QUANTIFI PHOTONICS™

Programming

QUICK START GUIDE

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Units of Measurement

Units of measurement in this publication conform to SI standards and practices

Version: 2.04

Contents

1 Conventions

Before using the instrument described in this manual, take note of the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in **death or serious injury**. Do not proceed unless the required conditions are met and understood.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in **minor or moderate injury**. Do not proceed unless the required conditions are met and understood.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in **component damage**. Do not proceed unless the required conditions are met and understood.

IMPORTANT

Refers to information about this product that you should not overlook.

NOTE

Indicates some information that requires your attention or some extra information for the current topic.

2 Local and remote communication with the product

The product IP address is required to use CohesionUI web-based application, to control the Quantifi Photonics product. It is also necessary to communicate with any installed PXIe module / MATRIQ instrument and to send SCPI commands.

2.1 Communication with a MATRIQ instrument

Power ON the MATRIQ instrument and connect a USB / Ethernet cable. Note down the IP address as displayed on the rear LCD screen and use it as a URL in a compatible browser (Google Chrome or Microsoft Edge).

> ⚠ **IMPORTANT**
> Install the Cohesion Operator software package on the client computer to control or communicate with the MATRIQ instrument. Refer the MATRIQ Software Installation Guide for more information.

2.2 Communication with a PXIe module

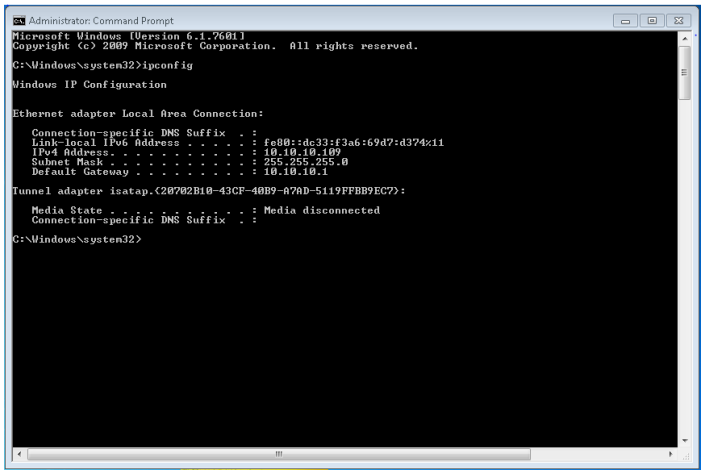
2.2.1 Local communication

Power ON the PXIe chassis and open a compatible browser (Google Chrome or Microsoft Edge) on the PXIe chassis controller. Type https://127.0.0.1 as a URL, or double-click the desktop icon for CohesionUI / select it from the Start menu.

> ⚠ **IMPORTANT**
> The **Cohesion Installer** software package needs to be installed on the chassis to control or communicate with the PXIe module. Refer the PXIe Software Installation Guide for more information.

2.2.2 Remote communication

Power ON the PXIe chassis and connect an **Ethernet** cable to the network. Open a command prompt window and type in **ipconfig** or navigate to the **Network properties** tab within the Control Panel. Note down the **IP address** of the chassis.



