User Manual

Photonfocus

PFViewer Quick Start Guide

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1 How to get started

1.1 Introduction

Photonfocus GigE cameras are fully GigE Vision and GenICam compliant. The cameras can be run with the PFViewer, which can be downloaded from the Photonfocus webpage, or with any other tool that supports GigE Vision and GenICam. This document will help you to get started with your Photonfocus GigE camera and to grab the images with the Photonfocus PFViewer.

1.2 Hardware Requirements

The hardware installation which is required for this guide is described in this section.

The following hardware is required:

- PC with Microsoft Windows OS (Windows 8, Windows 10)
- A Gigabit Ethernet network interface card (NIC) must be installed in the PC. The NIC should support jumbo frames of at least 9014 bytes. The latest drivers for this NIC must be installed.
- For 10GigE applications NIC which comply with PCIe3.0 or later are highly recommended.
- Photonfocus GigE camera.
- Suitable power supply for the camera (see in the camera manual for specification) which can be ordered from your Photonfocus dealership, or a power over ethernet (PoE) switch/injector for PoE cameras
- GigE cable of at least Cat 5E or 6.

Photonfocus GigE cameras can also be used under Linux.

Do not bend GigE cables too much. Excess stress on the cable results in transmission errors. In robots applications, the stress that is applied to the GigE cable is especially high due to the fast movement of the robot arm. For such applications, special drag chain capable cables are available.

1.3 Hardware Installation (PoE Cameras)

The following list describes the connection of the camera to the PC when the camera is powered over Ethernet (see in the camera manual for more information):

1. Remove the Photonfocus GigE camera from its packaging.
2. Connect the camera to a PoE switch or a PoE injector and connect the switch or injector to your PC.

The GigE cables need to be at least Cat 5E or 6 for GigE and 6 or higher for 10GigE.

Suitable X-coded M12 GigE interface cables can be ordered from your Photonfocus dealership.

MV4 GigE and 10GigE can be powered either over PoE or with a power supply connected to the I/O connector (see Section 1.4).

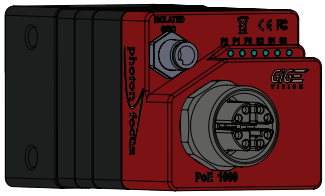

Figure 1.1: Rear view of a Photonfocus MV0 GigE camera with I/O connector and the x-coded M12 GigE connector

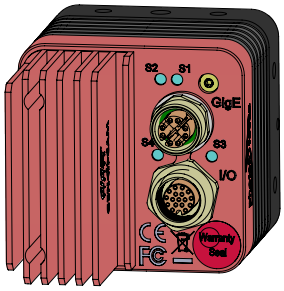

Figure 1.2: Rear view of a Photonfocus MV4 GigE camera with I/O connector and the x-coded M12 GigE connector

1.4 Hardware Installation (non PoE Cameras)

The following list describes the connection of the camera to the PC when the camera is powered over the power connector (see in the camera manual for more information):

1. Remove the Photonfocus GigE camera from its packaging.
2. Connect the camera to the GigE interface of your PC with a GigE cable of at least Cat 5E or 6 for GigE and 6 or higher for 10GigE.

Suitable X-coded M12 GigE interface cables can be ordered from your Photonfocus dealership.

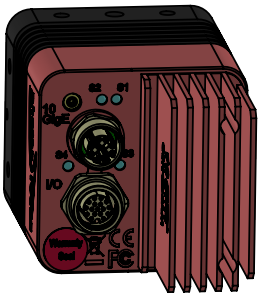

Figure 1.3: Rear view of a Photonfocus MV4 10GigE camera with I/O connector and the x-coded M12 GigE connector

Figure 1.4: Rear view of a Photonfocus MV3 GigE camera with I/O connector and the x-coded M12 GigE connector

3. Connect a suitable power supply to the power plug. The pin out of the connector is shown in the camera manual.

   Check the correct supply voltage and polarity! Do not exceed the operating voltage range of the camera.

   A suitable power supply can be ordered from your Photonfocus dealership.

4. Connect the power supply to the camera (see Fig. 1.4).

1.5 Network Adapter Configuration

This section describes network adapter card (NIC) settings that enhance the performance for GigEVision. Additional tool-specific settings are described in the tool chapter.

1. Open the Network Connections window (`Control Panel -> Network and Internet Connections -> Network Connections`), right click on the name of the network adapter where the Photonfocus camera is connected and select `Properties` from the drop down menu that appears.

