

# Polycom® Acoustic Fence™ and Acoustic Fence with Beam Shaping Technology

## Introduction

Polycom® Acoustic Fence™ and Polycom® Acoustic Fence with Beam Shaping limit the pickup of microphone audio to constrained areas in open office environments. These features only affect the audio transmitted from the room to the far-end, not the audio rendered out the loudspeaker from the far-end.

For the Polycom Acoustic Fence, primary microphones and fence microphones are required. The primary microphones serve to pick up the audio within the fence boundaries. The fence microphones define the “fence” boundary. Sounds originating outside the fence boundary will not be picked up.

The Polycom Acoustic Fence with Beam Shaping defines a beam aligned with a particular microphone in the desktop microphone array or ceiling microphone array. The beam width can be adjusted from +/-10 to +/- 60 degrees. Sounds outside the beam region are not picked up. Unlike the Acoustic Fence, the Acoustic Fence with Beam Shaping will work with a single microphone array.

## Polycom® Acoustic Fence™ Operation

The algorithm determines whether sounds are outside or inside the fence region by comparing the strength of the sound at the fence microphone with the strength at the primary microphone. For sounds inside the fence region, the sound should be stronger at the primary microphone relative to the fence microphone. Alternatively, for sounds outside the fence region, the sound should be stronger at the fence microphone relative to the primary microphone.

### Polycom Acoustic Fence Microphone Array

The fence ceiling microphone array is specially processed to develop a null of approximately +/- 45 degrees centered where the dot is located on the ceiling array. This null helps substantially in discriminating sounds originating inside versus outside the fence region. Therefore, in hanging the fence ceiling microphone array, it is very important to rotate the ceiling arrays so that the dot points to the middle of the fence region. Roughly, sounds outside the +/-45 degree beam width will be outside the fence region whereas sounds inside the +/- 45 degree beam width will be inside the fence region.

### Polycom Acoustic Fence Configurations

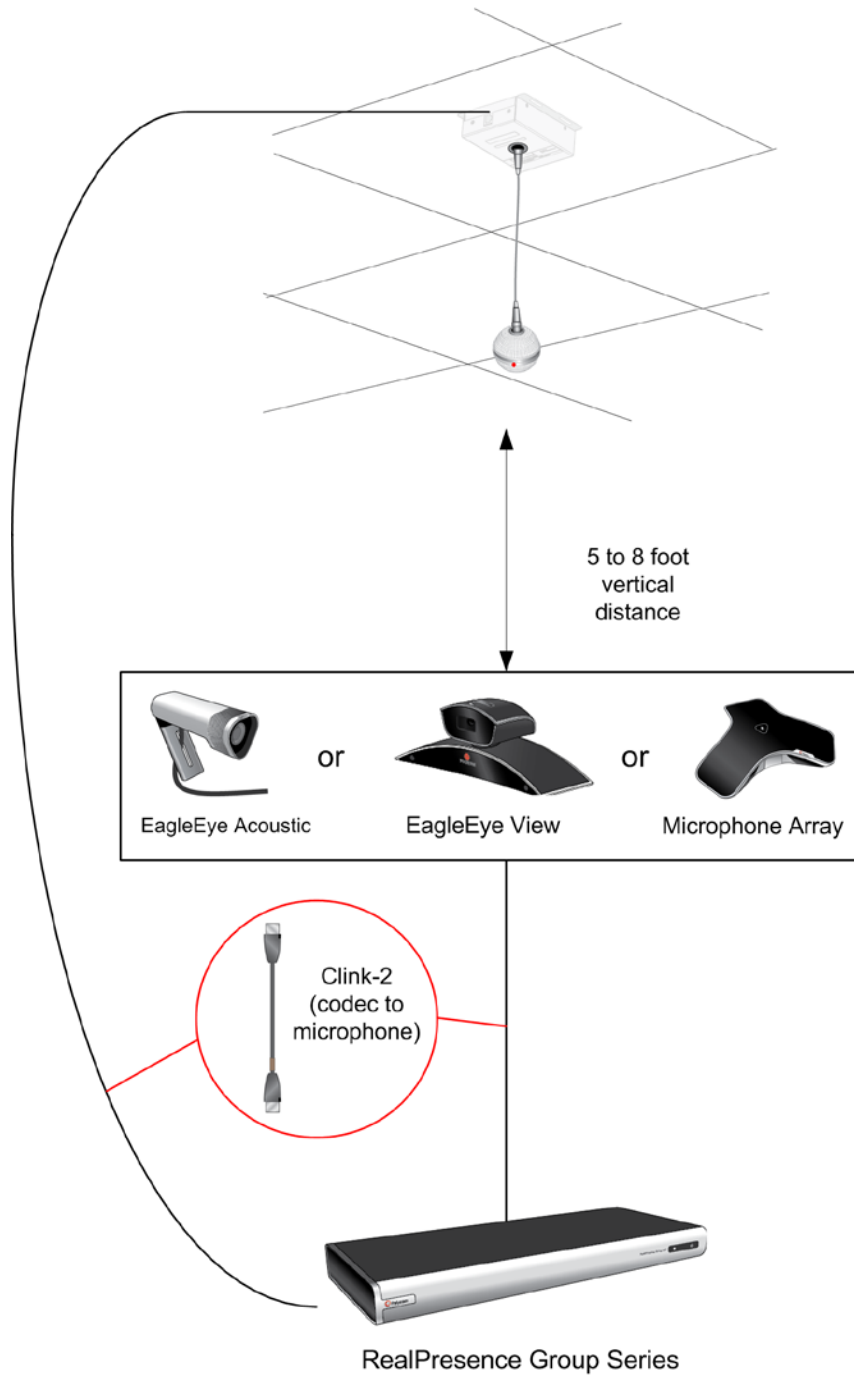
Configuration for Acoustic Fence includes a primary microphone and fence microphone. All possible configurations for Acoustic Fence are listed in the table below:

