Main Macro Instructions

Cisco Boardroom Version 2.0
For multi-camera solutions, up to five total cameras

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SpeakerTrack 60 versus the Quad Camera

Throughout this document, we will refer to the Quad Camera, with the occasional mention of SpeakerTrack 60. Both of those cameras are "SpeakerTracking" cameras. We have tested the macros with Quad Cameras; *we have not tested with SpeakerTrack 60 Cameras*, although the hope of the programming is that SpeakerTrack 60 will also work.
Any time you see "Quad Camera", you can substitute "SpeakerTrack 60" if there is no specific mention.
If you plan to use SpeakerTrack 60 Cameras in your installation, we suggest you contact your Cisco Collab account team, and ask them to register the sales opportunity with the Global Virtual Sales Engineering team so that a programmer can be assigned to work with you. In this manner, any issues affecting the operation of SpeakerTrack 60 can be fixed.
As always, if you do find bugs in the code, please notify the programmers and best effort will be utilized to optimize the JavaScript code. And please be sure to read the license.md file that is included with this documentation.

Main Concepts

- PTZ Microphone Zones – Z1 / Z2 / etc
- V1 / V2
- SP

PTZ Microphone Zones are used only for PTZ Cameras, if you have any.
V1 / V2 are used only for Cisco Quad Cameras. Literally, Video input 1 (V1) or Video input 2 (V2) are used for either a Quad Camera that is attached to the Primary Codec (V1 only), or the video link from an Aux Codec (V2 only).
SP is used only for a SpeakerTrack 60 Camera that is attached to the Primary Codec, which should be in Video inputs 1 and 2.
(The use of Quad Cameras and SpeakerTrack 60 arrays are mutually exclusive since you cannot have both connected to a single Codec.)

Each of these types actually uses one or more microphone inputs on the Primary Codec to trigger them. In general, there are three types of microphone zones – one that triggers the local Quad Camera (or SpeakerTrack 60), one or two that trigger Auxiliary Quad Cameras (or Auxiliary SpeakerTrack 60s), and up to five that trigger "PTZ Microphone Zones" – in other words, camera presets.

Legal camera combinations
One or two Quad Cameras (or none at all)
One or two SpeakerTrack 60 Cameras (or none at all)
One or more PTZ cameras
The total cannot exceed five cameras, because the Primary Codec has only six video inputs, and you must reserve at least one for content.
There must be at least two cameras that depend on microphones to activate them.

Camera combinations that don't require this solution!
One Quad Camera by itself
One Quad Camera and one PresenterTrack camera
One SpeakerTrack 60 by itself
One SpeakerTrack 60 and one PresenterTrack camera

Why are these listed as not requiring this solution? Because you don't need any type of macros for these installations; which means you don't need this document or anything you downloaded along with it. *They are standard, out-of-the-box, TAC-supported installations.*

The program in this solution provides automation – when a person is speaking, the appropriate camera is automatically engaged. This is done by monitoring the microphone inputs on the Codec Pro to determine which input has a person that is actively speaking.
When a microphone is active, it will trigger a change in the Main Video Input on the Codec Pro. If you are using one or two Quad Cameras, it will select one of them, and the Quad Camera will automatically zoom in on the person speaking. If you are using one or two PTZ cameras (PTZ 4K or Precision 60), it will trigger a camera preset for one of the cameras.
If you are using two PTZ cameras, you can have a primary preset (using one camera) and a backup preset (using the other camera) so that remote participants never see one camera moving from one preset to another. Instead, the available PTZ camera will always be used, so the far end sees a clean cut.

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+ Section 1 +
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For any installation that has two Quad Cameras, the design mandates the use of a Primary Codec Pro and an Auxiliary Codec Plus.
If your installation uses two codecs, enter the following information into Section 1 of your copy of the main_codec.macro.js file that will be installed in the main codec:
Line 33 – enter the IP address of the Auxiliary Codec
Lines 38 and 39 – enter a valid admin username and password for inter-codec communication.

- Whenever there are two codecs, they communicate with each other using HTTP messages.
- The admin must create identical admin-level accounts on both codecs, for use by the program
- An example is username: CameraMacro and password: CameraMacro
- It is recommended to use these accounts only for the macros to use; create separate admin account(s) for the installer and local administrators

If your installation uses only one codec, enter the following information into Section 1:
Line 33 – just two single quote marks to indicate an empty string as the value for AUX_CODEC_IP

Lines 38 and 39 – comment them out as they are not needed

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+ Section 2 +
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Lines 69 and 70 – if you have PTZ cameras, this is where you define the PTZ Microphone Zones for them.
A simple example – let's say you need one PTZ camera to point toward the head of the table, where the executives sit, because the Quad Camera does not zoom in enough. So – you would use one of your microphone Zones and line 69 would look like this:
const Z1= {'primary': 11, 'secondary': 11}
Why? Because you are only defining one microphone zone, and you have only one PTZ camera. You can't have a different secondary preset if there is only one PTZ camera. Currently, the code is always also looking for the 'secondary' key so you must specify it even if it's corresponding value is the same as the 'primary'.
What? The number 11 represents the PresetID that you are using on the codec. **Don't use PresetIDs 1 thru 10**, because your users will need the ability to set camera presets from the Cisco Navigator / Touch 10 user interface. Therefore, we recommend that you start with PresetID: 11 and go up from there.