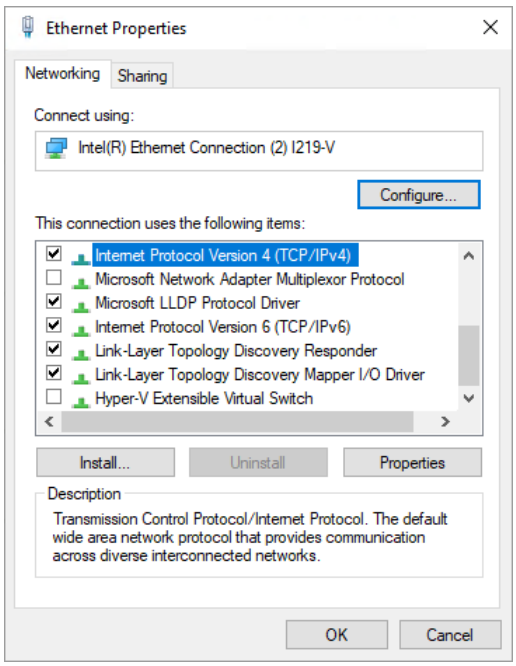

Figure 1.5: Local Area Connection Properties

2. By default, Photonfocus GigE Vision cameras are configured to obtain an IP address automatically. For this quick start guide it is recommended to configure the network adapter to obtain an IP address automatically. To do this, select `Internet Protocol (TCP/IP)` (see Fig. 1.5), click the `Properties` button and select `Obtain an IP address automatically` (see Fig. 1.6).

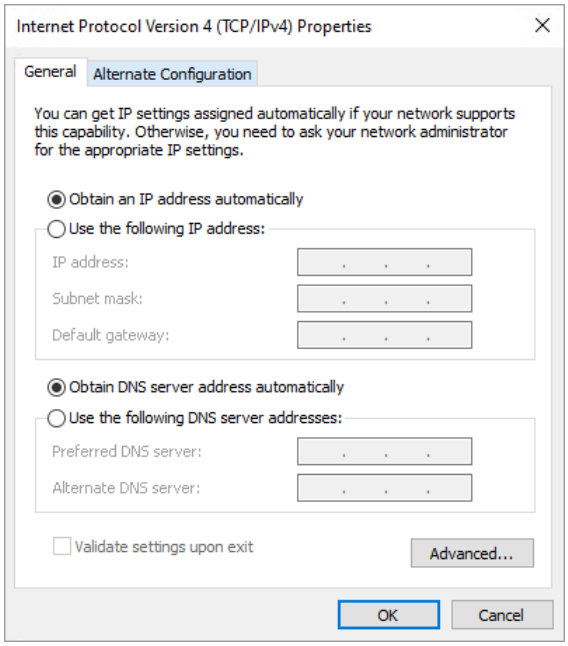

Figure 1.6: TCP/IP Properties

3. Open again the Local Area Connection Properties window (see Fig. 1.5) and click on the Configure button. In the window that appears click on the Advanced tab and click on Jumbo Frames in the Settings list (see Fig. 1.7). The highest number gives the best performance. Some tools however don't support the value 16128. For this guide it is recommended to select 9014 Bytes in the Value list.

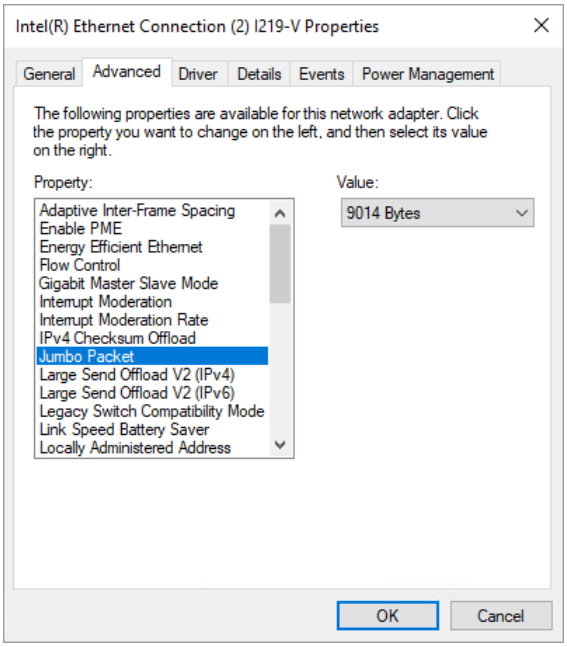

Figure 1.7: Advanced Network Adapter Properties: Jumbo Frames

4. If necessary to improve the reliability of the connection following settings can be configured: If available in the network card configuration, the receive buffer size (Fig. 1.8) should be set to the highest number, the interrupt moderation (Fig. 1.9) should be switched off and the auto negotiation (Fig. 1.10) should be disabled and set to the corresponding link speed.

