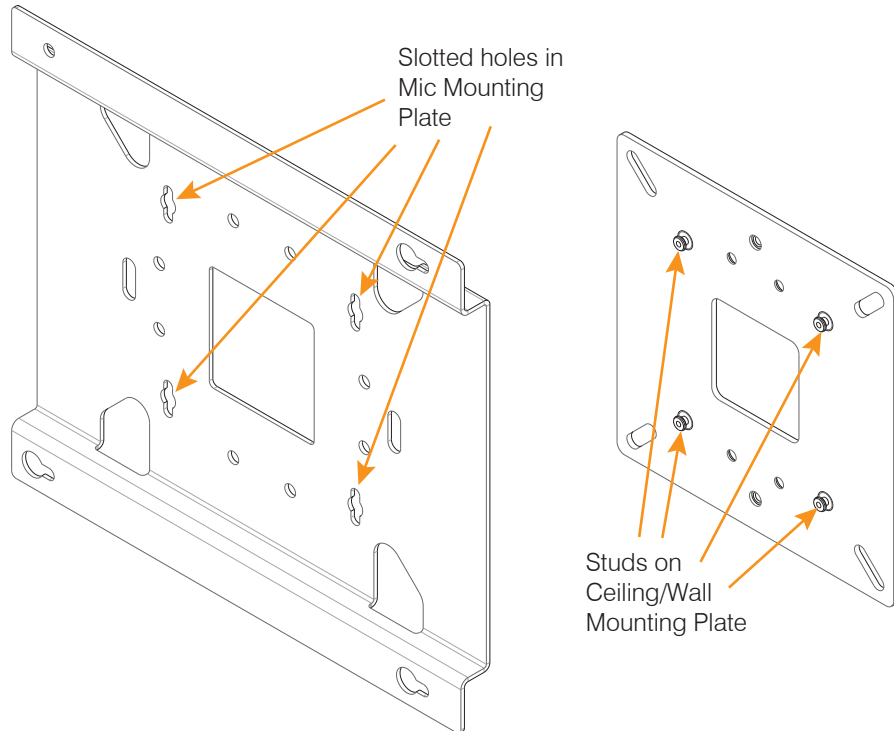


## WALL MOUNTING PROCEDURE

The wall mounted Beamforming Microphone Array must be placed on a wall facing the intended conference participants. It can be placed below a video conferencing system such as COLLABORATE, or in audio-only applications, at eye level with the participants. The face of the Beamforming Microphone Array should be about 8 to 10 feet from the participants.

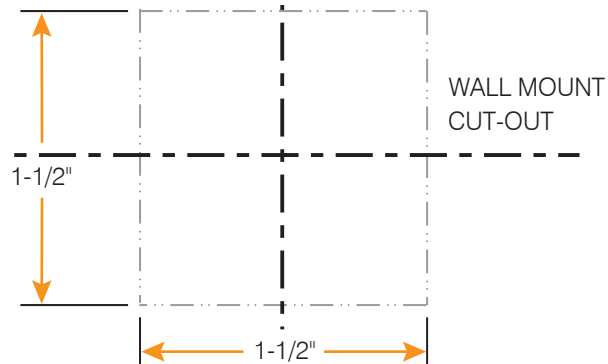
- » **NOTE:** Wall mounting **MUST** be strictly horizontal and with the “C” logo on the left-hand side to assure proper adaptive steering of audio pickup.

The Ceiling/Wall Mounting Plate is designed with small studs projecting from the plate which fit into slotted holes on the Mic Mounting Plate to hold the Beamforming Microphone Array to the wall.



The Ceiling/Wall Mounting Plate is designed to be mounted to either a solid or hollow wall so the fasteners used to attach the plate to the wall must be appropriate to the wall material to be secure.

