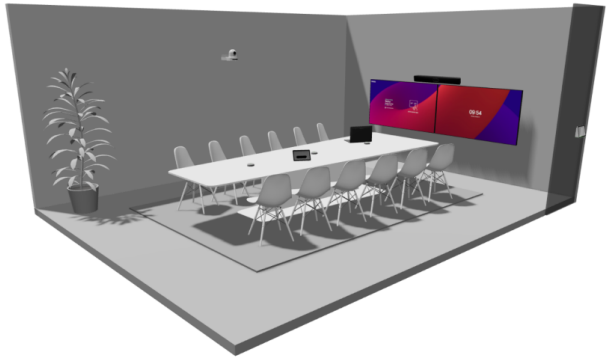
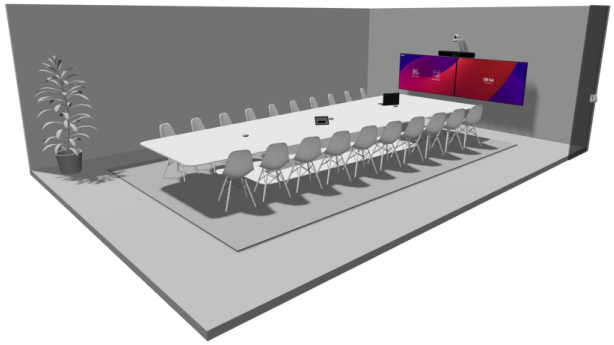
Multi Camera Setup

Room preparation guidelines for Cross-view and Extended speaker view



Cross-view



Extended speaker view

This document outlines the guidelines for a successful installation and use of Cross-view and Extended speaker view, using Cisco PTZ 4K cameras, Cisco Quad Cameras, the Cisco Codec EQ or Codec Pro, and Cisco Table microphones Pro.

These guidelines cover aspects related to room dimensions, camera positionings, and other factors such as table size, seating arrangements, microphones, acoustic considerations, and lighting.

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Cross-View

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Introduction

Cross-View

Cross-view is an AI-driven feature that brings a cinematic view to your meetings, using two PTZ 4K or two Quad cameras as side cameras, one Quad camera, one Codec EQ or Codec Pro, and Table microphones Pro. By analyzing room activity, recognizing speakers, and tracking where people are facing, the system automatically picks the best camera angle to get the best view.

Having additional cameras allows for a more comprehensive capture of discussions, even when conversations are taking place across the table, ensuring an inclusive hybrid meeting.

Please note that this setup only powers a native cross-view experience. Connecting more than one Quad Camera to any Codec is not supported for any other cases than Cross-view.

To ensure an optimal experience, it is crucial to follow the recommendations outlined in this document. The successful implementation of these guidelines is key to guaranteeing a positive and effective outcome.

Required materials

1 Room Kit EQX/Codec EQ or Codec Pro.

Power injectors or power supplies for the PTZ 4K cameras if using Codec Pro with them. See the power supplies supported in the Cisco PTZ 4K Camera Overview on the data sheet and on the Codec Pro data sheet.

Main camera: 1 Quad camera.

Side cameras: 2 PTZ 4K cameras or 2 Quad cameras.

1 PoE switch. See Configuration of switches for Cisco devices.

Minimum 3 Table microphones Pro for voice pick up and audio triangulation.

Additional materials

2 4K HDMI cables to connect the PTZ 4K cameras to the codec.

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Cross-view support across various environments

- Cross-view with side PTZ 4K cameras with Codec EQ/EQX and Codec Pro is supported on both RoomOS and MTR.
- Cross-view with side Quad Cameras with Codec EQ/EQX and Codec Pro is supported on RoomOS only.
- Combining Cross-view with side Quad Cameras and Extended speaker view with PTZ 4K on Codec Pro is supported on RoomOS only.

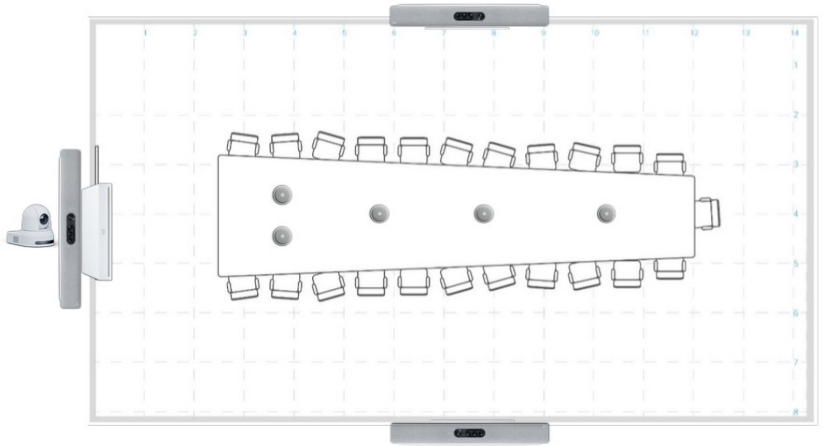

Illustration showing the combination of side Quad Cameras and Extended speaker view with PTZ 4K on Codec Pro

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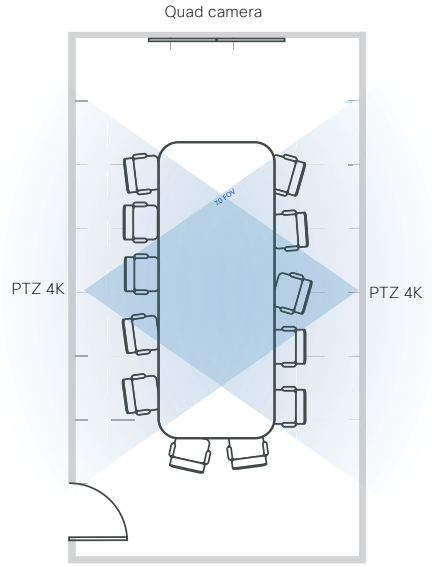
Recommended room layout with PTZ 4K

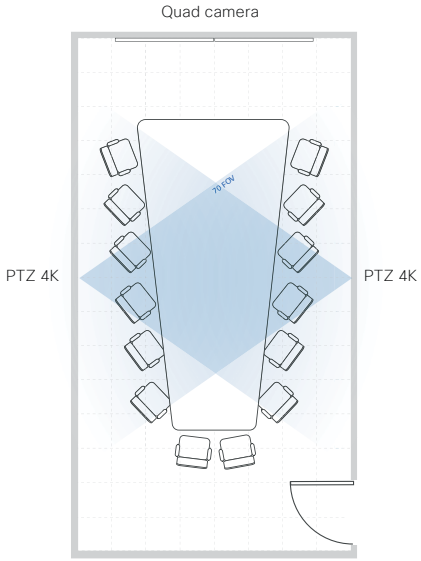
Room layout using PTZ 4K cameras as side cameras

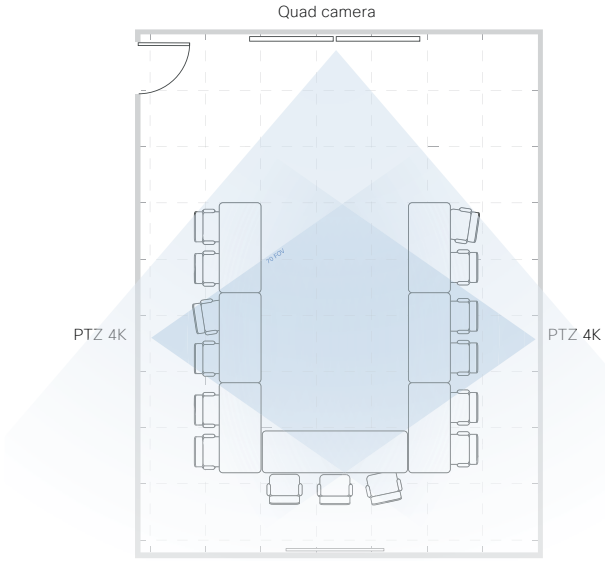
Cross-view supports long and narrow type conference rooms. The experience is designed for inclusive hybrid meetings, even as the discussion is happening across the table. For horseshoe tables, it is crucial that everyone is captured by the Quad camera.

The rooms presented below can host up to 6 people on each side depending on the size of the room. Refer to the next chapter for more details on camera positions.

Each customer is unique. It is important to involve the local workplace resources team and a Cisco certified integrator to refine details of the set-up. Some customers may have special universal design and accessibility requirements. It is important to take into account the holistic integration and avoid combining our room elements in a way that compromise accessibility.







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Recommended camera positions for PTZ 4K

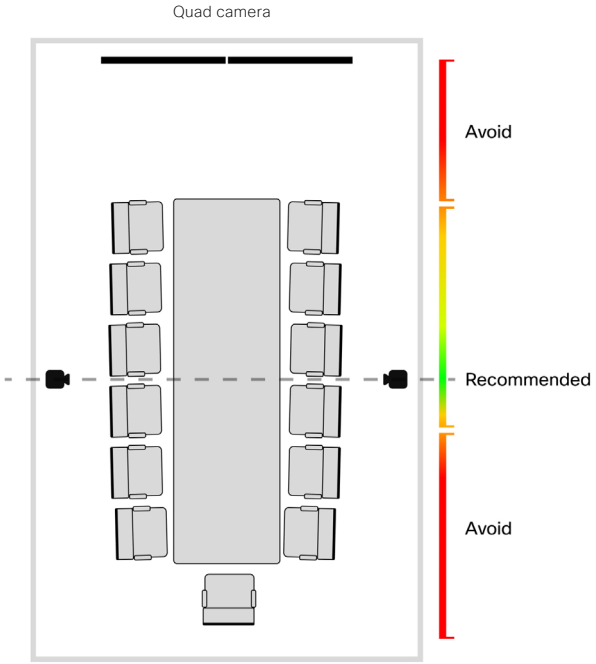
Camera positions using PTZ 4K cameras

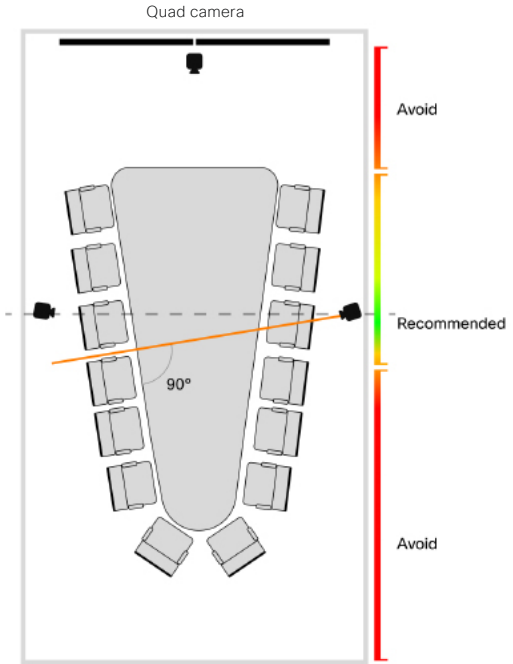
The PTZ 4K cameras need to be **mounted level**. Place the camera centered on the length of the table. If the room doesn't allow to center the camera, you can move the cameras slightly closer to the main video system side of the room. In-room meeting participants must be positioned within the field of view of the Quad Camera in addition to one of the two PTZ 4K cameras for the feature to work optimally. The participant sitting at the table end only needs to be framed by the Quad Camera.

