

AVer PTZ 310N/330N and TR311HN/TR3xxNV2 Camera

Integration used with Zoom and NDI

(February 2022)

Steps to integrate the AVer PTZ and New TR Cameras with Zoom and NDI protocol

NDI is a high-performance standard that allows anyone to use real time, ultra-low latency video on existing IP video networks. There are only certain AVer cameras that will support NDI video protocol, those with the “N”, designates that the camera can integrate with the NewTek NDI protocol. You can go to <https://www.ndi.tv/> to learn more about NDI or download the NDI Virtual Input application if needed.

AVer Pro-AV has high quality image Cameras (PTZ310N/PTZ330N and TR311HN/TR3xxNV2) that will integrate with Zoom video workflows for peak performance and ease of use. We will show how to configure these cameras with the Zoom platform, focusing on the NDI (Network Device Interface) video protocol.

We will show the configuration process for the PTZ310N/PTZ330N and TR311HN/TR3xxNV2 cameras and the NDI Software. There are some pre-requisites for this to happen, see below.

Prerequisites:

- AVer PTZ310N/PTZ330N or TR311HN/TR3xxNV2 Camera and accessories.
- Chrome Browser, version 79.0.3945.xxx and later.
- NDI Tools 5.x, approx. 150MB in size.

NDI Minimum System Hardware Requirements:

- 64-bit Microsoft® Windows 7 operating system (OS) or better
- Intel i3 or i5 (2.8GHz) Sandy Bridge CPU (Quad/Six core) or better with integrated GPU (NVIDIA discrete GPU, with 2GB video memory or better recommended)
- 8GB system memory, minimum
- Gigabit connection or better
- Display with screen resolution of 1024 x 768 or higher *Faster CPU recommended to support more video streams or higher resolutions*

Overview of NDI use with AVer PTZ and New TR311HN/TR3xxNV2 cameras

NDI offers several options to broadcast, connect, stream, view, video over 1Gbit/s IP networks.

We will discuss the 4 main functions from NDI Tools for use with AVer cameras, we will not discuss each in detail, but only as needed to setup the PTZ and TR cameras, they are:

- NDI Studio Monitor
- NDI Virtual Input
- NDI Access Manager (Routing Control)
- NDI PTZ Camera control from Studio Monitor

NDI 5 Tools Installation

1. If NDI 5 Tools software is not installed, go to <https://www.ndi.tv/> to download and install.
2. From the NDI website, select NDI->NDI Tools, and then scroll down to NDI Tools 5.x to download.



3. Next, select “NDI Tools for Windows” download.



- NDI Bridge ^{NEW}
- NDI Remote ^{NEW}
- NDI Audio Direct ^{NEW}
- NDI Studio Monitor
- NDI Screen Capture
- NDI Screen Capture HX
- NDI Webcam Input
- NDI VLC Plugin
- NDI for Adobe Creative Cloud
- NDI Import I/O for Adobe CC
- NDI Access Manager
- NDI Test Patterns
- NDI|HX Driver



NDI 5 Tools Installation (continued)

- You will be asked to register for the Download, Name, email, etc. then you should see the following to continue with the download.



- Once installed, you should have the following on your Windows Start Menu:



NDI Bandwidth

The following table is intended as a guide for calculating bandwidth needs based on video resolutions and frame rates. Each reference stream includes 16 channels of audio.

***Note:** Information provided by NewTek NDI Technical brief.

Example NDI video stream	Approximate bandwidth required
1 x UHDP60 video stream	250 Mbps
1 x UHDP30 video stream	200 Mbps
1 x 1080p60 video stream	125 Mbps
1 x 1080i60 video stream	100 Mbps
1 x 720p60 video stream	90 Mbps
1 x SD video stream	20 Mbps

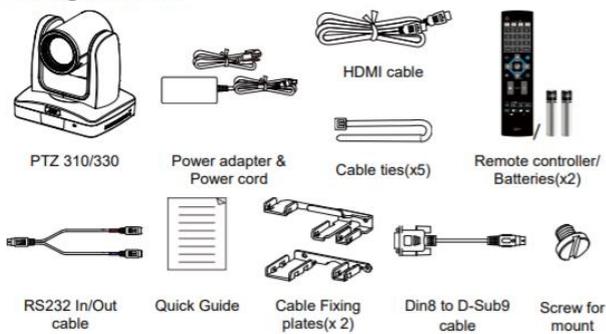
Table 1. Bandwidth Requirements. The approximate bandwidth required per NDI video stream for common video resolutions and frame rates.

AVer PTZ310N/PTZ330N NDI Camera Overview

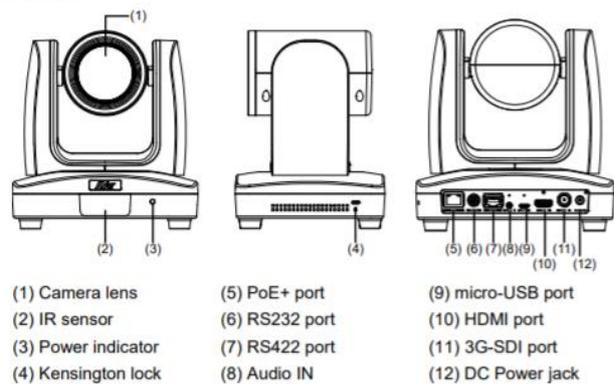
The AVer PTZ330N NDI PTZ Live Streaming Camera is the latest camera with NewTek NDI® integrated. It combines both standard SDI and HDMI connections as well as Ethernet/NDI network connectivity for HD video streaming, recording, and broadcasting. The PTZ330N can output HD video and audio while receiving control signal and power over a single connection.



Package Contents



Overview



AVer PTZ310N/PTZ330N Camera NDI Video Mode

Before proceeding, we need to verify that the PTZ310N/330N camera is setup for NDI, if not; there will be no NDI output.

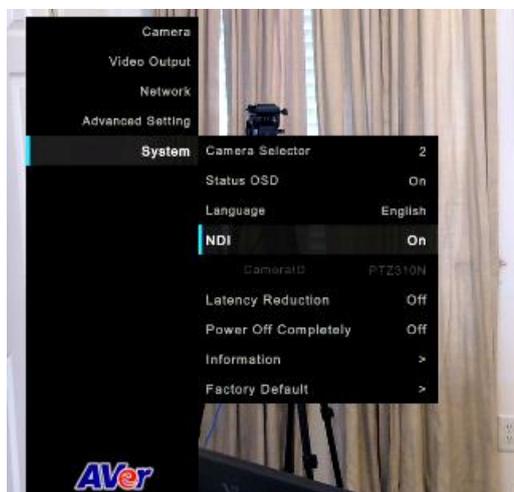
There are (2) ways to do this:

- HDMI Output of the camera
- WebUI of the camera

HDMI

1. Connect the HDMI output of the camera to a monitor and use the camera remote to enable the OSD (On Screen display), then navigate to the System → NDI → setting and verify it is set to ON.

***Note:** The cameras from the factory come with NDI enabled, but this may change in future production models.



2. If it is set to OFF, select ON, the camera will need to reboot.

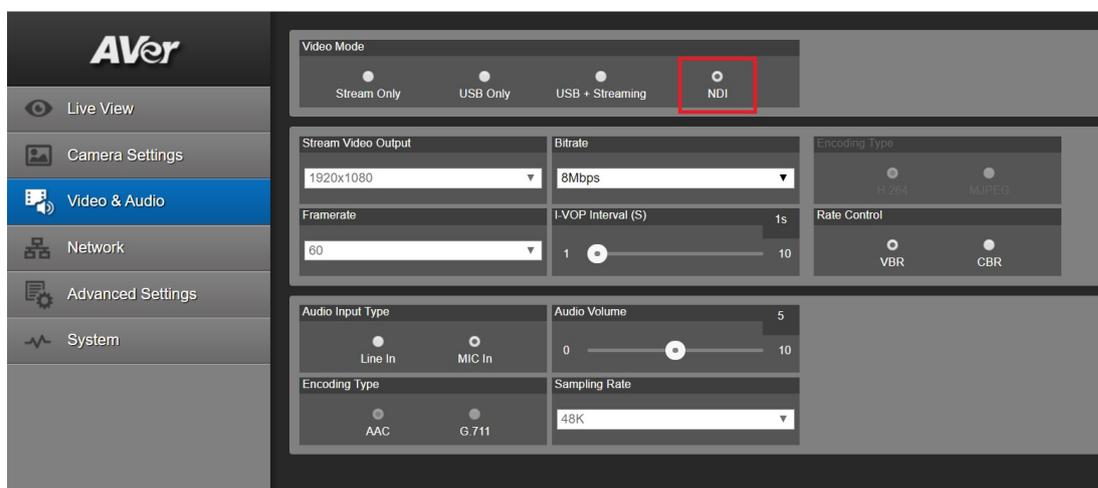
***Note:** When the camera is in NDI mode, the USB video output is disabled.

