Simulated Phonomicrosurgery Station Camera Network Configuration

Disabling the Windows Firewall

In order to communicate with the Basler cameras over GigE the Windows Firewall must be told to allow the communication. In Windows 7 this can be done on a case-by-case basis. Anytime a new program tries to access the cameras a Windows Security Alert will ask if the connection should be allowed. In order to bypass this the firewall can be disabled. In the case that the cameras are connected to a network adapter that is not connected to anything else (the case for the Surgery Tracking setup) this is the preferred option. How to do this is described below. Note this was taken directly from the document given below which describes how to disable the firewall for different Windows based operating systems.

Installation and Setup Guide for Cameras used with Baler's Pylon API. Document Number: AW000611 Version: 05 pp 36-38

To disable the Windows 7 firewall via advanced security settings

1. Open the **Windows Firewall with Advanced Security** window:
    a. Press the Windows key + **R** key. The command shell opens.
    b. Enter **WF.msc** in the command line.
    c. Press the **Enter** key.

The **Windows Firewall with Advanced Security** window opens.

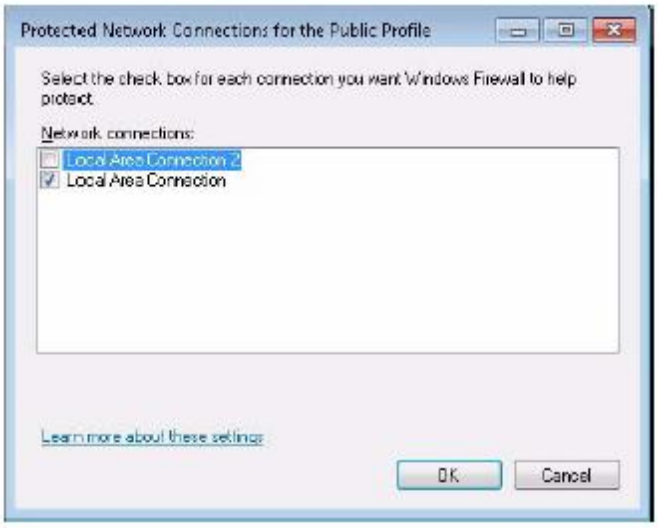
2. In the central pane, at the bottom of the **Overview** group: Click **Windows Firewall Properties** to open the **Windows Firewall with Advanced Security on Local Computer Properties...** window.

3. Select the tab for the profile where you want to disable firewall protection.
You will typically disable firewall protection for the **Public Profile** when a camera is directly connected to the network interface. However, if you use a dedicated network card we recommend also disabling firewall protection for all other profiles.

4. Select the **Public Profile** tab.

5. Click **Customize** in the **State** group. The **Protected Network Connections for the Public Profile** window opens listing connections where a firewall is enabled.

6. Uncheck the connections where cameras are attached to disable their firewall protections (in the figure below, the firewall is disabled for **Local Area Connection 2** as an example).



7. Click **OK**.

8. If you use a dedicated network card also select the other tabs of in the **Windows Firewall with Advanced Security on Local Computer Properties...** window and carry out steps 6. and 7. for each tab.

9. Click **OK** in the **Windows Firewall with Advanced Security on Local Computer Properties...** window.

10. Click **OK** in the **Windows Firewall with Advanced Security** window.
The firewall is disabled where necessary.

Configuring Network Adapter & Camera IP Behavior

IP configuration refers to how an IP address is assigned to a device when it is connected to a network. For the Surgery Tracking setup the network is very simple: a PC (GigE) and two Basler Ace cameras connected via a network switch. By default these devices use APIPA (Automatic Private IP Addressing) to assign themselves non-conflicting IP addresses. This is because there is no DHCP server on the network and causes latency for the cameras establishing themselves on the network when reset. For this configuration it is ideal to fix the IP addresses of the network adapter and the two cameras. This minimizes network establishment of the cameras and in general reduces ambiguity about the IP addresses of all the components in the network. Below describes how to set the network adapter and cameras to have a fixed IP address. Note it is taken directly from the document given below.

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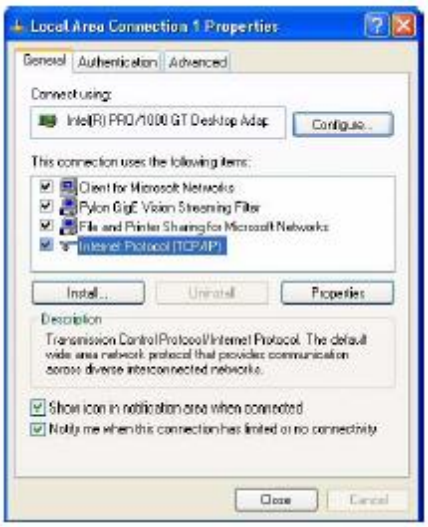
Setting an Adapter to Use a Fixed IP Address

You can configure a network adapter to use a fixed IP address by doing the following:

1. Open the **Network Connections** window.

a. Find the connection for the adapter you want to configure. Right click on the name of the connection and select **Properties** from the drop down menu as shown below.