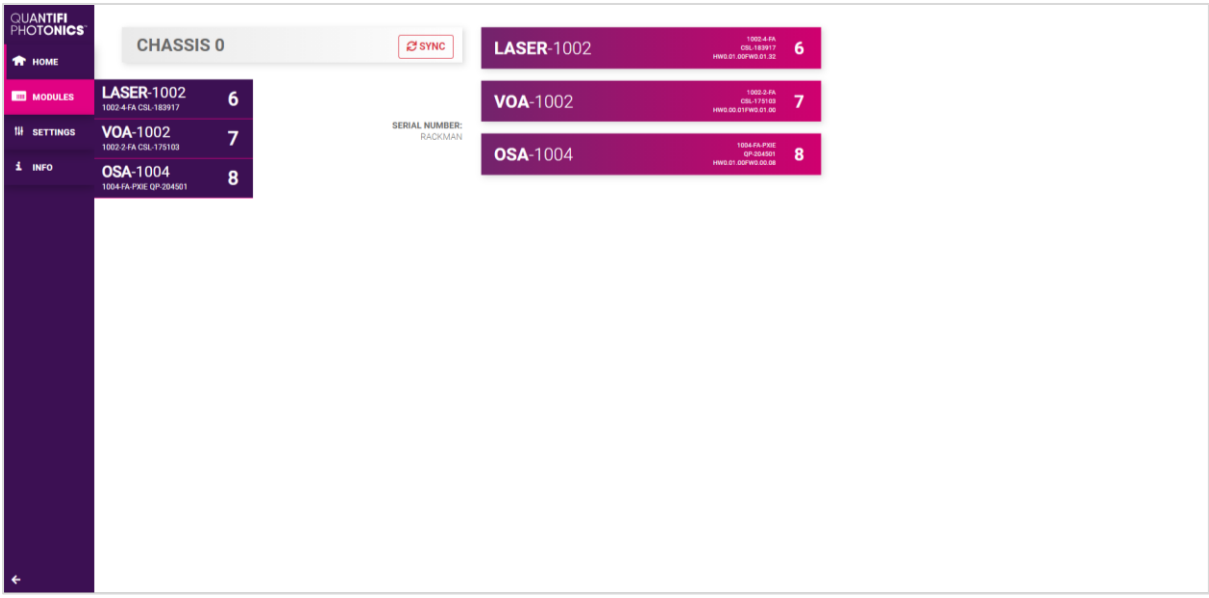
To communicate remotely with the PXIe, use the chassis IP address and one of the following methods:

- CohesionUI - Type in https:// followed by the chassis IP address (e.g. https://10.10.10.XXX)
- NI MAX and LabView environments
- SCPI commands, addressed over a VXI11 TCP client tools

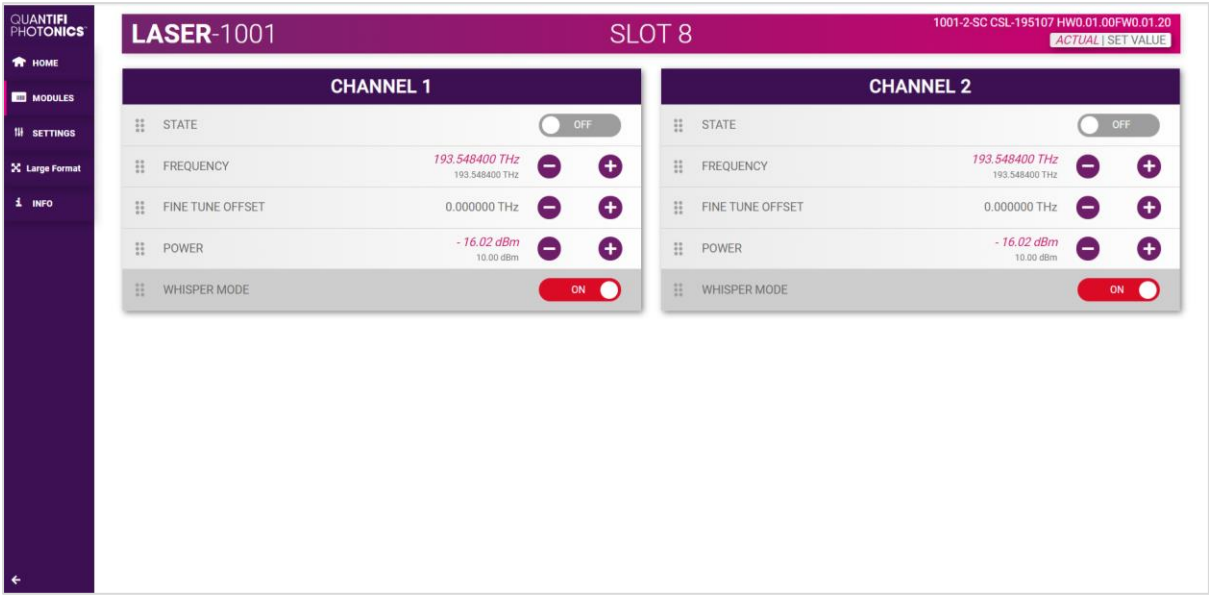
3 Controlling the product with CohesionUI

The main landing page in CohesionUI is called the HOME page. It displays a graphical representation of the module arrangement in the PXIe chassis or the MATRIQ instrument channels.