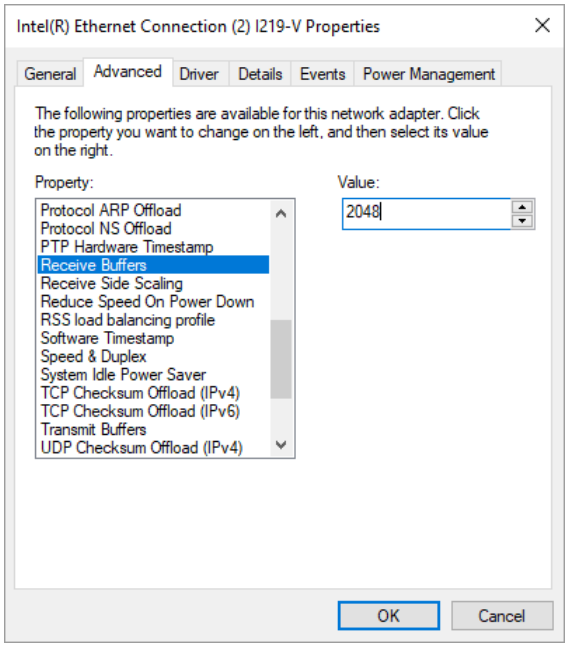

Figure 1.8: Advanced Network Adapter Properties: Receive Buffer Size

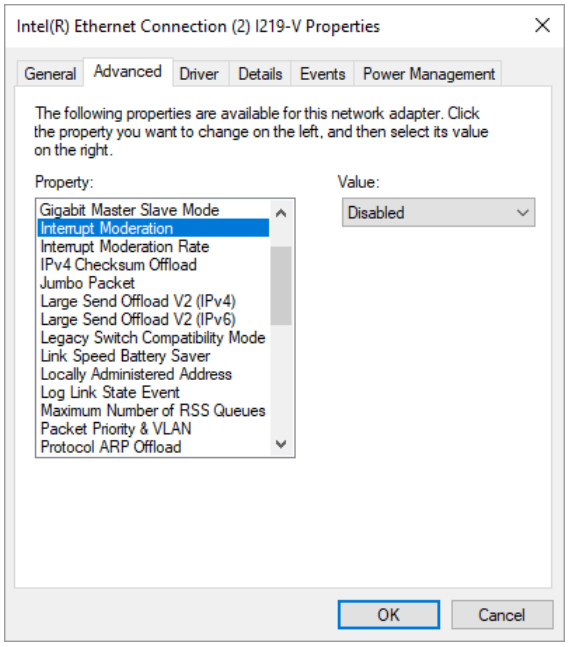

Figure 1.9: Advanced Network Adapter Properties: Interrupt Moderation

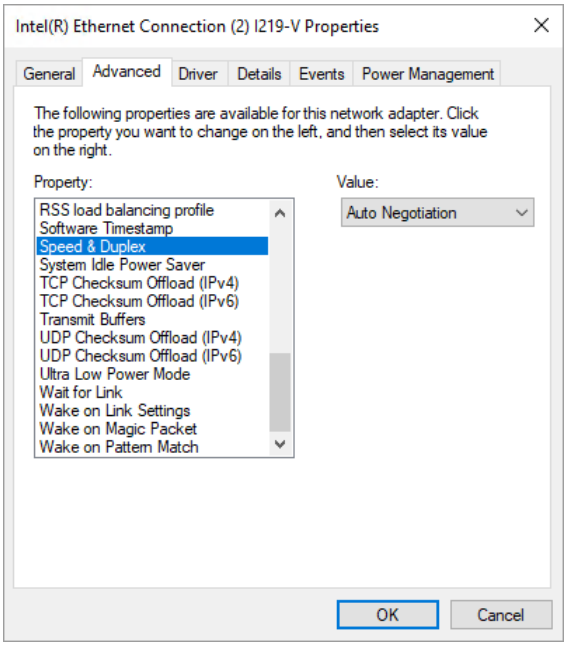

Figure 1.10: Advanced Network Adapter Properties: Auto Negotiation

2 PFViewer

2.1 Introduction

This chapter will help you getting started using a Photonfocus GigE camera with the PFViewer tool.

2.2 Software Installation

This section describes the installation of the required software to accomplish the tasks described in this chapter.

1. Install the latest drivers for your GigE network interface card.
2. Download the latest PFSDK installation file from the Photonfocus server.

   You can find the latest version of the PFSDK on the support (Home > Support > Software) page at www.photonfocus.com.