AVer PTZ310N/PTZ330N Camera NDI Video Mode (continued)

WebUI

1. The **Default IP** address is 192.168.1.168. You can change this using the HDMI output OSD, selecting the Network setting.
2. Use a Chrome Browser to access the WebUI of the camera.
3. The **Default** Username/Password is: admin / admin
4. The login credentials will need to be changed, carefully write down the NEW credentials.
5. Login to the WebUI of the camera with the NEW credentials.
6. Once logged in, go to the “Video & Audio” settings, verify that “Video Mode” has the “NDI” radio button selected.

***Note:** The camera will need to re-boot when changing to/from NDI video mode.

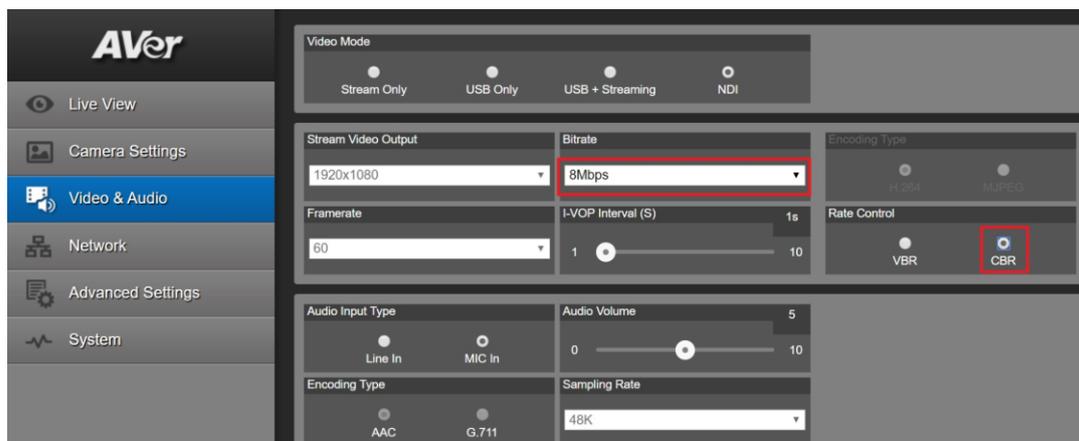


***Note:** The STREAM Video Output, Framerate, encoding type, and Sampling Rate settings are only for viewing, they are not adjustable in NDI mode. The NDI native video resolution is 1920x1080p /60.

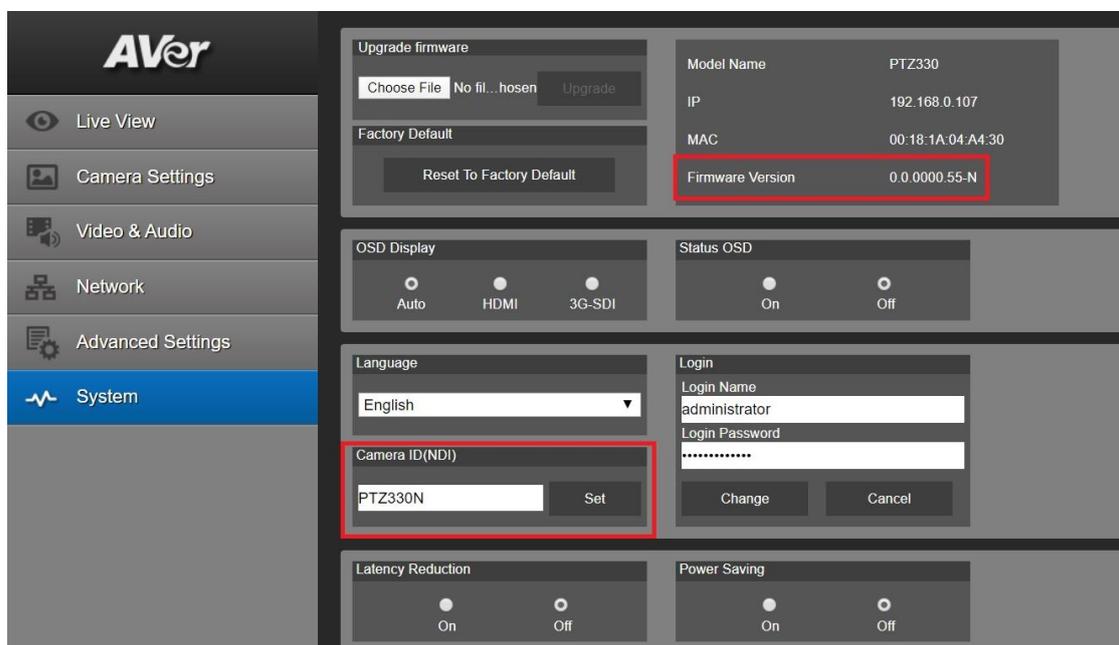
Video Standard →	Stream Only (Various)	USB Only (Various)	USB + Streaming (Various)	NDI (1080p/60)
SDI Output	✓	✓	✓	✓
HDMI Output	✓	✓	✓	✓
USB Output	✗	✓	✓	✗
RTSP Output	✓	✗	✓	✓

AVer PTZ310N/PTZ330N Camera NDI Video Mode (continued)

- The Rate Control setting should be set to CBR, there have been better results seen using this option.



- Setting the Bitrate to 8Mbps is also recommended, but you may see different results on your network with other settings.
- In the *System* page you can set the identity name *Camera ID (NDI)* for display on the NDI interface. There is a limit of 10 characters for the name. After choosing your name press "Set" to make the change. ***Note:** A reboot of the camera is necessary for the name change. The firmware version can also be verified from the *System* page.



AVer PTZ310/PTZ330N Camera NDI Video Mode (continued)

10. The following characters can be used for the Camera ID description.

Numeric characters	0123456789
Alphabetical characters (upper and lower cases)	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
Symbols	! @ # \$ % ^ & * () , . \ ; : " ' + = < > ? [] { } - _ ` ~ \ /

AVer PTZ Camera Audio Settings

Before connecting to the Microsoft Teams environment, verify that the Audio and Video can be recorded using the NDI *Studio Monitor* Tool.

1. Using the PTZ camera Audio (In) connection, set the Audio Input Type to *Line-In*.



MIC-In: Use a 3 to 4 MIC-In cable to connect the camera and MIC-In device (microphone).
50mVrms (max.); supplied voltage: 2.5V

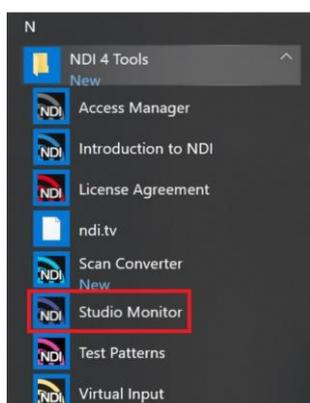
Line In: Line Input level is 1Vrms (max.)

2. Select the Audio Settings in the NDI Monitor tool to a level where audio is being captured; you may need to “tweak” the level to get a good level.
3. Next, we will discuss how to test that NDI audio/video is being received and recorded using *NDI Studio Monitor*.

NDI Studio Monitor

Using NDI Studio Monitor is a quick way to verify that the AVer PTZ camera is outputting NDI video and audio.

1. Go to Windows Start Menu, select NDI’s *Studio Monitor*.

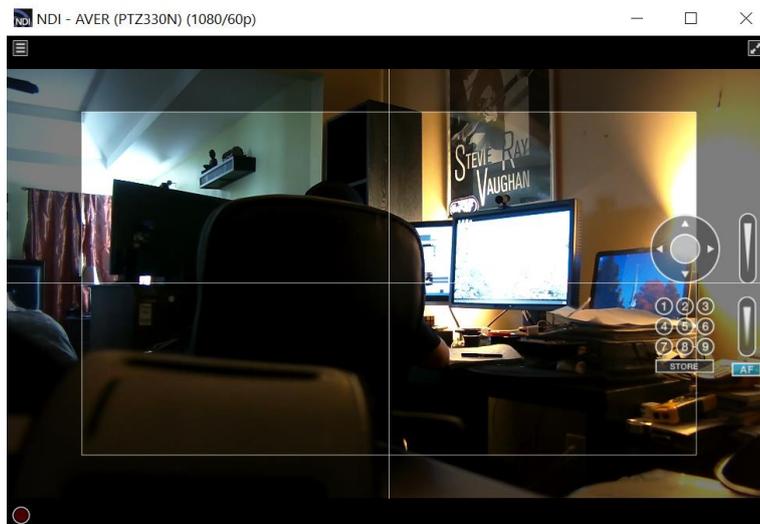


NDI Studio Monitor (continued)

2. Next, the NDI Studio Monitor window will open, it may display AVer video or may display NDI's default video of "None".
3. Next, to view AVer video, select the Menu box displayed on upper left, then select "AVER PTZ330N". You can also "right-click" anywhere within the window to access the menu.



4. Next, you should now be viewing the AVER PTZ330/310N video as a source and it should also be displaying the Video Standard (1080/60p) from AVer Camera.