Hollow wall mounting gives the advantage of concealed cable routing. Use the following dimensions for the cable pass-through cut-out for a hollow wall mounting:



**This page can be used as a template for the cut-out**

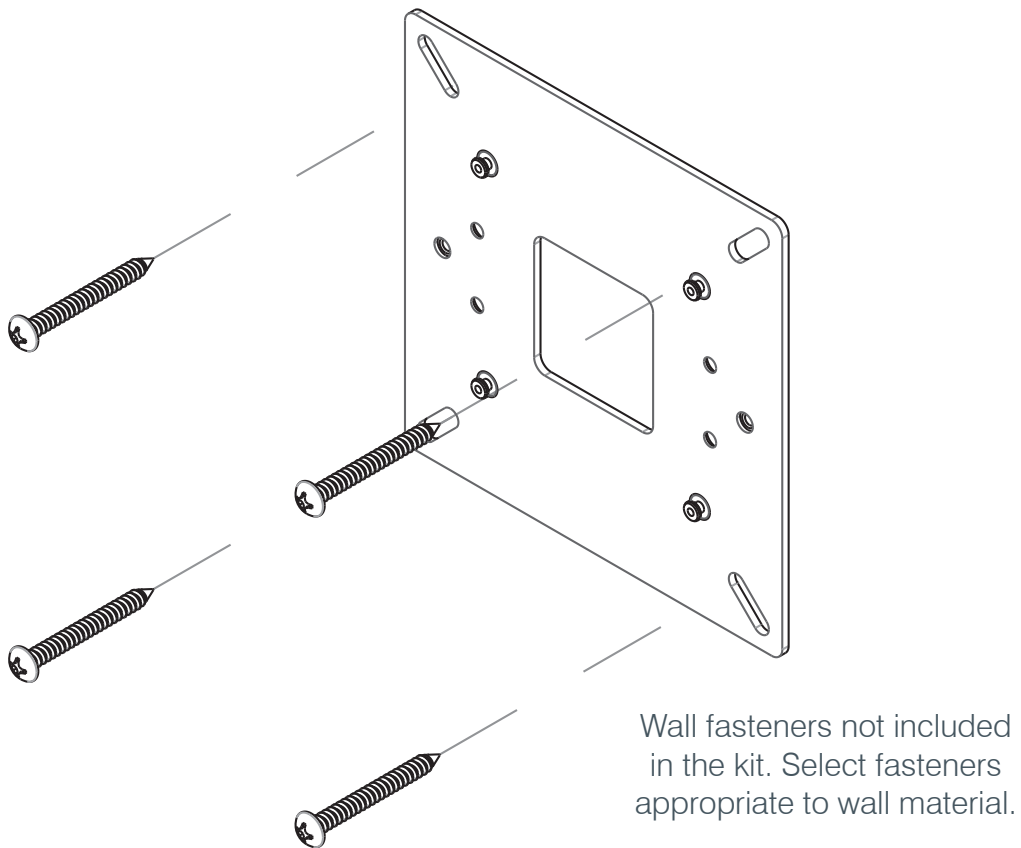


Locate, level and mark for drill holes and the cable pass-through cut-out where the Wall Mounting Plate will attach to the wall.

Drill holes in the marked locations to receive the fasteners

Cut out the cable pass-through cut-out hole.

- » **NOTE:** The anchors and screws used to mount the Ceiling/Wall Mounting Plate are not provided and must be selected by the installer for the type of wall material supporting the Ceiling/Wall Mounting Plate. Take care while drilling and installing the anchors so the wall material does not tear out and weaken the attachment.