3. Install the PFSDK by double-clicking on the file. Follow the instructions and select the components accordingly.

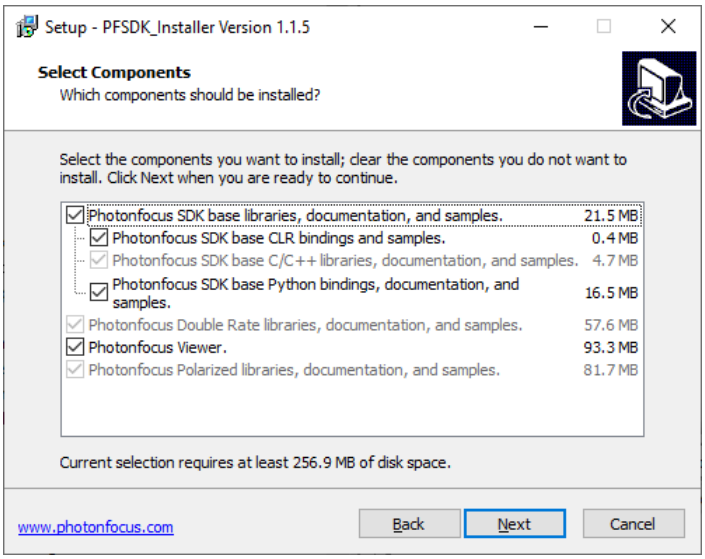

Figure 2.1: PFInstaller components choice

4. During the installation, the installer will ask you to install the Photonfocus filter driver. To achive maximum performace, we recommend you to do so.

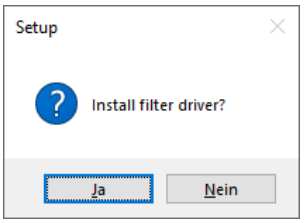

Figure 2.2: PFInstaller GigE Vision filter driver choice

2.3 Firewall configuration

Communications with GigE cameras may be blocked by the firewall if not properly configured. If you have issues communicating with the camera, please make sure to configure firewall rules appropriately.

In case you are using the Windows Firewall, the first time you connect to a camera using the PFViewer, the operating system should ask for permission to add a new rule.

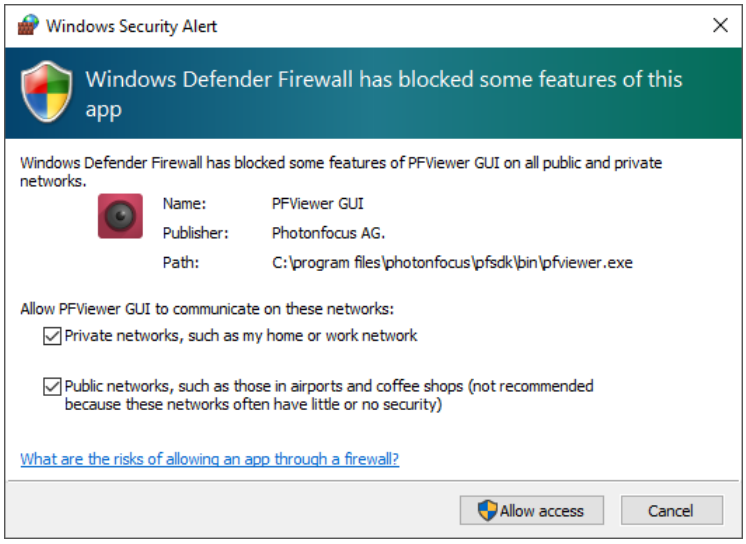

Figure 2.3: Configuration of firewall rules

Please select either Private or Public networks as per your requirements (or both in case of doubt) and click Allow access.

If a third party firewall is used, please refer to its manual and add rules to allow the UDP protocol for the PFViewer application.

2.4 Network Adapter Configuration for Photonfocus PFViewer

To check the configuration of your network adapter, open the Network Connections window (`Control Panel -> Network and Internet Connections -> Network Connections`), right click on the name of the network adapter where the Photonfocus camera is connected and select `Properties` from the drop down menu that appears. A Properties window will open. If the Photonfocus filter driver has been properly installed, the `Photonfocus GigE Vision Filter Driver` item will appear in the list. Recommended settings for the Network Adapter Card are described in Section 1.5.
The filter driver must be activated within the PFViewer tool additionally. Open the stream preferences window (`Preferences -> Stream`) and active to box `User Filter Driver` (see Fig. 2.5). This option is only available when a connection to a camera has been established.

