GETTING STARTED

Setup completed on May 10, 2021.

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Contents

SYSTEM SUMMARY

This system is designed to acquire and record images from **4 x Basler raL2048-48gm** monochrome line scan cameras at **2048 x 2048 pixels resolution, 23 fps** and **8 bit /pixel**.

Pylon viewer utility software and/or **StreamPix** can configure the cameras. **StreamPix** records images.

The system has been completely configured, tested and validated. Under normal condition the end user should only have to re-assemble it to start using **StreamPix 8**.

Note: Because of the IP configuration of cameras and computer, it is not recommended to swap cameras from systems to systems. Should you need to do this, IP address on the camera and/or the corresponding NIC adapter must be reprogrammed (see section related to NIC and camera configuration for further details).

UNPACKING CONSIDERATIONS

Transportation has its hazard; it is therefore recommended to open the computer chassis and perform a visual inspection before powering the system. Firmly press on all devices to make sure that they are well connected to their respective slots. Secure all connections.

SYSTEM DESCRIPTION

COMPUTER

- **Make:** Image et Technologies
- **Operating System:** Windows 10 Professional 64 bit
- **CPU:** Intel(R) Xeon(TM) Silver 4214R CPU @ 2.40GHz
- **Motherboard:** Supermicro X11SPA-TF
- **RAM:** 48GB

DISKS CONFIGURATION

- 1 x Samsung SSD 870 EVO Plus 250GB disk: **OS (C:)**
- 8 x Samsung SSD 860 PRO 4TB configured in 4 RAID0 volumes (2 disks per volume): **Cam1 (D:)**, **Cam2 (E:)**, **Cam3 (F:)**, **Cam4 (G:)**

OTHER HARDWARE

- 1 Nvidia Quadro P400 (slot #5)
- 1 x Intel quad I350 GigE adapter (slot #1)
- 1 x Areca 1883I disk controller (slot #3)
- 1 x Startech Wifi adapter (slot #7)

CAMERAS

- 4 x Basler raL2048-48gm

STREAMPIX

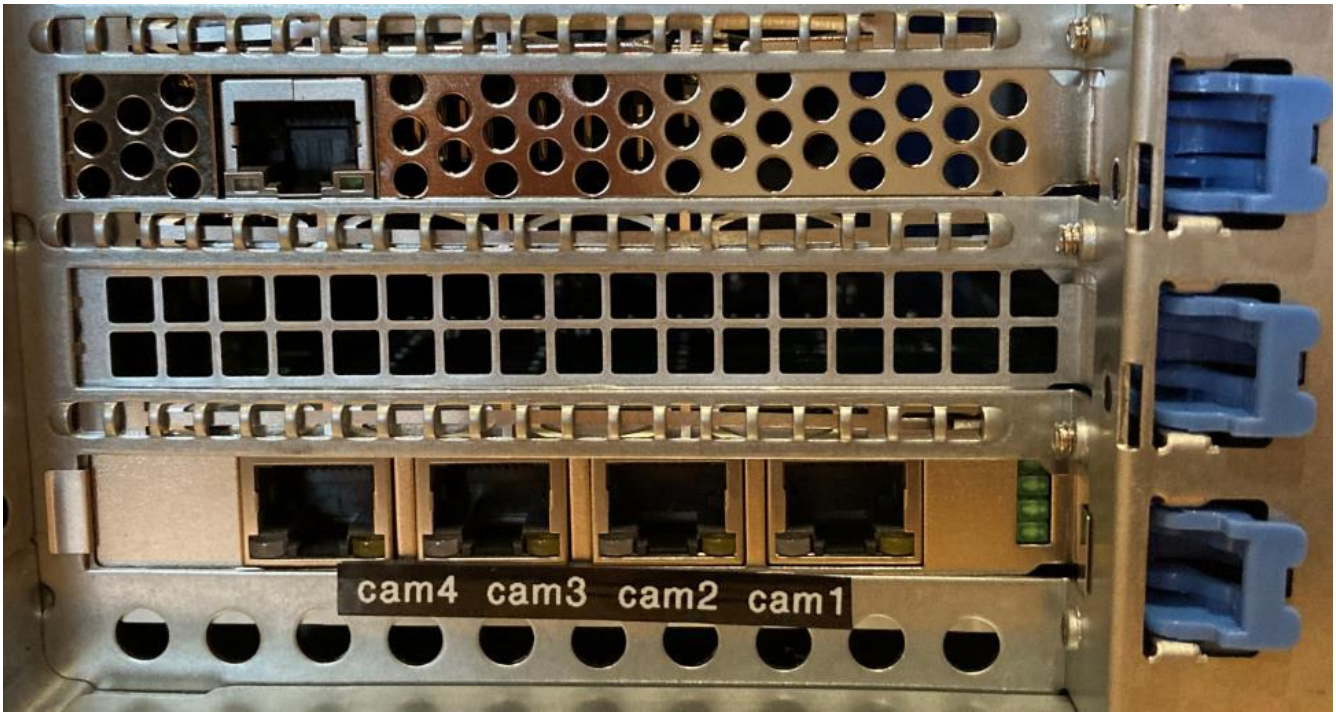
- Version 8.4.0.84
- Licensing: USB key

SOFTWARE INSTALLED BY NORPIX

- Code Meter Runtime 7.10
- Intel driver 26.1
- Basler pylon 6.2.0.21487

PHYSICAL CONNECTIONS

The cameras were connected into the NIC as shown below:



INSTALLING THE SOFTWARE

The following sections describes how to reconfigure the system to its initial state. This is in the event of a partial or complete corruption of the system. It assumes that Microsoft Windows and the motherboard drivers have already been reinstalled.

Complete reconfiguration involves the following steps:

- Installing the camera drivers and software
- Validating the cameras configuration
- Installing the WIBU drivers
- Installing StreamPix
- Configuring StreamPix

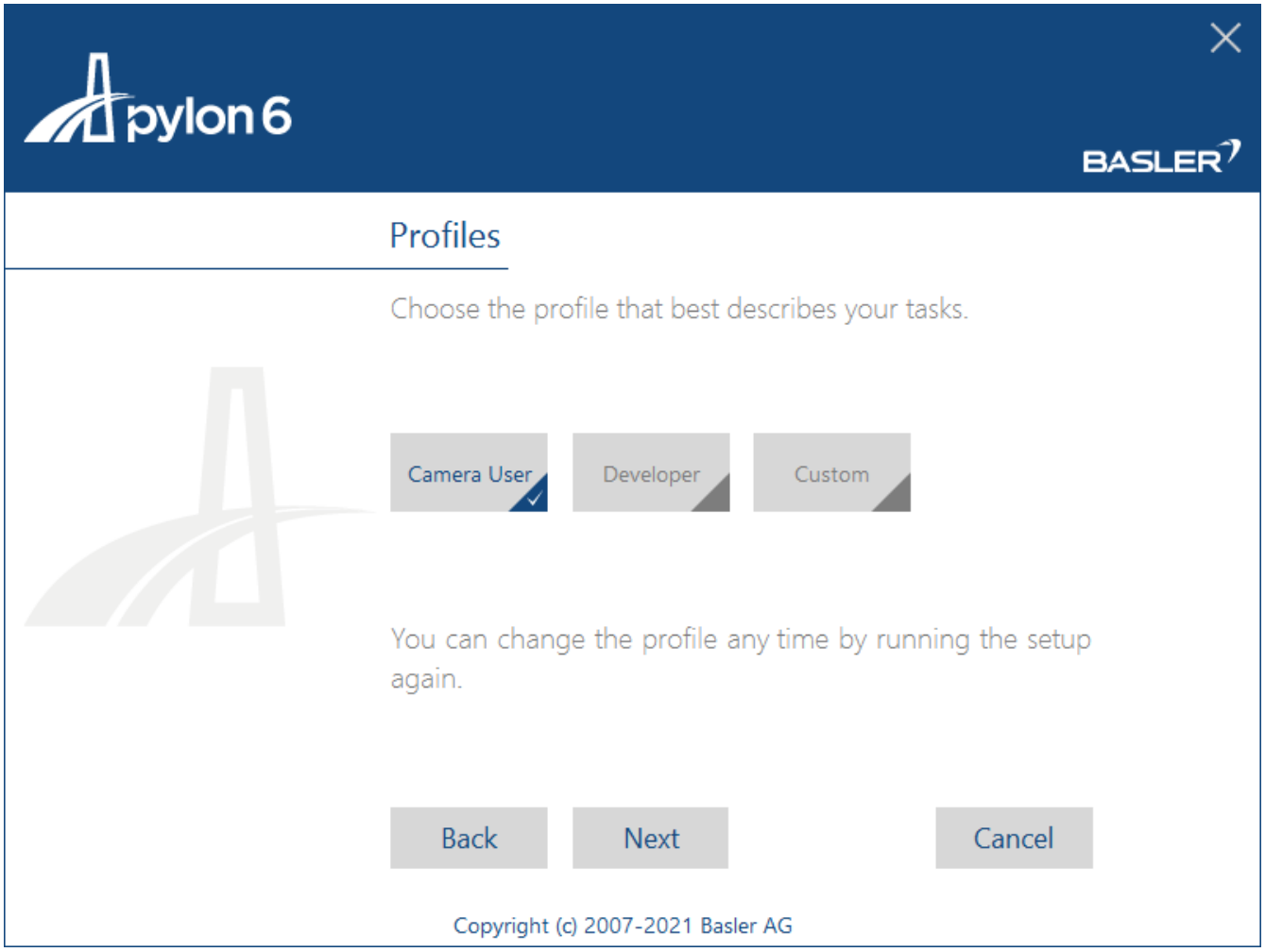
All installation utilities and configuration files were saved to the **C:\Software Installed by NorPix** folder and on the **StreamPix DVD** shipped with the system.

INSTALLING THE CAMERAS DRIVER AND SOFTWARE

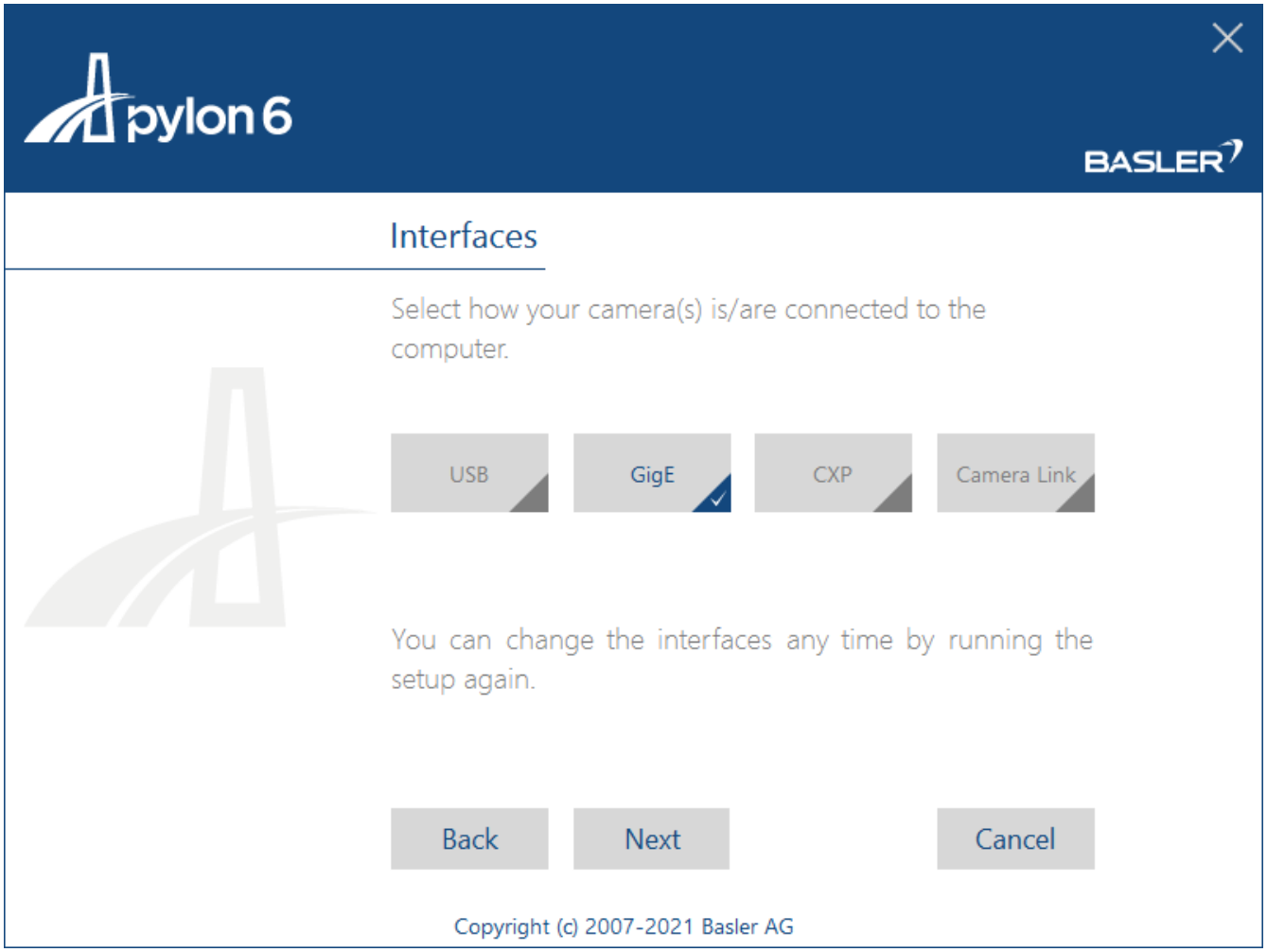
The camera setup application was saved to **C:\Software Installed by NorPix\Basler**.