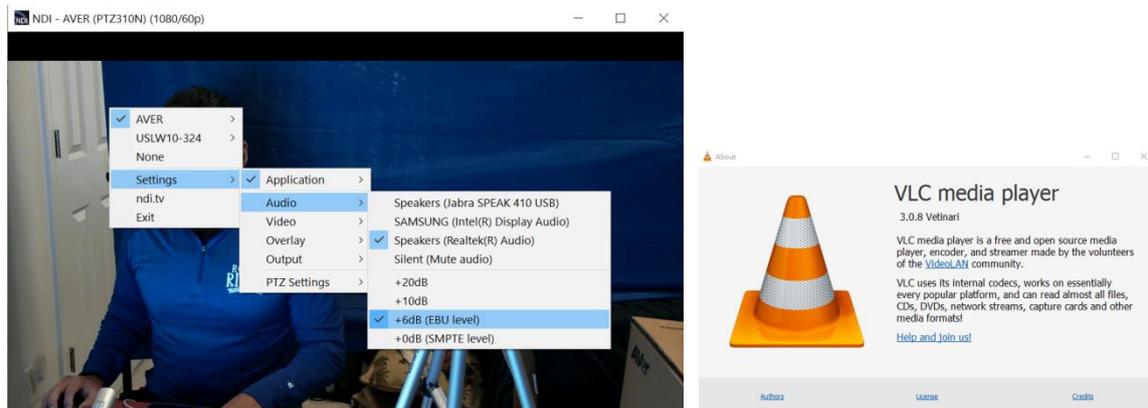


5. At this point, you can close the window and have verified NDI video from PTZ camera is working.

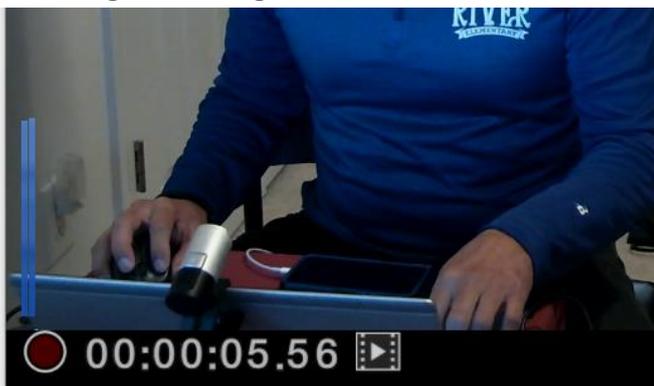
AVer PTZ Camera NDI Audio

Once we have verified that video is working properly, we need to verify that audio is also being captured.

1. In the example below we needed to adjust level to +6dB (EBU Level) to get audio recorded through the NDI Monitoring tool then played through VLC Media Player (3.0.8).



2. You should also see blue "Audio bars" in the lower left corner of the NDI display indicating an audio signal is being received.



3. Next, select the red "record" circle icon to begin recording.

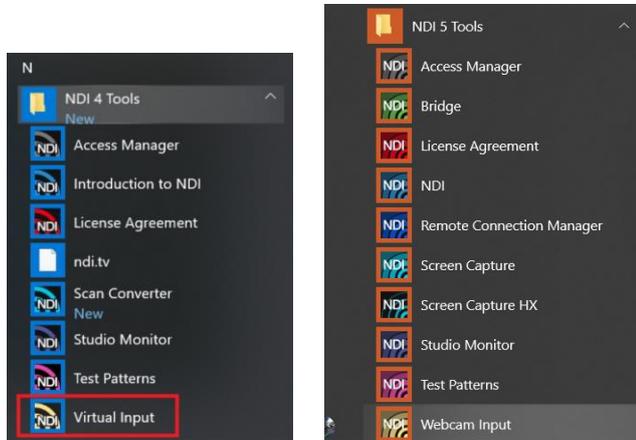


4. Next, select the red "record" circle icon again to end the recording.
5. Next, select the  "film" icon and will take you to the recording directly. The recorded video will be in the "C:\Users\Dave\Videos\" folder in Windows.
6. Use VLC or some other player that supports NDI.
7. This concludes the quick test to verify that Audio/Video is being recorded and played via NDI.

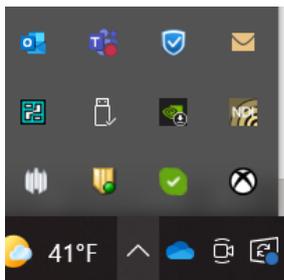
NDI Virtual Input / Webcam Input

Using the NDI Virtual Input, it gives you the ability of supplying a high-quality video source to Zoom or Hangouts meetings, (i.e., from PTZ330N), here is how to configure a “Webcam Input” from NDI. This “Webcam Input” will be the video *Source* for Zoom.

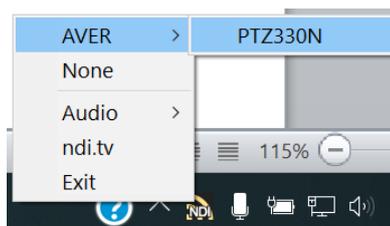
1. Go to Windows Start Menu, select NDI's *Virtual Input* application.



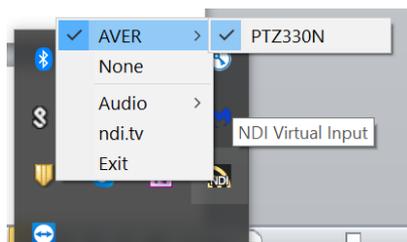
2. Next, it will open and place an icon on your System Tray.



3. Next, Right-Click on the NDI icon, you should have the ability to select AVER->PTZ330.



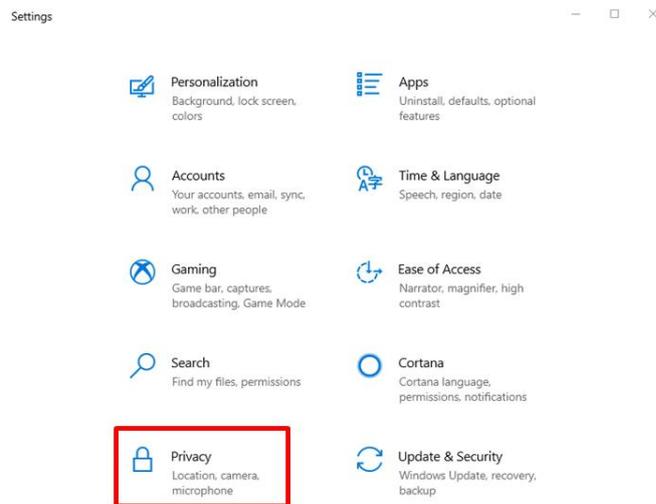
4. Next, verify that your selection is for AVER->PTZ330N, Right-click on icon to verify check marks are there.



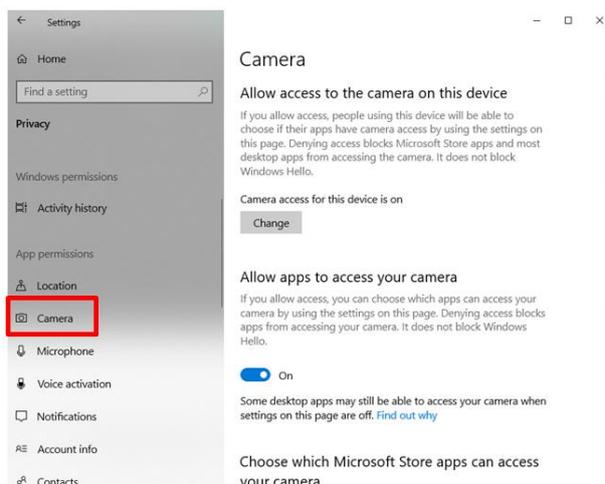
5. This concludes setting up the AVer PTZ camera as a Virtual Input for NDI integration.

Microsoft OS Settings

1. One of the very first things to check is if Microsoft Teams has permission to access your camera and microphone. There are instances where the App will not detect your camera if left disabled in your PC's settings.
2. Press the **Windows Key** and **I** key together. This will bring up the **Windows Settings** page.



3. Next, look for the **Privacy** setting and select it.
4. Next, from the left sidebar, under **App permissions** click on **Camera**.

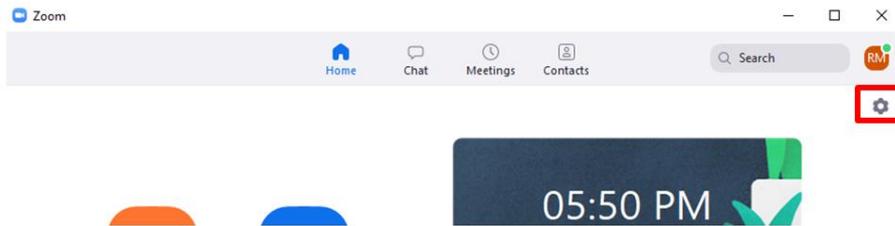


5. Next, on the **Camera** page, you want to make sure the option **Allow Apps to access camera** is turned **On**.
6. You also want to make sure that under **Choose which app can access your camera**, that **Zoom** is turned **On**.