2. A **... Properties** window will open as shown below. Make sure that **Internet Protocol (TCP/IP)** is highlighted and click the **Properties** button.



3. An **Internet Protocol (TCP/IP) Properties** window will open and the **General** tab will be selected as shown below.

4. Click the radio button next to **Use the following IP address**. The window will change and will now allow you to enter IP address information.

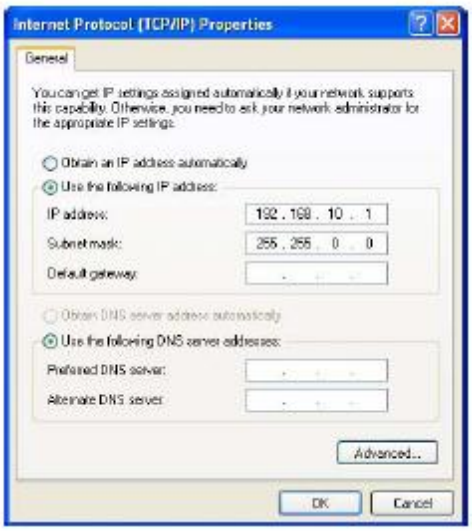
a. Enter your desired IP address and subnet mask. The figure below shows the window with typical values entered. You can also enter a default gateway if desired, however, a default gateway is not normally needed.

b. If you will be using a domain name server (DNS), enter the appropriate information. (A domain name server is not normally needed.)

c. Click the **OK** button. The **Internet Protocol (TCP/IP) Properties** window will close.

d. Click the **Close** button on the **Local Area Connection Properties** window.

e. Your system will wait for several seconds while the new settings take effect. Once the new settings are in place, the **Local Area Connection Properties** window will close.



When you configure an adapter to use a fixed address, there are some things that you must keep in mind:

- If your PC has multiple network adapters, each adapter must be in a different subnet.
- The recommended range for fixed IP addresses is from 172.16.0.1 to 172.32.255.254 and from 192.168.0.1 to 192.168.255.254. These address ranges have been reserved for private use according to IP standards.
- If you are assigning fixed IP addresses to you cameras, keep in mind that for a camera to communicate properly with a network adapter, it must be in the same subnet as the adapter to which it is attached.

Changing a Camera's IP Configuration

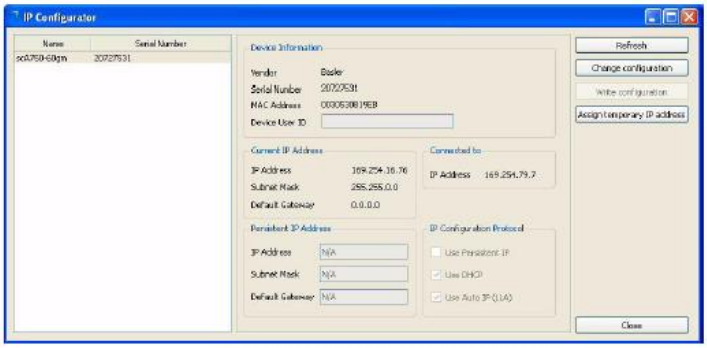
An application called the IP Configuration Tool is included as part of the pylon driver installation package. The IP Configuration Tool lets you make changes to the IP configuration of your camera.

To start the IP Configuration Tool:

- Double click the **pylon IP Configuration Tool** icon on your desktop
- Or click **Start**, click **All Programs**, click **Basler Vision Technologies**, click **Pylon x.x**, click **Pylon IP**

Configuration Tool.

The tool will start and an **IP Configurator** window will open as shown below.



When the tool starts, it scans for cameras attached to the PC's network adapters. All cameras detected will be listed by model name and serial number in a box on the left side of the **IP Configurator** window. To select a camera to work with, click on its name in the list. When you select a camera, the tool will display IP configuration and other basic information for the camera in various boxes:

- The **Device Information** box will display the Vendor's name, the Serial Number, the MAC address, and the Device User ID (if one has been assigned) for the selected camera.
- When the tool is in edit mode, the **Current IP Address** box will display the current IP Address, Subnet Mask, and Default Gateway for the selected camera. (When the tool is in list mode, this information is not available and N/A is displayed.)
- If the selected camera has a persistent (fixed) IP Address assigned to it, the **Persistent IP Address** box will display the current persistent IP Address, Subnet Mask, and Default Gateway.
- The **Connected to** box will display the IP Address for the network adapter to which the selected camera is connected.
- The **IP Configuration Protocol** box will display the current IP configuration of the selected camera.