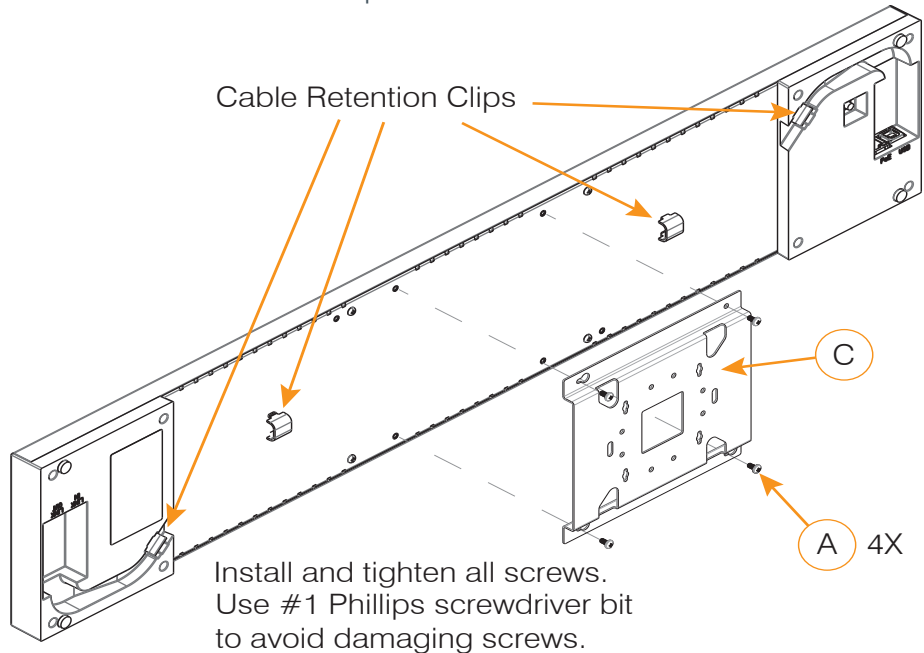
Attach the Wall Mounting Plate to the wall with fasteners.

If you have attached the Ceiling/Wall Mounting Plate to a hollow wall, thread the cables for Link In, Link Out and PoE through the wall space and out through the hole in the center of the plate.

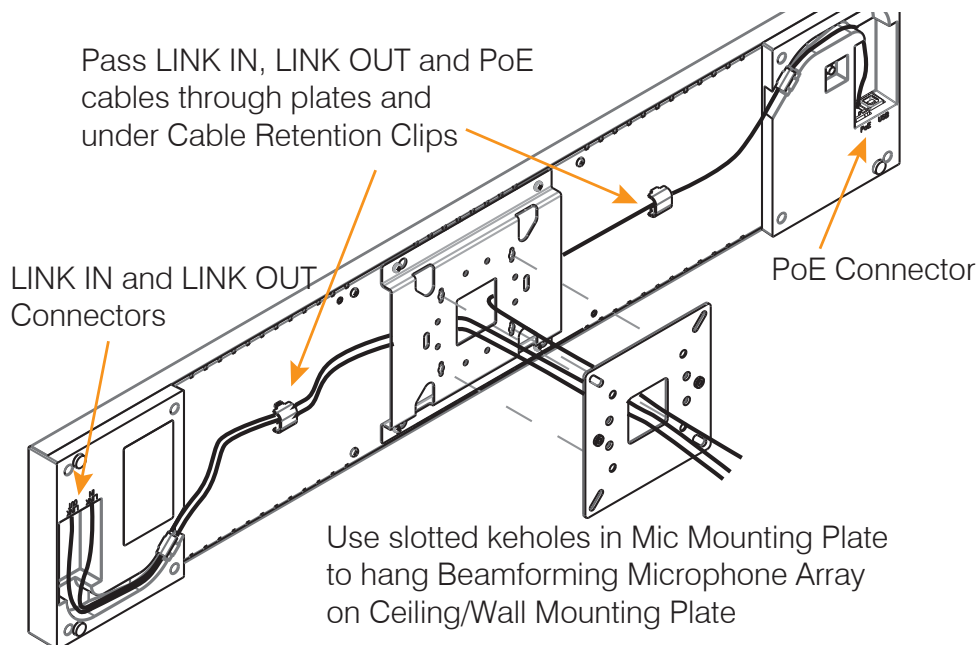
- » **NOTE:** Allow enough extra cable length to pass through the hole to easily run under the Mic Mounting Plate when it is attached to the microphone array and to the ends where they are to be connected.

Notice that the Mic Mounting Plate (C) has four holes used for mounting to the back of the Beamforming Microphone Array. There are three slotted keyholes big enough for screw heads to pass through and one hole that is not slotted.