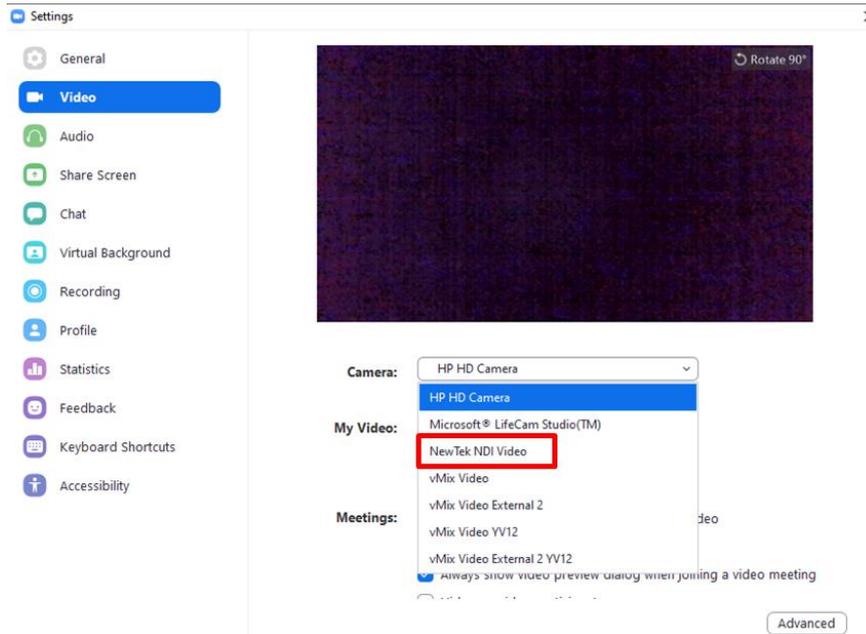
Zoom Configuration

Once the NDI video protocol has been configured and confirmed working you will need to open Zoom and login to your account.

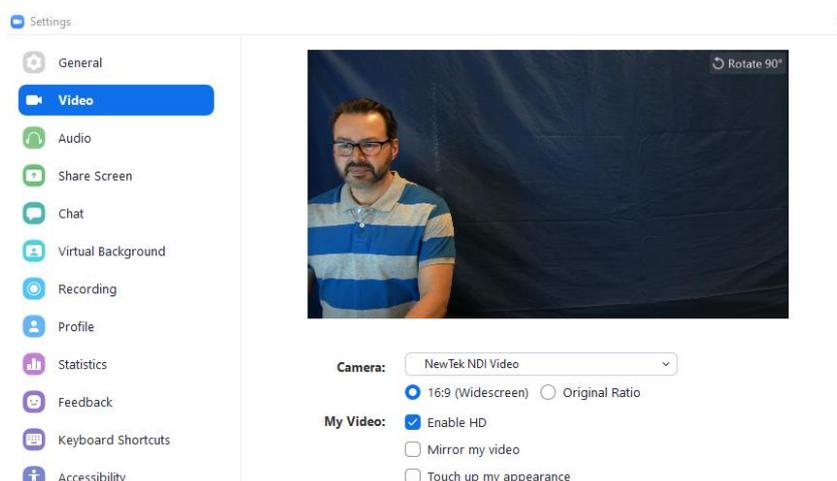
1. Open **Zoom** and login, select *Home* then the *Settings* gear icon.



2. Next, select *Video* then select the **Camera:** type

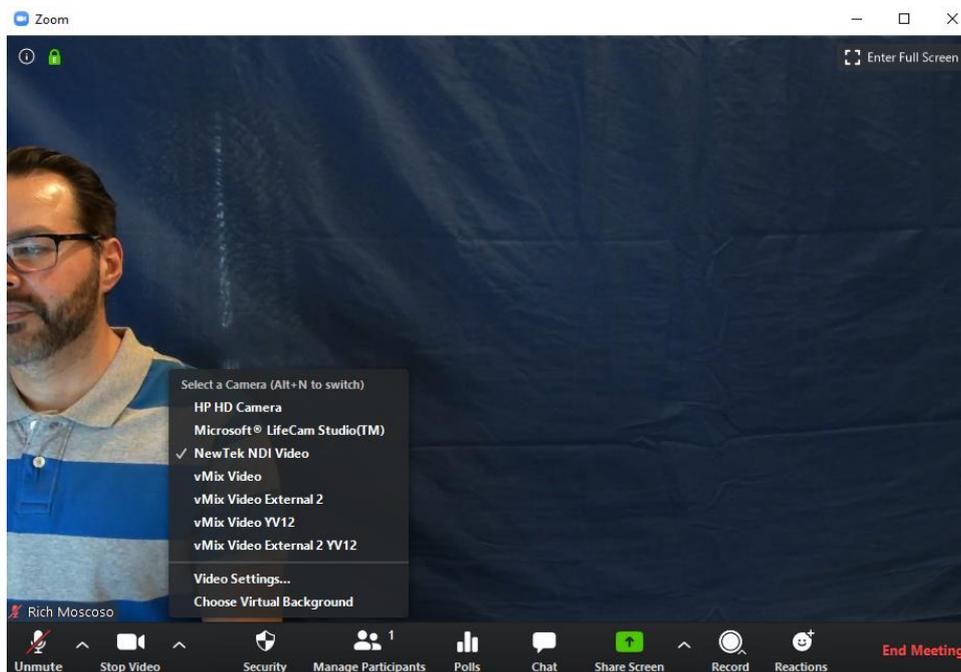


3. If this is the first instance of opening this setting after installing the *NDI Tools* you will see a new selection for *NewTek NDI Video*.
4. When configuring the *NDI Virtual Input* in the previous section, we defined the PTZ330N camera as in Input. Once selected, you should be seeing the PTZ330N NDI video.



Zoom Configuration (continued)

5. Next, start a Zoom meeting; you should be seeing the PTZ330N NDI video as your Camera video. You can change it during the meeting if needed by selecting another video source.

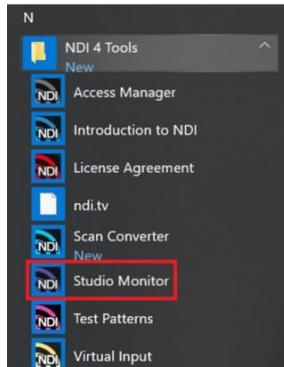


6. This concludes setting up Zoom with the PTZ310N/330N cameras configured in NDI mode.

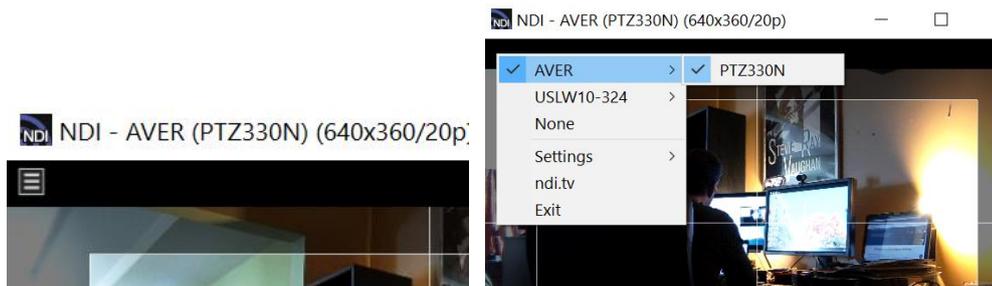
PTZ Camera Control from NDI Studio Monitor

The NDI Studio Monitor allows you to view or display any number of NDI video sources across the network, such as the AVer PTZ310/330N camera. There is also remote control of PTZ, recording, and configuration of an applicable source. We will discuss the NDI PTZ control of the AVer PTZ310/330N camera.

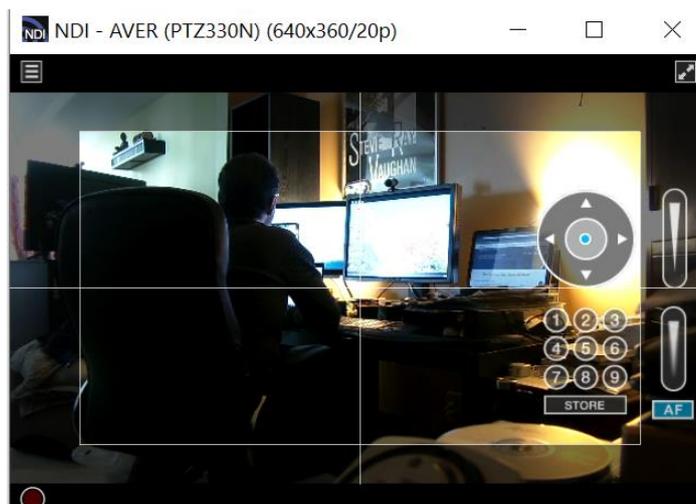
1. Go to Windows Start Menu, select NDI's *Studio Monitor*.



2. Next, the NDI Studio Monitor window will open, it may display AVer video or may display NDI's default video of "None". If "None" is displayed, select the Menu box (or right-click on display), then select *AVER->PTZ330N* as the source.