The PTZ 4K cameras willl use digital pan, tilt, and zoom to frame speakers. There will be no physical movement of the cameras.

Mount the PTZ 4K cameras with the ceiling mount if you have a glass wall or a room narrower than 4 m. / 157 in. The PTZ 4K has limited tilt downwards when mounted with the wall bracket underneath.

The side cameras can capture 5 people in a 4.5 m. / 177 in. wide room, and 6 people in a wider room (5.5 m. / 216,5 in. or wider).





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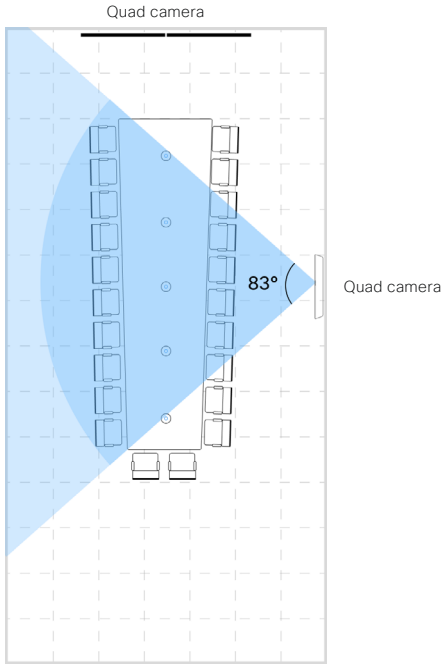
Recommended room layout with Quad cameras

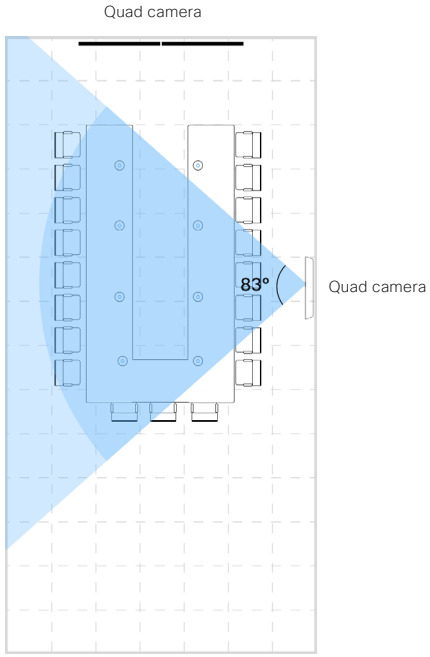
Room layout using Quad cameras as side cameras

Cross view supports long and narrow type conference rooms. The experience is designed for inclusive hybrid meetings, even as the discussion is happening across the table. For horseshoe tables, it is crucial that everyone is captured by the main Quad camera.

Refer to the next chapter for more details on camera positions.

Each customer is unique. It is important to involve the local workplace resources team and a Cisco certified integrator to refine details of the set-up. Some customers may have special universal design and accessibility requirements. It is important to take into account the holistic integration and avoid combining our room elements in a way that compromise accessibility.





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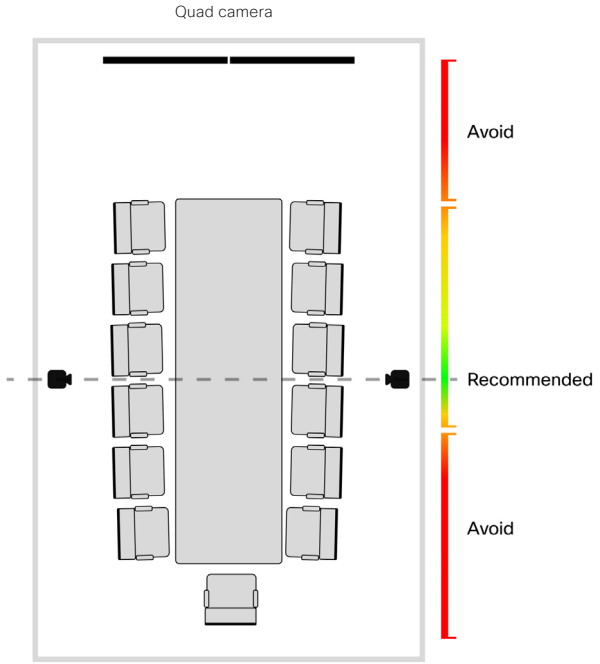
Recommended camera positions for Quad cameras

Camera positions using Quad cameras

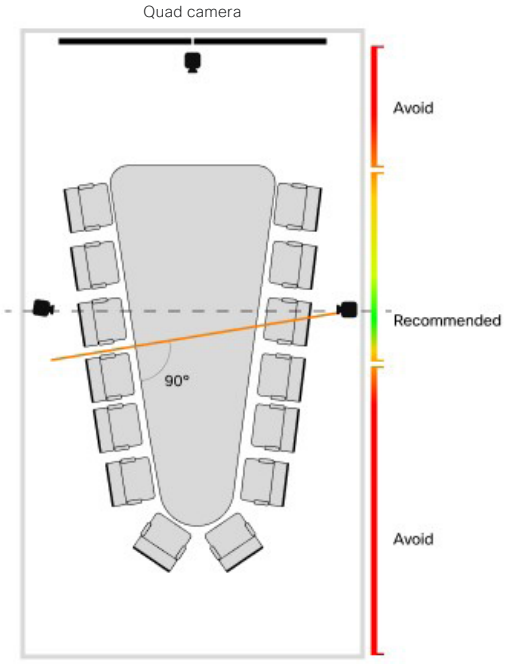
The Quad cameras need to be **mounted level**. Place the camera centered on the length of the table. If the room doesn't allow to center the camera, you can move the cameras slightly closer to the main video system side of the room. In-room meeting participants must be positioned within the field of view of the Quad Camera in addition to one of the two side Quad cameras for the feature to work optimally. The participant sitting at the table end only needs to be framed by the main Quad Camera.

The Quad cameras willl use digital pan, tilt, and zoom to frame speakers. There will be no physical movement of the cameras.

The side cameras can capture 6 people in a room that is 4.5 meters (177 inches) wide and 7 people in a room that is 5.5 meters (216.5 inches) wide. Thanks to the Quad camera's zoom capabilities, they can be used in even wider rooms, accommodating more people. The camera has a close-up range of 6 meters and a range of 9 meters for capturing two people.



Side camera lens height: 2,15 m



Consider moving the camera slightly towards the display for tapered tables. (given that participants are still within the horizontal field of view)

Side camera lens height: 2,15 m

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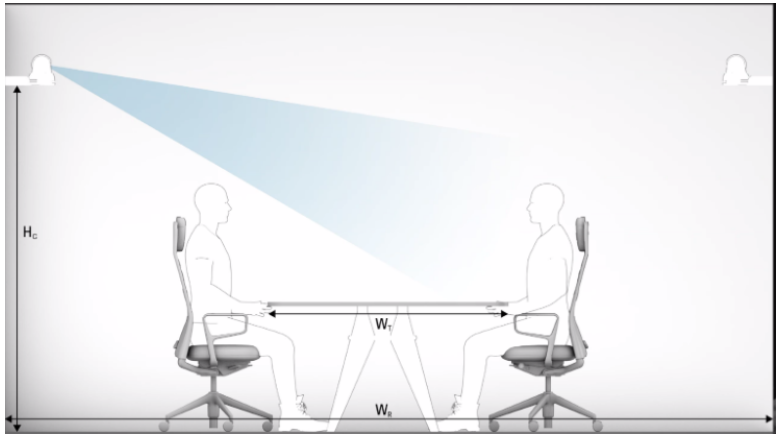
Recommended camera heights for side cameras

In accordance with ADA (Americans with Disabilities Act) guidelines, it is crucial to follow specific requirements when installing the PTZ 4K or Quad cameras. In addition to maintaining a minimum height of 203 cm / 80 in. for camera placement, consider factors such as clear pathways and unobstructed views to enhance accessibility for all users, regardless of mobility or visual impairments.

Note: If the cameras need to be positioned at a lower height, ensure the presence of physical barriers to prevent contact with the camera, such as placing a drawer beneath it.

Tip: The PTZ 4K can be mounted upside down with the Cisco PTZ 4K ceiling mount.



Parameters to consider

- Field of view of the cameras
- PTZ 4K has a 70° horizontal field of view and a 43° vertical field of view.
- Quad Camera has a 83° horizontal field of view and 51.5° vertical field of view.
- Width of the meeting room (WR)
- Width of the table (WT).
- Mounting height of the side cameras

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Ideal camera height for common meeting room sizes

The camera height is measured from lowest point of the camera unit. The recommendations below are given based on a symmetrical room layout with a rectangular table.

It's important to consider that these are approximate values.

Tip: wider tables give a more natural viewing angle to the subject.