All the installed modules and instruments are displayed on the HOME page. To access the controls for a specific module, click the corresponding module name, or hover over the MODULES button and select a module or channel from the displayed list.



All the information relating to the instrument such as the model number, serial number and firmware versions are displayed in the top right corner of the window.



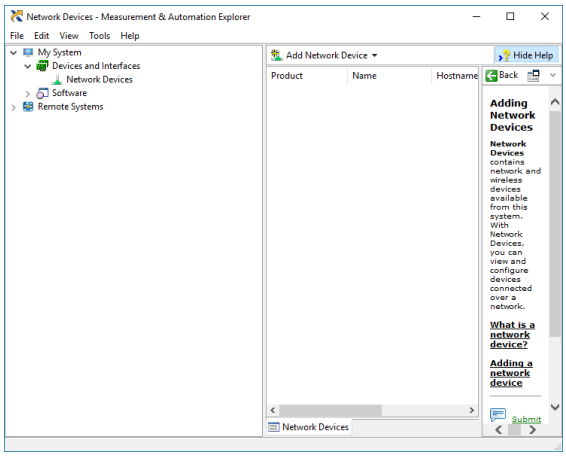
4 Control the product with SCPI commands

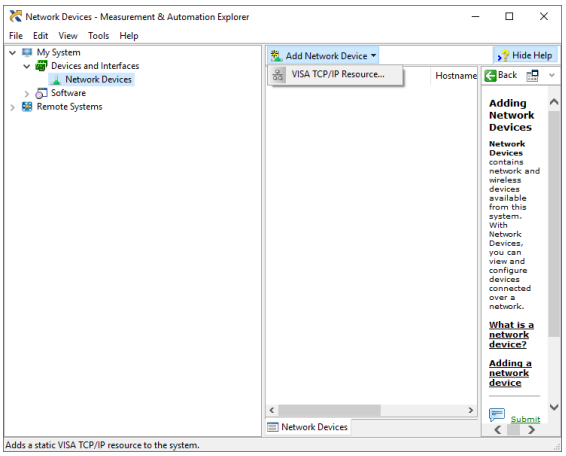
The following section details the various methods that a user may send these commands to a Quantifi Photonics product via **SCPI** commands.

4.1 NI-MAX application

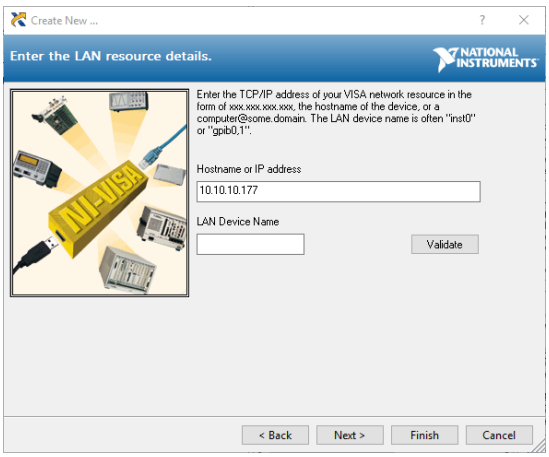
To communicate with any Quantifi Photonics PXIe or MATRIQ product, the chassis / instrument must first be setup as a TCP/IP instrument.