A complex example – you have two Quad Cameras (leaving you only six Microphone Zones) and you have two PTZ cameras. And – you want to set up six Microphone Zones with both a Primary and a Secondary Camera Preset.
Line 69 would start like this:
const Z1= {'primary': 11, 'secondary': 12}
const Z2= {'primary': 14, 'secondary': 13}
const Z3= {'primary': 15, 'secondary': 16}
const Z4= {'primary': 18, 'secondary': 17}
const Z5= {'primary': 19, 'secondary': 20}
const Z6= {'primary': 22, 'secondary': 21}

Why? You have defined six different Microphone Zones, each with a primary and a backup camera preset. Remember: these zones are only used for PTZ cameras – they are not needed for Quad Cameras.

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+ Section 3 +
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Line 85 – this is where you identify the physical microphone inputs on the Codec Pro that you want to monitor. Any microphone input that is used to automate a camera selection is listed here. You can list any microphone input numbers – just a few or all eight. Don't list the presenter microphone here – because PresenterTrack uses a different mechanism to start.

The physical microphone inputs on the Codec Pro are used to trigger camera actions automatically. If you use Cisco Table Microphones, you can have up to eight connected to the Codec Pro. If you use an audio DSP, you can have up to eight analog inputs from the DSP into the Codec Pro. Each analog line from the DSP would represent the microphones that define the up-to-eight Microphone Zones that you need.

Line 96 – this is where you map each microphone input to a camera source. Remember, your choices here are SP if you have a SpeakerTrack 60 attached to the Primary Codec, V1 / V2 for Aux Codecs running Quad

Cameras, and Z1-Z8 for PTZ Microphone Zones. **IMPORTANT: The number of entries in this constant must match the number of entries in line 85.** If you list five microphones in line 85, you *must* have five entries in line 96.

Line 112 – in order for the program to work correctly, it is necessary to list the physical video input for each Camera ID# - but only for the PTZ cameras. For example, it is common to have one of the cameras plugged into 3G-SDI input 6, so as written CameraID: 2 is using physical input #6. The other two PTZ cameras have IDs of 3 and 4, using inputs 2 and 4 respectively. Any camera can use any input, except that the Quad Camera should use input 1 (because of ARC). You do NOT need to list the inputs used by the local Quad Camera, by the Aux Codecs, or by a Presenter Camera.

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+ Section 4 +
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Now we introduce the OVERVIEW shot. This is used under three conditions:

1. At the beginning of the call
2. If nobody in the room is speaking
3. If someone presses the mute button (perhaps to have a sidebar)

Your choices for the OVERVIEW shot are Side By Side (indicated by overviewShowDouble = true), or to have a single camera OVERVIEW of the room.
If you set line 128 for false, then line 131 should indicate the video source for the camera that you want to use for the OVERVIEW shot. The OVERVIEW shots always use Preset ID 30.

However, if you want to use one of the PTZ Microphone Zones for the OVERVIEW shot – like perhaps the head of the table, you can enter this in line 137. Simply comment out line 137 and enter your primary (and secondary if it exists, otherwise set same as primary) camera presets in line 138 – and uncomment it. This will take precedence over line 131.

Line 143 – if you are using Side by Side as OVERVIEW, this allows you to enter the order of the video inputs. Usually, it is 2,1 but depending on how your cameras are positioned it could be 1,2.

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+ Section 5 +
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Timers and Thresholds

Line 155 allows you to change the amount of time before the OVERVIEW shot is used when nobody is speaking. The default is 10 seconds, but this can be changed.
Line 157 is the amount of time to wait before switching to another speaker. Two seconds works well.
Line 159 is the amount of time that the OVERVIEW shot is used at the beginning of a call.
Line 162 is the amount of time that the codec will wait for the new camera to arrive at its preset before switching to it. It allows the camera to pan / tilt / zoom without being seen by remote participants. You should experiment with this value during commissioning.