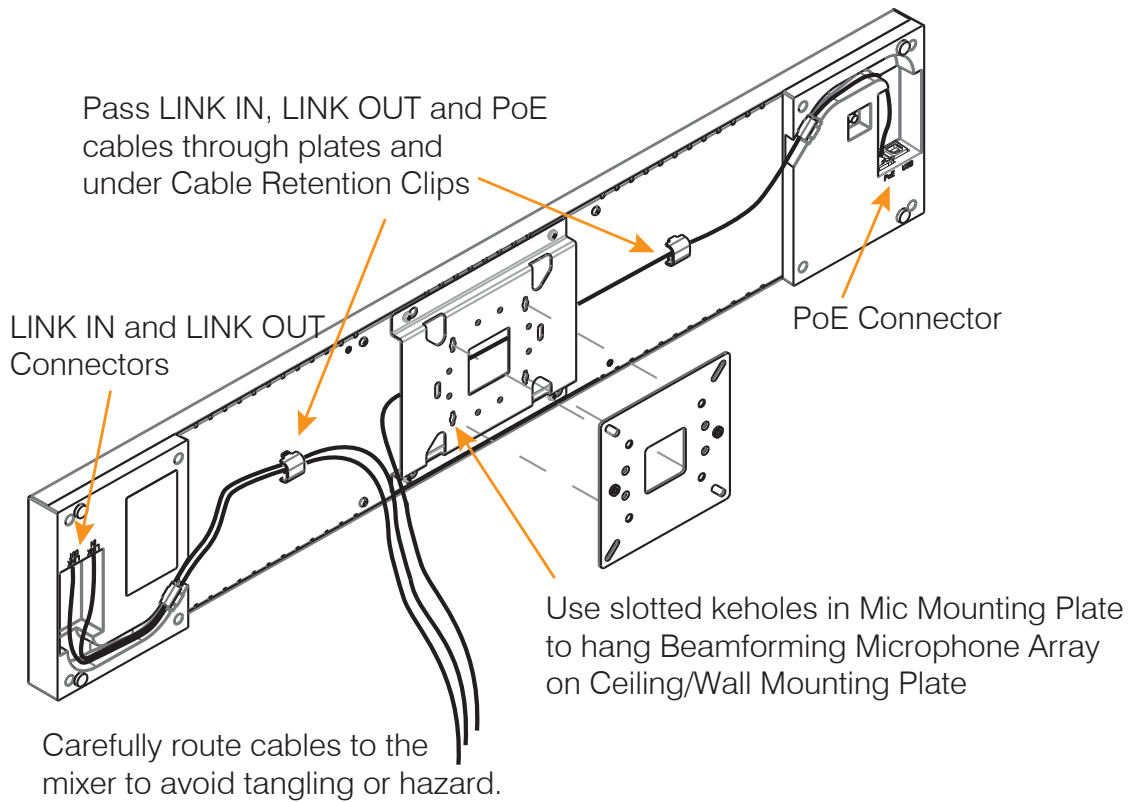
Place the Mic Mounting Plate on the back of the Beamforming Microphone Array and insert the screws (A) into the Beamforming Microphone Array corresponding to the holes in the Mic Mounting Plate. Tighten all screws with the #1 Phillips screwdriver.



For mountings with the cables coming through the wall, hold the Beamforming Microphone Array with the Mic Mounting Plate attached, route the E-bus and PoE cables under the Mic Mounting Plate to the ends where they will be connected. Connect the LINK IN, LINK OUT (if needed) and PoE cables and secure the cables under the Cable Retention Clips.