3. You should now be seeing the PTZ310/330 video, to activate the controls, move your mouse over the window.

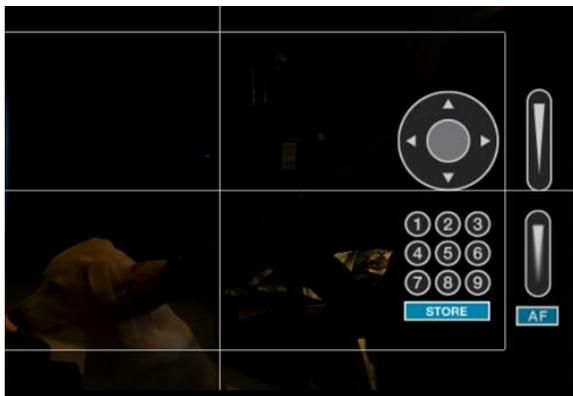


PTZ Camera Control from NDI Studio Monitor (continued)

4. The NDI AVer camera controls are Pan, Tilt, Zoom, Manual Focus, Automatic Focus, and Position Presets.



5. Initially there will *not* be a blue dot in any of the controls, move your mouse over to the Pan/Tilt control area, and then left click hold. You will now have a “Joystick” type control of the AVer camera. ***Note:** Selecting the Up/Down, Left/Right arrows do nothing.
6. Move your cursor over the Zoom control, left click hold, you can control the Zoom of the camera.
7. To create a “Preset”, adjust the camera to the preferred position, then select “Store” followed by one of the 9 presets.



This concludes the AVer PTZ310N/330N camera integration with NDI Studio Monitor.

TR311HN and TR3xxNV2 Cameras

AVer Pro-AV first launched the NEW AI tracking cameras around April 2021 with the “H” chip, which were not TAA compliant. To fix this issue, AVer Pro-AV then came out with the NEW V2 cameras that would satisfy and be compliant with the TAA regulations. The AI Auto Tracking is the same, there are some differences though in the height of the camera and the USB output connection, but the process to integrate them within an NDI workflow is the same.



Camera	TR311HN	TR311	TR313 - 4K	TR331	TR313V2 - 4K	TR333V2 - 4K
Zoom	12X Optical, 12X digital	12X Optical, 12X digital	12X Optical, 12X digital	30X Optical, 12X digital	12X Optical, 12X digital	30X Optical, 12X digital
Max Resolution	1080@60fps	1080@60fps	2160@30fps	1080p@60fps	2160p@30fps	2160p@30fps
Outputs	IP / HDMI / USB	3G-SDI / IP / HDMI / USB	3G-SDI / IP / HDMI / USB	3G-SDI / IP / HDMI / USB	3G-SDI / IP / HDMI / USB	3G-SDI / IP / HDMI / USB
Streaming	RTMP / RTSP SRT / NDI	RTMP / RTSP / SRT				
Auto Tracking	People Tracking (half or full body), Zone Tracking, Hybrid	People Tracking (half or full body), Zone Tracking, Hybrid	People Tracking (half or full body), Zone Tracking, Hybrid	People Tracking (half or full body), Zone Tracking, Hybrid	People Tracking (half or full body), Zone Tracking, Hybrid	People Tracking (half or full body), Zone Tracking, Hybrid
PoE+	Yes	Yes	Yes	Yes	Yes	Yes
USB 3.0, Type-C	Yes	Yes	Yes	Yes	No, USB 3.0, Type-B	No, USB 3.0, Type-B
TAA Compliant	No	No	No	No	Yes	Yes
WDR & Tally Light	Yes	Yes	Yes	Yes	Yes	Yes

TR311HN and TR3xxNV2 Cameras (continued)

TR313V2

12X Ultra HD PTZ live streaming camera

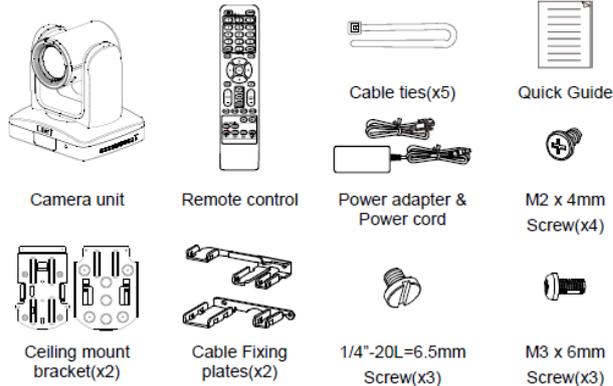
Featuring NEW AI Auto Tracking



***Note:** The TR3xxNV2 may not have an SDI output connection.

- AVer TR311HN and TR3xxNV2 Camera and accessories.

Package Contents



TR311HN and TR3xxNV2 Camera Video Mode

Before proceeding, we need to verify that the TR311HN/TR3xxNV2 camera is setup for NDI, if not; there will be no NDI output.

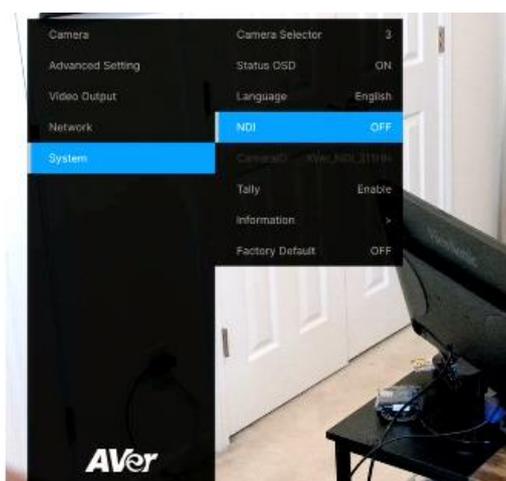
***Note:** The TR311HN/TR3xxNV2 cameras come with NDI activated from the factory but could change with future production models.

There are (2) ways to do this:

- HDMI Output of the camera
- WebUI of the camera

HDMI

1. Connect the HDMI output of the camera to a monitor and use the camera remote to enable the OSD (On Screen display), then navigate to the System → NDI → setting and verify it is set to ON.



2. If it is set to OFF, select ON, the camera will reboot.

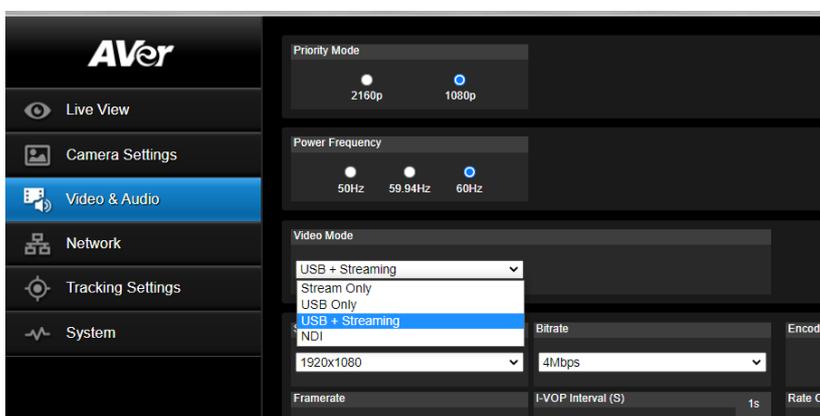
***Note:** When the camera is in NDI mode, the USB video output is disabled.

TR311HN and TR3xxNV2 Camera Video Mode (continued)

WebUI

1. The **Default IP** address is 192.168.1.168. You can change this using the HDMI output OSD, selecting the Network setting.
2. Use a **Chrome Browser** to access the WebUI of the camera.
3. The **Default Username/Password** is: admin / admin
4. The login credentials will need to be changed, carefully write down the NEW credentials.
5. Login to the WebUI of the camera with the NEW credentials.
6. Once logged in, go to the “*Video & Audio*” settings, verify that “*Video Mode*” has “*NDI*” selected.

***Note:** The camera will need to re-boot when changing to/from NDI video mode.

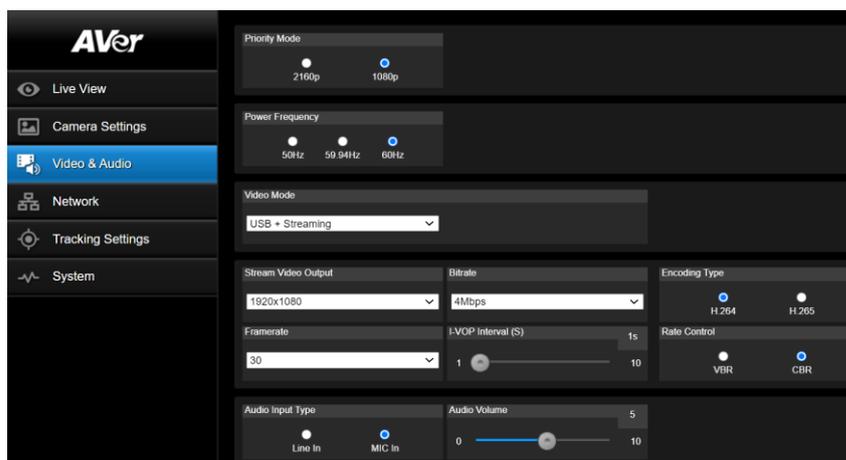


***Note:** The STREAM Video Output, Framerate, encoding type, and Sampling Rate settings are adjustable in NDI mode. The TR311HN/TR3xxNV2 cameras can be adjusted, 30fps / 60fps etc. The TR Camera will have an SDI/HDMI output in ALL modes.