**Polycom Acoustic Fence Configurations**

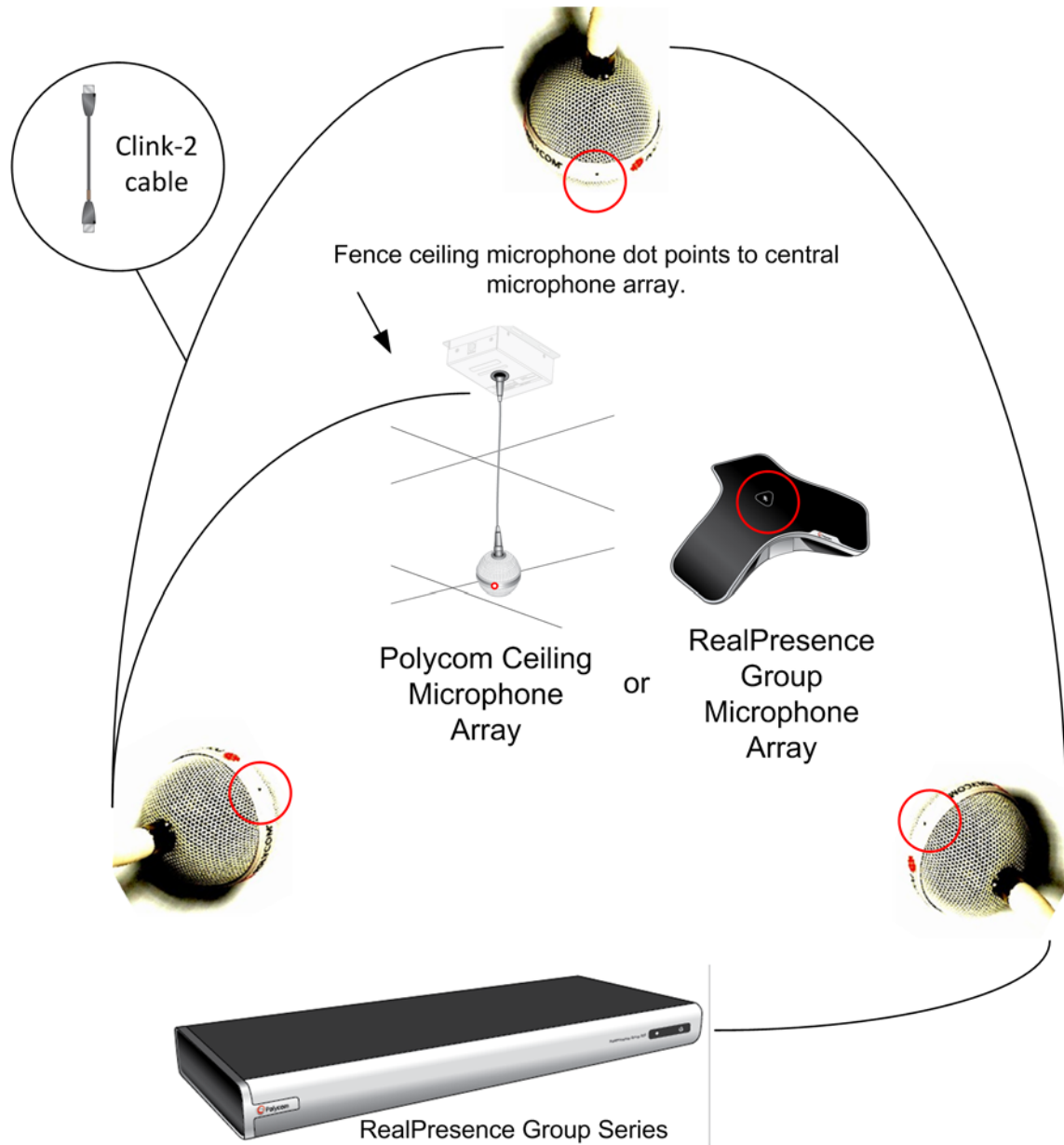
<i>Primary Microphone</i>	<i>Fence Microphone</i>	<i>Configuration</i>
1 ceiling microphone array	1 to 3 ceiling microphone arrays	Rotate fence ceiling microphone array so that the dot points to primary microphone area. Region opposite the dot is the area where unwanted sounds occur. Last ceiling array in the daisy-chained link is the primary microphone.
1 or 2 desktop microphone arrays	1 ceiling array directly above desktop microphone arrays	Rotation does not matter; primary pick-up area is ~ +/-45 degree area beneath the ceiling array.