If you would like to make sure that all of the displayed information is current, click the **Refresh** button. The tool will rescan the cameras and update the displayed information. The IP Configuration Tool has two modes, List Mode and Edit mode:

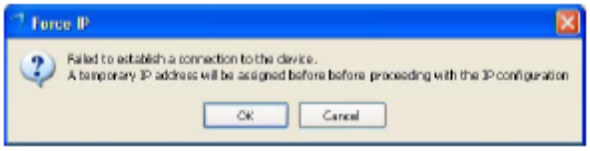
- When the tool is first opened it is in **List** mode. In list mode, the tool can display a list of detected cameras, can display information about the camera selected in the list, and will let you assign a temporary IP address to the selected camera. When in list mode, the tool does not have a control channel open to any of the detected cameras. In list mode, the tool communicates with the cameras at a very low level.

- When the **Change Configuration** button is pressed, the tool will enter **Edit** mode. In edit mode, the tool will open a control channel to the selected camera. Once the control channel is open, the tool can make changes to things such as the selected camera's persistent IP address or Device User ID. Clicking the **Write Configuration** button takes the tool out of Edit mode and places it in List mode.

Making Changes to the Camera's IP Configuration

You can use the IP Configuration Tool to make permanent changes to the camera's IP configuration. (Permanent means that the changes will stay in place even when the camera is reset or switched off and back on.) If you want to change the IP configuration of the camera:

1. Click on the **Change Configuration** button.
   a. In some cases (such as when the camera's current IP address is misconfigured), a **Force IP** window will appear as shown below. The message in the window will indicate that you must first assign a temporary IP address. If you see this message, go to step 2.
   b. If you do not see a message about assigning a temporary IP address, go to step 3.



2. Click the OK button in the **Force IP** window. An **Assign Temporary IP Address (Force IP)** window will open as shown below.
   a. Enter an IP Address, Subnet Mask, and Default Gateway. (If you are using the camera in a peer-to-peer network, you do not normally need to enter a default gateway.) (Keep in mind that for the camera to communicate properly with the network adapter to which it is attached, the

camera must be in the same subnet as the adapter and the camera must have a unique IP address.)

b. Click the **OK** button.

c. The camera's IP address will be changed and the **Assign Temporary IP Address (Force IP)** window will close.

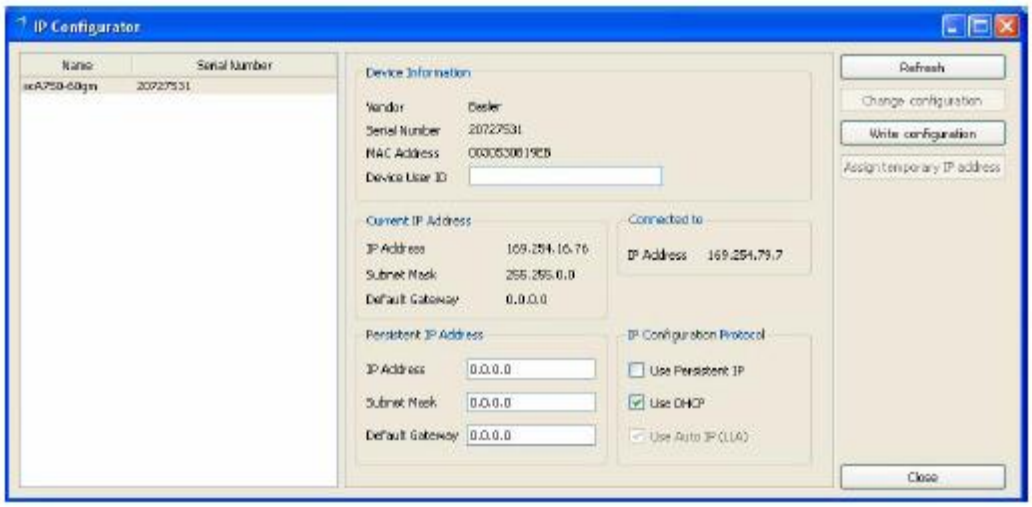
d. Go on to step 3.

3. The **IP configurator** window will enter edit mode and will now allow you to enter new IP values as shown below.

a. If desired, enter a Device User ID for the camera.

b. If you want to assign the camera a persistent (fixed) IP address, enter an IP address, a subnet mask, and a default gateway. Also make sure that the **Use Persistent IP** check box is checked. (Before you assign a persistent IP address, you should read the notes that appear in the note at the end of this procedure.)

c. If you want the camera to use DHCP address assignment (i.e., to obtain an IP address from a DHCP server attached to the same network as the camera), make sure that the **Use DHCP** check box is checked and that the **Use Persistent IP** check box **is not** checked.



4. When you are finished making changes, click the Write Configuration button. A message will appear indicating that the camera is restarting its IP configuration cycle as shown below. When this message disappears the changes to the IP configuration will be in place and the **IP Configurator** window will now show the changed settings.

When you configure a camera to use either a temporary or a persistent address, there are some things that you must keep in mind:

- For a camera to communicate properly, it must be in the same subnet as the adapter to which it is connected.
- The camera must have an IP address that is unique within the network.
- The recommended range for persistent IP addresses is from 172.16.0.1 to 172.32.255.254 and from 192.168.0.1 to 192.168.255.254. These address ranges have been reserved for private use according to IP standards.
- If your PC has multiple network adapters, each adapter must be in a different subnet.