

# Programming





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

### Version: 2.04

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# 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.

# OCAUTION

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 <u>https://127.0.0.1</u> 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.

Administrator: Command Prompt	23
Microsoft Windows [Version 6.1.7601] Convright (c) 2009 Microsoft Corporation. All rights reserved.	<u>^</u>
C:\Windows\system32)ipconfig	
Windows IP Configuration	
Ethernet adapter Local Area Connection:	
Connection-specific DNS Suffix : : 600:s4c32.9f3a6:6947:d374:11 Link-local IVe0 Address : 600 8.643.66:6947:d374:11 Distribution : : : : 600 8.643.66:6947:d374:11 Distribution : : : : : : : : : : : : : : : :	
Tunnel adapter isatap.<20702B10-43CF-40B9-A7AD-5119FFBB9EC7>:	
Media State	
C:\Windows\system32>	
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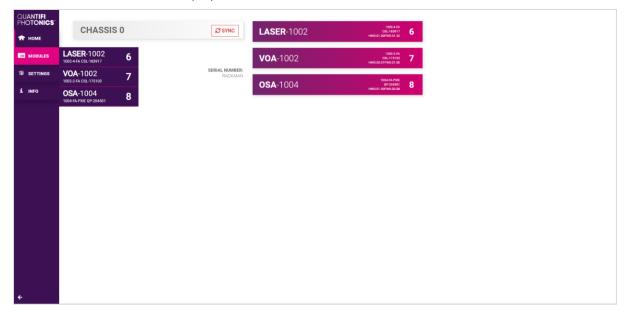
To communicate remotely with the PXIe, use the chassis IP address and one of the following methods:

- 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.

QUANTIFI PHOTONICS	LASER-1001	SL	OT 8	1001-2-SC CSL-195107 HW0.01.00FW0.01.20	
	СН	ANNEL 1	C	HANNEL 2	
114 SETTINGS	II STATE	OFF	1 STATE	OFF	
X Large Format	# FREQUENCY	193.548400 THz	# FREQUENCY	193.548400 THz	
1 INFO	## FINE TUNE OFFSET	0.000000 THz 😑 🕂	# FINE TUNE OFFSET	0.000000 THz 🖨 🕂	
	E POWER	- 16.02 dBm	# POWER	- 16.02 dBm 🕒 🕂	
	## WHISPER MODE	ON O	# WHISPER MODE	ON	
÷					

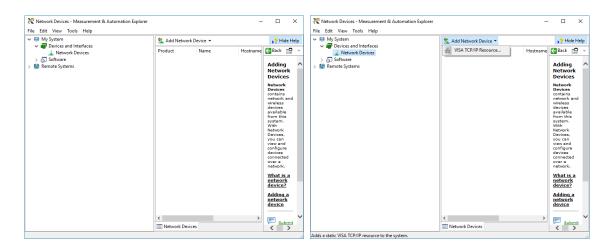
# 4 Control the product with SCPI commands

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.



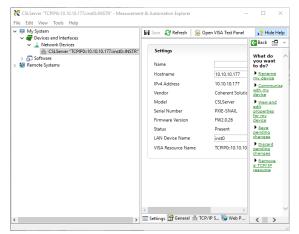
3. Select Manual Entry of LAN Instrument. Enter in the Hostname or IP Address. The left image below is an example of operating remotely, the right image below is an example of operating locally. Note when operating locally, enter in the localhost IP address of 127.0.0.1. Click Finish to end the setup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

🔀 Create New	? ×	🔀 Create New	? ×
Enter the LAN resource details.		Enter the LAN resource details.	
Enter the TCP/IP address of your VISA network, from of xxx xxx xxx, xxx, the 'hostname of the devic couplinging domain. The LAN device name or "gab(J.") Hostname or IP address 10:10:10.177 LAN Device Name	ce, or a	Enter the ICP/IP address of your form of xos accounts, with the bolth compared to the source down. The Data so	ame of the device, or a
< Back Next >	Finish Cancel	< Back N	Next > Finish Cancel

# 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.

💥 TCPIP0::10.10.10.177::inst0::INSTR - VISA Test Panel		-		×
Configuration Input/Output 🔅 Advanced NI I/O Trace	Help		ATION/	AL IENTS
Basic I/O	Return Data Read Opera No Error			
Select or Enter Command TDN?\n Select or Enter Command DV Select or Enter C				
View mixed ASCII/hexadecimal				
Return Count: 6 bytes 2: Read Operation Return Count: 49 bytes Coherent:4550utions,CSLServer,FXIE-SNAIL,FW2.0.26\n				
Copy to Clipboard Clear Buffer				

# 4.3 Python<sup>®</sup> 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 vxill.vxill import VxillException
# replace this with the IP of your device
ip = "127.0.0.1"
try:
      print("connecting to " + ip + " ... ")
      instrument = vxill.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 VxillException as e:
      # pass
      print("ERROR" + str(e) + ", command: " + str(command))
```

### 4.4 MATLAB<sup>®</sup> code example

To communicate with a Quantifi Photonics product in MATLAB<sup>®</sup> 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<sup>™</sup> application

### 4.5.1 Soft Panels

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

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

	antifiPhotonics_LabVIEW_2015_v2.6 Share View			
← → ∽ ↑ 📴 → This PC → Downloads → QuantifiPhotonics_LabVIEW_2015_v2.6 → 🗸 🗸 Search Quantifi				
📌 Quick access	Name	Date modified	Туре	Size
E Desktop	Quantifi Photonics Ltd	27/10/2020 15:34 27/10/2020 15:35	File folder Text Document	2 KB

 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.

← → ∽ ↑ <mark> </mark> -	« Quantifi Photonics Ltd → Control Pan	els	ې ق 🗸	Search Control Par
🖈 Quick access	Name	Date modified	Туре	Size
	LaserPXIe	27/10/2020 15:34	Application	789 KB
Desktop	😰 O2EPXIe	27/10/2020 15:34	Application	806 KB
	📴 OSAPXIe	27/10/2020 15:34	Application	754 KB
	😰 PowerPXIe	27/10/2020 15:34	Application	818 KB
	😰 SwitchPXIe	27/10/2020 15:34	Application	1,269 KB
	🔯 VOAPXIe	27/10/2020 15:34	Application	940 KB

# **▲ IMPORTANT**

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

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

📴 O2EPXIe	×
Chassis VISA Resource Name	QUANTIFI Photonics
Module	

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<sup>™</sup> Virtual Instruments (VIs)

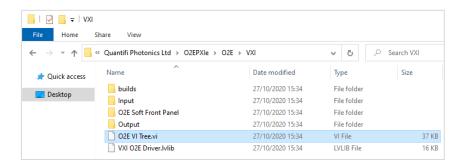
Instead of using the Soft Panels, the Virtual Instruments can also be used to control the product from within LabVIEW. These VIs are provided for customers who want to develop custom applications using the PXIe modules / MATRIQ instruments.

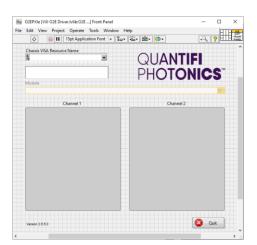
Copy the QuantifiPhotonics\_LabVIEW\_2015\_v2.6 > Quantifi Photonics Ltd folder to the following path:
 C:\Program Files\National Instruments\LabVIEW 20XX\instr.lib\

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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