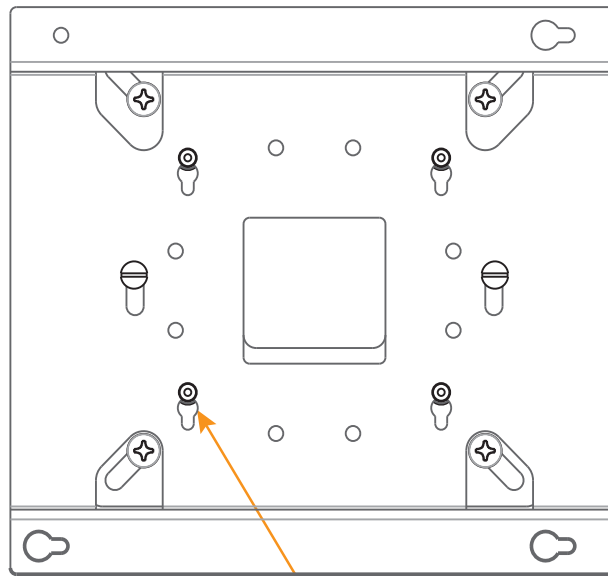


For mountings with the cables coming in front of the wall, hold the Beamforming Microphone Array with the Mic Mounting Plate attached, route PoE cable under the Mic Mounting Plate and the LINK IN and LINK OUT (if needed) cables to the ends where they will be connected. Connect the LINK IN, LINK OUT and PoE cables and secure the cables under the Cable Retention Clips as shown below.



Move the Beamforming Microphone Array forward onto the Ceiling/Wall Mounting Plate with the studs passing through the slotted keyholes. Then slide the assembly down slightly to firmly seat the studs into the tops of the slots. If the cables are outside of the wall, carefully route them to the mixer to avoid tangling or hazard.

Front View of Mic Mounting Plate over Wall Mounting Plate  
(Beamforming Microphone Array and cables not shown.)



Wall Mounting Plate stud through  
slotted kehole in Mic Mounting Plate

When the wall mounting of the Beamforming Microphone Array is completed, use the CONVERGE Console software to configure the array for the proper pickup pattern.

- » **NOTE:** Wall mounting **MUST** be strictly horizontal and with the “C” logo on the left-hand side to assure proper adaptive steering of audio pickup.

### MUTING

On the wall, the Mute On/Off buttons are available for use when conferencing. When the microphone array is active, the microphone icons in the buttons illuminate blue. If either button is pressed, the Beamforming Microphone Array mutes and the buttons illuminate red. If pressed again, the array un-mutes and is active again.



## Chapter 4: Table Top Installation

Once you have verified all the firmware updates and necessary connections made while executing the tasks outlined in the Beamforming Microphone Array Quick-Start Guide, you can proceed to the installing the Beamforming Microphone Array on a table top in your conference room. There is no installation kit required.

### PARTS REQUIRED

All that is required for installation of the Beamforming Microphone Array is a PoE power source and cable (available using the 910-001-004 PoE Power Supply and Cable Kit for Beamforming Microphone Array) and the LINE IN and LINE OUT cables. The LINE In and LINE OUT cables are not provided with the Beamforming Microphone Array but must be provided on site.

### TOOLS REQUIRED

This installation assumes the conference table or surface to hold the Beamforming Microphone Array already has a hole or cable passage for the PoE, LINE IN and LINE OUT cables. If this is not present, the installer must make preparations for the proper routing and protection of the cables.