1 or 2 desktop microphone arrays	2 to 3 ceiling microphone arrays	Rotate fence ceiling arrays so that the dot points to primary microphone area. Region opposite the dot is the area where unwanted sounds occur.
EagleEye™ Acoustic	1 to 2 desktop microphone arrays	Rotation does not matter; single desktop microphone array should be placed behind talker. With 2 desktop arrays, place one to the left of the talker, one to the right.
Headset	Microphone on laptop or webcam	Pickup area within a few inches of the headset microphone. Implemented on RealPresence Desktop and RealPresence Mobile.

The following examples demonstrate Acoustic Fence configurations with RealPresence Group Series microphones:

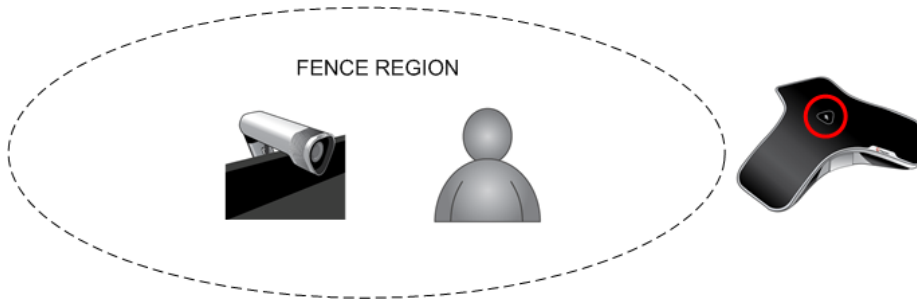
**Example One: Single Ceiling Microphone Array with RealPresence Group Series**