Ideal camera height in cm

		Table width			
		120	**140**	**160**	**180**
Room width	**400**	195*	179*	168*	N/A**
	450	208	190*	178*	169*
	500	221	202	188*	178*
	550	235	213	198*	187*
	600	248	225	207	196*
	650	262	236	217	205

* Recommended height when physical barriers are in place to prevent accidental contact with the camera.

** Too narrow room for this table size.

Ideal camera height in in.

		Table width			
		47	**55**	**63**	**71**
Room width	**157**	77*	70*	66*	N/A**
	177	82	75*	70*	67*
	197	87	80	74*	70*
	217	93	84	78*	74*
	237	98	89	82	77*
	257	101	93	85	81

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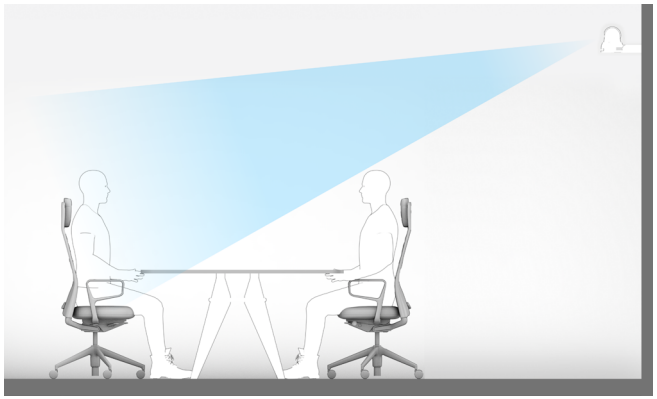
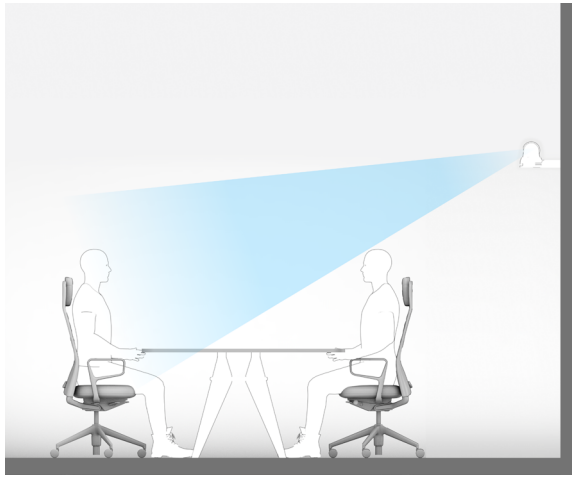
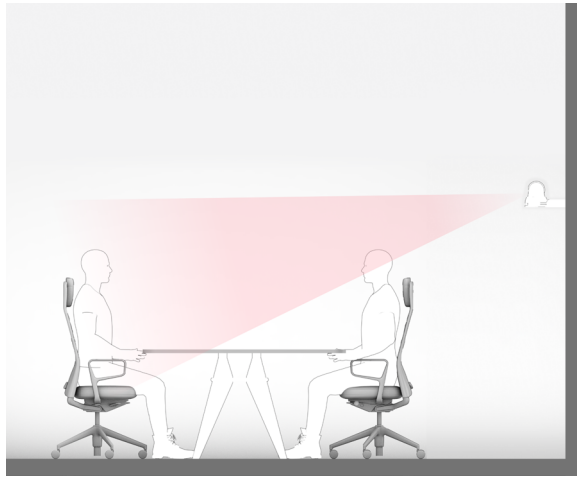


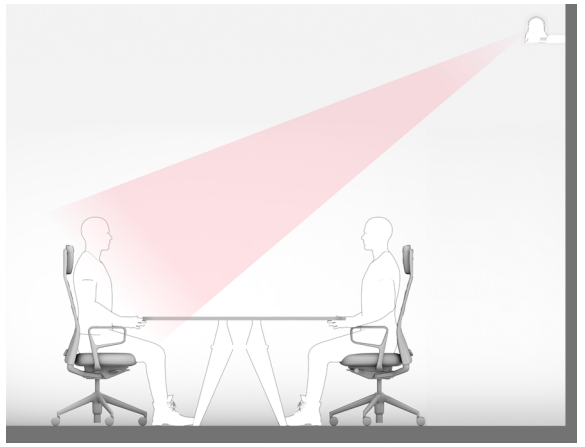
Wide room



Narrow room



The camera is too low



The camera is too high

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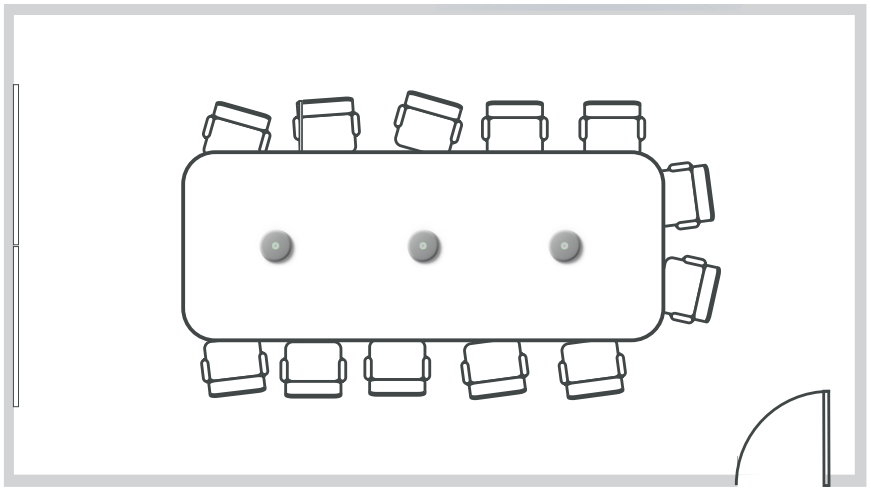
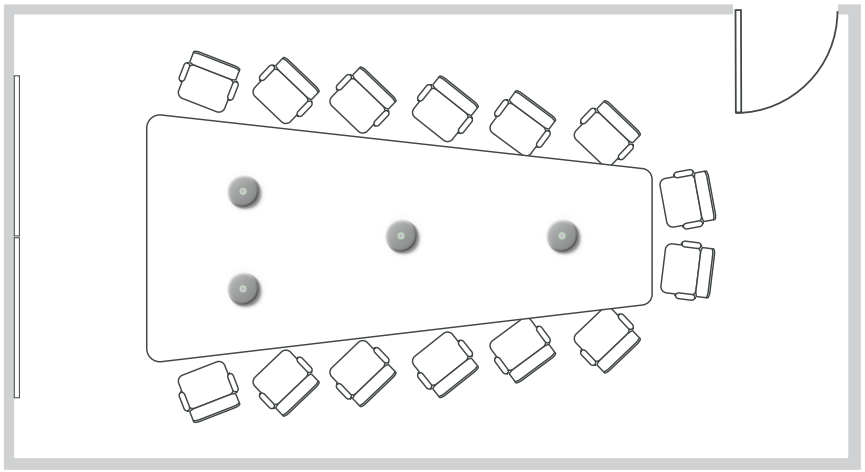
Microphones considerations





You need 3 to 6 table microphones depending on the table width. For tables wider than 1.8 m / 70.8 in., consider adding two lanes of microphones.

If your Room Kit EQX has analog microphones, we recommend you to remove them.

See the Cisco Table Microphone Pro installation guide for more information.

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Connecting the cables

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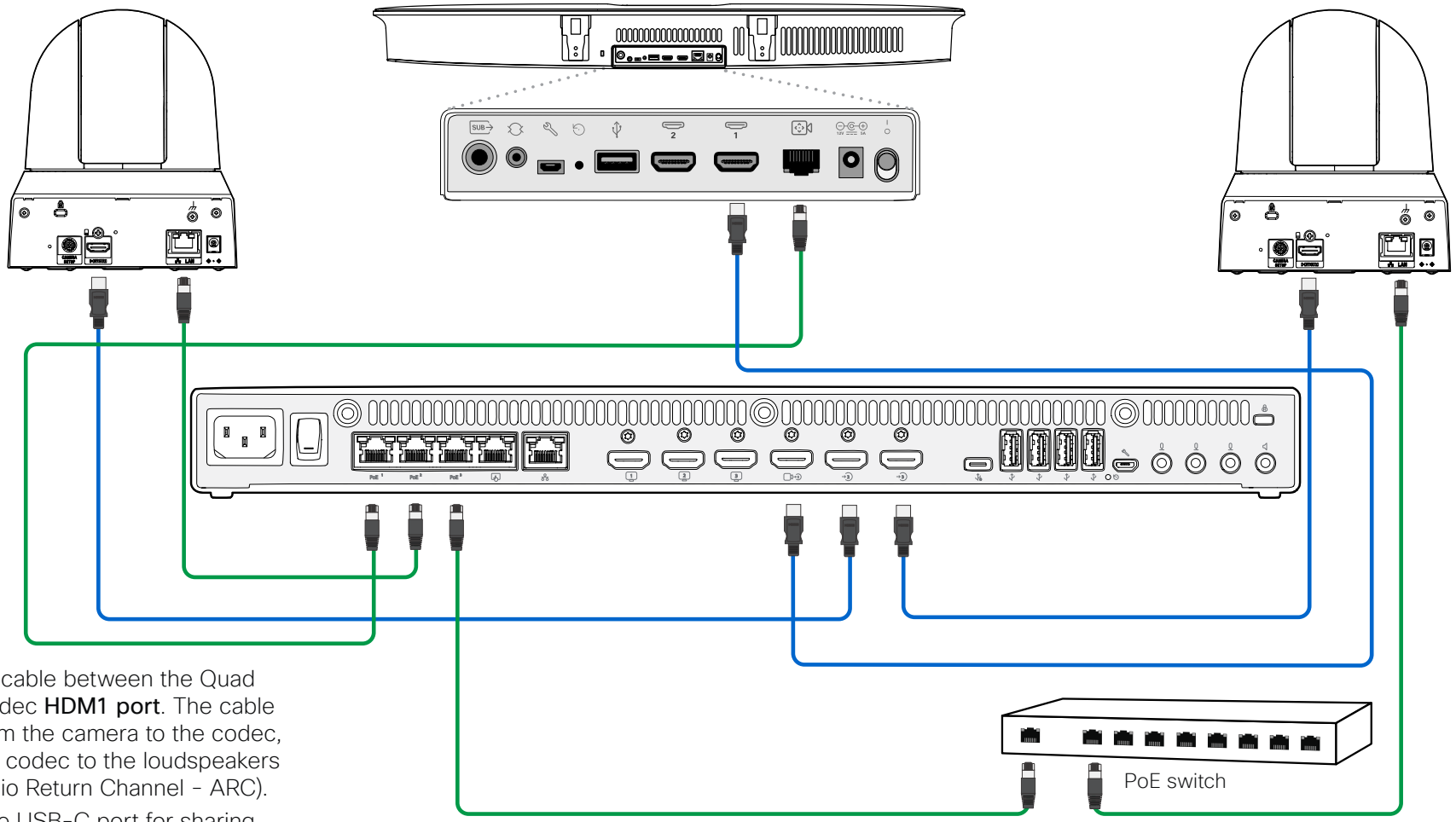
Connect PTZ 4K cameras to Codec EQ



- Connect the HDMI cable between the Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel - ARC).
- You need to use the USB-C port for sharing content.
- See the Configuration of switches for Cisco devices.