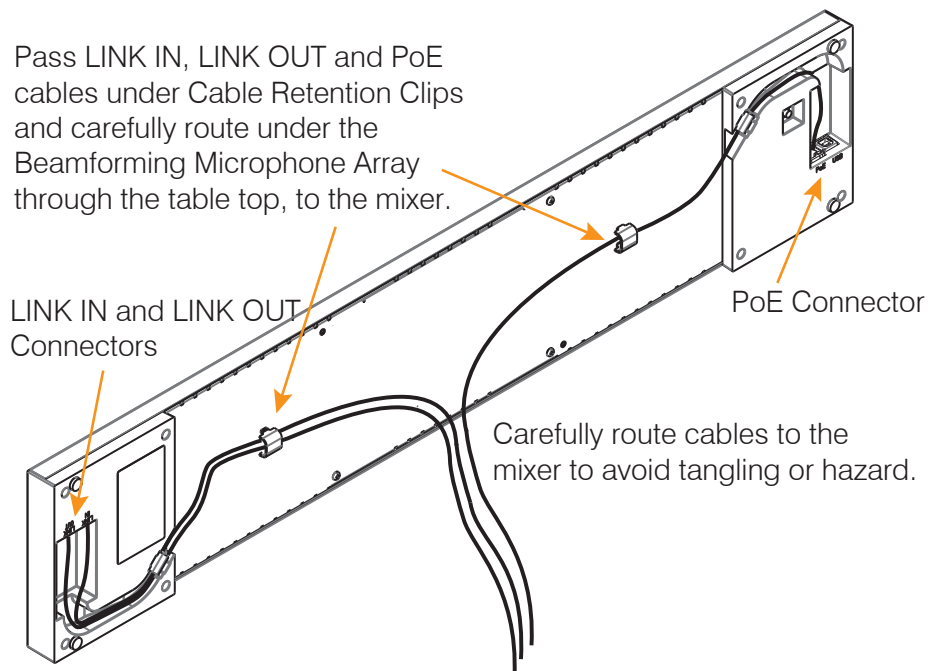
There are no other tools required.

### TABLE TOP PROCEDURE

The Beamforming Microphone Array must be placed on the table lengthwise with the long axis of the table and participants. The face of the Beamforming Microphone Array should be unobstructed from the participants.

### CONNECTIONS

The Beamforming Microphone Array unit is connected to the CONVERGE Pro stack via the LINK IN and LINK OUT (if needed) E-bus connections. Bring the cables up through the table top cable passage or hole, secure under the Retention Clips, and plug them into the appropriate connector.

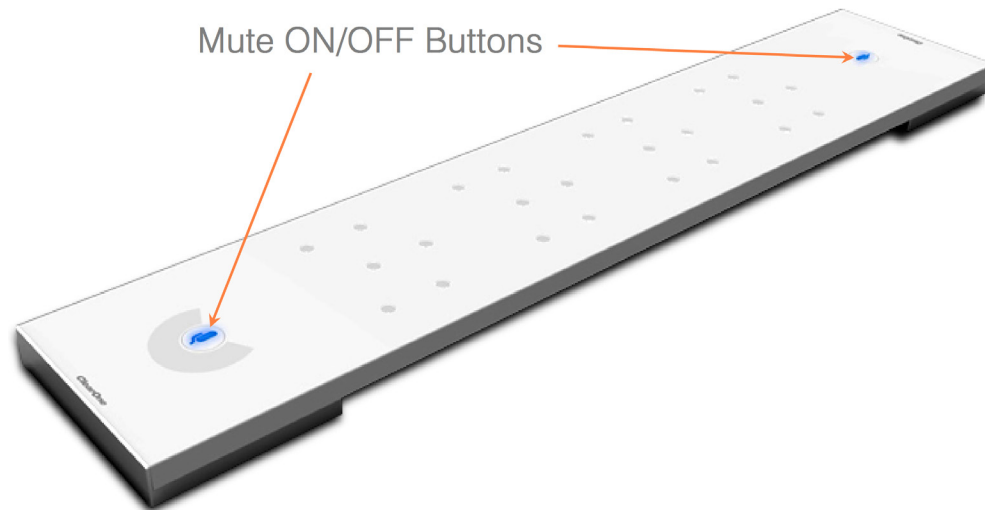


## USAGE

When the table top installation of the Beamforming Microphone Array is completed, use the CONVERGE Console software to configure the array for the proper pickup pattern.