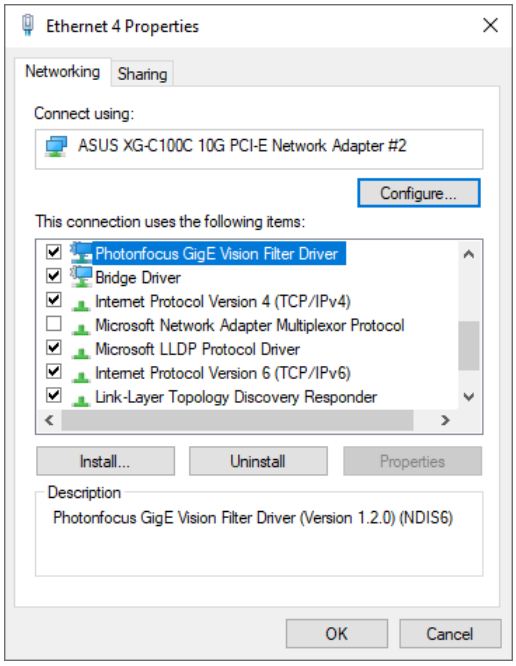

Figure 2.4: Local Area Connection Properties

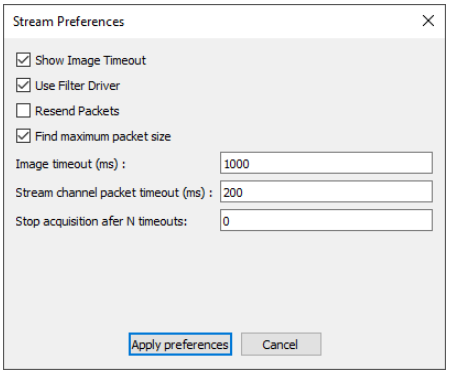

Figure 2.5: PFViewer Stream Preferences

2.5 Stream Channel Packet Size Configuration for Photonfocus PFViewer

Under most circumstances, configuring the camera stream channel packet size (SCPS) to be as large as possible will result in optimal performance. The SCPS should be as close as possible to, but smaller than, the jumbo frame size configured in the NIC (see Fig. 1.5) A SCPS larger than the jumbo frame size will result in packet fragmentation on the network, which will degrade performance. This configuration can be achieved in two ways:

1. Activate the option to find the maximum packet size that can be used with the current NIC and camera combination. Go to `Prefereces -> Stream` and enable `Find maximum packet size` (see Fig. 2.5).
2. Manually set the value. After connecting to the camera, open the feature browser, change visibility to `Guru`, and set the desired value to the `GevSCPSPacketSize` feature (see Fig. 2.6).

In some edge cases however, large values may not be optimal. For instance, extremely small image sizes in which the payload can fit into a single packet of smaller size. In this case, using the smaller packet size will result in reduced overhead and increased performance.

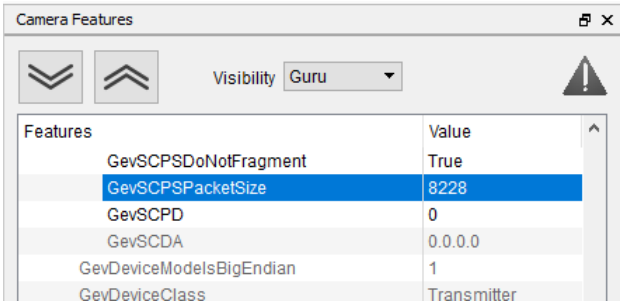

Figure 2.6: Stream Channel Packet Size Configuration (GevSCPSPacketSize)

2.6 Getting started

This section describes how to acquire images from the camera and how to modify camera settings.

1. Open the PFViewer software (Start -> Photonfocus -> PFViewer) which is a GUI to set camera parameters and to see the grabbed images (see Fig. 2.7).

Figure 2.7: PFViewer start screen

2. Click on the Discover available cameras button in the PFViewer. A window with all detected devices appears (see Fig. 2.8). If your camera is not listed then select the box Ignore Subnet.

