



Microsoft Teams

USB and content camera

Device category and release timeline

Device Category	Required (Y/N)	Feature release targeted for	Shared with the following Partners:
Teams Phones (desk phone)	No	N/A	N/A
Teams Phones (conference phone)	No	N/A	N/A
Teams Phones (Low Cost Phone)	No	N/A	N/A
Teams Displays	No	N/A	N/A
Teams Rooms on Android	Yes	2022 FW Update #1	Lenovo , Yealink, Crestron, Poly, Audiocodes, Jabra, Logitech, EPOS, Neat
Teams Panels	No	N/A	N/A

Overview

This feature is based on android camera2 APIs. The firmware must expose a USB camera connected and disconnected state using standard Android Camera2 APIs. Teams app should be able to use camera2 APIs to find, query capabilities and read frames.

Android camera2 guide: <https://developer.android.com/training/camera2>

Goals

1. Transition to camera2 APIs on all MTRA devices

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2. Report peripheral cameras to MTRA devices with proper information
3. Identify content cameras that cannot be used as a room camera.

Non-Goals

1. Change the UI/UX of MTRA devices when it comes to camera
2. Select the default camera
3. Do video format conversion for cameras in Microsoft Teams.

Functional Specification

1.1 New characteristics reported by firmware

Firmware reports custom characteristics through *android.hardware.camera2*.

CameraCharacteristics.Key<String>. The newly supported characteristics are as follows:

Key name	Value type	Value
teams.camera.name	String	Readable name of a USB camera
teams.camera.manufacturer	String	Manufacturer of a USB camera
teams.camera.model	String	Model of a USB camera
teams.camera.pid	String	Camera UVC device product ID
teams.camera.vid	String	Camera UVC device vendor ID

1.2 USB camera lens facing

The lens facing of a USB camera should be *LENS_FACING_EXTERNAL* which reported by the existing *android.hardware.camera2*. *CameraCharacteristics.LENS_FACING*.

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1.3 Video format of USB camera

A USB camera must send RAW video stream(NV21 format) to Teams app:

- If OEM chooses USB 2.0, OEMs must convert MJPEG to RAW data and expose NV21 format to Teams;
- If OEM chooses USB 3.0 and RAW data is directly received from camera, no conversion is needed.

1.4 Content camera

Any USB camera can be selected as a content camera in Teams settings if there are two or more cameras available and at least one of them is a UVC camera.

And OEMs can choose to designate a USB camera for content camera purposes only, in this case this camera will not be selectable as a room video camera by Teams app.

Designate a USB camera as content camera only

If a USB camera is designated as a content camera only. Then it must be reported with a camera characteristic representing the camera type. Teams client will check the camera type of the available camera using the code below to ensure the camera is a content camera only:

Camera characteristic name: **camera.type**

Value of camera type: **external_content_camera**

```
CameraManager cameraManager = (CameraManager) context.getSystemService(Context.CAMERA_SERVICE);
cameraManager.registerAvailabilityCallback(new CameraManager.AvailabilityCallback() {
```

```
    @Override
```

```
    public void onCameraAvailable(@NonNull String cameraId) {
```

```
        super.onCameraAvailable(cameraId);
```

```
        try {
```

```
            CameraCharacteristics characteristics = cameraManager.getCameraCharacteristics(cameraId);
```

```
            String cameraType = characteristics.get(cameraTypeCharacteristic);
```

```
            if (cameraType != null && cameraType.equals("external_content_camera")) {
```

```
                // Content camera detected, start screen sharing session.
```

```
            }
```

```
        } catch (Exception ex) {
```

```
            // handle exception
```

```
        }
```

```
    }
```

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```
@Override
public void onCameraUnavailable(@NonNull String cameraId) {
    super.onCameraUnavailable(cameraId);
    // if content camera disconnected, stop any active screen sharing session.
}
}, new Handler());
```

Please note that this designated camera ability is not necessarily required for devices and cameras from different manufactures.

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