## MUTING

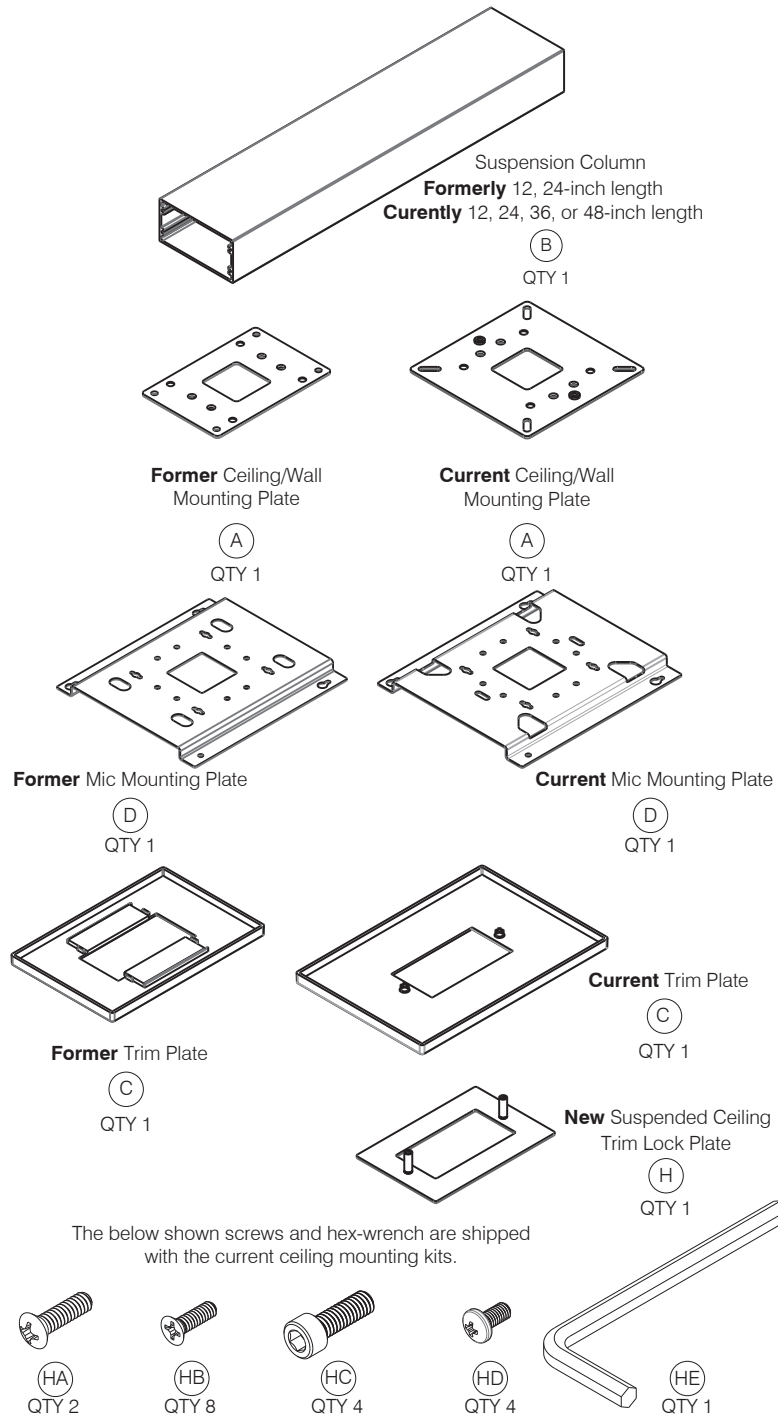
On the tabletop, the Mute On/Off buttons are readily available for use when conferencing. When the microphone array is active, the microphone icons in the buttons illuminate blue. If either button is pressed, the Beamforming Microphone Array mutes and the buttons illuminate red. If pressed again, the array un-mutes and is active again.



# Chapter 5: Change History

This is the fourth revision of the Beamforming Microphone Array Installation Guide. It incorporates design changes to the Suspension Column, Ceiling/Wall Mounting Plate, the Trim Plate, and Mic Mounting Plate allowing for a more secure installation, including the feature of mounting to a junction box and a more secure trim plate attachment.

Below are illustrations of the former and current parts used in installation.



# Service and Support

If you need assistance setting up or operating your product, please contact us. We welcome your comments so we can continue to improve our products and better meet your needs.

## TECHNICAL SUPPORT

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## PRODUCT RETURNS

All product returns require a Return Material Authorization (RMA) number. Contact ClearOne Technical Support before returning your product. Make sure you return all the items and packing materials that originally shipped with your product.

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