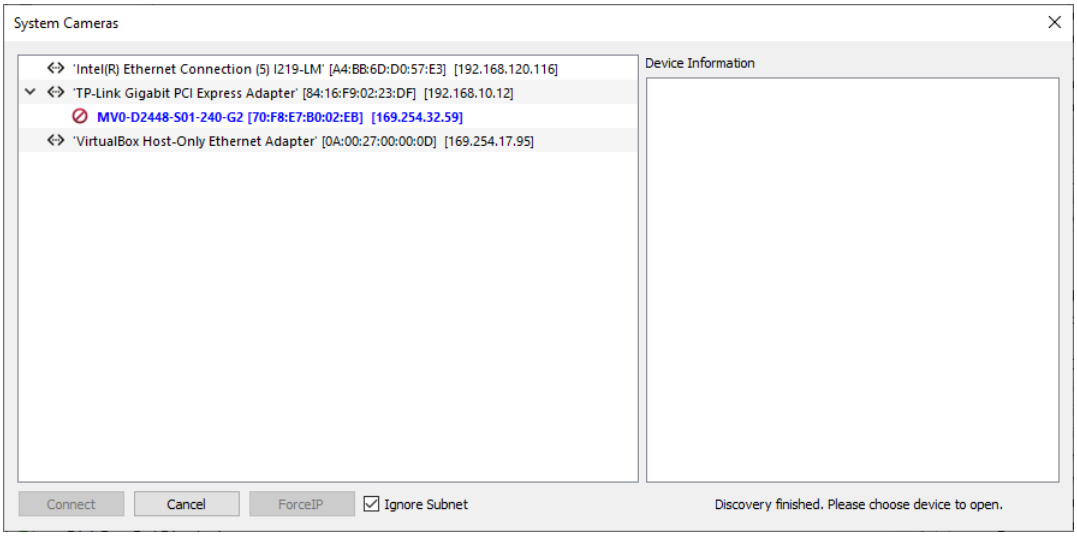

Figure 2.8: PFViewer Device Selection Procedure displaying available cameras

3. Select camera model to see the device information. When a red ban mark is displayed on the left side of the selected camera, then the camera doesn't have a valid IP address; which is also shown as Not in the same subnet by the Access Status. This happens, when there isn't a DHCP server available in the network, which is mostly the case, when the camera is directly connected to the NIC. In this case click on ForceIP in order to configure a valid IP address.

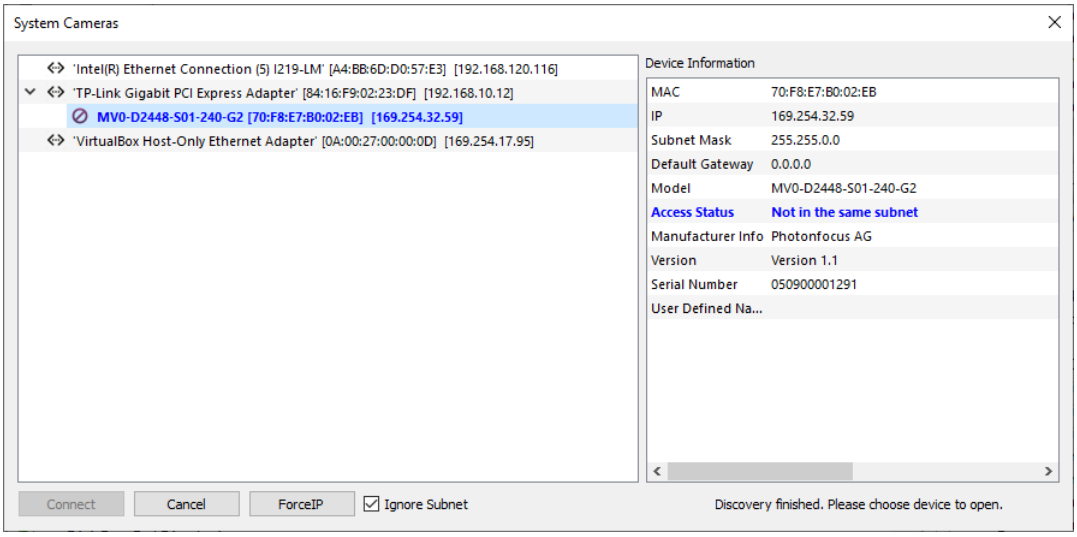

Figure 2.9: PFViewer Device Selection Procedure displaying Deivce Information of the selected camera

4. Configure a valid IP address for the selected camera which belongs to the current subnet (see Fig. 2.10). Click on `Set` button in the `Force IP` dialog to take over the new IP address.