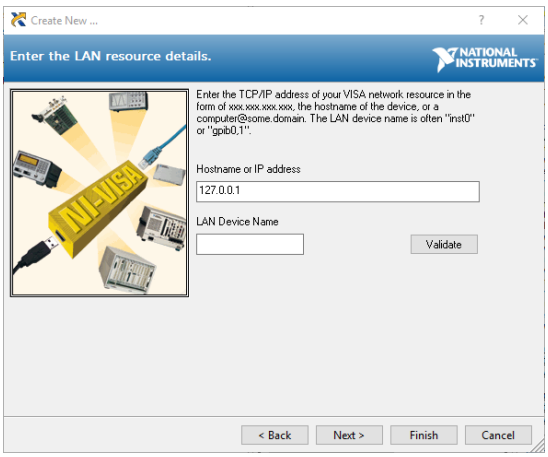
1. After installing NI-MAX, launch the application. In the left side panel of the window, click the **Devices and Interfaces** option. A drop down of available instruments detected will show up.
2. Click on **Network Devices**, then click **Add Network Devices** and select **VISA TCP/IP Resource**.





3. Select **Manual Entry of LAN Instrument**. Enter in the Hostname or IP Address. The left image below is an example of operating remotely, the right image below is an example of operating locally.
   Note when operating locally, enter in the localhost IP address of **127.0.0.1**. Click **Finish** to end the setup process.

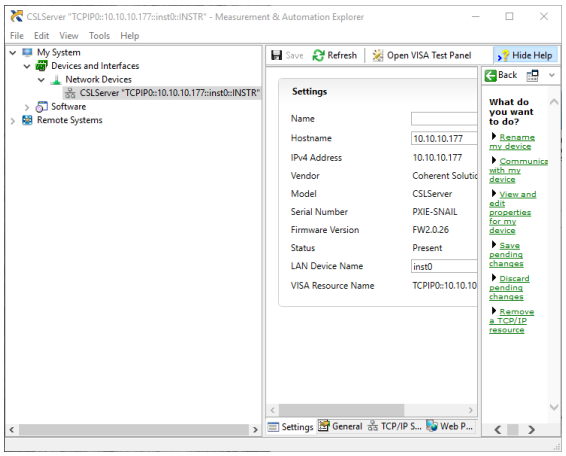




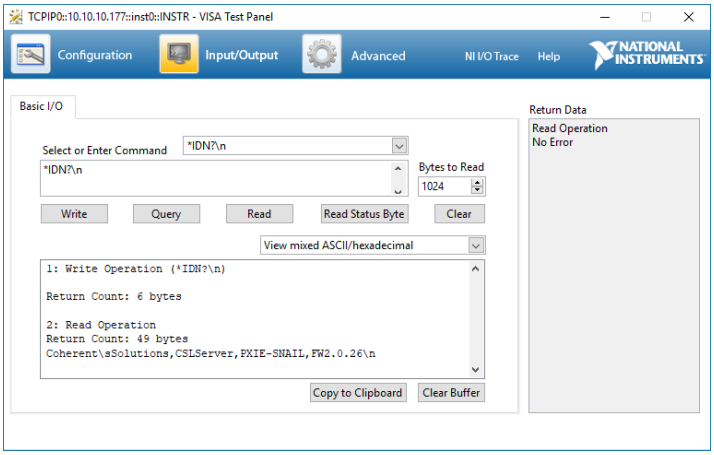
4.2 NI-VISA application

NI-VISA is used to communicate with the PXIe chassis or installed modules / instruments. The above steps must be completed before attempting to communicate using NI-VISA.

1. Launch NI-MAX. In the left-hand side menu, select an Instrument from the **Network Devices** list.



2. On the righthand side panel, select **Open VISA Test Panel**. A new window will popup. Click the **Input / Output** button from the window menu.
   Valid chassis and module commands can be entered in, and their returns queried.