Run the **Basler_pylon_6.2.0.21487** installer.

When prompt. Select to install **Camera User**:



When prompt to select the component to be installed, since the cameras are GigE Vision based, there is no need to install the **USB driver**:



Finally, click on **Next** to finish the installation.

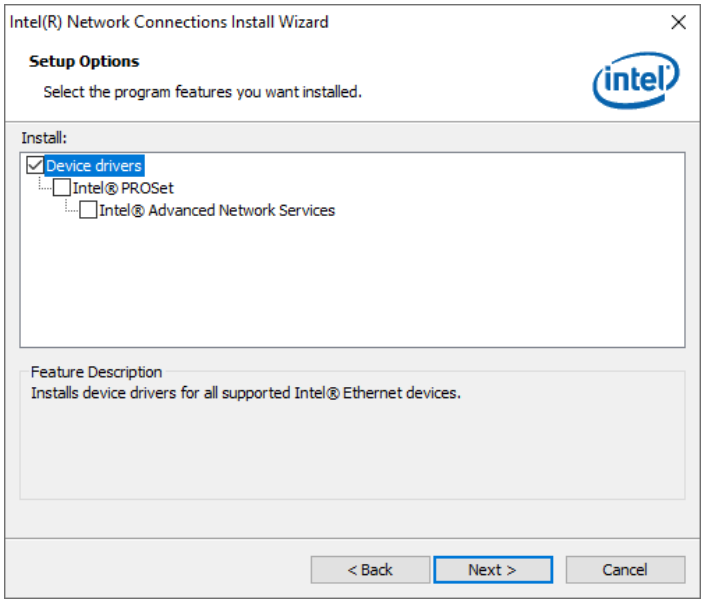
CONFIGURING THE CAMERA COMMUNICATION CHANNEL(S)

If your DVR station will be connected to the local network, make sure to select an IP address for your camera interfaces and NIC different than IP range in used in your LAN.

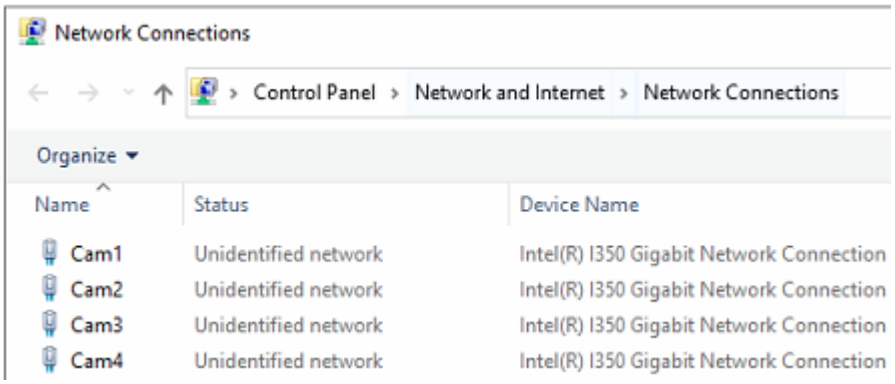
CONFIGURING THE COMPUTER INTERFACES

Each camera is connected to the computer over a direct point-to-point network. It is necessary to configure each NIC adapter port to operate the cameras. A fixed IP address must be set to both the NIC and cameras. IP addresses must be in the same network range.

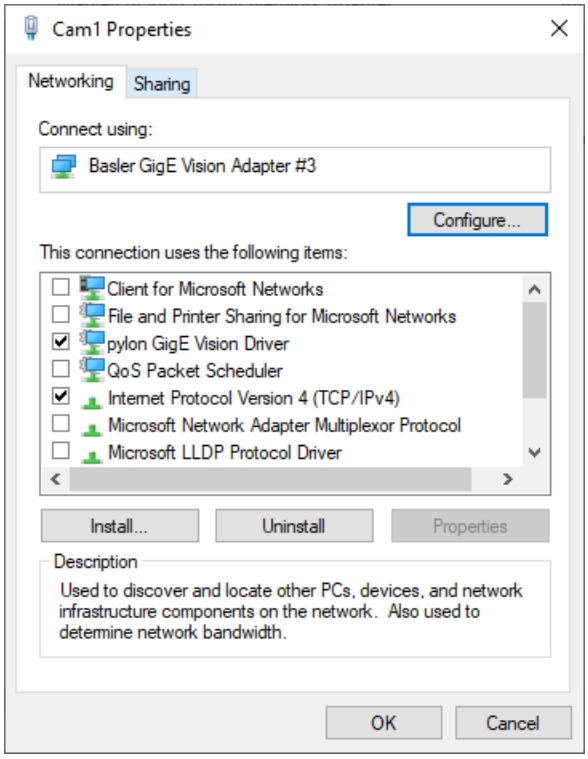
1. Install the Intel network adapter driver from **C:\Software Installed by NorPix\NIC**. Only **Device drivers** needs to be installed:



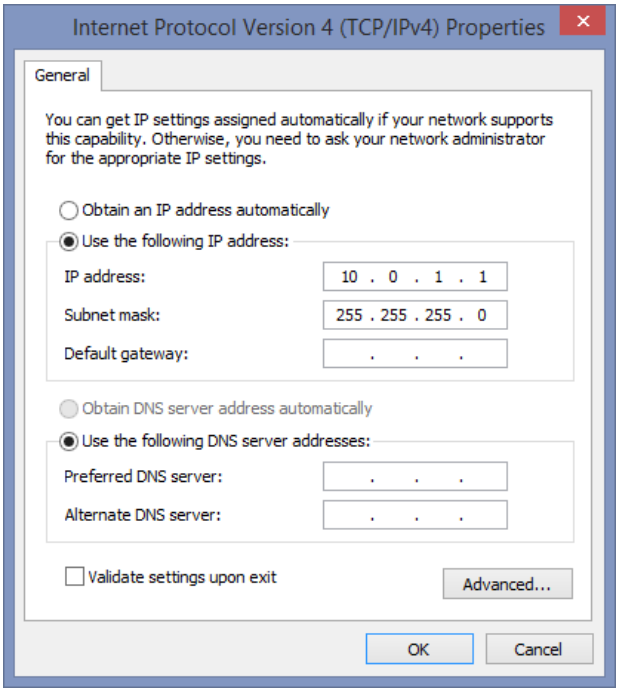
2. Open Network and Sharing Center:
   Start -> Control Panel -> Network and Sharing Center -> Change adapter settings
   You can rename network ports to match their respective camera connection. Make sure to use ports related to the **Intel Adapter I350:**



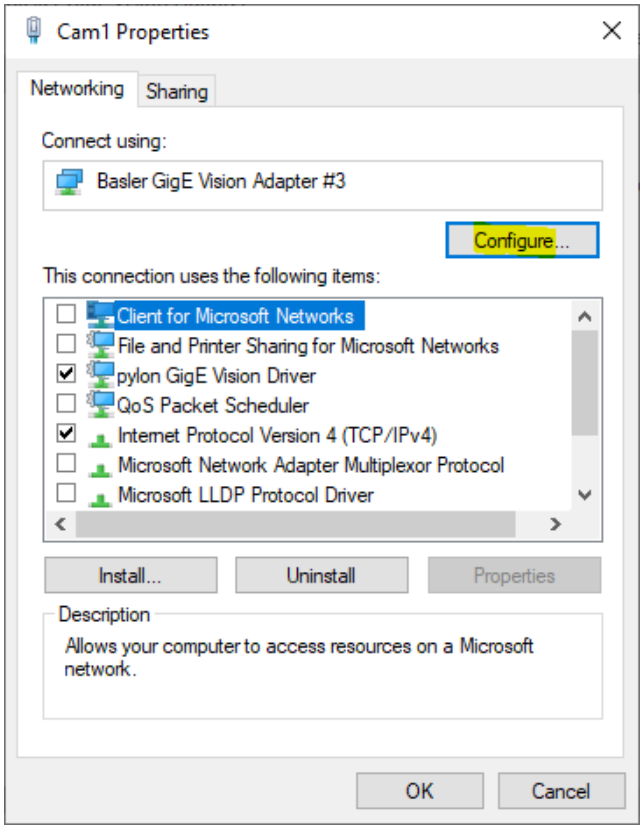
3. Right-click on the **Cam1** interface and select **Properties**. Uncheck every box but **pylon GigE Vision Driver** and **Internet Protocol Version 4 (TCP/IPv4)**:



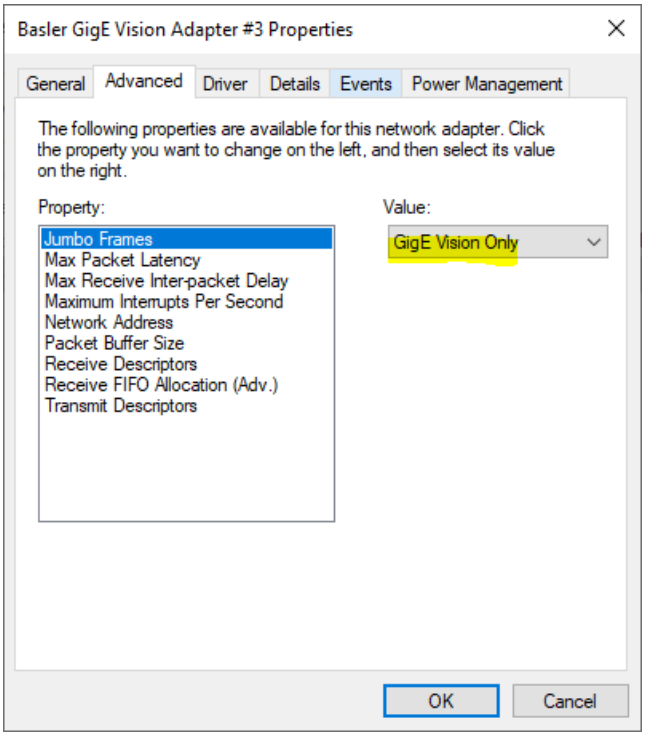
4. Double-click on **Internet Protocol Version 4 (TCP/IPv4)** and select **Use the following IP address**. Enter **10.0.1.1** in the **IP address** field and **255.255.255.0** in the **Subnet mask** field:



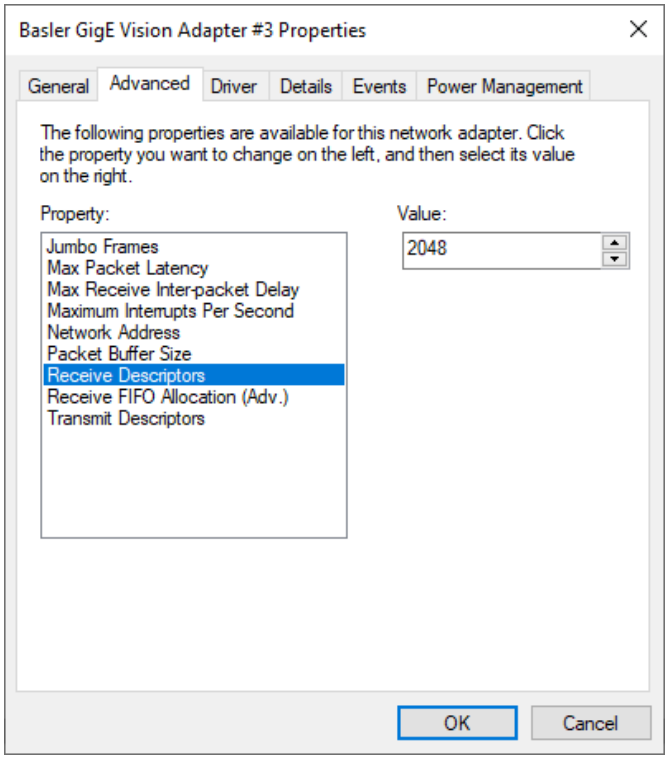
5. Click on the **Configure...** button of the **Cam1 Properties** window:



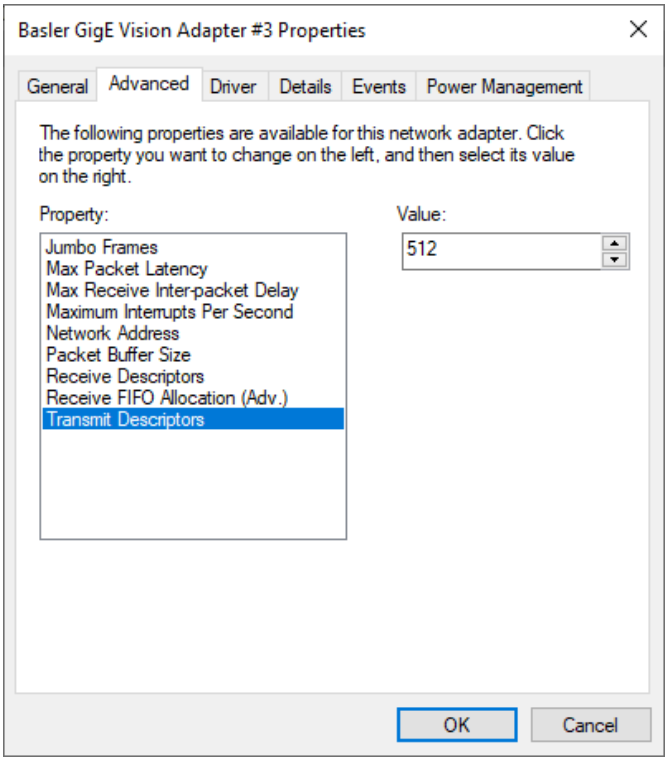
6. Select the **Advanced** tab and set **Jumbo Frames** to **GigE Vision Only**:



7. Set **Receive Descriptors** to max allowable **(2048):**



8. Set **Transmit Descriptors** to **512**:



9. Click on the **OK** button when done. Follow the same steps to configure the **Cam2, Cam3** and **Cam4** interfaces. Use the following IP addresses:

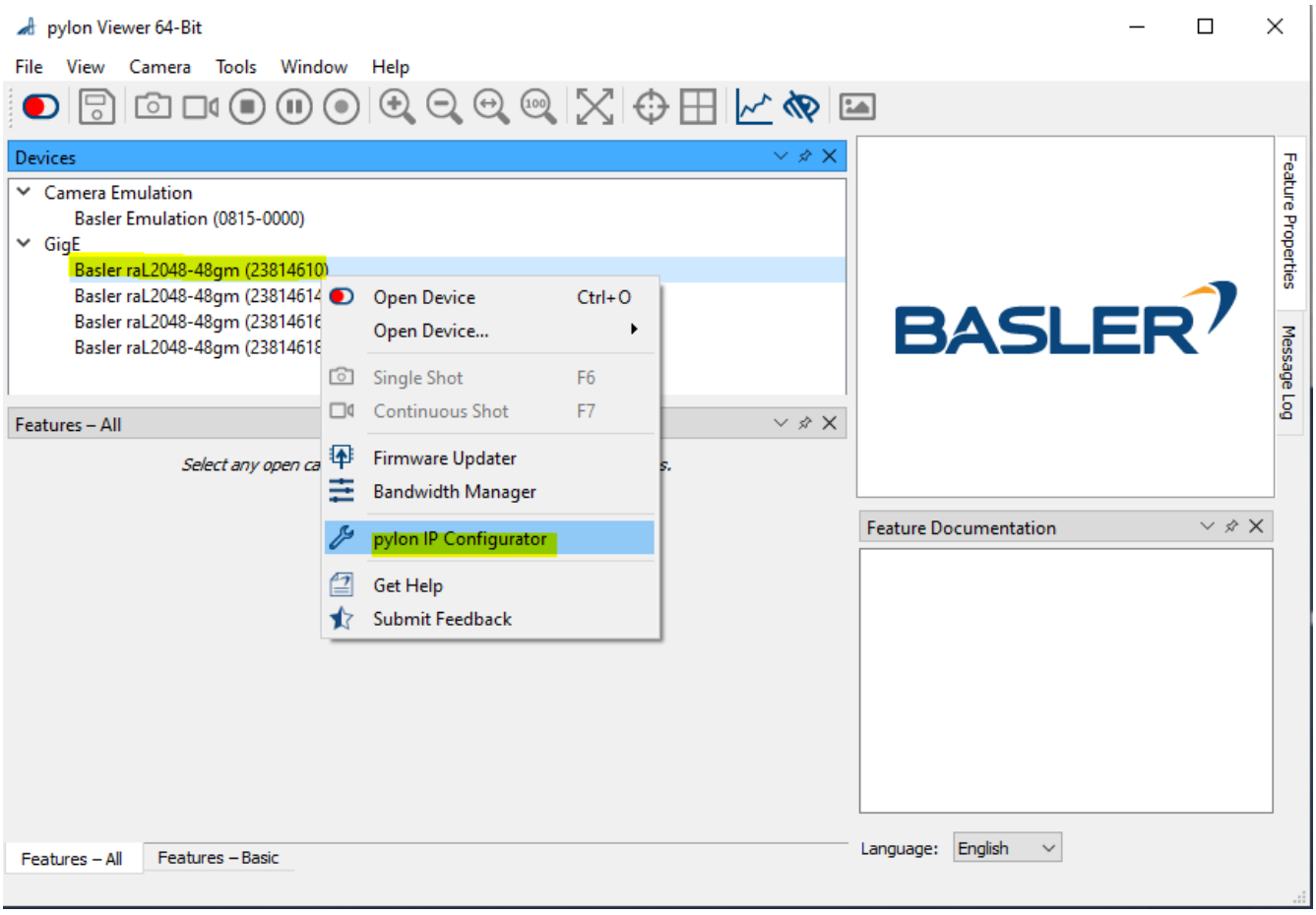
Camera serial number	Interface	IP address	Subnet mask
23814610	Cam1	10.0.1.1	255.255.255.0
23814614	Cam2	10.0.2.1	255.255.255.0
23814616	Cam3	10.0.3.1	255.255.255.0
23814618	Cam4	10.0.4.1	255.255.255.0

CONFIGURING THE CAMERA INTERFACES

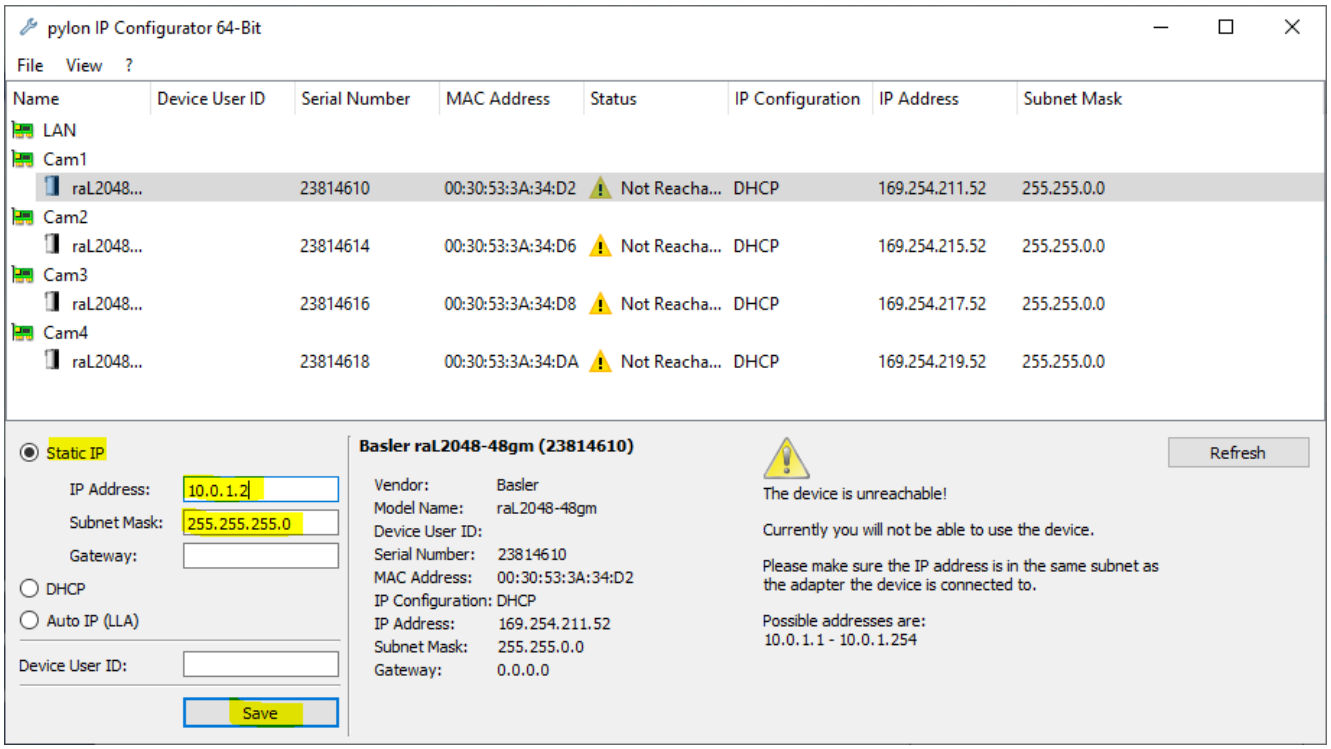
A static IP address must be assigned to each camera as this diminishes the risk of connection failure. Use the following procedure to assign static IP addresses to the cameras:

1. Open the **pylon Viewer** application from **C:\Program Files\Basler\pylon 6\Applications\x64\bin**.
   A shortcut of the application can be found on desktop:

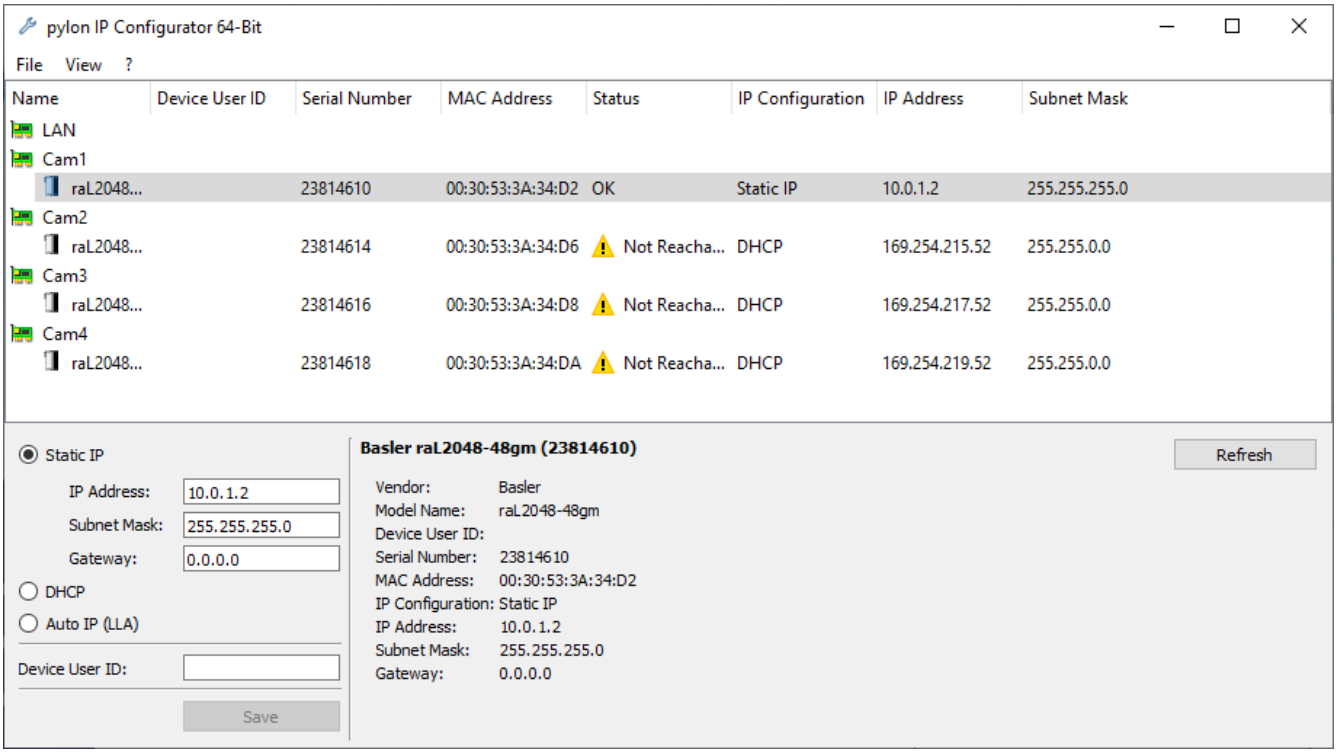
2. **pylon Viewer** GUI should appear. Right click on the first camera and select **pylon IP Configurator**:



3. Check **Static IP**, set **IP Address** and **Subnet Mask** as below and then click on **Save**:



4. After setting the IP address of the first camera, pylon IP Configurator should show as below:



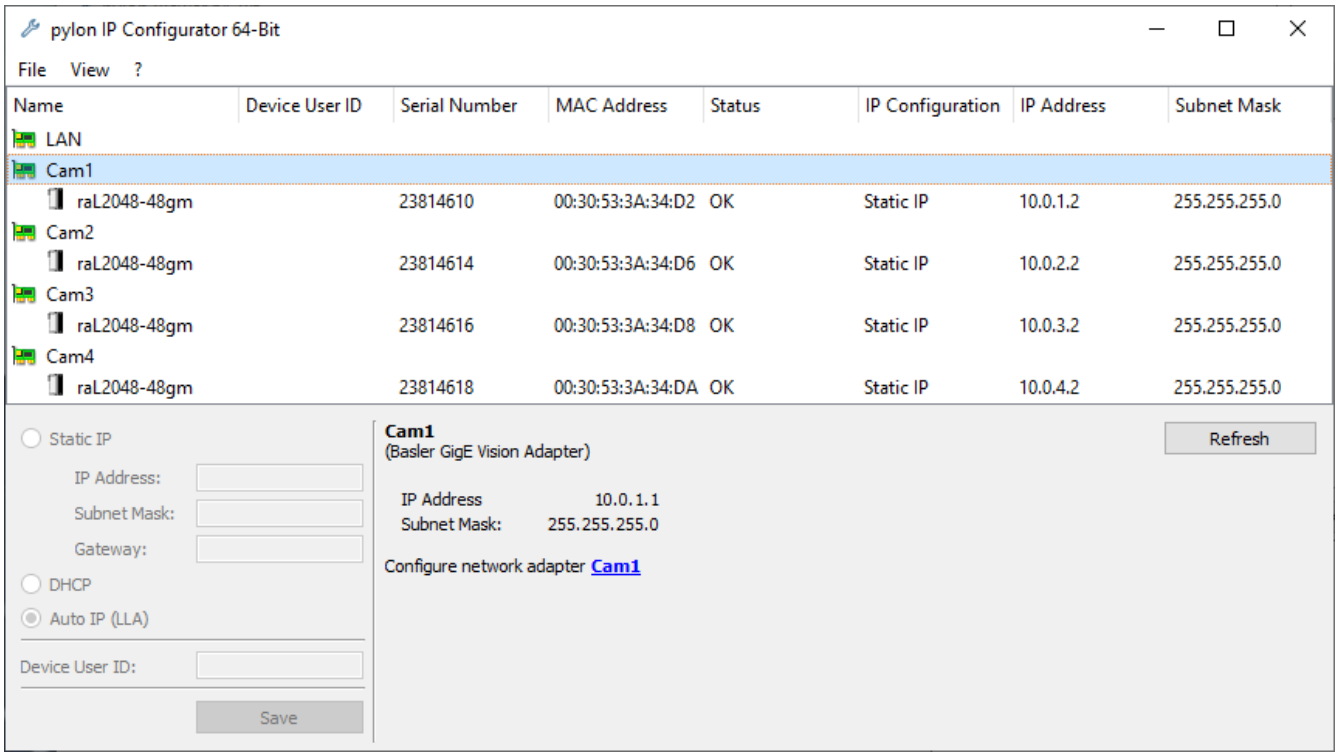
5. Repeat the step4 to set the IP addresses for the other cameras.

   You can identify the cameras by their serial numbers.

   Use the following IP addresses:

Camera	Serial number	IP address	Subnet mask
Cam1	23814610	10.0.1.2	255.255.255.0
Cam2	23814614	10.0.2.2	255.255.255.0
Cam3	23814616	10.0.3.2	255.255.255.0
Cam4	23814618	10.0.4.2	255.255.255.0

6. After setting the IP address of all the cameras, pylon IP Configurator should show as below:

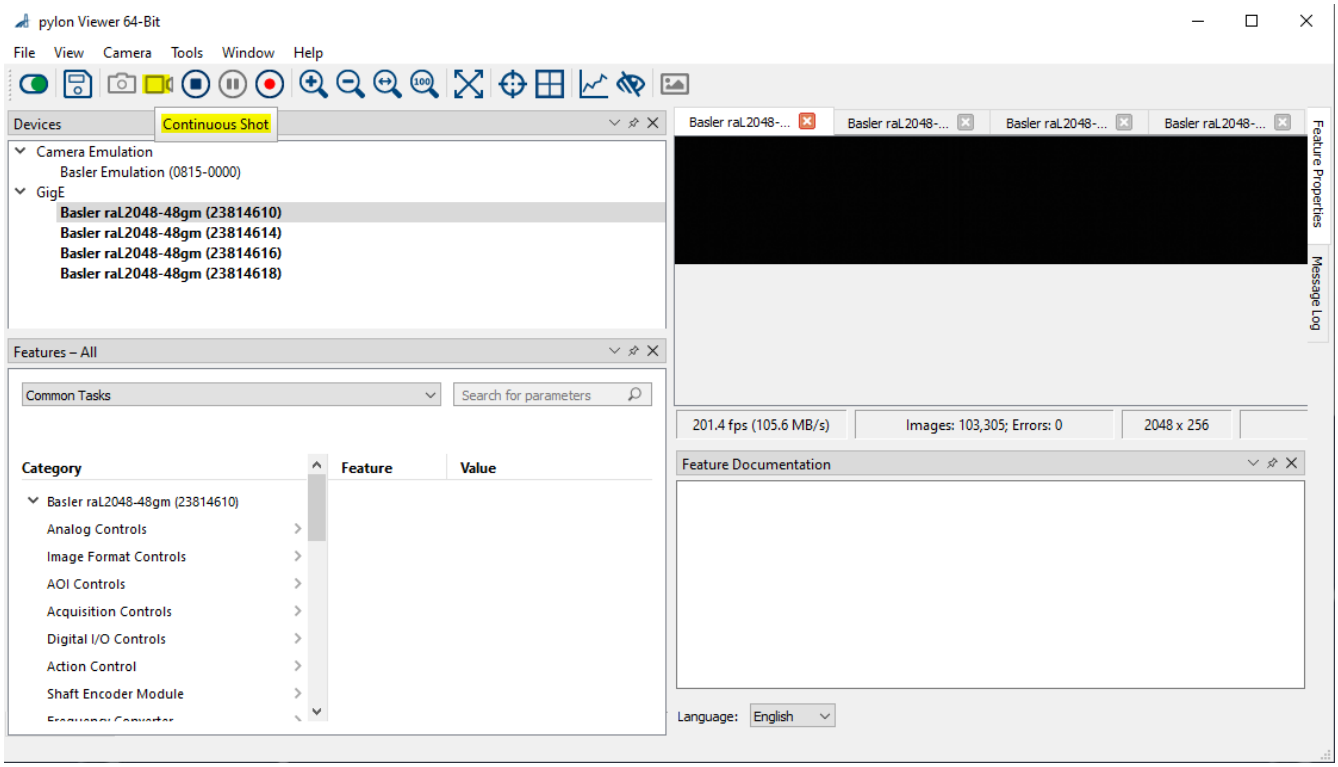


VALIDATING THE CAMERAS CONFIGURATION

It is recommended to validate the cameras configuration before using them within **StreamPix**.

For this, use the **pylon Viewer** application (a shortcut of this application has been saved on desktop).

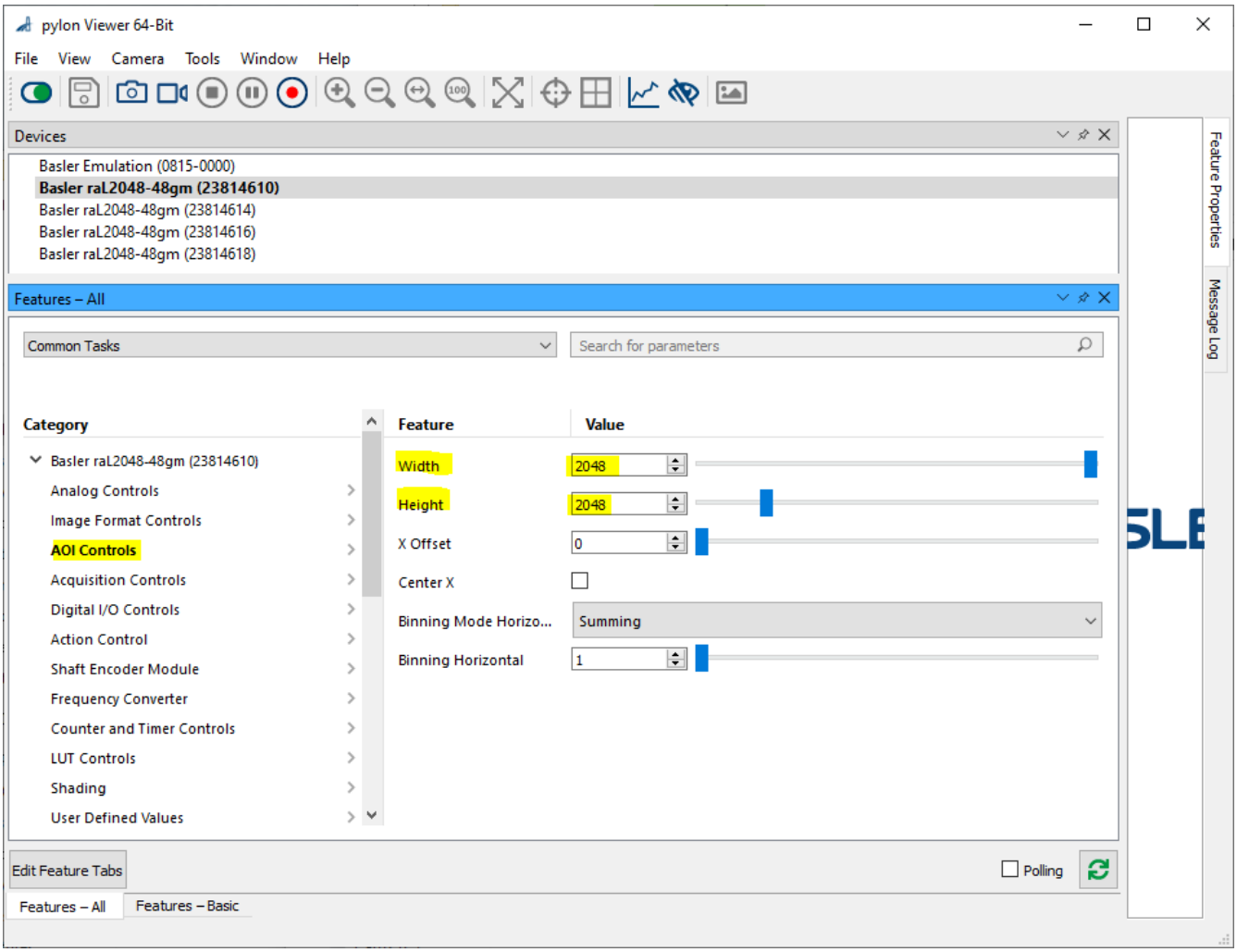
After opening, **pylon Viewer** should display all the available cameras. To start the acquisition, double click on a camera from the list and then click on **Continuous Shot**:



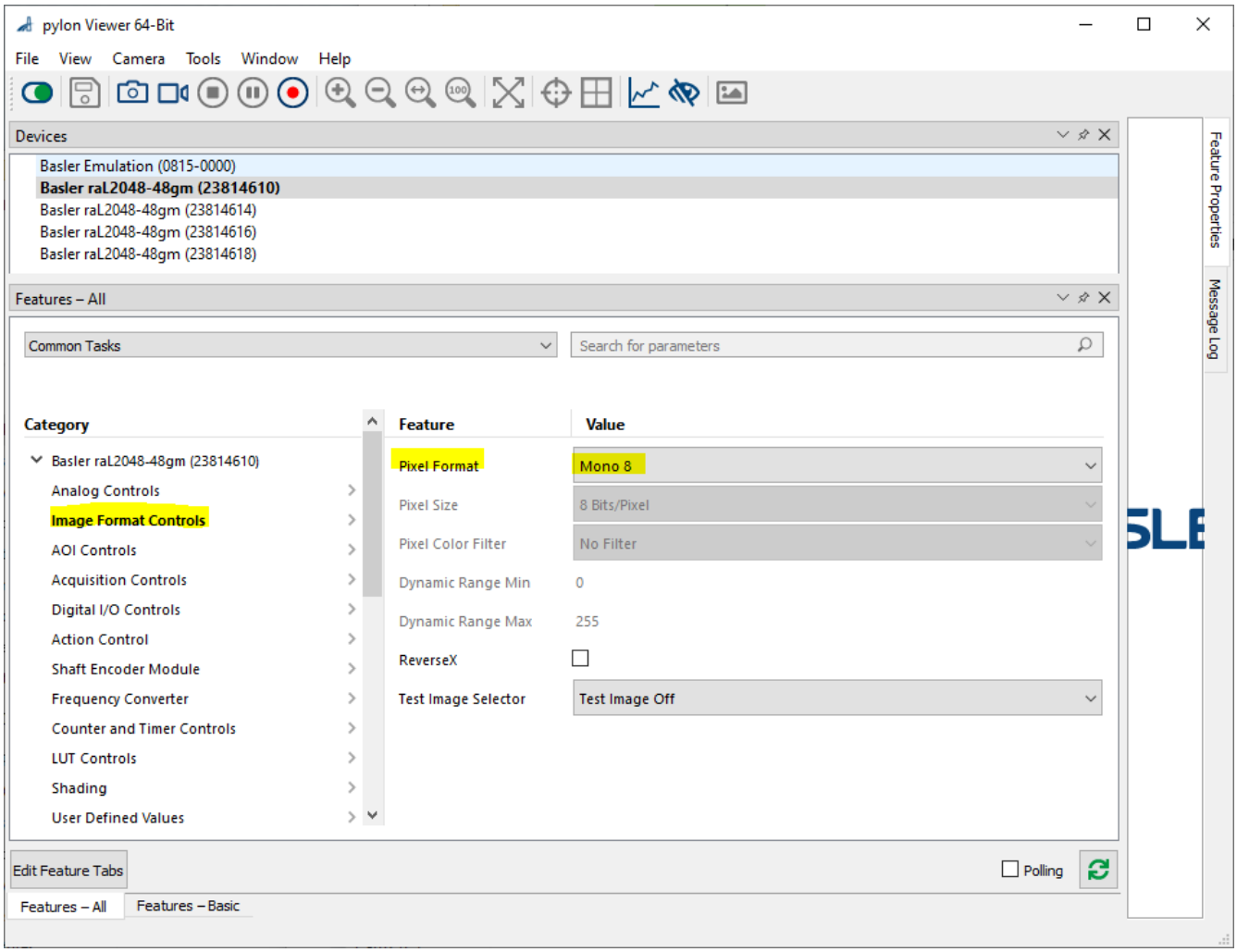
All the camera parameters can be accessed via the **Feature All** tab.

The following parameters need to be modified as below:

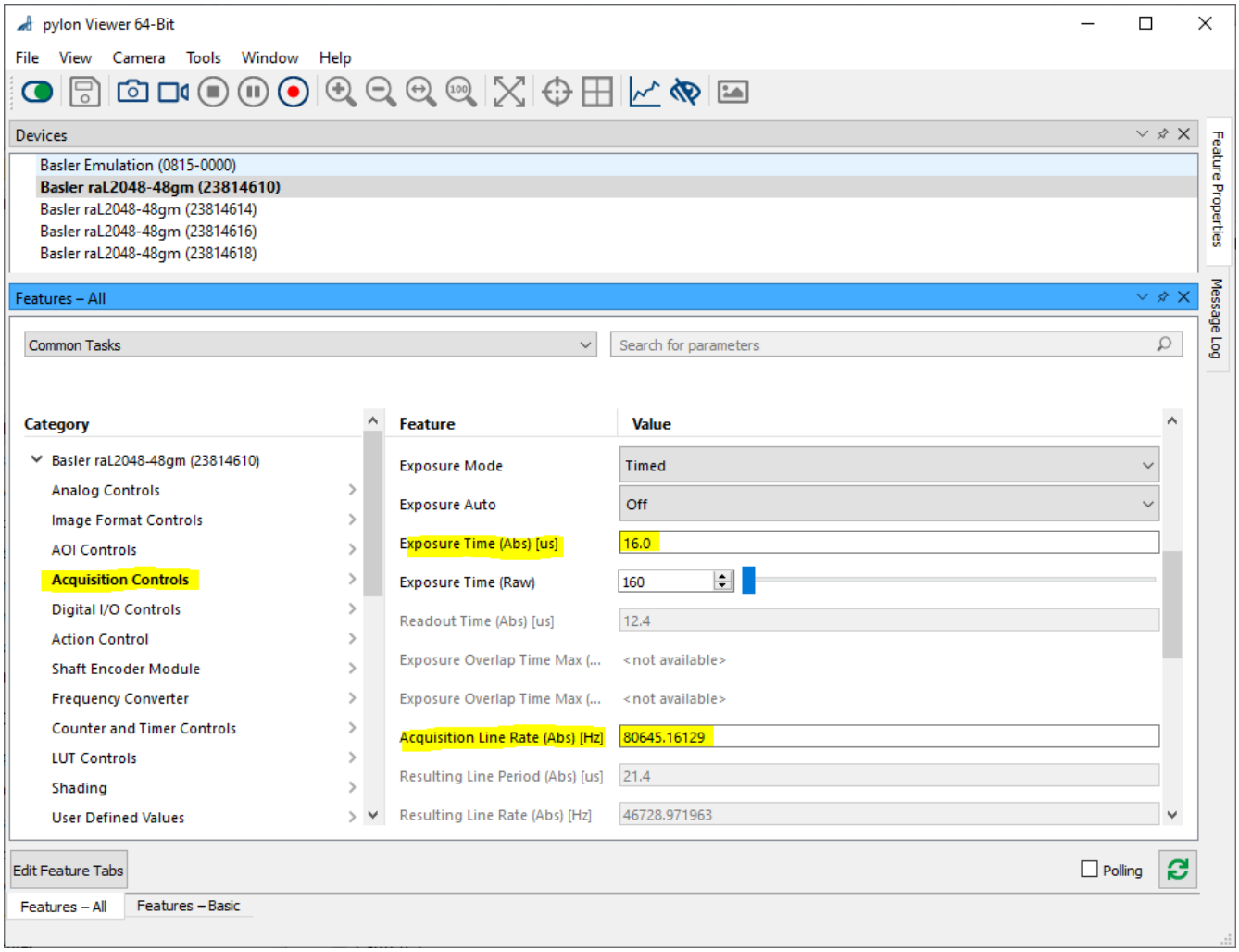
1) The **resolution** to **2048 x 2048**:



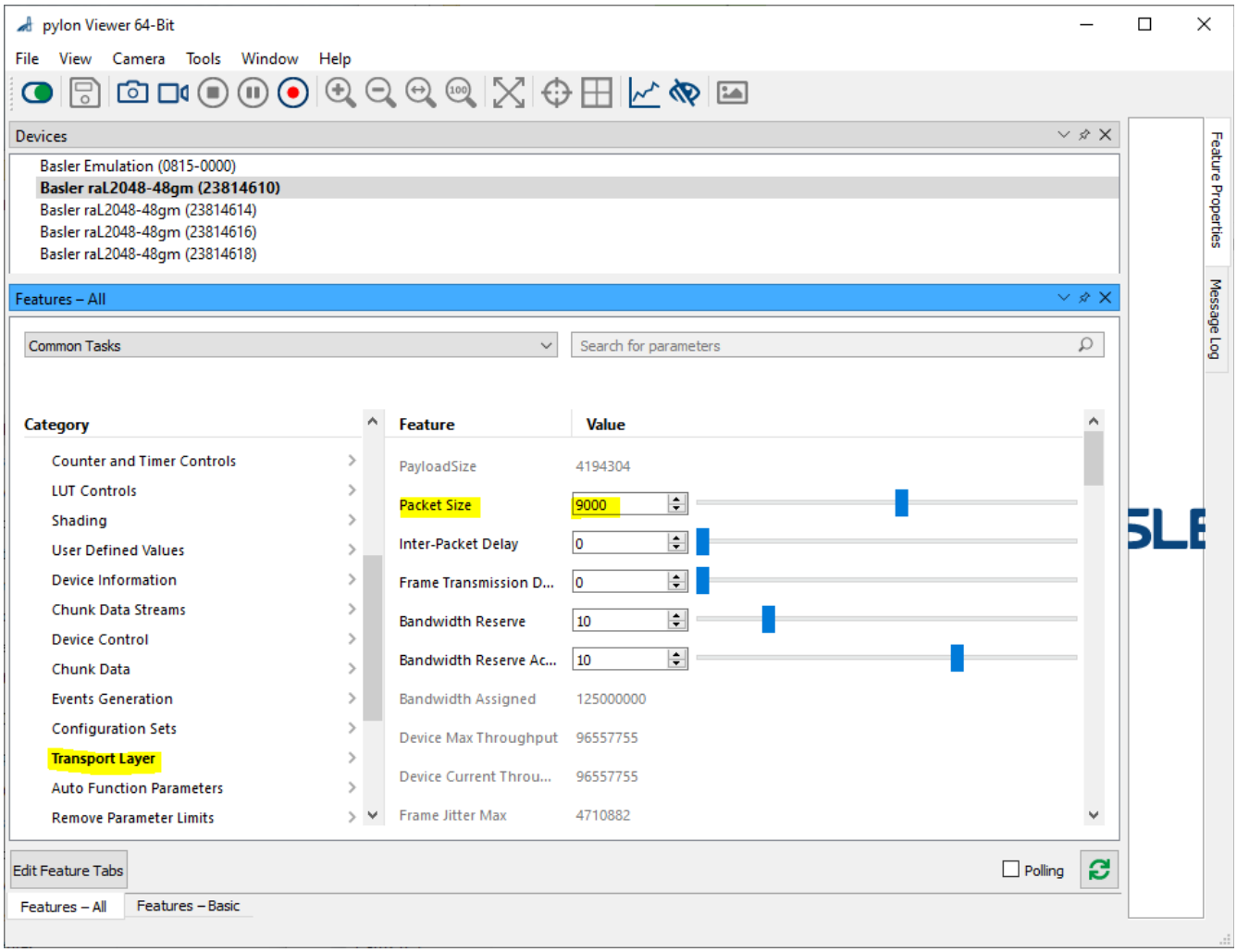
2. **Image Format** to **Mono 8**:



3. **Exposure Time** and **Acquisition Line Rate**:



4. Packet Size to **9000**:

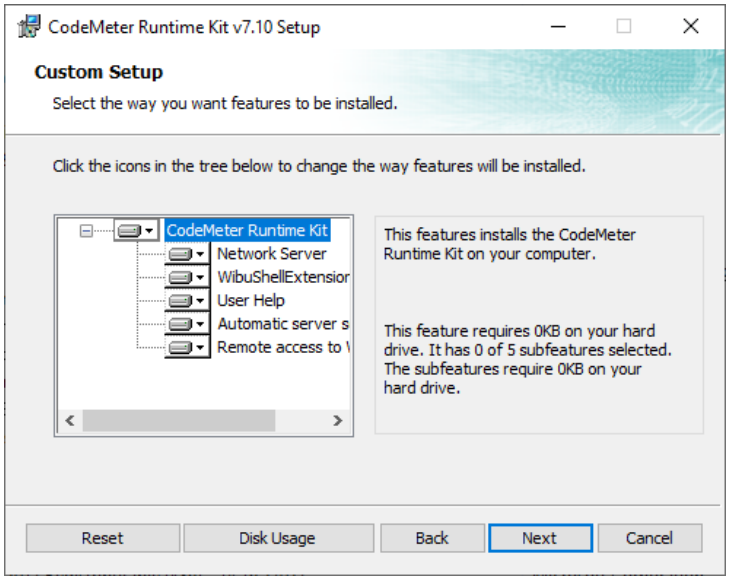


INSTALLING THE WIBU DRIVERS

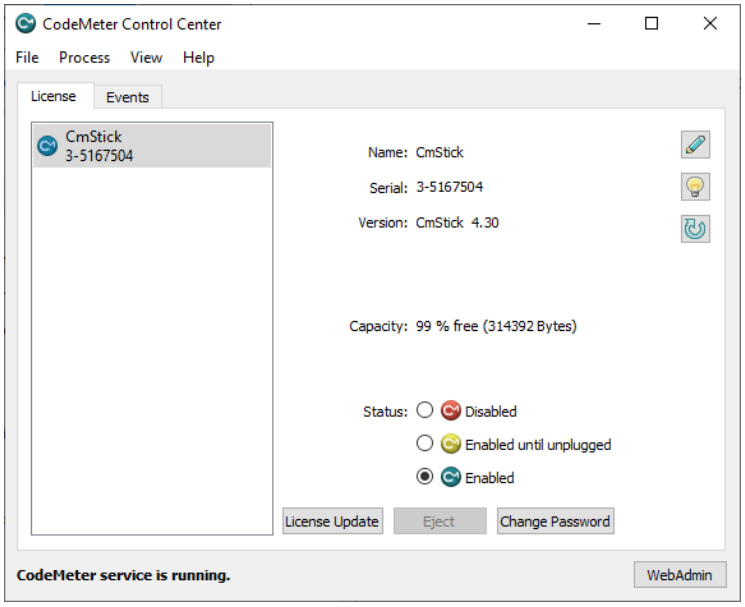
The **WIBU drivers** allow you to use the USB license key provided by NorPix. Hence, they need to be installed to use **StreamPix**.