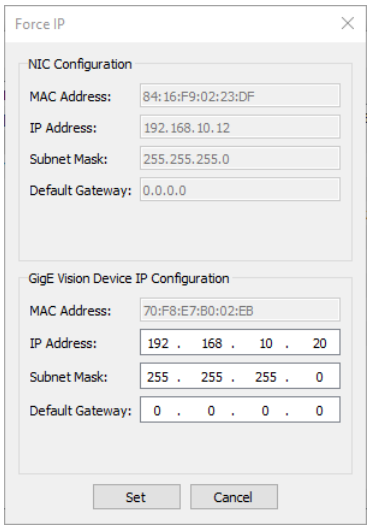

Figure 2.10: PFViewer Device Selection Procedure displaying Force IP

5. The IP address is properly configured, when its `Access Status` shows `Ok` in the Device Information (see Fig. 2.11).

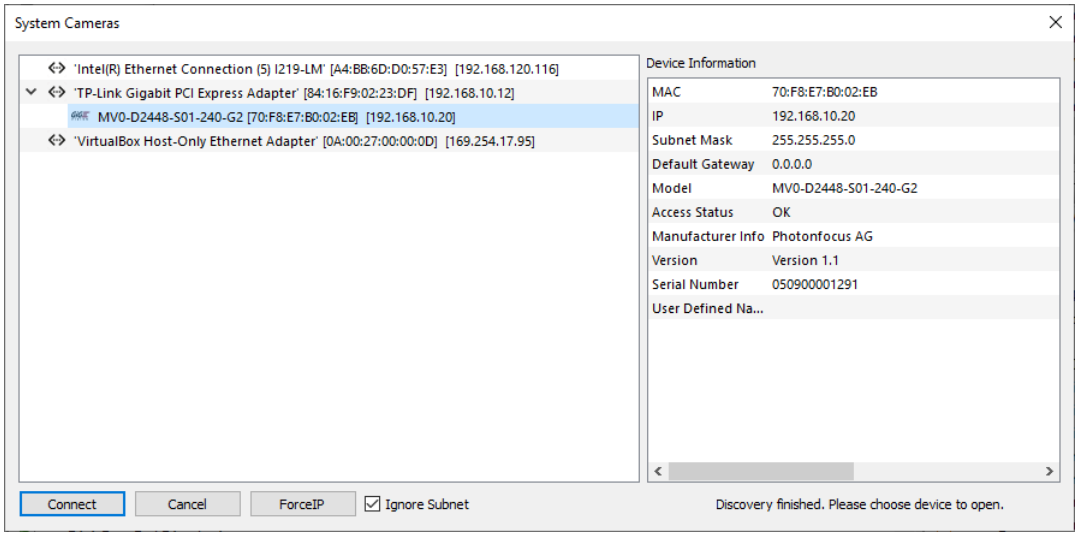

Figure 2.11: PFViewer Device Selection Procedure displaying properly configured IP address

6. Finish the configuration process by clicking the button `Connect` The PFViewer is ready to grab images (see Fig. 2.12).

Figure 2.12: PFViewer is properly configured

7. The camera is now connected to the PFViewer. Click on the green `Grab Camera` button to grab images.

If no images can be grabbed, close the PFViewer and adjust the Jumbo Frame parameter (see Section 2.2) to a lower value and try again.

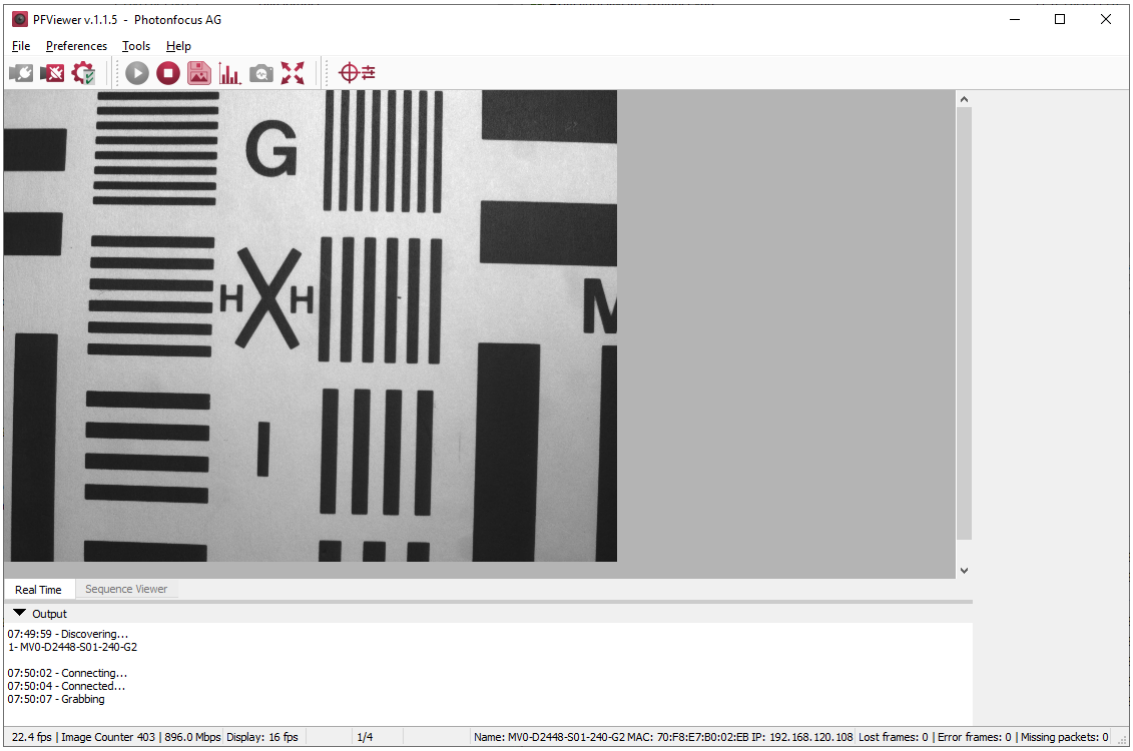

Figure 2.13: PFViewer displaying live image stream

8. Camera parameters can be modified by clicking the button `Features` (see Fig. 2.14). The visibility option `Beginner` shows most the basic parameters and hides the more advanced parameters. If you don't have previous experience with Photonfocus GigE cameras, it is recommended to use `Beginner` level.