4.3 Python® 2.7 code example

The following example shows how to communicate with a Quantifi Photonics product using Python code. For a list of supported and valid SCPI commands, refer to the **Programming Guide**.

```
# You can get VXI11 from pip:
# pip install python-vxi11==0.9
import vxi11
from vxi11.vxi11 import Vxi11Exception
# replace this with the IP of your device
ip = "127.0.0.1"
try:
        print("connecting to " + ip + " ... ")
        instrument = vxi11.Instrument(ip)
        print("connected")
        print("checking IDN...")
        command = "*IDN?"
        data = instrument.ask(command)
        print("IDN: " + data)
        print("checking OPT...")
        command = "*OPT?"
        data = instrument.ask(command)
        print("OPT: " + data)
        # replace this with a valid command for your device (read # the
        programming guide section for examples)
        command = ""
        print("writing a specific command")
        instrument.write(command)
        print("checking ESR")
        command = "*ESR?"
        data = instrument.ask(command)
        print("*ESR?: " + data)
except Vxi11Exception as e:
        # pass
        print("ERROR" + str(e) + ", command: " + str(command))
```

4.4 MATLAB® code example

To communicate with a Quantifi Photonics product in MATLAB® the installation of a VISA IO driver is required. These drivers enable the creation of the Interface Object for instrument communication.

If developing locally on the product, then these will already be installed. However, if development is on a remotely connected system the VISA Libraries, e.g. National Instruments NI-VISA will have to be installed.

> ⚠ **IMPORTANT**
> MATLAB 2010x or later with the Instrument Control Toolbox is required to execute the code detailed in this section.

The following example shows how to communicate with a Quantifi Photonics product using MATLAB code. For a list of supported and valid SCPI commands, refer to the **Programming Guide**.

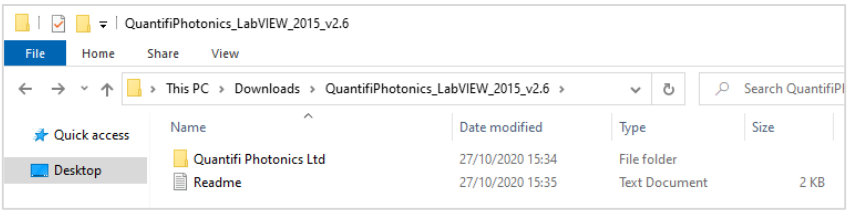
```
% Find a VISA-TCPIP object. This is if the VISA object has already been
% created with tmtool or has been removed from the workspace without
% first being closed (cleanly disconnected).
PXIE_Chassis = instrfind('Type', 'visa-tcpip', ...
       'RsrcName', 'TCPIP0::10.10.10.89::inst0::INSTR', 'Tag', '');
% Create the 'agilent' VISA-TCPIP object if it does not exist
% otherwise use the object that was found.
if isempty(PXIE_Chassis)
       PXIE_Chassis = visa('agilent', 'TCPIP0::10.10.10.89::inst0::INSTR');
else
       fclose(PXIE_Chassis);
       PXIE_Chassis = PXIE_Chassis (1);
end
% Open the connection to the VISA object.
fopen(PXIE_Chassis);
% Query the PXIE_Chassis.
response = query(PXIE_Chassis, '*IDN?');
disp('The *IDN query response:');
disp(response);
response = query(PXIE_Chassis, '*OPT?');
disp('The *OPT query response:');
disp(response);
% Replace this with a valid command for your device (read the programming
% guide section for examples)
command = ''
% Close the connection to the object.
fclose(PXIE_Chassis);
% Clean up all objects.
delete(PXIE_Chassis);
```

4.5 LabVIEW™ application

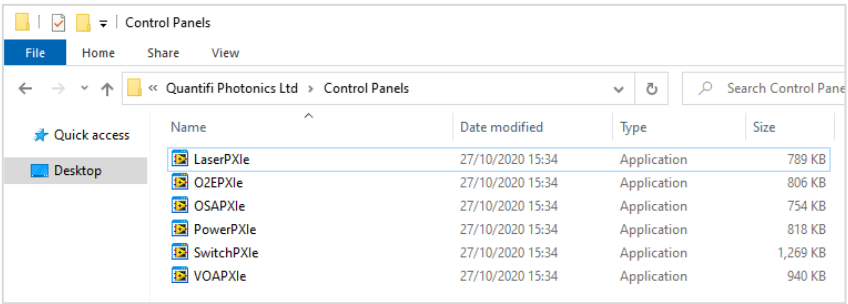
4.5.1 Soft Panels

To control the product with a LabVIEW™ Soft Panel, you will need to have setup the chassis / instrument as a TCP/IP Resource as shown in Section 04.1.