Proceed as follow to install the **WIBU drivers**:

1. Make sure the USB key is not connected to the computer.
2. Run **CodeMeterRuntime.exe.exe** from **C:\Software Installed by NorPix\WIBU**.
3. When prompt, select all options:



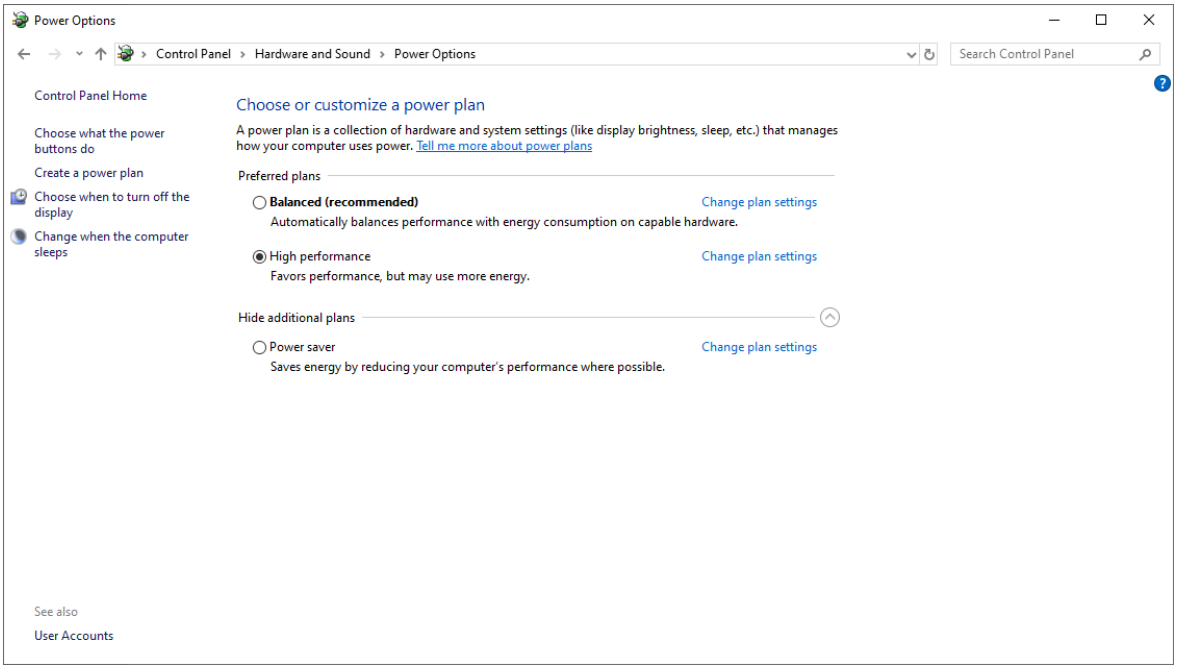
4. To make sure the key was installed properly, open **Code Meter Control Center** (C:\Program Files (x86)\Code-Meter\Runtime\bin\CodeMeterCC.exe) and check if the key is listed there:



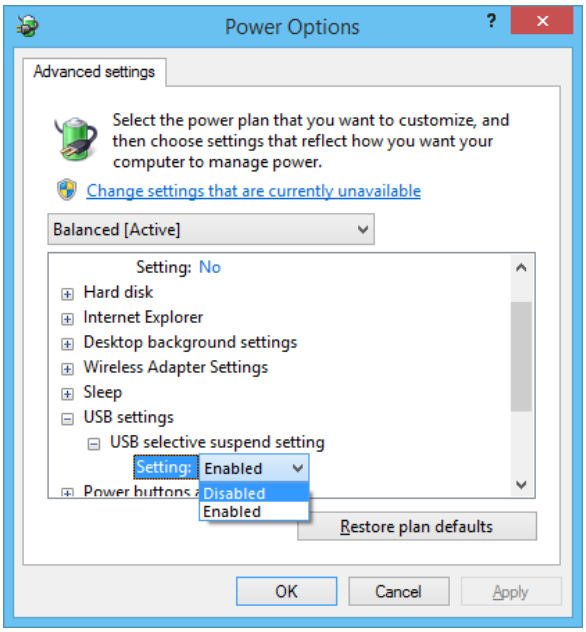
5. You can connect the USB key to the computer once the installation is complete.
6. Make sure that the USB port where the key is connected is never powered down while the computer is running. Open Windows' **Power Options** menu:

   Start -> Control Panel -> Power Options

7. Click on **Change plan settings** and select the **Performance Power plan**:

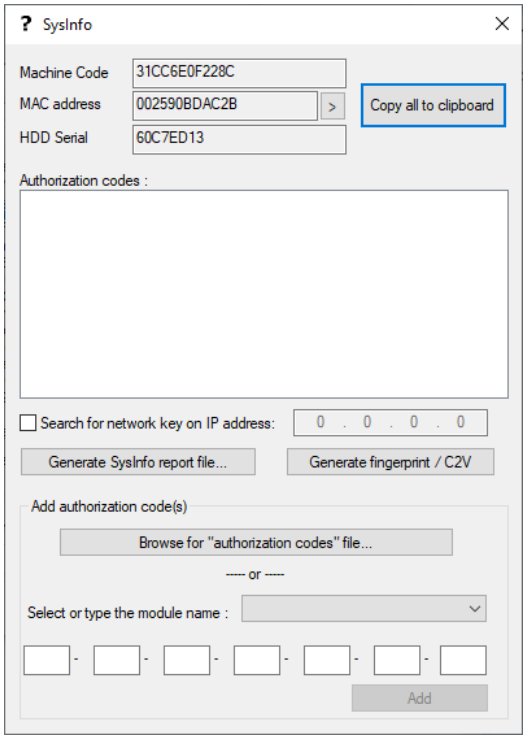


8. Scroll down to the **USB settings** section and set **USB selective suspend setting** to **Disabled**. Click **OK**:

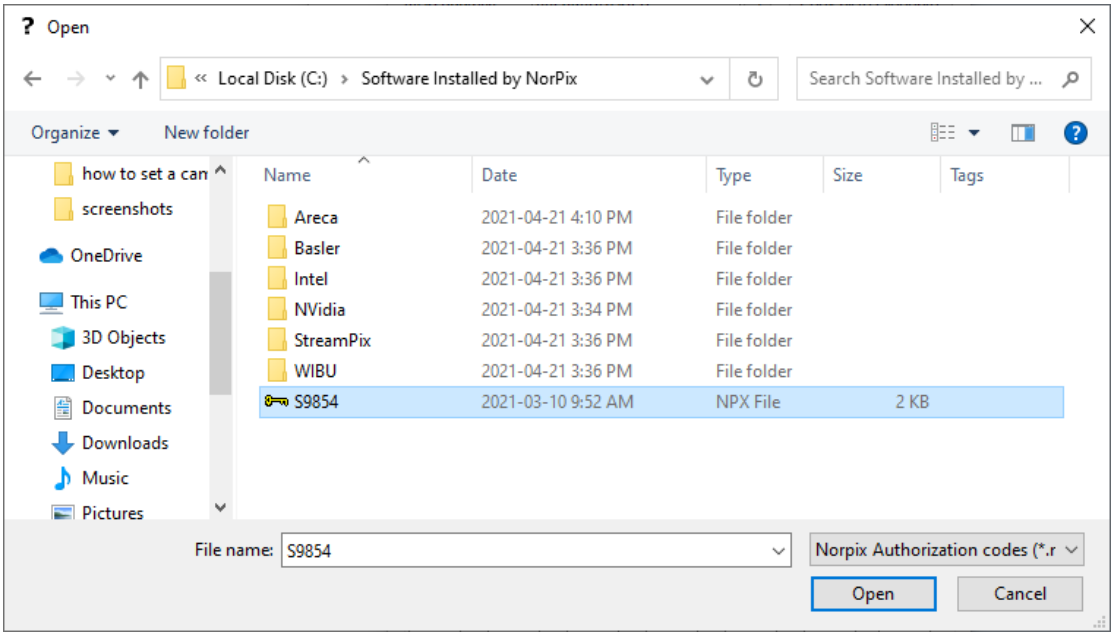


INSTALLING STREAMPIX

1. Browse to the **C:\Software Installed by NorPix\StreamPix** folder, launch the **Streampix.Win64-setup.exe** application and follow all instructions.
2. In the first run, **StreamPix** will prompt for your license file through the **SysInfo** application.



3. Click **Browse for "authorization codes" file...** and browse to the **C:\Software Installed by NorPix** folder. Select the **S9854 - StreamPix 8.npx** license file:



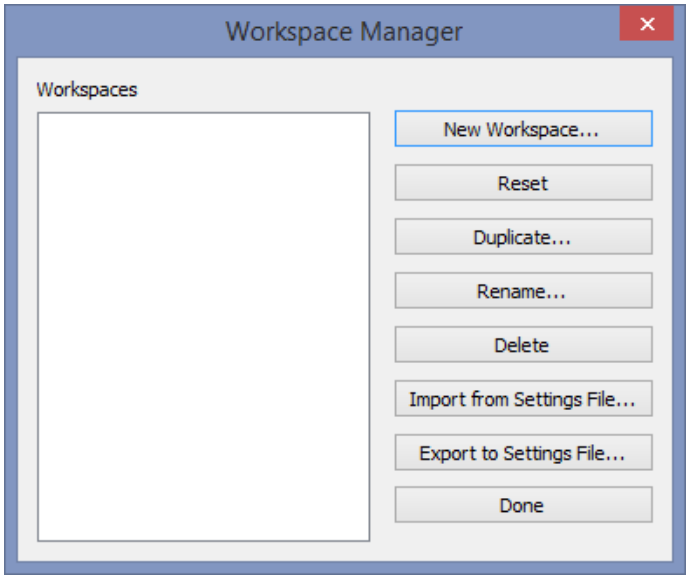
The **SysInfo** application can be found in the **C:\Program Files\NorPix\StreamPix** folder. For a complete reference on how to use **StreamPix**, please refer to the Software User's Guide. It can be accessed through the **StreamPix Help** ribbon or through: **START -> NorPix -> StreamPix -> User Manual**

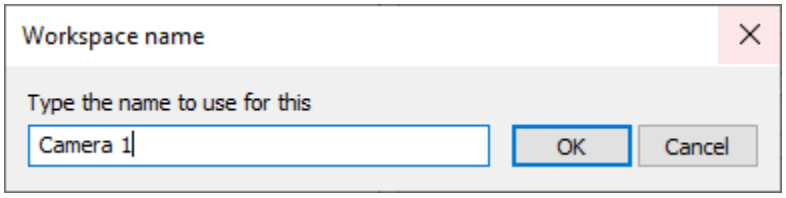
CONFIGURING STREAMPIX

At this point the cameras configuration should have been validated.