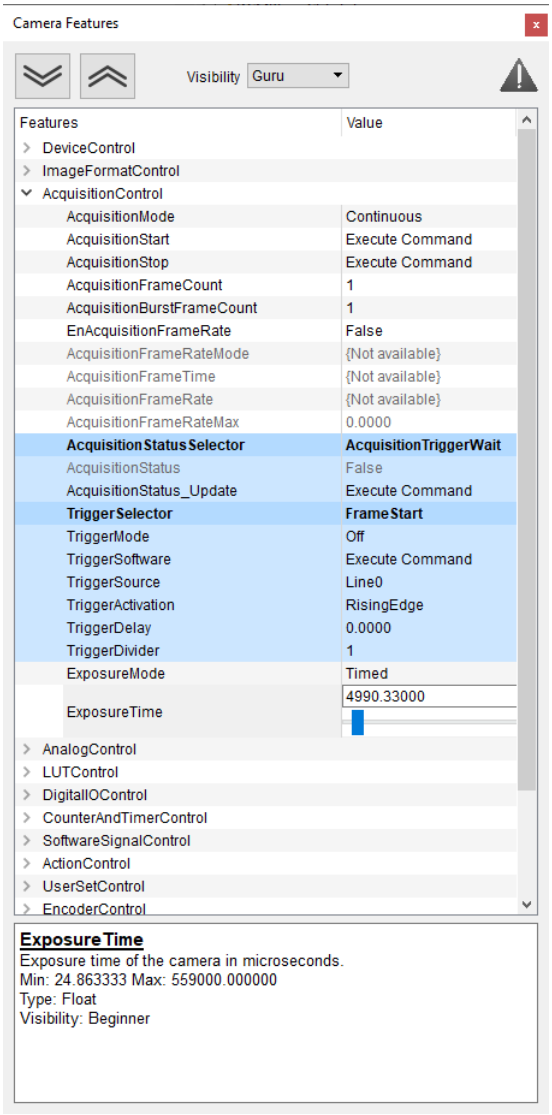

Figure 2.14: Control settings on the camera

9. To modify the exposure time scroll down to the `AcquisitionControl` control category and modify the value of the `ExposureTime` property.

2.7 Set Persistant IP Address

There are two ways to connect the camera, via DHCP or with a Persistent IP address. By default, the connection protocol is DHCP. To keep the same IP configuration after a power cycle, please enable the Persistent IP configuration by setting the following properties (seeFig. 2.15):

1. `GevCurrentIPConfigurationDHCP` to `False`
2. `GevCurrentIPConfigurationPersistentIP` to `True`
3. Set `GevPersistentIPAddress`, `GevPersistentSubnetMask` and `GevPersistentDefaultGateway` to the desired address
4. Perform a DeviceReset command or a power cycle to apply the changes

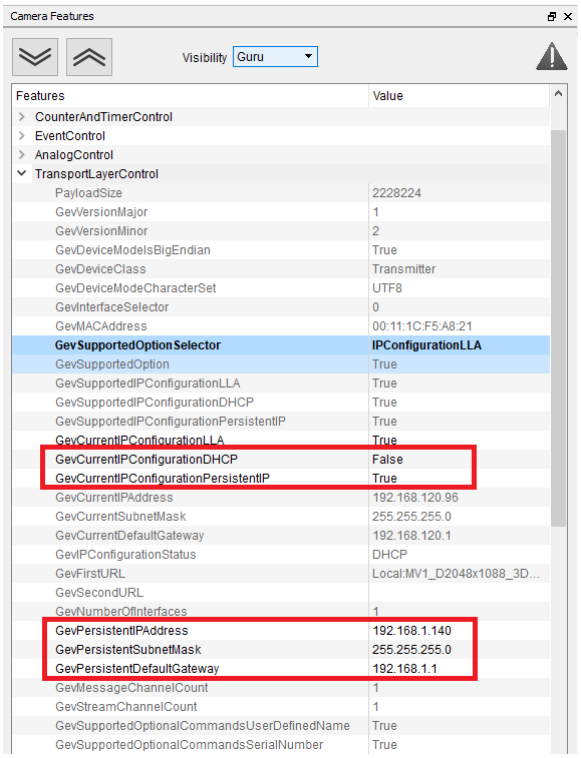

Figure 2.15: Setting Persistant IP Address

A

Revision History

Revision	Date	Changes
1.0	September 2019	First version
1.1	December 2020	More configuration option added to chapter (Section 1.5), Configuration description, how to actived Photonfocus GigE Filter Driver, added
1.2	September 2021	Screenshots of PFViewer release 1.5 inserted. Chapter "Set Persistant IP Address" added. Chapter "Firewall configuration" modifed.
1.3	November 2021	Stream Channel Packet Size configuration added