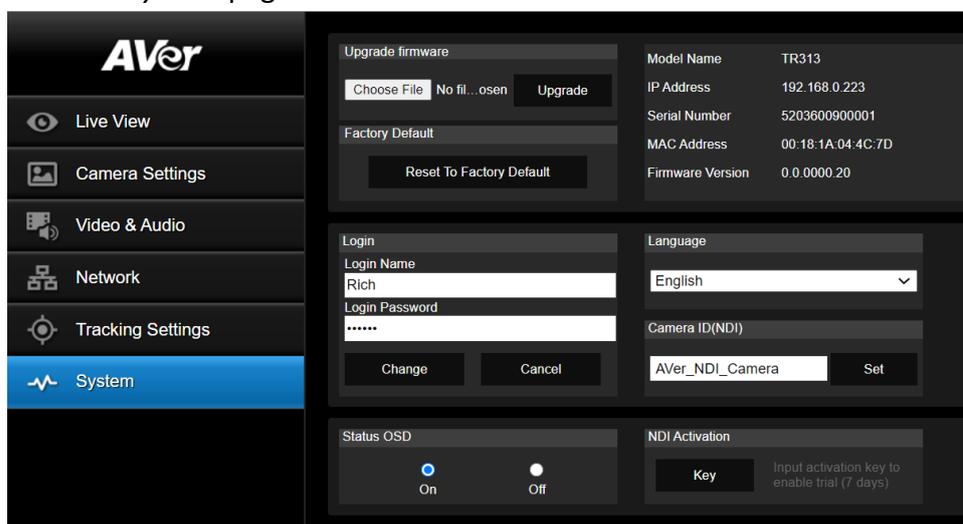
Video Standard -->	Stream Only (Various)	USB Only (Various)	USB + Streaming (Various)	NDI (1080p/60)
SDI Output	✓	✓	✓	✓
HDMI Output	✓	✓	✓	✓
USB Output	✗	✓	✓	✗
RTSP Output	✓	✗	✓	✓

TR311HN and TR3xxNV2 Camera Video Mode (continued)

- The Rate Control setting should be set to CBR, there have been better results seen using this option.



- Setting the Bitrate to 8Mbps is also recommended, but you may see different results based on your network with other settings.
- In the *System* page you can set the identity name *Camera ID (NDI)* for display on the NDI interface. After choosing your name press “Set” to make the change. ***Note:** A reboot of the camera is necessary for the name change. The firmware version can also be verified from the *System* page.



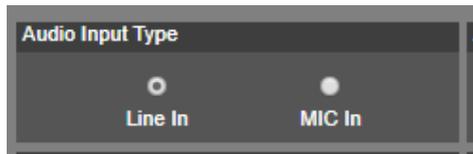
- The following characters can be used for the Camera ID description, there is a limit of 10 characters for the name.

Numeric characters	0123456789
Alphabetical characters (upper and lower cases)	ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz
Symbols	! @ # \$ % ^ & * () , . \ ; : ' ' + = < > ? [] { } - _ ` ~ \ /

TR311HN and TR3xxNV2 Camera Audio Settings

Before connecting to the Google Meet/Hangouts environment, verify that the Audio and Video can be recorded using the NDI *Studio Monitor* Tool.

1. Using the TR camera Audio (In) connection, set the Audio Input Type to *Line-In*.



MIC-In: Use a 3 to 4 MIC-In cable to connect the camera and MIC-In device (microphone).
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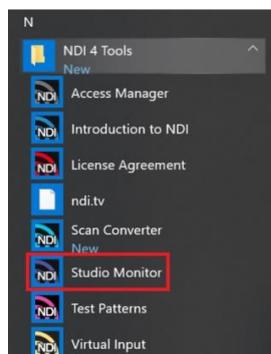
Line In: Line Input level is 1Vrms (max.)

2. Select the Audio Settings in the NDI Monitor tool to a level where audio is being captured; you may need to “tweak” the level to get a good level.
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NDI Studio Monitor

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2. Next, the NDI Studio Monitor window will open, it may display AVer video or may display NDI’s default video of “None”.

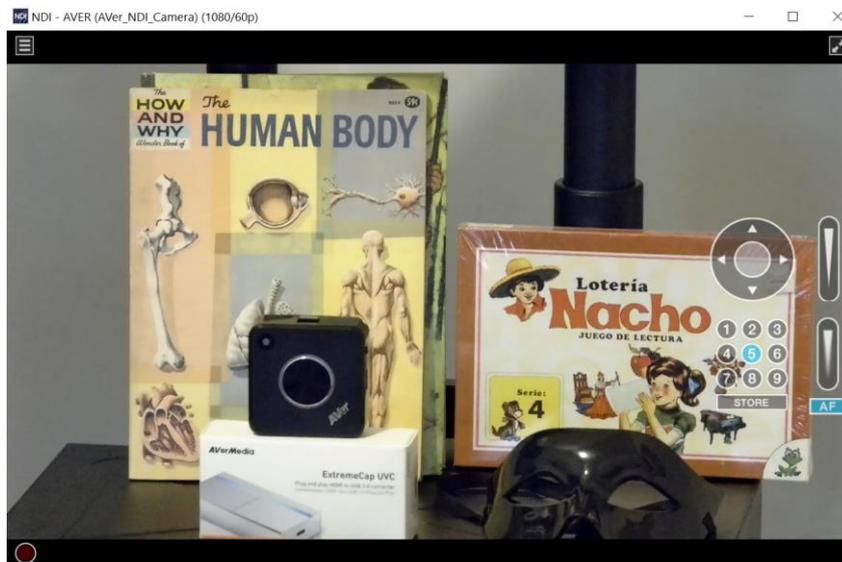


NDI Studio Monitor (continued)

3. Next, to view AVER video, select the Menu box displayed on upper left, then select “AVER_NDI_Camera”. You can also “right-click” anywhere within the window to access the menu.



4. Next, you should now be viewing the AVER TR311HN/TR3xxNV2 video as a source and it should also be displaying the Video Standard (1080/60p) from AVer Camera.

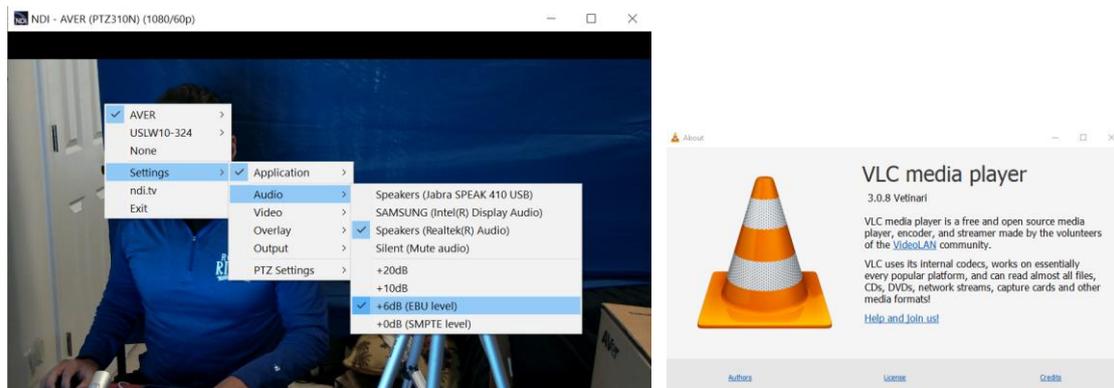


5. At this point, you can close the window and have verified NDI video from TR camera is working.

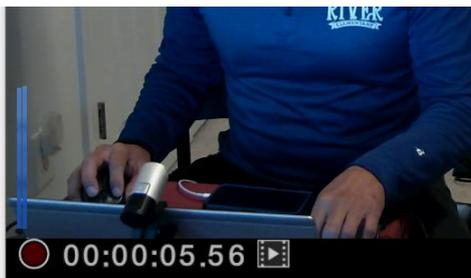
TR311HN and TR3xxNV2 Camera NDI Audio

Once we have verified that video is working properly, we need to verify that audio is also being captured.

1. In the example below we needed to adjust level to +6dB (EBU Level) to get audio recorded through the NDI Monitoring tool then played through VLC Media Player (3.0.8).



2. You should also see blue "Audio bars" in the lower left corner of the NDI display indicating an audio signal is being received.



3. Next, select the red "record" circle to begin recording.

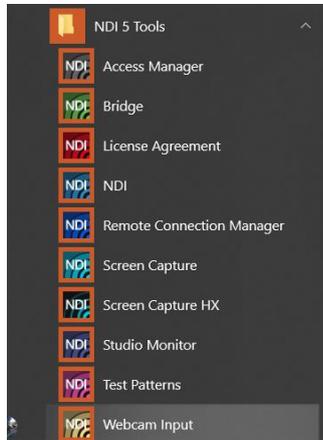


4. Next, select the "record" circle again to end the recording.
5. Next, select the  "film" icon and will take you to the recording directly. The recorded video will be in the "C:\Users\Dave\Videos\" folder in Windows.
6. Use VLC or some other player that supports NDI.
7. This concludes the quick test to verify that Audio/Video is being recorded and played.