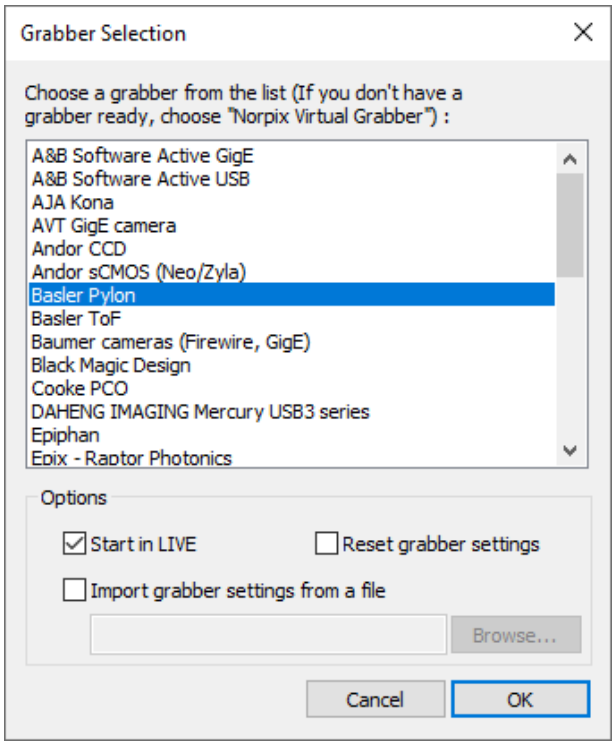
CREATING A WORKSPACE

1. Open the **Workspace Manager** from the **Workspace** ribbon and click on **New Workspace...**. Name the new workspace:

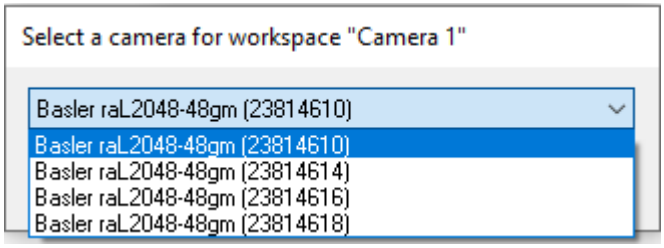




1. Select **Basler Pylon** from the list:



2. Click on the **OK** button to complete the workspace creation.
3. A pop-up list will appear, with all detected cameras. Select a camera from the list. To properly identify the cameras, use their serial numbers:



Follow the same steps to create the **Camera 2**, **Camera 3** and **Camera 4** workspaces.

Below is the correspondence between workspaces and cameras:

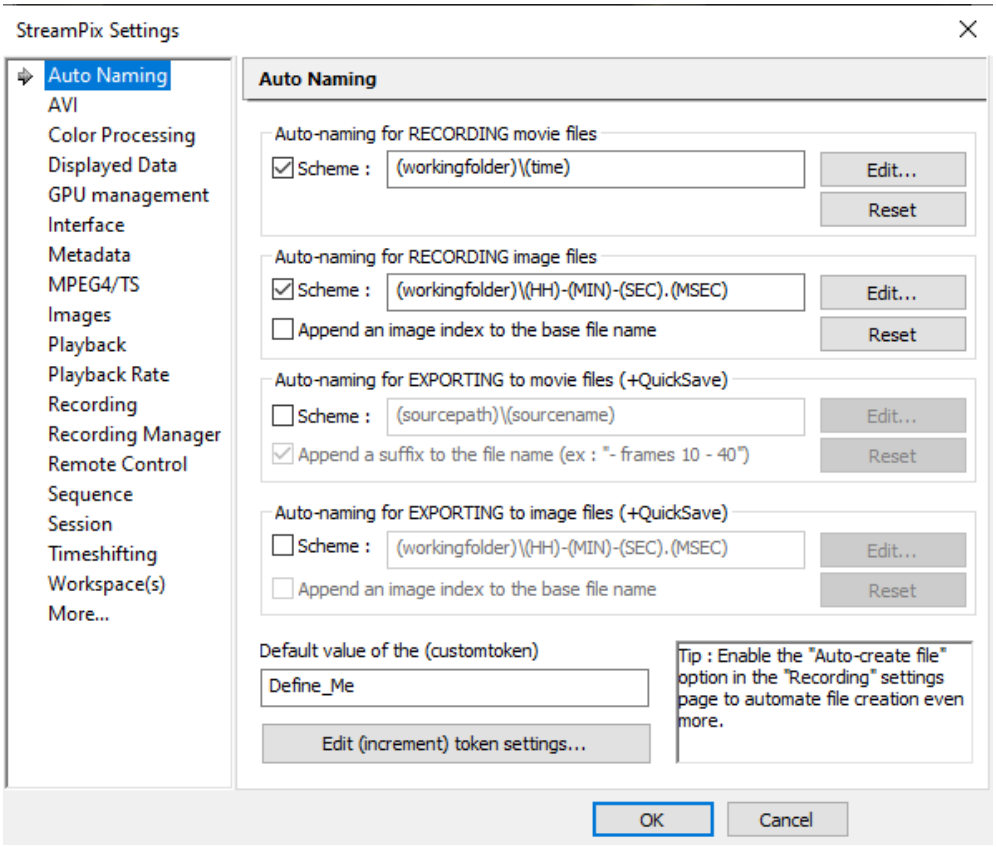
Workspace	Camera serial number
Camera 1	23814610
Camera 2	23814614
Camera 3	23814616
Camera 4	23814618

GENERAL SETTINGS

1. Click on the **StreamPix Settings** button from the **Home** ribbon:

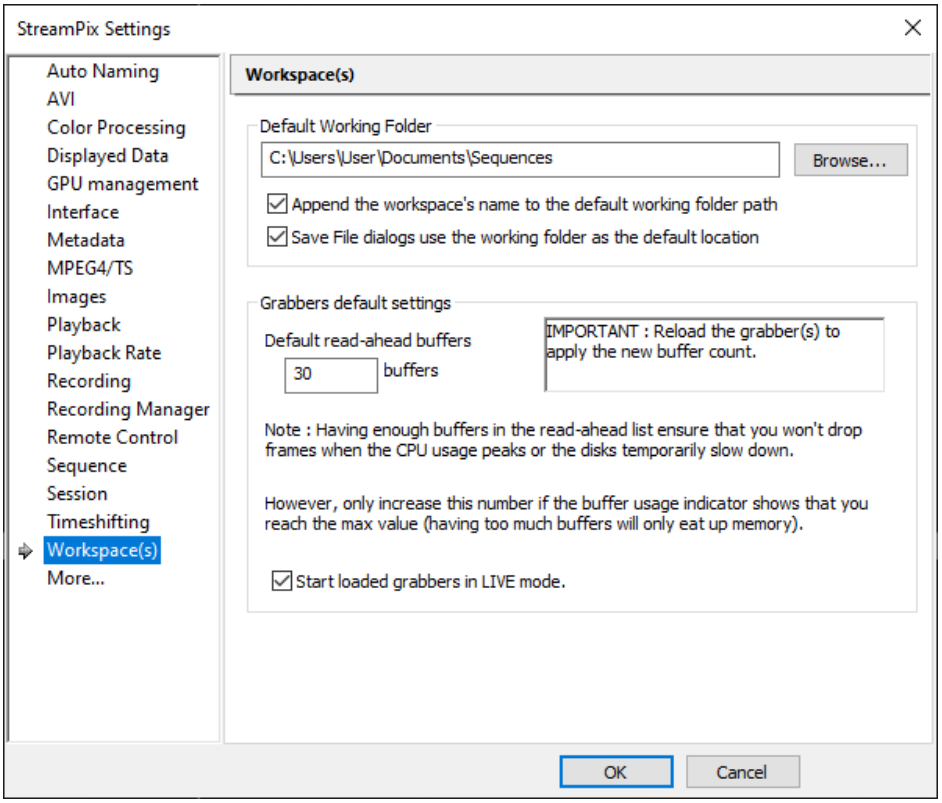
The **StreamPix Settings** window will open:

2. Select the **Auto Naming** tab located on the left panel of the window and check the **Scheme** box under **Auto-naming for RECORDING Image files**:

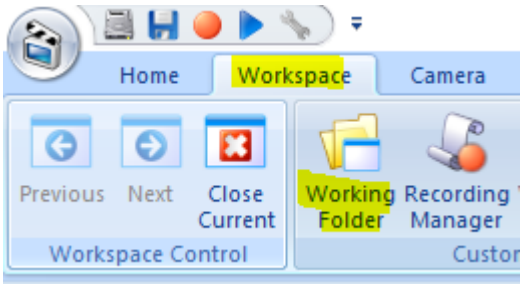


Enabling this feature dispenses the user to have to manually enter a sequence / image name for each workspace every time a new recording is started. You may edit the auto-naming scheme so that it matches your requirements.

3. Select the **Workspace(s)** tab and adjust the internal software buffer pool. We typically recommend allocating a pool equivalent to 1 second of images. Set the number of buffers at **30** (the default value):



4. Click on the **OK** button to complete **StreamPix** general configuration.
5. The working folder can be set, for each workspace, via the **Workspace** menu:



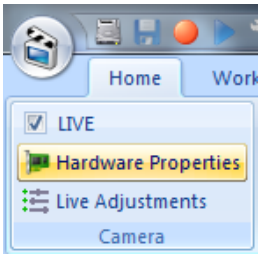
Each camera stream should record to its dedicated drive.

Below is the correspondence between workspaces and working folders:

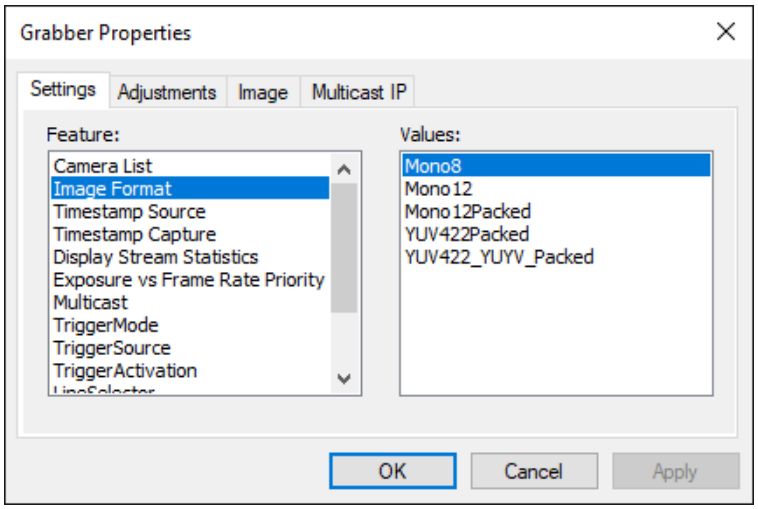
Workspace	Drive
Camera 1	D:
Camera 2	E:
Camera 3	F:
Camera 4	G:

CAMERAS SETTINGS

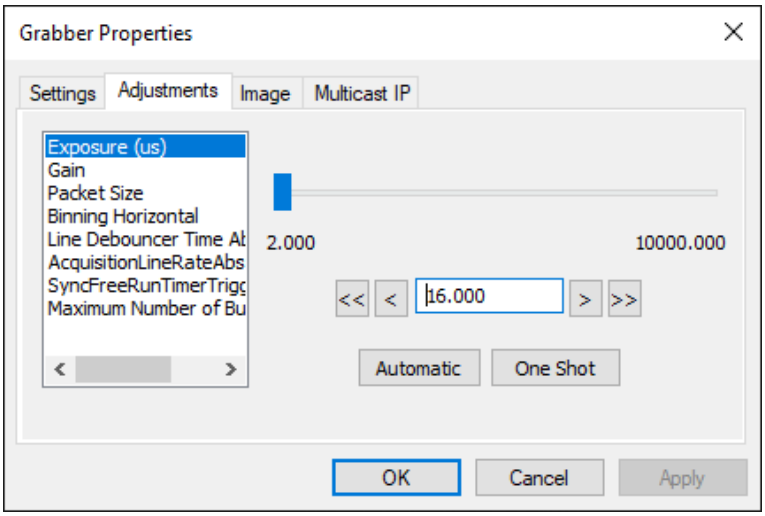
1. Select the **Camera 1** workspace and open the **Hardware Properties** menu by clicking on the **Hardware Properties** button from the **Home** ribbon:



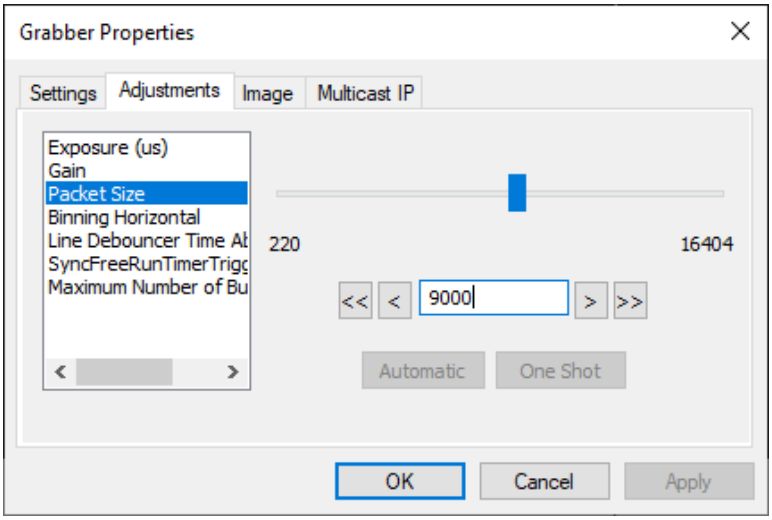
2. Make sure that the workspace is attached to the right camera and click on **Settings**.
3. Set **Image Format** to **Mono8**:



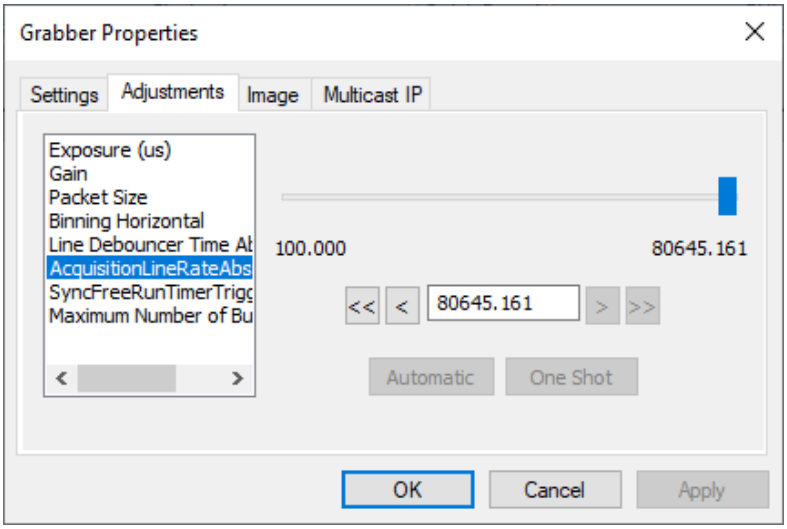
4. Select the **Adjustments** tab and set **Exposure Time** to **16**:



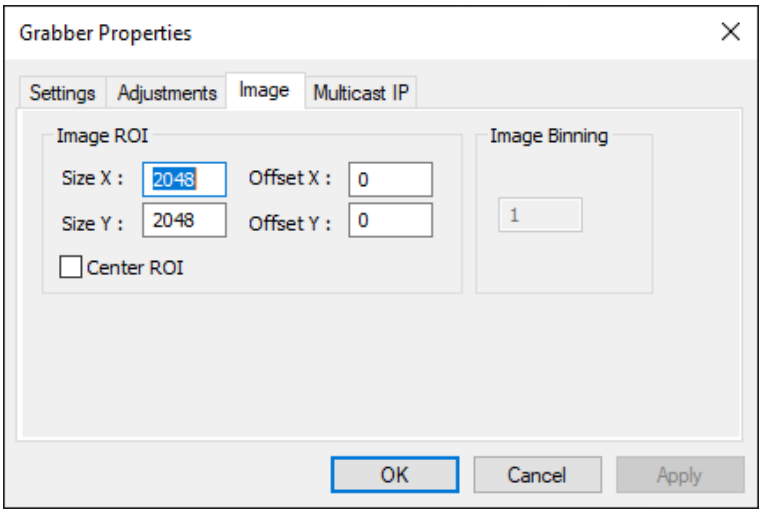
5. Set **Packet Size** to **9000**:



6. Set **AcquisitionLineRateAbs** to its maximum value:



7. Click on **Image** and set **the resolution** to **2048 x 2048**:



8. Click on the **OK** button to close the window.

Follow the same steps to configure the **Camera 2**, **Camera 3**, and **Camera 4** workspaces.

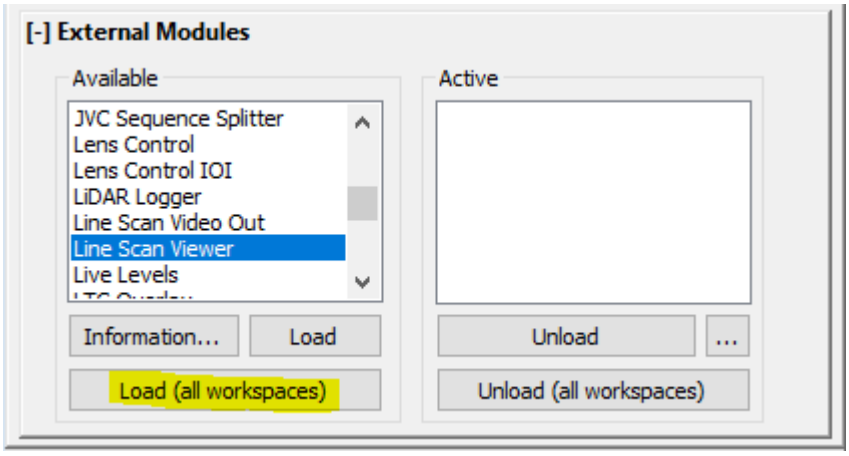
Most camera settings can be modified within the **Hardware Properties** menu. Changes are saved in the system's registry and are reloaded to the camera every time you run **StreamPix**.

Please refer to the User Manual for a complete reference on how to use **StreamPix**. It can be accessed through the **Help** ribbon of **StreamPix** GUI or from Windows Start menu:

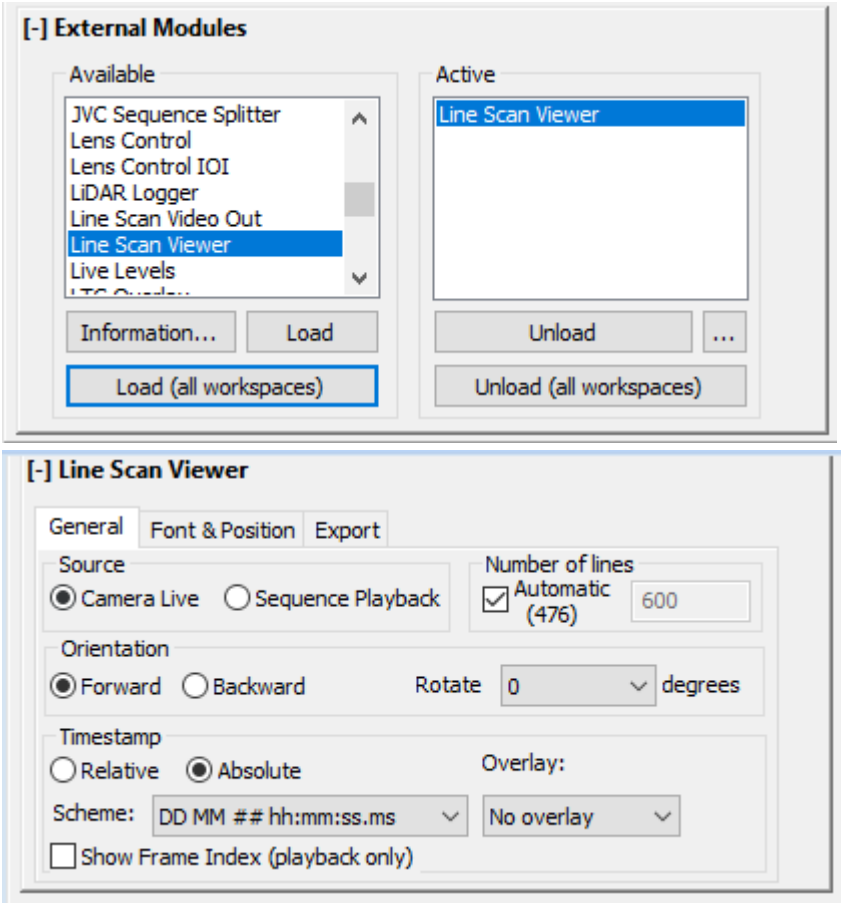
START -> NorPix -> StreamPix (x64) -> User Manual

WORKING WITH LINE SCAN VIEWER MODULE

The **Line Scan Viewer** module can be loaded from the **External Modules** list from the right panel of StreamPix:



After loading it, the module should appear in the **Active** list:

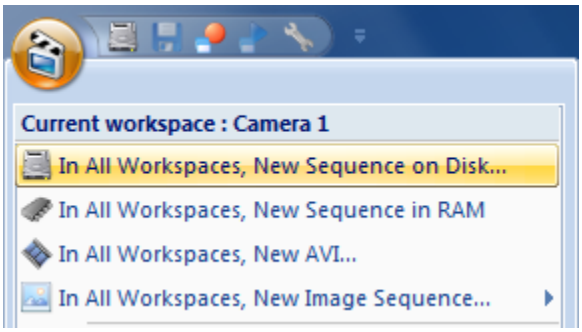


For further details on **Line Scan Viewer**, refer to the StreamPix manual available under the Help menu.

RECORDING

1. Activate the **Select All Workspaces** button from the **Home** ribbon:

2. Click on **In All Workspaces, New Sequence on Disk...** from the application menu:



3. Click **Record** from the **Home** ribbon:

Recording should start.

4. Click on the **Stop** button to stop recording:

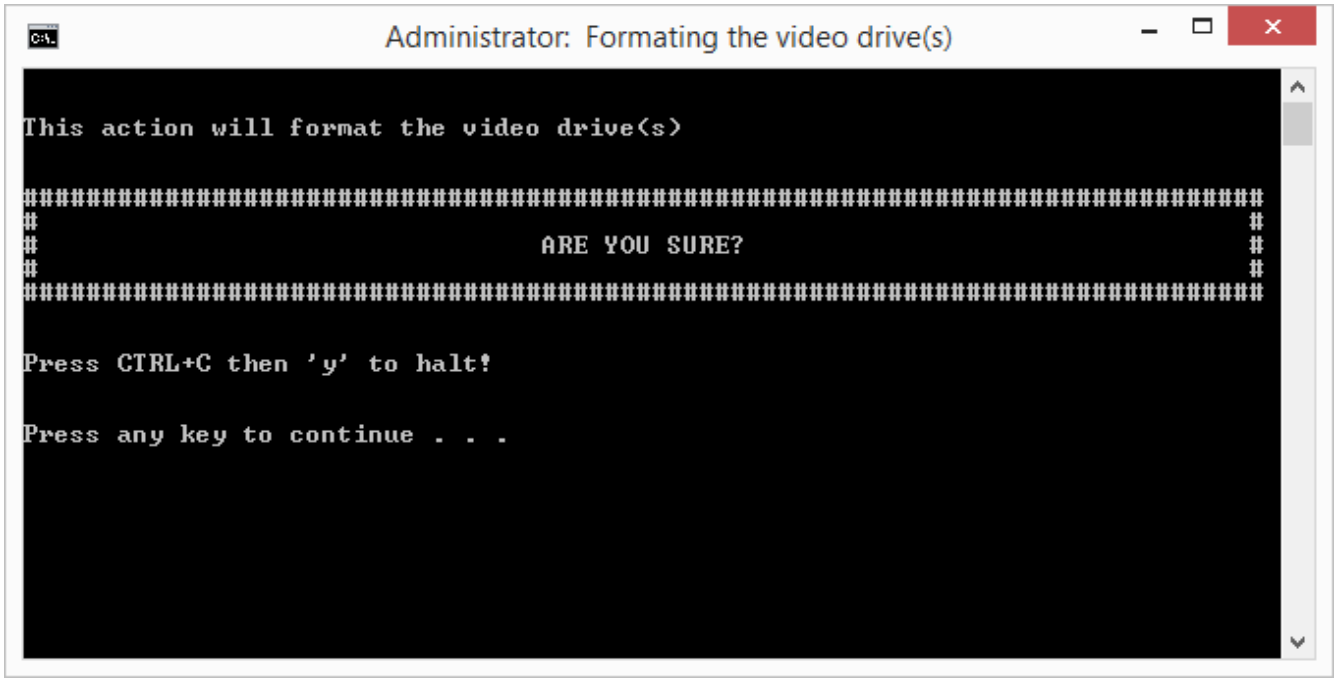
SYSTEM MAINTENANCE AND RECOVERY

QUICK FORMATTING THE DESTINATION DRIVES

To assure optimum streaming capabilities, it is recommended to maintain the video drives in good shape. The drives can be easily reformatted using the **QuickFormat** bat file located in the **C:\Software Installed by NorPix** folder.

1. Right-click on **QuickFormat** icon and select **Run as administrator**:

2. A command prompt window will open. You will be asked if you want to format the video destination drives:



If you are sure that you want to format the drives, simply hit any key, else hit CTRL+C and then Y. Once formatted, the destination drives will be ready for the next recording.

RESTORING STREAMPIX SETTINGS

All **StreamPix** settings are stored in the system registry. Each user account in the computer has its own user settings. If a new user account is created, settings will have to be redone for that new user.

The registry tree related to **StreamPix** settings can be exported and saved as a registry file. It can then be restored or imported by third party users, to avoid doing such reconfiguration for each user.

The current system settings were saved under the **config.REG** file located in the **C:\Software Installed by NorPix** folder. Double clicking on that file will restore settings.

SYSTEM VALIDATION

During our validation procedure we have tested and validated the following configuration:

Resolution	Buffer Usage	CPU Load	Destination Format	Max recording time
4 cameras, 2048x2048 resolution, 23 fps and 8bit/pixel.	Av: 5 Max: 11	Av: 10% Max: 25%	.TIFF to disk	15hours 40 minutes