1. Download the LabVIEW zip file from the Quantifi Photonics website. This contains all the Soft Panels and Virtual Instruments (VIs) for Quantifi Photonics PXIe modules.



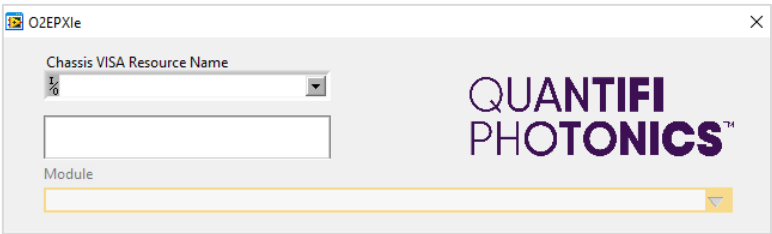
2. Open the Control Panels folder and select the corresponding Soft Panel for the desired PXIe module / MATRIQ instrument. Because these are executables, they will need LabVIEW Runtime Engine 2015 to run.



⚠ IMPORTANT

If LabVIEW Runtime Engine 2015 is not present, a system dialog will pop up. To proceed download the Runtime Engine from the NI website.

3. Once the desired executable has been run, select the VISA Resource corresponding to the intended instrument.



Note this step depends on the setup process shown in Section 4.1. If the instrument has not been setup, then the Soft Panel cannot be used.

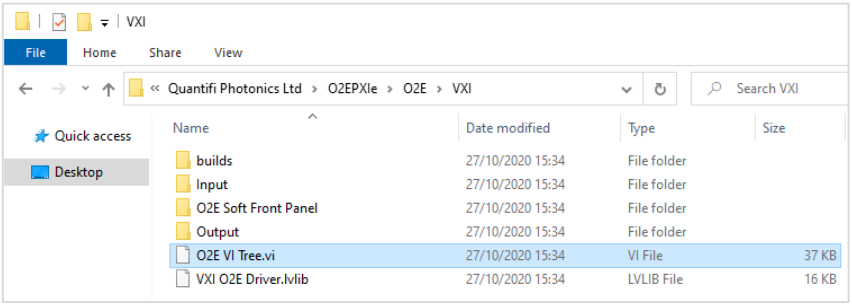
4.5.2 LabVIEW™ Virtual Instruments (VIs)

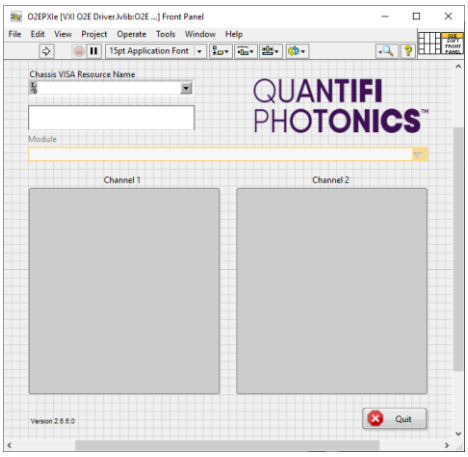
Instead of using the Soft Panels, the Virtual Instruments can also be used to control the product from within LabVIEW. These VIs are provided for customers who want to develop custom applications using the PXIe modules / MATRIQ instruments.

1. Copy the QuantifiPhotonics_LabVIEW_2015_v2.6 > **Quantifi Photonics Ltd** folder to the following path:
   C:\Program Files\National Instruments\LabVIEW 20XX\instr.lib\

2. Within the Quantifi Photonics Ltd folder, navigate to the intended module's sub folder.
   e.g. Quantifi Photonics Ltd > O2E > O2E > VXI

This VI Tree can then be added into the desired development project, therefor the Soft Panel can be rebuilt and used by other LabVIEW Runtime Engine.





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