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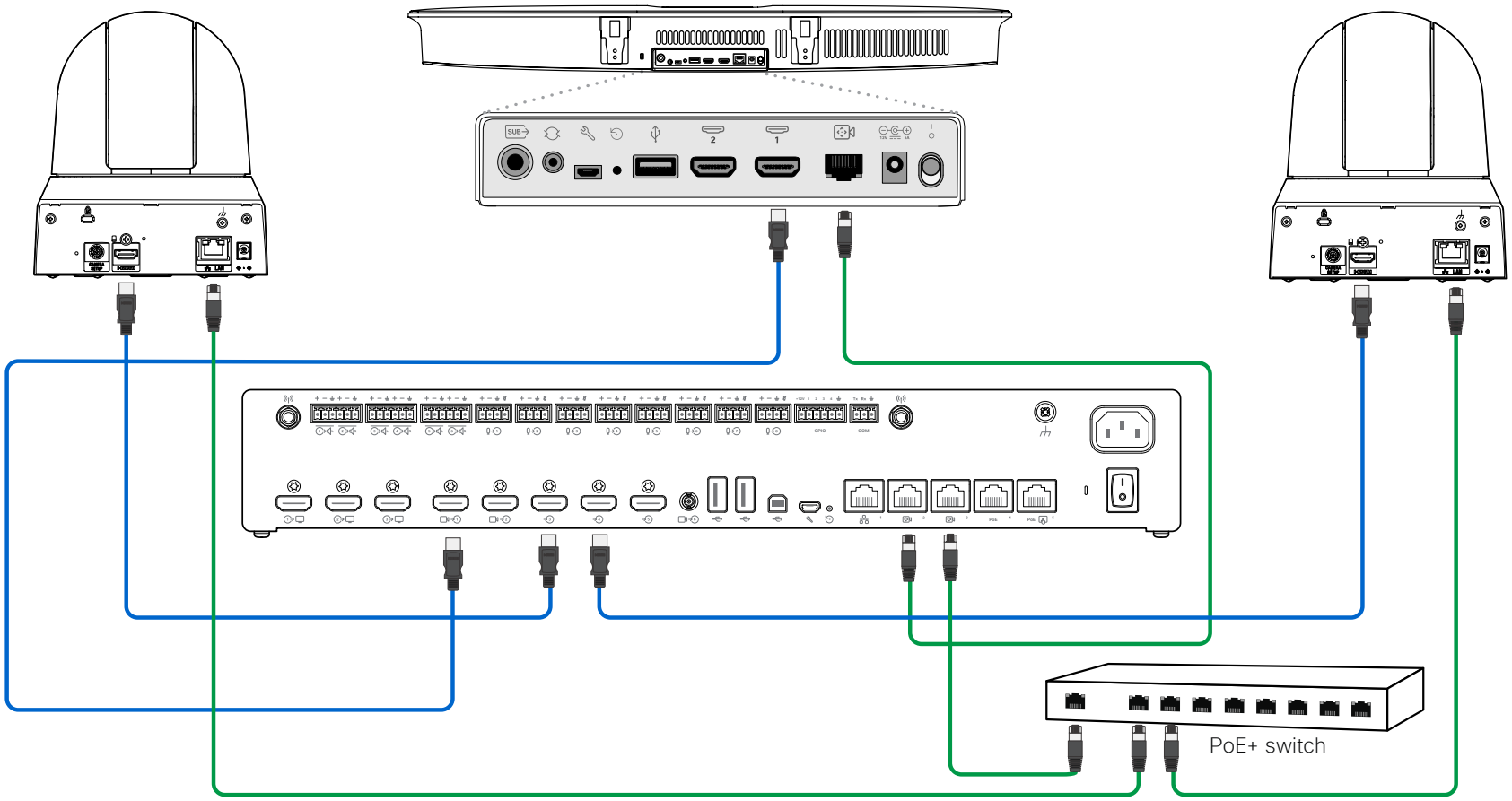
Connect PTZ 4K cameras to Codec Pro



- Connect the HDMI cable between the Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel – ARC).
- See the Configuration of switches for Cisco devices.
- Make sure to use a switch that supports PoE+. You can also use a power injector for each PTZ 4K or use the PTZ 4K power supplies. That is because the Codec Pro ethernet is PoE and the PTZ 4K requires PoE+.

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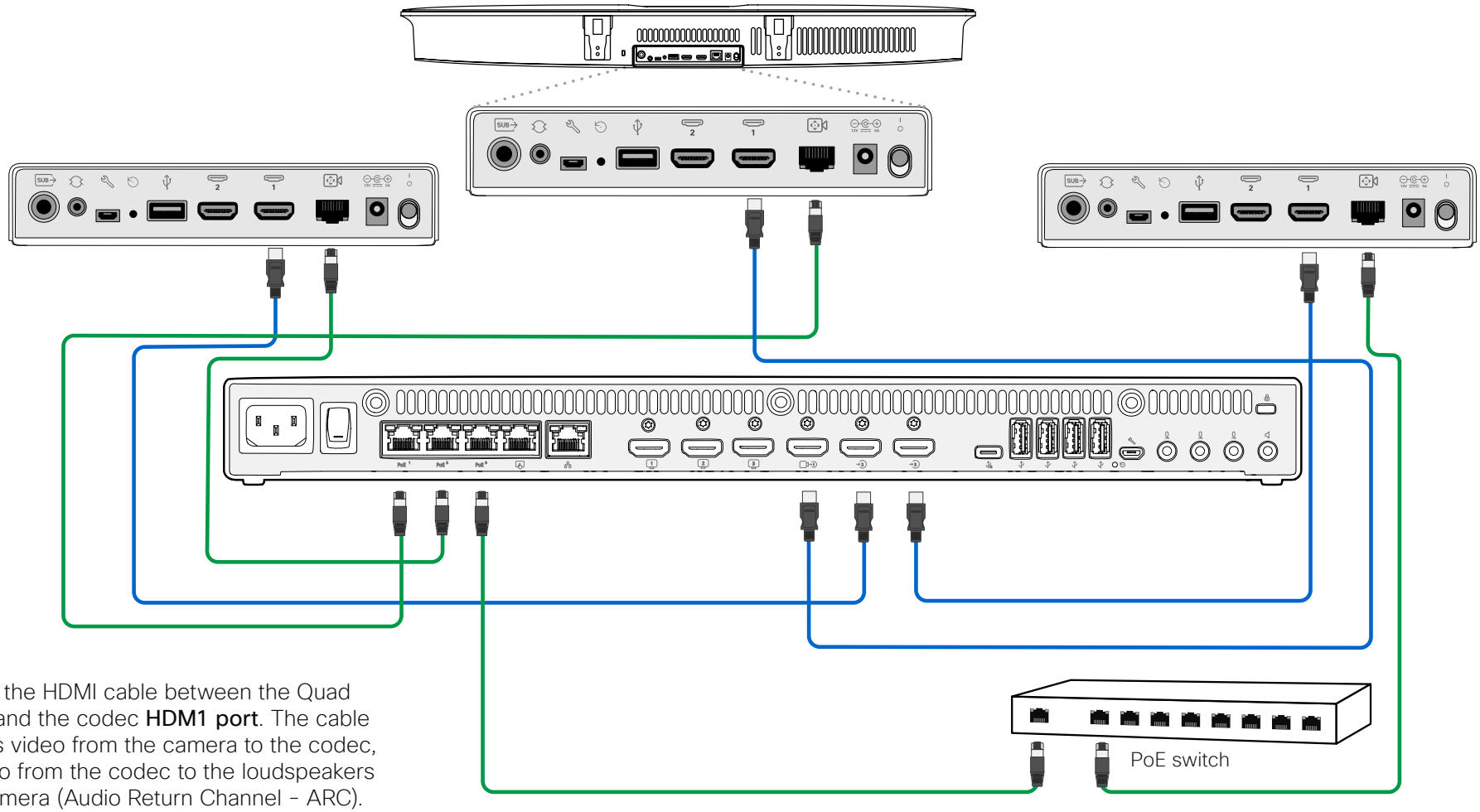
Connect Quad cameras to Codec EQ



- Connect the HDMI cable between the Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel - ARC).
- You need to use the USB-C port for sharing content.
- See the Configuration of switches for Cisco devices.