Lines 172 and 173 are the minimum and maximum microphone level thresholds. The default values usually work well, but this should experimented with during commissioning. The way it works is this:

- If a single microphone has an average value above the MICROPHONEHIGH threshold for two seconds, then action is taken to switch to the appropriate camera. If the camera is already there, no action is taken.
- If all of the microphones have an average value below the MICROPHONELOW threshold, then action is taken to switch to the OVERVIEW shot. If the camera is already there, then no action is taken.
- If the loudest microphone is between the LOW and HIGH thresholds, then there is not enough information, and no change happens from the previous time interval.

The rest of the macro should not be edited.

APPENDICES

APPENDIX A – How to set camera presets using the API

- Open an SSH session into the codec you are working on.
- Attach a Touch 10 or Navigator to the codec (in case there is not one already attached).
- Using the touch interface, select the desired camera and use the PTZ controls to get to the specific area you want to cover. Obviously, use full screen SelfView while you are doing this.
- To assist in lining up the camera settings between the Main and Aux codecs for this macro, you can issue this command on the Main code (Codec Pro) to be able to see both Camera 1 (QuadCam) on the CodecPro and the view coming from the Auxiliary codec into connector 2 side by side:
  - **`xCommand Video Input SetMainVideoSource ConnectorId: 2 ConnectorId: 1 Layout: Equal`**

  If you manually adjust the camera on the Main codec, it will revert to showing you Camera Input 1 full screen on your self-view or preview, just re-issue the above command on the command line to check again. Manually adjusting the camera on the Aux codec while in this manual side by side view will not reset the preview so you might want to do the fine adjustments on the Aux camera so line up with what you have for the main camera.
- Once you are satisfied with the camera view, use the API to store the preset - **do not use the Touch 10 or Navigator to store the preset**.
- Here is the API you need to use:
  - xCommand Camera Preset Store
  - CameraId(r): <1..7>
  - Name: <S: 0, 255>
  - PresetId: <1..35>
- The "Name" field is optional.
- Example: in order to set camera #1 with a preset number of 30, you would use this command:
  - **`xCommand Camera Preset Store CameraId: 1 PresetId: 30`**
- Repeat this process for each camera and every camera preset that you need to set.
- To make adjustments to a preset that you have already stored, again you would use the API. Let's use the same example:
  - **`xCommand Camera Preset Activate PresetID: 30`**
- Use the touch interface to correct the camera position, then store it again:
  - **`xCommand Camera Preset Store CameraId: 1 PresetId: 30`**

NOTES:

- Sometimes major RoomOS upgrades delete presets. So that you do not have to re-do the entire process described above, you might want to store away the Pan-Zoom-Tilt settings on the camera for each codec while the Preset30 is active by issuing this command on each and safely storing the values returned:
    - **`xCommand Camera Preset Show PresetId: 30`**

  You can later set the camera exactly to what the preset had stored before saving it again using this command:
    - **`xCommand Camera PositionSet CameraId: value Pan: value Tilt: value Zoom: value`**

  More details on that command can be found here:
  https://roomos.cisco.com/xapi/Command.Camera.PositionSet

- Normally the Primary Codec has the highest number of camera presets.
- It is perfectly OK to use identical preset ID numbers on *different* codecs.
    - For example, we normally use PresetID 30 for all Overview shots. In the case that you use two codecs - one Pro and one Plus - you would set PresetID 30 on both of them for the Overview shot.
    - To summarize - you cannot use identical Preset numbers on a single codec; but when you have multiple codecs it is a good practice to use identical preset numbers for identical purposes (like the Overview shot).

APPENDIX B – How to properly set up multiple cameras on a Codec Pro

- All of the cameras that are connected directly to the Primary Codec - the Quad Camera or SpeakerTrack 60 (if any) and the Precision 60 or PTZ 4K Cameras - **must** be controllable successfully from the Cisco user interface.
- The Quad Camera should **always** use HDMI input 1, and should **always** have CameraID 1.
- All of this requires that the cameras are correctly setup in the codec's web interface. Specifically, there are two areas of concern:
    - In the Video Input section, for each Connector that has a camera (Connectors 1-6 on the Codec Pro; Connectors 1-3 on the Codec Plus), the Input Source Type should be Camera, there should be a valid numeric CameraID, and Camera Control Mode should be On.
    - In the Settings / Camera section, enter the camera serial numbers into their corresponding CameraID sections.
    - Do not skip CameraID numbers! If you have five cameras, they must be numbered from 1 to 5.
    - If you are using SpeakerTrack 60, use CameraIDs 1 and 2 – because there are two P60 cameras.
- If all of this is done correctly, you will be able to control every camera from the Touch 10 / Navigator. Then you can proceed with setting camera preset ID numbers.
- If any Auxiliary codecs are used - such as a Codec Plus - the Quad Camera or SpeakerTrack 60 connected is also setup correctly as described above. It is not common to have any PTZ cameras on the Auxiliary codecs, but if they exist, they must also be set up correctly.

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