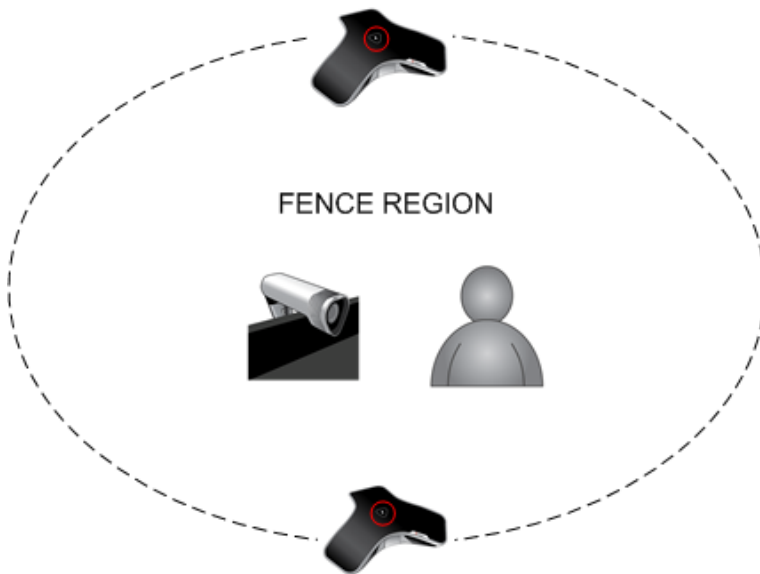
**Example Two: Central Ceiling Microphone Array or Single RealPresence Group Microphone Array**



**Example Three: Single RealPresence Group Microphone Array with EagleEye Acoustic Camera**



**Example Four: Two RealPresence Group Microphone Arrays with EagleEye Acoustic Camera**



**Polycom® Acoustic Fence with Beam Shaping Operation**

Polycom Acoustic Fence with Beam Shaping technology greatly reduces sounds outside a well-defined beam. The beam width can be varied from +/- 10 degrees to +/- 60 degrees.

It is important to choose the beam width so that talkers within the desired region do not get cut out. Start with the widest beam width and decrease the width if interfering noise is a problem. The beam width can be adjusted using by choosing a number ( 0 to 10 ) in the "Acoustic Fence Sensitivity" menu. 10 corresponds to the widest beam angle of +/- 60 degrees, while 0 corresponds to the smallest beam angle.

A single desktop microphone array or a single ceiling microphone array forms the beam by comparing the energy between the microphones in the beam direction with the energies of the other two microphones (all three microphones contained in a single array).

If two desktop arrays or two ceiling arrays are connected, then only sounds inside the intersection of the beams formed by each of the two desktop arrays or two ceiling arrays is picked up. In addition, if one desktop array and one ceiling array are hooked up, and only sound within the intersection of their two beams will be picked up.

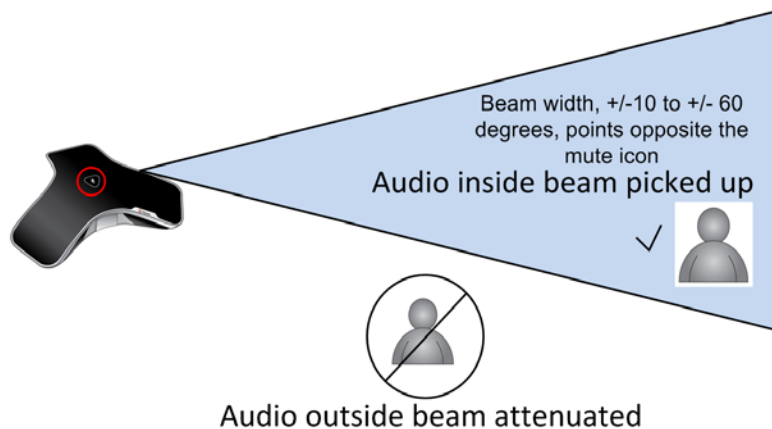
The following table describes all possible configurations with RealPresence Group Series microphones:

**Polycom Acoustic Fence with Beam Shaping Configurations**

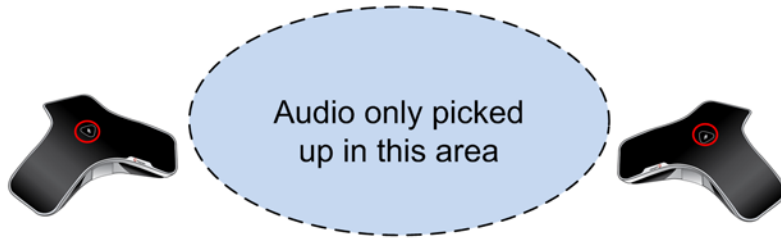
<i>Microphone</i>	<i>Configuration</i>
1 desktop microphone array	Beam points along leg with Polycom Logo.
2 desktop microphone arrays	Each array forms beam along the leg with the Polycom Logo. The intersection of the two beams is the area of pickup.
1 ceiling microphone array	Beam points in direction of the dot.
2 ceiling microphone arrays	Each array forms beam in the direction of its dot. The intersection of the two beams is the area of pickup.
1 desktop microphone array and 1 ceiling microphone array	For desktop array, beam points along leg with Polycom Logo. For ceiling array, beam points in direction of dot. The intersection of the two beams is the area of pickup.

The following examples describe layouts for the Polycom Acoustic Fence with Beam Shaping for RealPresenceGroup Series:

**Example One: Single RealPresence Group Microphone Array**

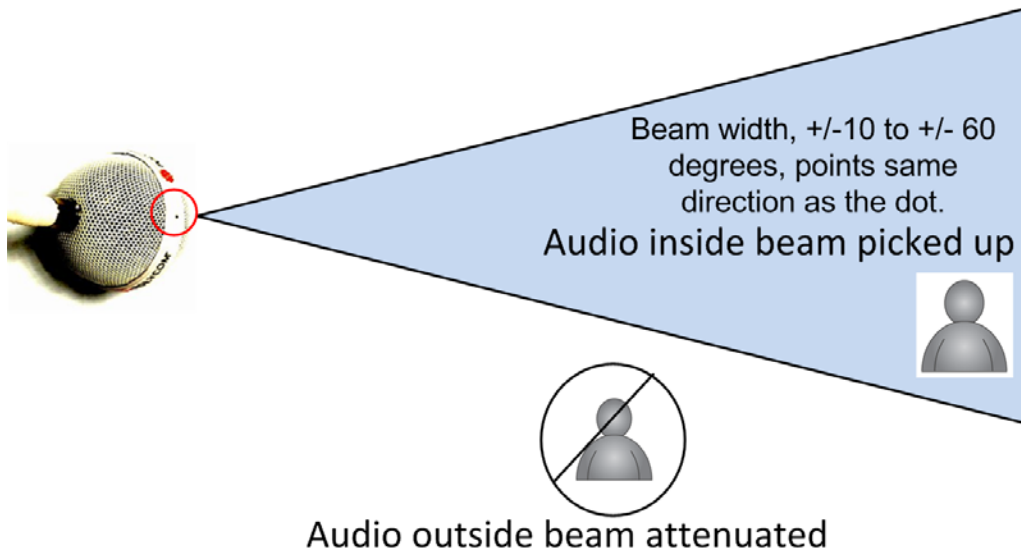


**Example Two: Two RealPresence Group Microphone Arrays**



If two RealPresence Group Series Microphone Arrays are hooked up, audio is only picked up in the area that intersects the two beams (pointing opposite the mute button on each microphone).

**Example Three: Single Ceiling Microphone Array**



**Example Four: Two Ceiling Microphone Arrays**



If two are hooked up, audio is only picked up in the area that intersects the two beams.

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