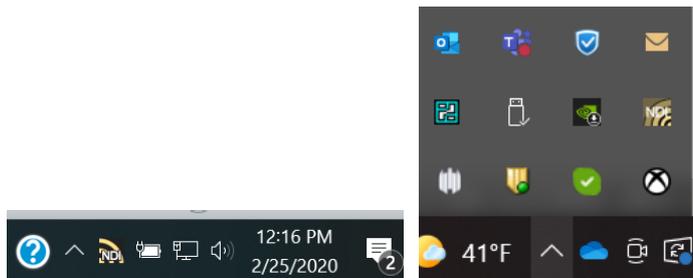
NDI Virtual Input / Webcam Input

Using the NDI Virtual Input, it gives you the ability of supplying a high-quality video source to Zoom or Hangouts meetings, (i.e., from TR311HN), here is how to configure a “Webcam Input” from NDI. This “Webcam Input” will be the video *Source* for Zoom.

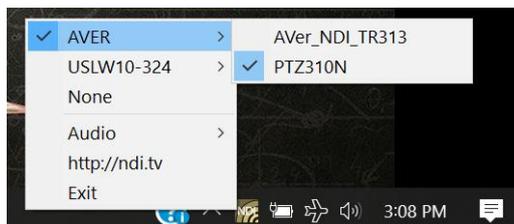
1. Go to Windows Start Menu, select NDI's *Virtual Input* application.



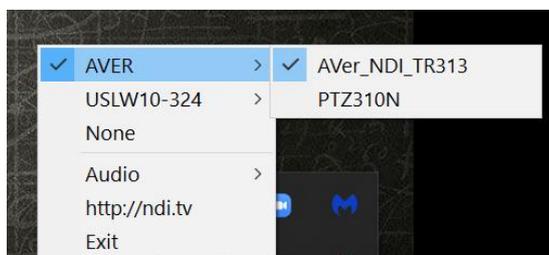
2. Next, it will open and place an icon on your System Tray.



3. Next, Right-Click on the NDI icon, you should have the ability to select AVER->TR311HN.



4. Next, verify that your selection is for AVER->TR311HN, Right-click on icon to verify check marks are there.

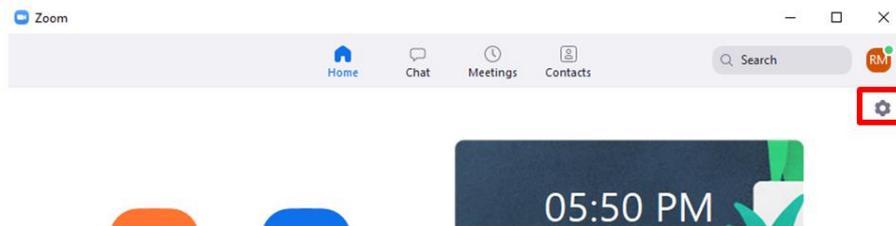


5. This concludes setting up the AVer TR camera as a Virtual Input for NDI integration.

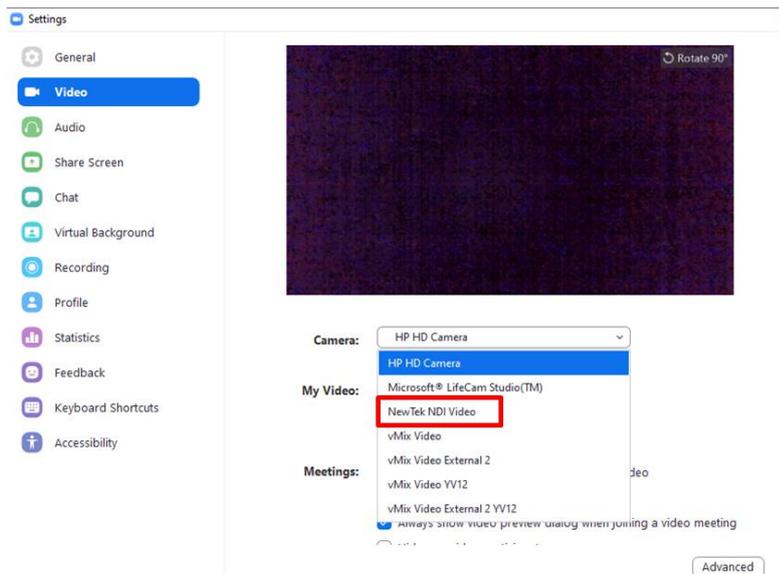
Zoom Configuration

Once the NDI video protocol has been configured and confirmed working and the NDI Virtual Input has been set, you will need to open Zoom and login to your account.

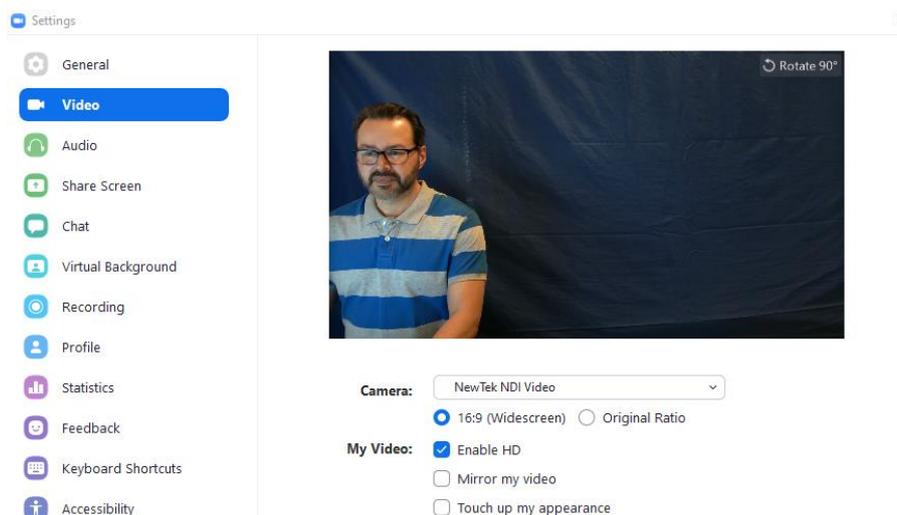
1. Open **Zoom** and login, select *Home* then the *Settings* gear icon.



2. Next, select *Video* then select the **Camera**: type

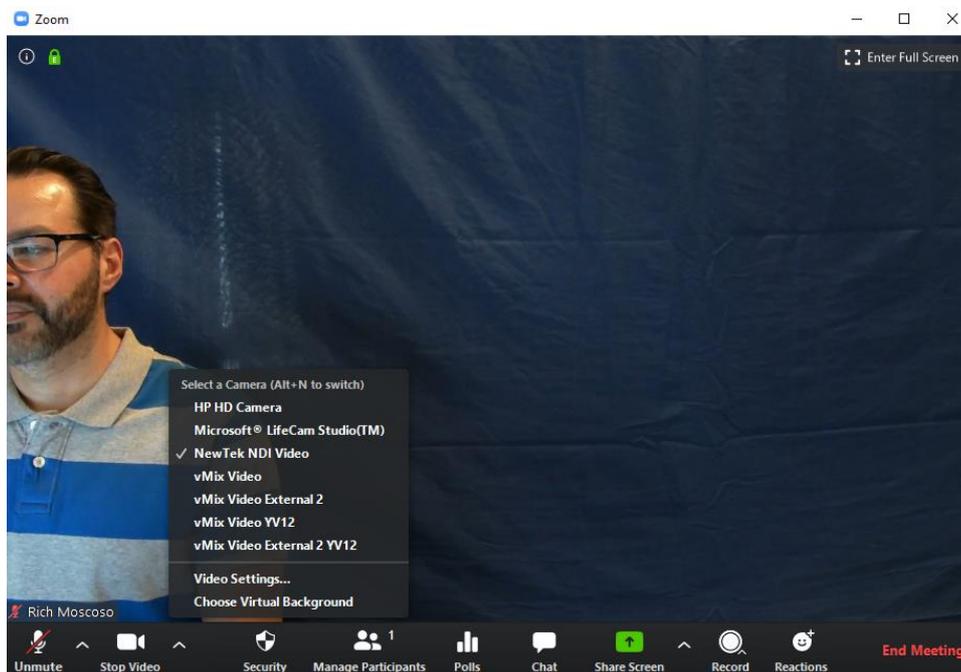


3. If this is the first instance of opening this setting after installing the *NDI Tools* you will see a new selection for *NewTek NDI Video*.
4. When configuring the *NDI Virtual Input* in the previous section, we defined the TR311HN camera as in Input. Once selected, you should be seeing the TR311HN NDI video.



Zoom Configuration (continued)

5. Next, start a Zoom meeting; you should be seeing the TR311HN NDI video as your Camera video. You can change it during the meeting if needed by selecting another video source.