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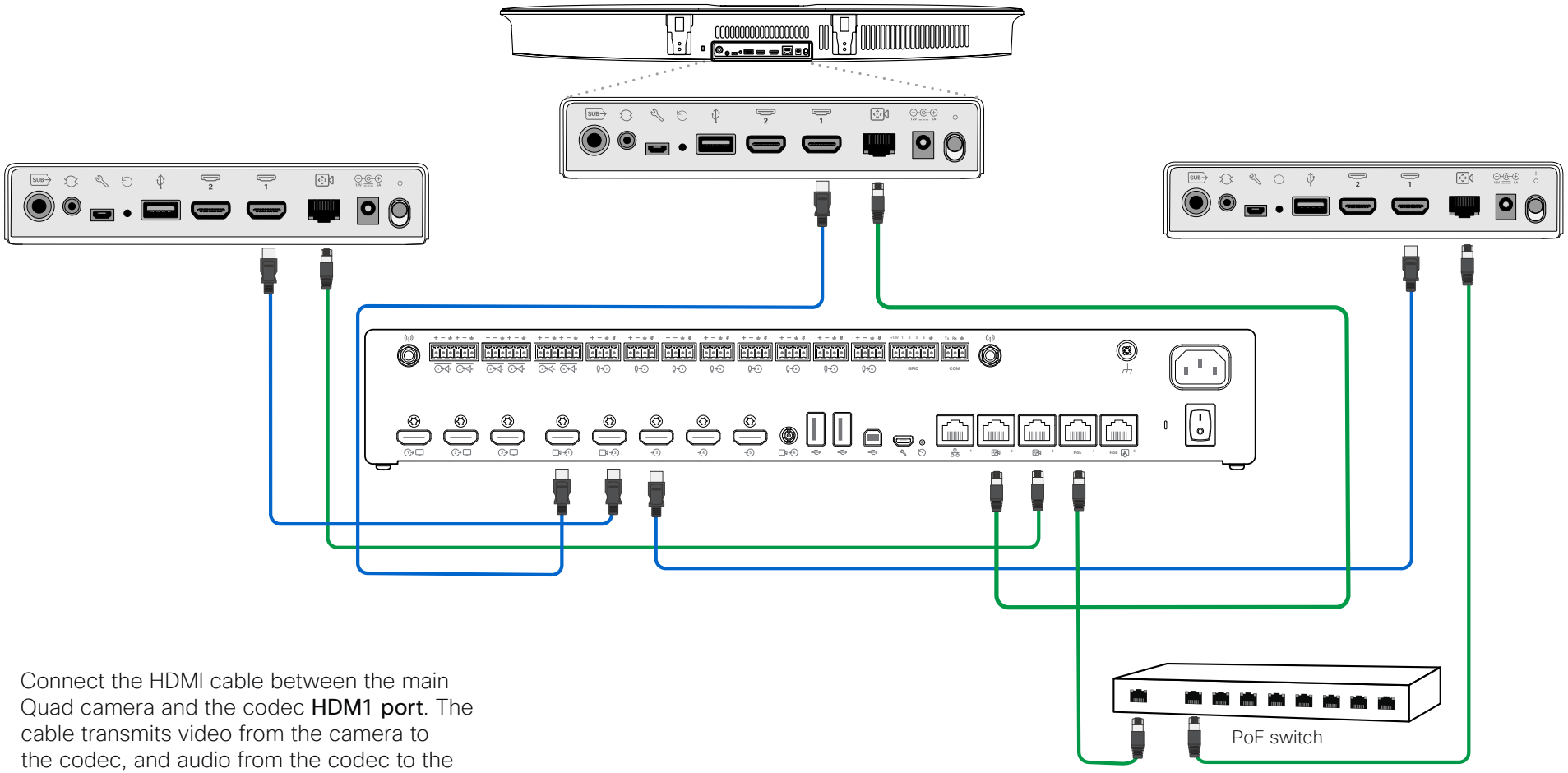
Connect Quad cameras to Codec Pro



- Connect the HDMI cable between the main Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel – ARC).
- See the Configuration of switches for Cisco devices.

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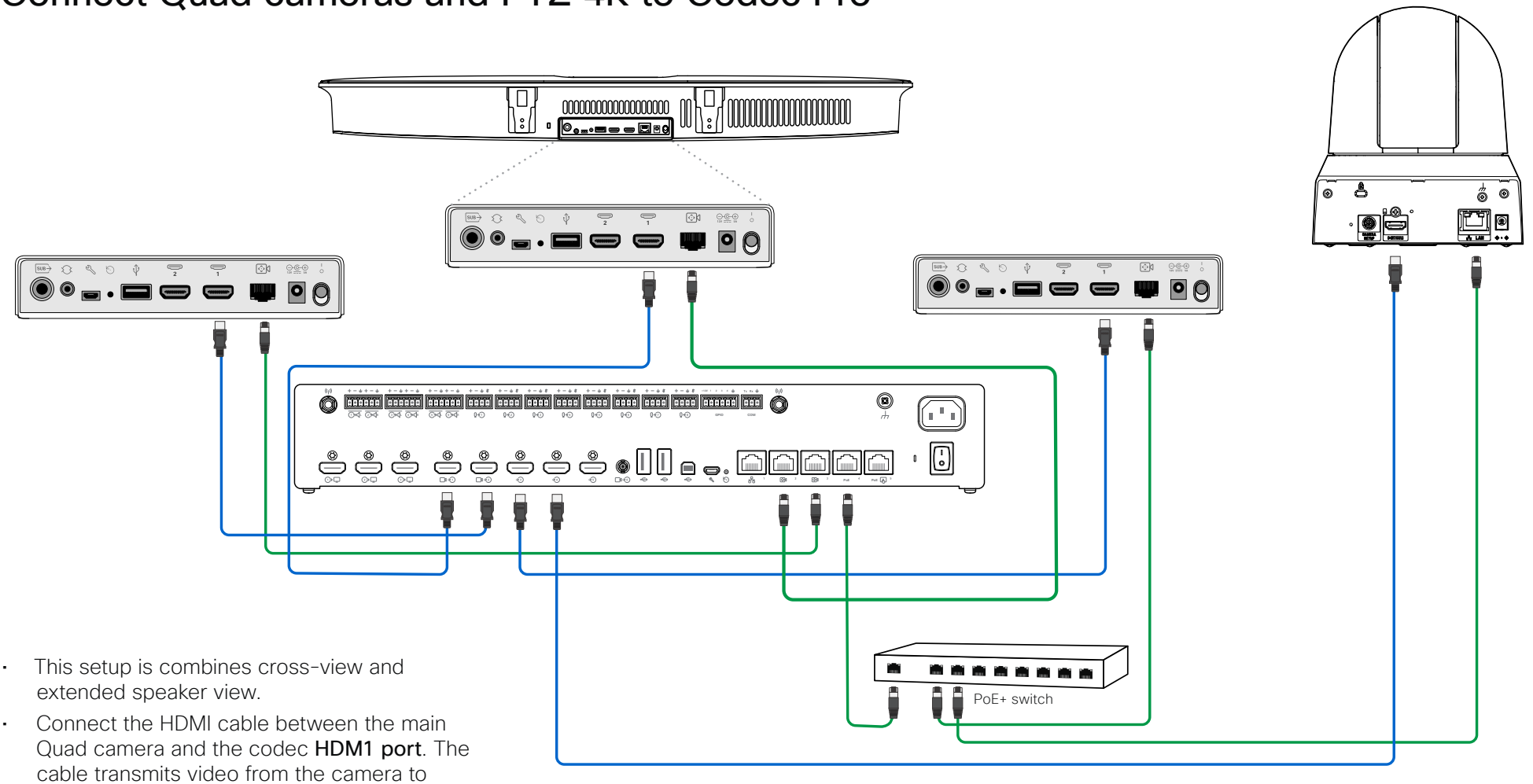
Connect Quad cameras and PTZ 4K to Codec Pro



- This setup is combines cross-view and extended speaker view.
- Connect the HDMI cable between the main Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel – ARC).
- See the Configuration of switches for Cisco devices.

- Make sure to use a switch that supports PoE+. You can also use the PTZ 4K power supplies. That is because the Codec Pro ethernet is PoE and the PTZ 4K requires PoE+.

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Extended speaker view

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Introduction

Extended speaker view

The Extended Speaker View feature enhances video conferencing by providing high-quality close-ups of all participants, including those seated at the far end of a long table. This is achieved using a PTZ 4K camera mounted above a Quad camera, a Codec EQ or Codec Pro, and Table Microphones Pro.

Adaptive speaker tracking and intelligent framing by the Cisco Quad Camera and the Cisco PTZ 4k pan-tilt-zoom camera capture the active speaker and other in-room participants, even in the largest spaces.

All intelligence related to camera switching and control is run locally on the RoomOS device meaning that Extended speaker view also works with other meeting plaforms than Webex, such as Microsoft Teams Room (MTR).

To ensure an optimal experience, it is crucial to follow the recommendations outlined in this document. The successful implementation of these guidelines is key to guaranteeing a positive and effective outcome.

Required materials

1 Room Kit EQX/Codec EQ or Codec Pro.

1 Power injector or power supplies for the PTZ 4K camera if using Codec Pro with it. See the power supplies supported in the Cisco PTZ 4K Camera Overview on the data sheet and on the Codec Pro data sheet.

1 Quad camera (main camera).

1 PTZ 4K camera.

Minimum 3 Table microphones Pro for voice pick up and audio triangulation.

Additional materials

1 4K HDMI cable to connect the PTZ 4K camera to the codec.

1 PoE switch (optional). See Configuration of switches for Cisco devices.

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Recommended room layout

Room layout

Extended speaker view supports long and narrow type conference rooms. The experience is designed for inclusive hybrid meetings, even as the discussion is happening at the end of the table.

- For tight close-ups of participants across the whole room, the ideal distance from the camera to the end of the table is up to 6.4 meters. With extended reach, this close-up range can be extended to 9 meters.
- For capturing a slightly wider 2-person frame, the effective range can be extended from 9 m to 15 meters.

Long and narrow tables are ideal for this setup, as they allow the cameras to efficiently capture participants along the length of the table.

See the next pages to for different exemples of room layout.

Each customer is unique. It is important to involve the local workplace resources team and a Cisco certified integrator to refine details of the set-up. Some customers may have special universal design and accessibility requirements. It is important to take into account the holistic integration and avoid combining our room elements in a way that compromise accessibility.