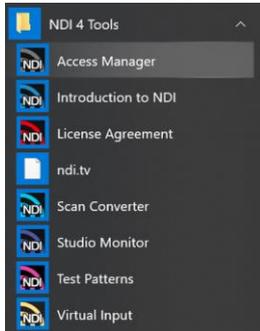


6. This concludes setting up Zoom with the TR311HN/TR3xxNV2 cameras configured in NDI mode.

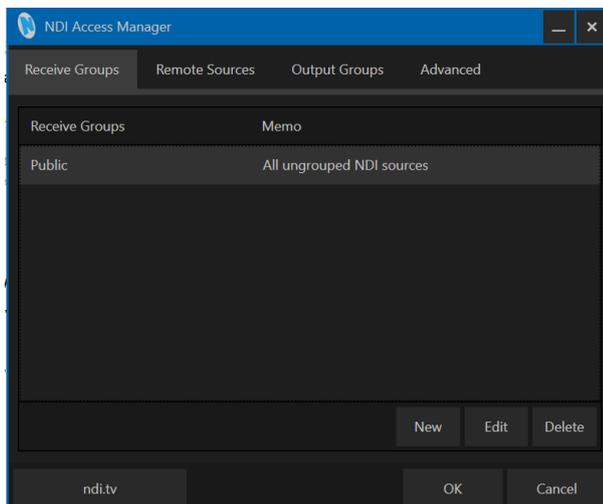
NDI Access Manager

When there are several video sources available, you will want to control the video sources by limiting the visibility of NDI channels to specific systems. You can organize your NDI channels into groups, choose which groups are available to your device, and select which groups can receive your NDI channels.

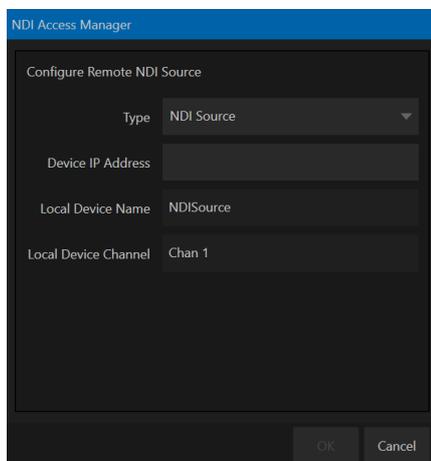
1. Go to Windows Start Menu; select NDI's *Access Manager* Application.



2. Next, you should be seeing the following window.

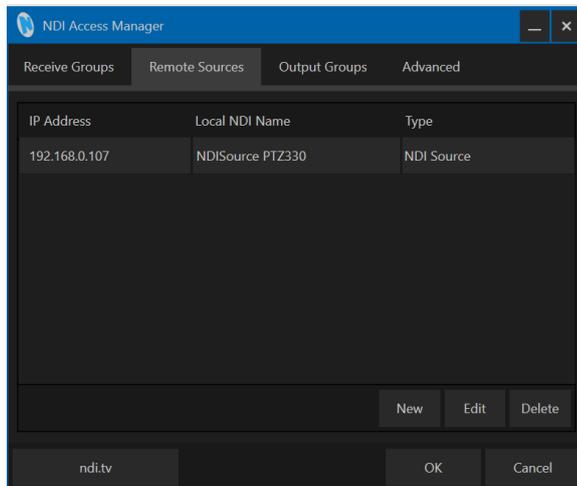


3. Next, select the Remote Sources tab, then select "New", under "Type" select NDI Source.

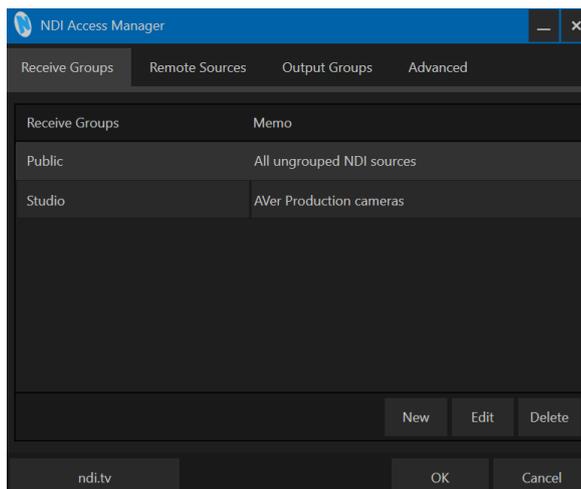


NDI Access Manager (continued)

- Next, enter the Device IP Address, Local Device Name, and Local Device Channel name. If you had multiple cameras, you would add each one of those here.



- Next, go back to the Receive Groups tab; you can create a group there such as “Studio”, “Editors”, “Public”.

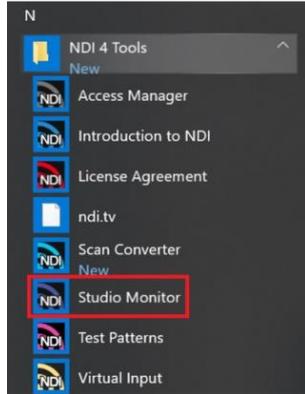


- For detailed information on *Access Manager* consult the NDI website, <https://ndi.tv/>

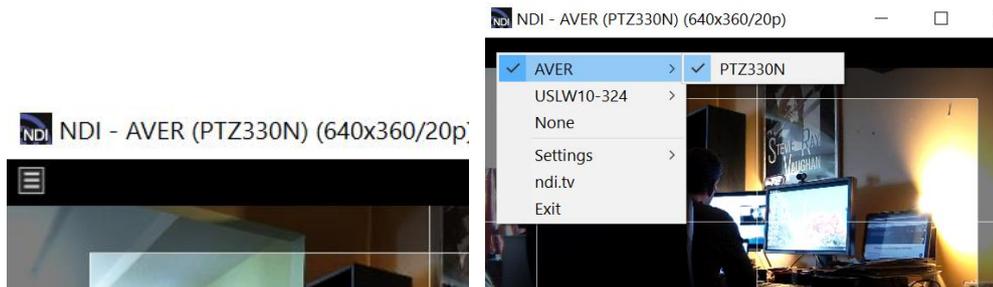
PTZ Camera Control from NDI Studio Monitor

The NDI Studio Monitor allows you to view or display any number of NDI video sources across the network, such as the AVer PTZ310/PTZ330N and TR311HN/TR3xxNV2 cameras. There is also remote control of PTZ, recording, and configuration of an applicable source.

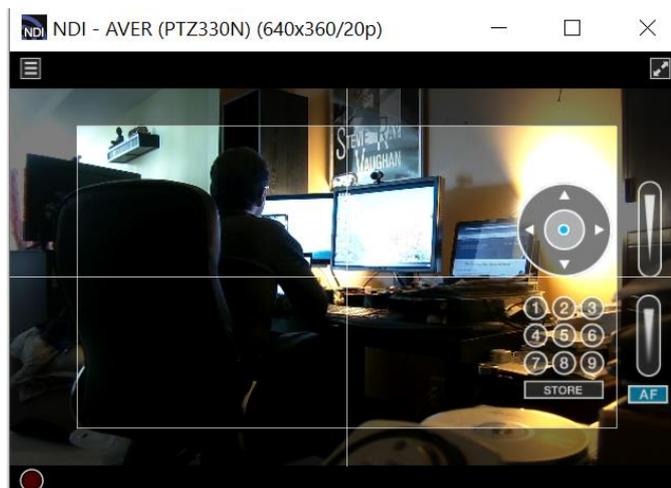
1. Go to Windows Start Menu, select NDI's *Studio Monitor*.



2. Next, the NDI Studio Monitor window will open, it may display AVer video or may display NDI's default video of "None". If "None" is displayed, select the Menu box (or right-click on display), then select *AVER->PTZ330N* as the source.



3. You should now be seeing the PTZ310/330 video, to activate the controls, move your mouse over the window.

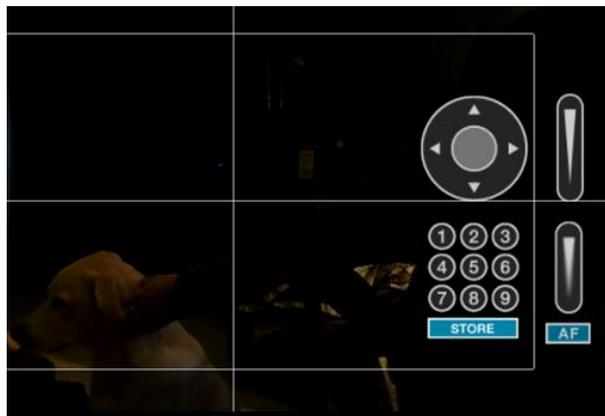


4. The NDI AVer camera controls are Pan, Tilt, Zoom, Manual Focus, Automatic Focus, and Position Presets.

PTZ Camera Control from NDI Studio Monitor (continued)



5. Initially there will *not* be a blue dot in any of the controls, move your mouse over to the Pan/Tilt control area, and then left click hold. You will now have a “Joystick” type control of the AVer camera. ***Note:** Selecting the Up/Down, Left/Right arrows do nothing.
6. Move your cursor over the Zoom control, left click hold, you can control the Zoom of the camera.
7. To create a “Preset”, adjust the camera to the preferred position, then select “Store” followed by one of the 9 presets.



8. This concludes the AVer PTZ310N/PTZ330N and TR311HN/TR3xxNV2 camera integration with NDI Studio Monitor.