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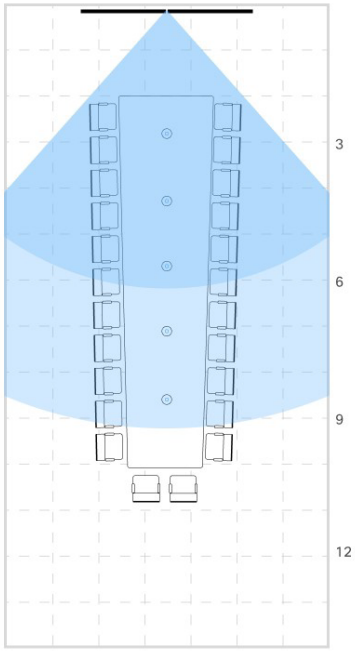
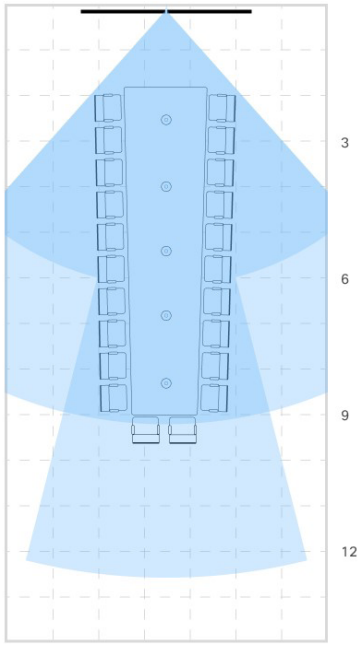


Quad camera reach

On the left, the coverage range achieved using only the Cisco Quad Camera.



Extended speaker view

With Extended speaker view, you can enhance the video system's reach by incorporating a Cisco PTZ 4K camera above the Quad camera. This addition captures participants located further from the video system. To the left, you can see an example of the combined coverage provided by the Cisco Quad Camera and the Cisco PTZ 4K camera. This setup provides a closeup of everyone around the table.

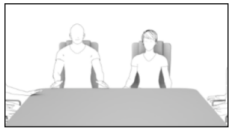
You can extend the close-up range to up to 9 meters, or achieve two-person framing at distances of up to 15 meters, depending on your room setup.

Close-up range

The dark blue area highlights the area where the camera can provide close-up of people talking. Frame width at target: 1,5 meter.

2-person range

The light blue area highlights the area where the camera can provide a 2-person framing. Frame width at target: 2,1 meter.



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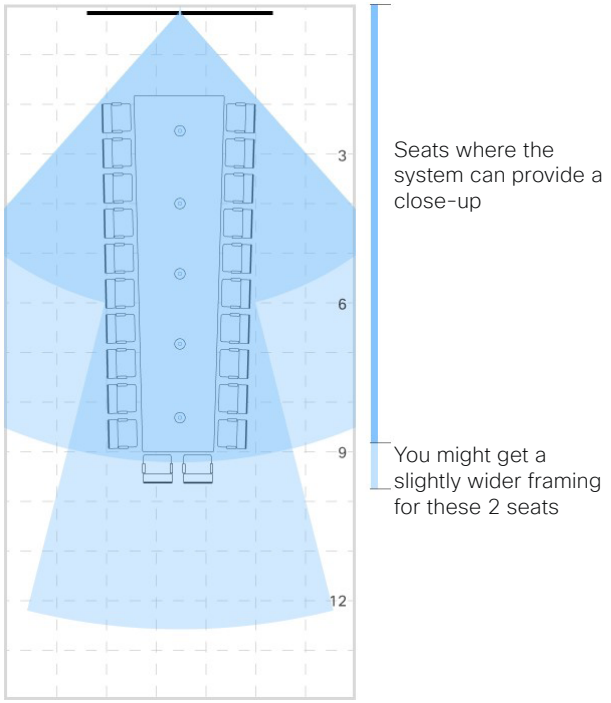
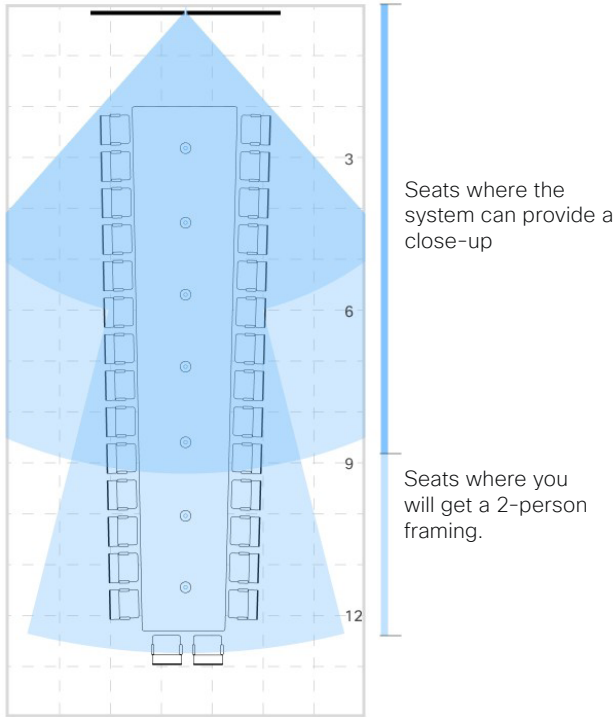
Here are a few practical examples showing how you can combine Cisco Quad camera with Cisco PTZ 4K. Depending on your desired end result you can select a wider coverage with a shorter reach, or a more narrow coverage with longer reach.

Get a close-up of each participant



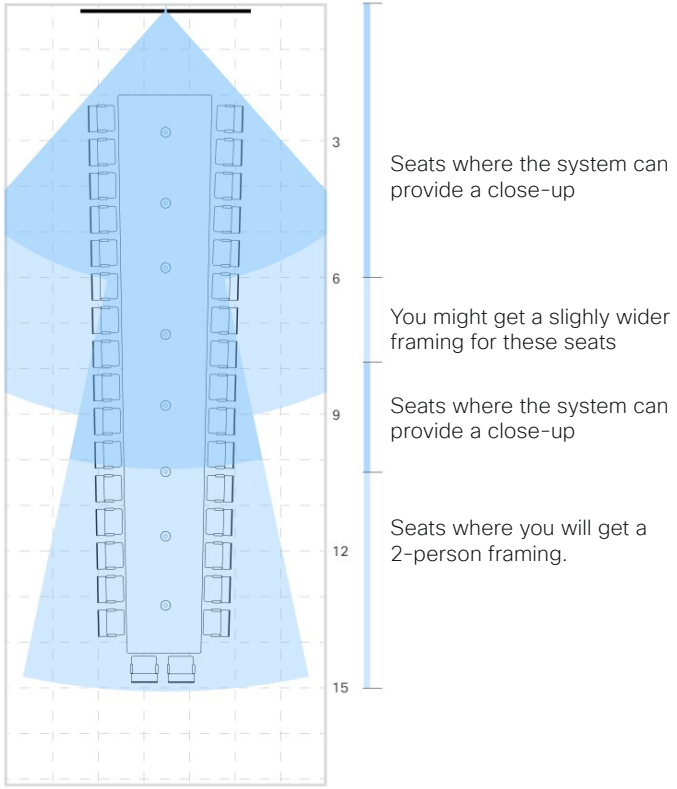
28 HFOV
1 person reach up to 9 meter
2 person reach up to 12,5meter

Optimized reach for a longer table



28 HFOV
1 person reach up to 9 meter
2 person reach up to 12,5meter

Maximum room size for 2-person reach



24 HFOV
1 person reach up to 10,6 meter
2 person reach up to 14,8 meter

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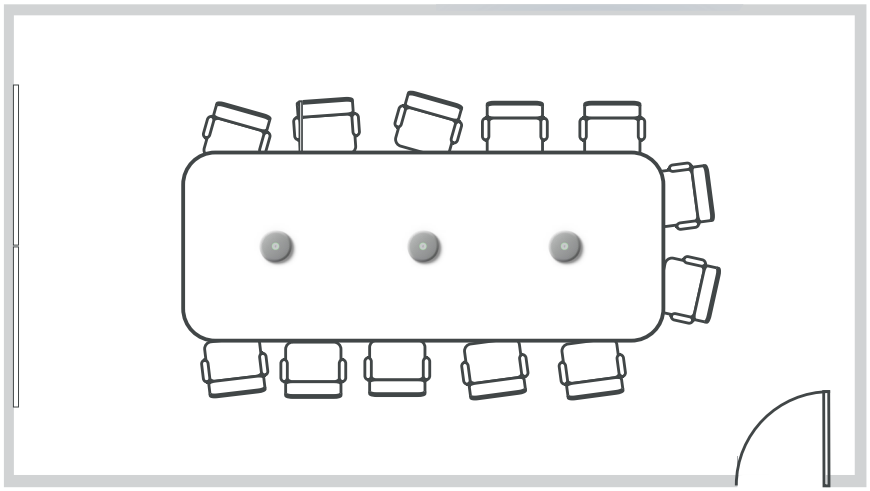
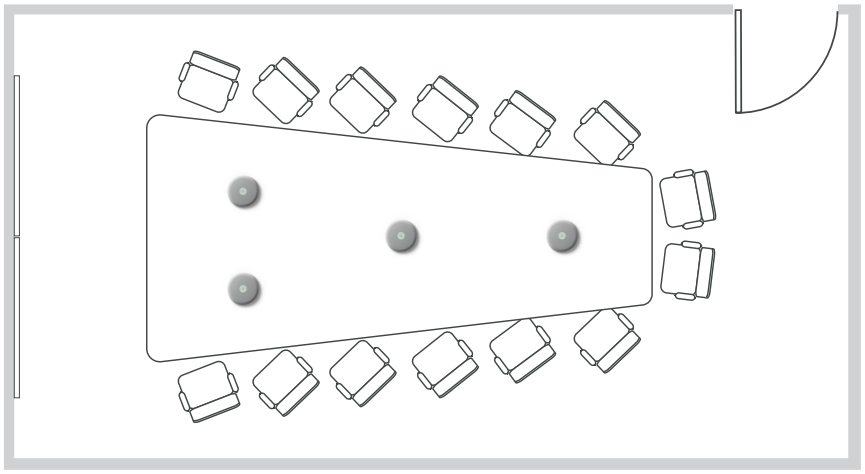
Microphones considerations





You need 3 to 8 table microphones depending on the table width. For tables wider than 1.8 m / 70.8 in., consider adding two lanes of microphones.

If your Room Kit EQX has analog microphones, we recommend you to remove them.

See the Cisco Table Microphone Pro installation guide for more information.

Known limitation: if the microphones are in a straight line, the audio tracking accuracy will not be optimal for the seat directly behind the microphone. As a workaround, you can place two chairs behind the microphone as shown in the first illustration. This is because the position slightly on the side of the microphone will have accurate audio tracking. This is temporary and will be fixed in the upcoming releases.

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Connecting the cables

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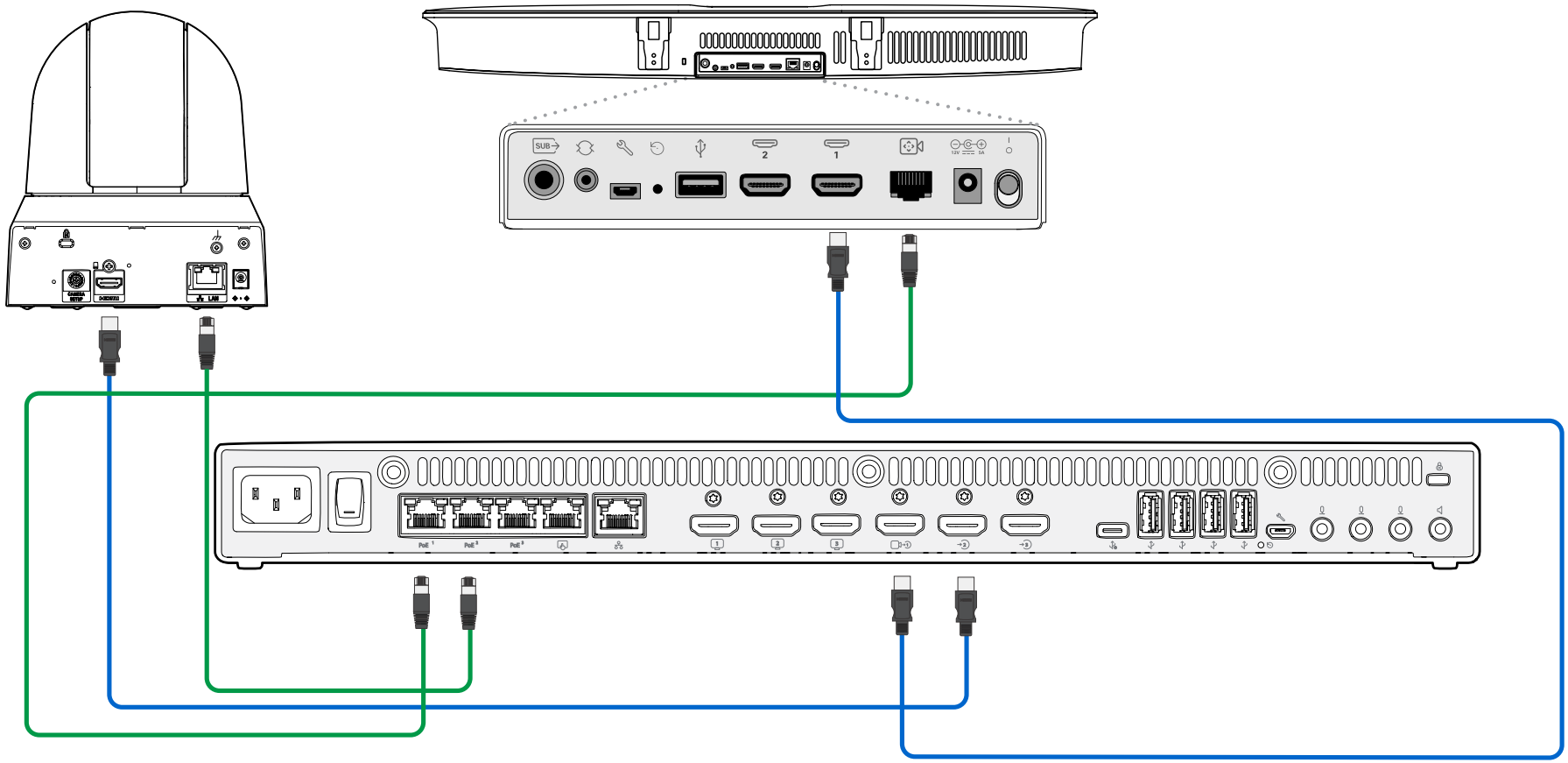
Connect PTZ 4K camera to Codec EQ



- Connect the HDMI cable between the Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel - ARC).
- You need to use the USB-C port for sharing content.
- See the Configuration of switches for Cisco devices.

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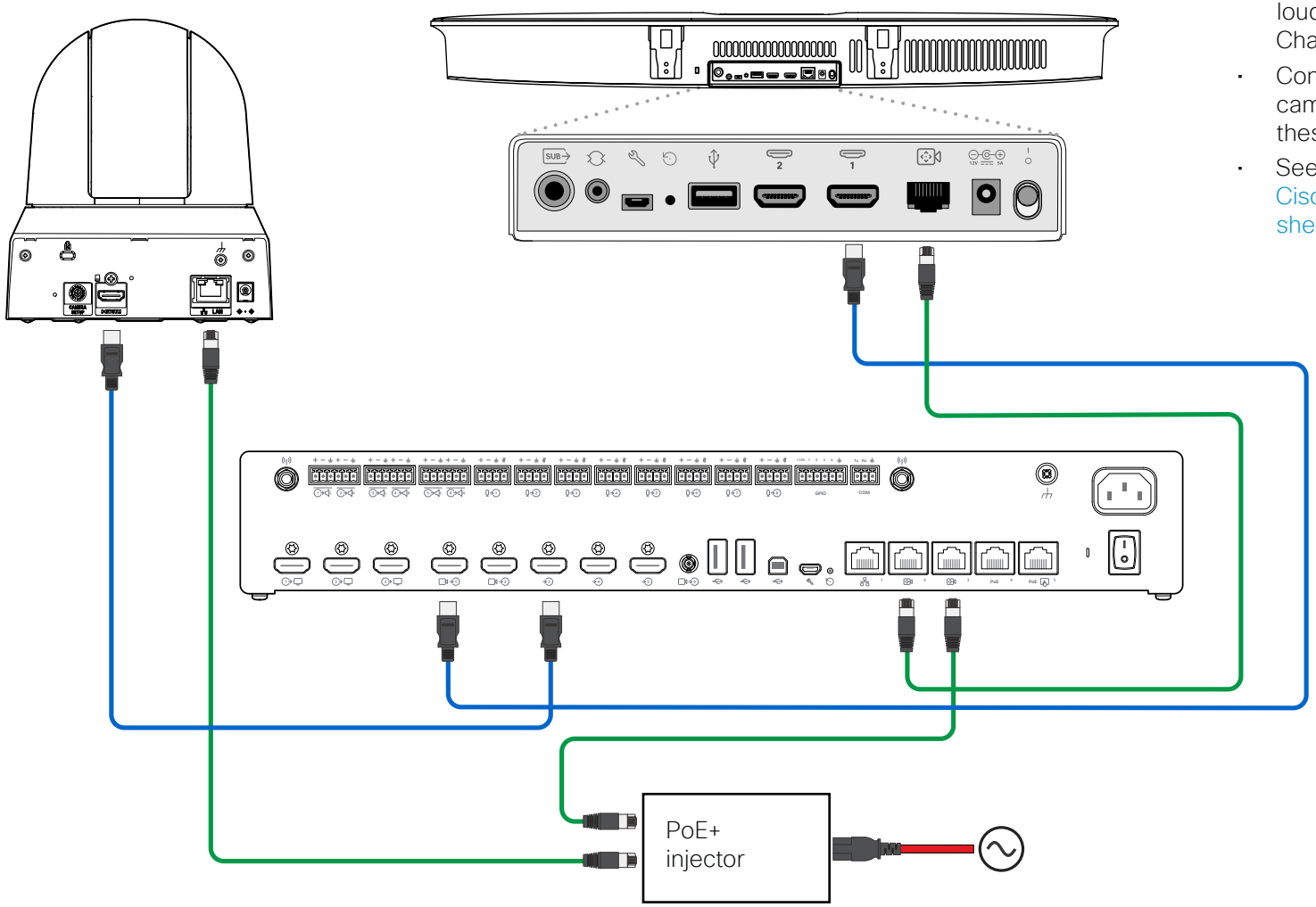
Connect PTZ 4K camera to Codec Pro



- Connect the HDMI cable between the Quad camera and the codec **HDMI 1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel – ARC).
- Connect the HDMI cable between the PTZ4K camera and the codec HDMI 3, 4, or 5, as these ports support 4K.
- See the power supplies supported in the Cisco PTZ 4K Camera Overview on the data sheet.

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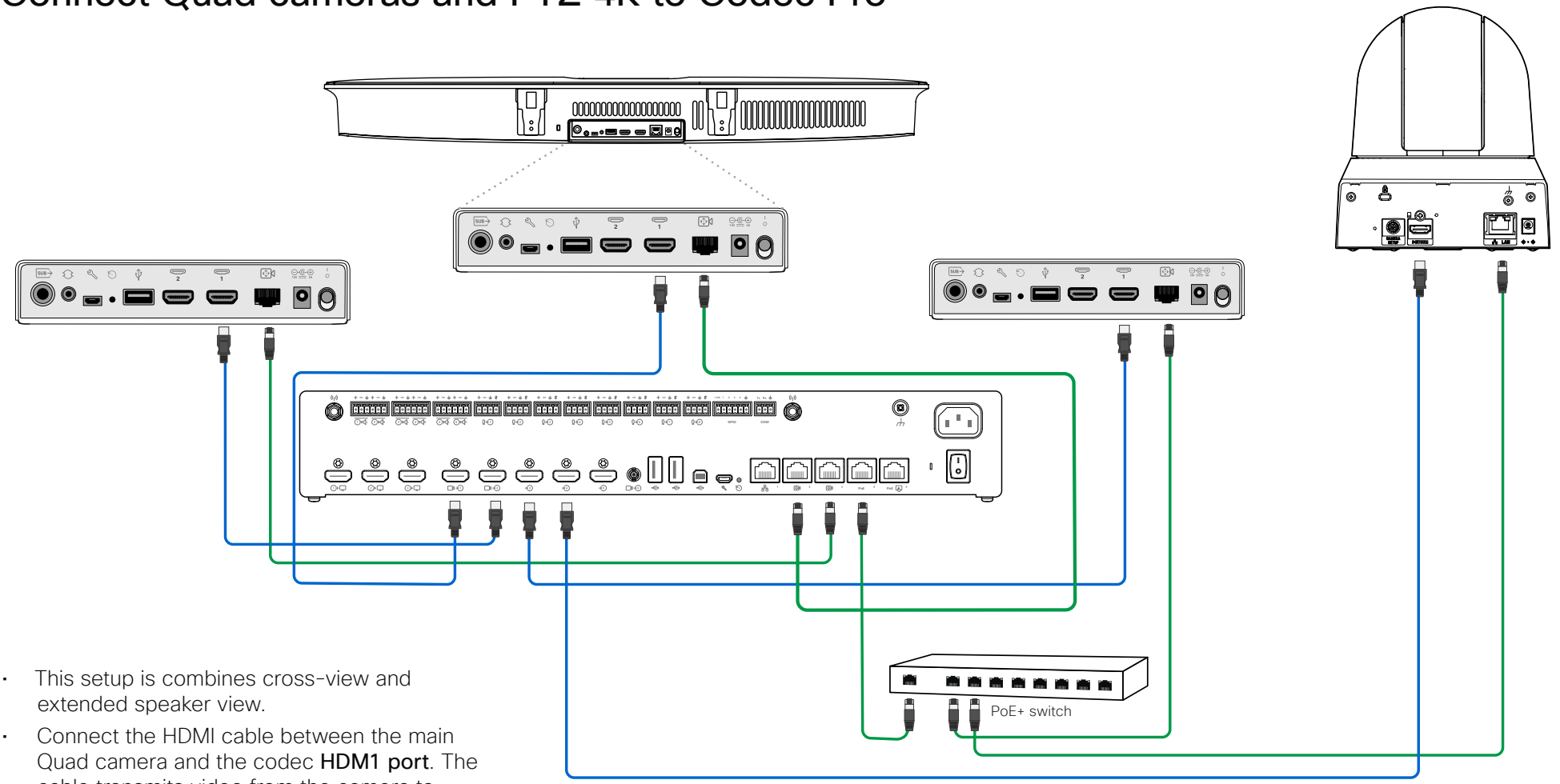
Connect Quad cameras and PTZ 4K to Codec Pro



- This setup is combines cross-view and extended speaker view.
- Connect the HDMI cable between the main Quad camera and the codec **HDM1 port**. The cable transmits video from the camera to the codec, and audio from the codec to the loudspeakers in the camera (Audio Return Channel – ARC).
- See the Configuration of switches for Cisco devices.

- Make sure to use a switch that supports PoE+. You can also use the PTZ 4K power supplies. That is because the Codec Pro ethernet is PoE and the PTZ 4K requires PoE+.

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Software setup

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Cross-view

Software setup

In the software setup you will be asked to input the height of the cameras, measuring from the floor to the center of the camera lens. You will beed a measuring tape or laser measure.

1. Set the cameras resolution

Before starting the setup wizard, make sure the output resolution for Cisco PTZ 4K is set to 4K: **xConfiguration Cameras Camera[N] VideoFormat: 3840_2160_30.** Go in and out of standby for the configuration to work.

Since the Ciso PTZ 4K is set to 4K, you also need to set **xConfiguration Video Input Connector[N] RGBQuantizationRange** to **Limited**. Make sure to set on the connectors where the PTZ 4K are connected.

2. Multi camera director setup

Once the hardware is installed, you can start the software setup in the **Device settings** by toggling on **Multi Camera Director** on the Room Navigator and follow the setup wizard.

3. External microphones voice tracking

In the new Settings menu, select **External microphones voice tracking** and follow the instructions to use the Table Microphones Pro to track the position of the speaker. This allows better video framing.

Start the cross-view experience

When the software setup is completed you can enable this feature from the camera settings in the control panel. Select **Speaker mode** to get the cross-view experience.

Configurations

To get the cross-view experience as default set **xConfiguration Cameras SpeakerTrack DefaultBehavior** to **Closeup** from Control Hub or the device web interface.

When the software setup is complete, make sure these configurations are set for **all** camera inputs:

xConfiguration Video Input Connector [N] PresentationSelection: Manual

xConfiguration Video Input Connector [N] InputSourceType: Camera

xConfiguration Video Input Connector [N] CameraControl Mode: On

xConfiguration Video Input Connector [N] Quality: Motion ***(optional)***

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Extended speaker view

Software setup

In the software setup you will be asked to input the height of the cameras, measuring from the floor to the center of the camera lens. You will need a measuring tape or laser measure.

1. Before starting the setup wizard

Make sure the output resolution for Cisco PTZ 4K is set to 4K:
xConfiguration Cameras Camera[N] VideoFormat: 3840_2160_30. Go in and out of standby for the configuration to work.

Since the Ciso PTZ 4K is set to 4K, you also need to set **xConfiguration Video Input Connector[N] RGBQuantizationRange** to **Limited**. Make sure to set on the connectors where the PTZ 4K are connected.

2. Multi camera director setup

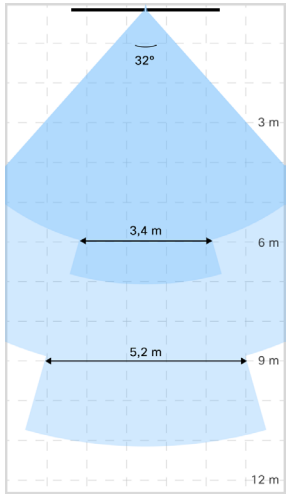
Once the hardware is installed, you can start the software setup in the **Device settings** by toggling on **Multi Camera Director** on the Room Navigator and follow the setup wizard.

Setting the camera view

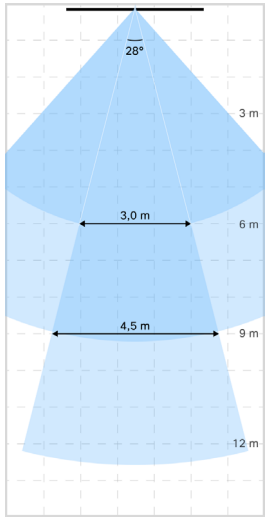
When setting the camera view in the setup wizard, use a HFOV between 24-32°for best results. Check the examples below to see how the camera view you set during the calibration affects the coverage of the video system.

The value can be found by reading **xStatus Cameras Camera N Zoom** and dividing the number by 100. The illustrations below show the most relevant extended reach scenarios.

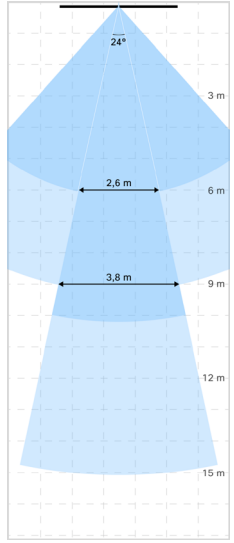
32° HFOV
1-person reach up to 8 meter
2-person reach up to 11 meter



28° HFOV
1 person reach up to 9 meter
2 person reach up to 12,5 meter



24° HFOV
1 person reach up to 10,5 meter
2 person reach up to 15 meter



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3. External microphones voice tracking

In the new Settings menu, select **External microphones voice tracking** and follow the instructions to use the Table Microphones Pro to track the position of the speaker. This allows better video framing.

Start the Extended speaker view experience

When the software setup is completed you can enable this feature from the camera settings in the control panel. Select **Speaker mode** to get the cross-view experience.

Configurations

To get the Extended speaker view experience as default set **xConfiguration Cameras SpeakerTrack DefaultBehavior** to **Closeup** from Control Hub or the device web interface.

When the software setup is complete, make sure these configurations are set for **all** camera inputs:

xConfiguration Video Input Connector [N] PresentationSelection: Manual

xConfiguration Video Input Connector [N] InputSourceType: Camera

xConfiguration Video Input Connector [N] CameraControl Mode: On

xConfiguration Video Input Connector [N] Quality: Motion ***(optional)***

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Other considerations

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Other considerations

Acoustics

The acoustic conditions of your room play an important role for both video calls and local meetings.

Refer to the Best Practices for Creating Effective Video-enabled Rooms to find more information about Acoustic Room Guidelines.

Temperature

When planning your room layout, make sure the Cisco cameras and codecs aren't subjected to direct sunlight. Recommended operating temperature and humidity is between 0°C (32°F) to 35°C (32°C to 95°F) ambient temperature and 10% to 90% Relative Humidity (RH).

Lighting

Lighting is essential when building great meeting rooms, supporting both local and remote telepresence meetings. Following are some general recommendations for how to create the best light conditions. To make meeting participants have the best appearance, they should be lit with key light, fill light and back light. The Key light is the main light source illuminating the subject. Fill light is added to avoid dark shadows over participants eyes, and a lack of it may cause the whites of the eyes to be lost along with any possibility of eye contact. And the back light makes the subjects stand out from the background and gives depth to the scene.

Refer to the Best Practices for Creating Effective Video-enabled Rooms to find more information about lighting.

Meeting Zone

Refer to the Meeting zone article to find more information about setting up a meeting zone on Board, Desk, and Room devices. For spaces like open offices, glass-walled meeting rooms, or rooms with reflective surfaces such as windows and whiteboards, this feature is particularly useful as it minimizes distractions caused by including people in the background during meetings. When someone stands outside the defined meeting zone, they won't be included in the automatic framing of the video. Only individuals within the meeting zone will be counted.

Installation guides

Connect other cables as described in the following guides:

Cisco Room Kit EQ installation guide

Cisco Room Kit EQ PTZ 4K installation guide

Cisco Room Kit EQX installation guide

Cisco Room Kit Pro Installation guide

Cisco Room Kit Pro PTZ 4K Installation guide

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