

# LASER

1200 Series

Tunable Laser Source

MATRIQ User Manual



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

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# 1 What's in this user manual?

You can find the following information in this document:

<b>Before you begin</b>	<a href="#">Conventions</a> <a href="#">Safety information</a> <a href="#">System requirements</a>
<b>Getting started</b>	<a href="#">Introducing the LASER 1200 Series</a> <a href="#">Setting up hardware</a> <a href="#">Installing software</a> <a href="#">Instrument IP address</a>
<b>Working with your LASER</b>	<b>CohesionUI GUI:</b> <a href="#">CohesionUI - Overview</a> <a href="#">Controlling your LASER with CohesionUI</a> <b>SCPI commands:</b> <a href="#">Controlling your LASER with SCPI commands</a> <a href="#">Programming examples and applications</a>
<b>Maintenance</b>	<a href="#">Upgrade firmware</a> <a href="#">Restore factory settings</a>

## 2 Conventions

Please make yourself familiar with these conventions; we use them throughout this user manual:

### **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** or **component damage**.

Do not proceed unless the required conditions are met and understood.

### **NOTE**

Indicates relevant information that requires your attention.

### 3 Safety information

Carefully read all safety information before using your Quantifi Photonics product.

#### 3.1 Optical laser radiation precautions



#### WARNING

To protect yourself from harm caused by optical radiation:

- > Do not install or terminate fibers while the light source is active.
- > Turn the Quantifi Photonics product OFF before inspecting the end face(s) of the product, or any optical patch cords connected to it.
- > Never look directly into a live fiber; ensure that your eyes are protected at all times.


#### CAUTION

The use of controls, adjustments, and procedures other than those specified in this document may result in exposure to hazardous situations involving optical radiation.

#### 3.2 Electromagnetic compatibility

#### CAUTION

For electromagnetic compatibility, this product is a Class A product. It is intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

 This symbol on the unit refers to documentation provided with the product for related safety information. Ensure that the required conditions are met and understood before using the product.

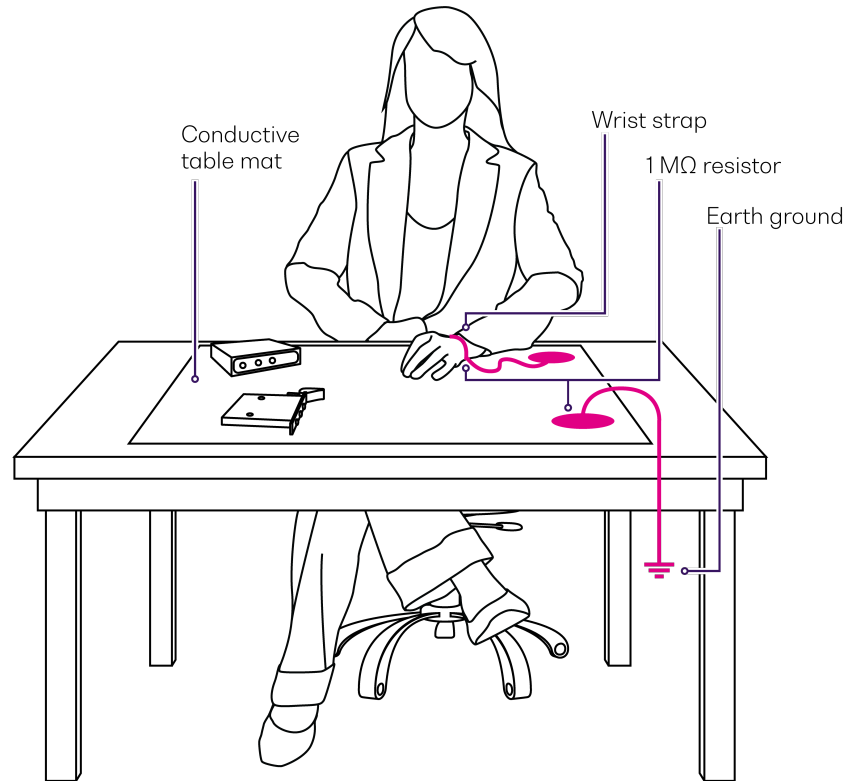


### 3.3 Electrostatic discharge precautions

#### CAUTION

The product is sensitive to electrostatic discharge (ESD). To ensure that you do not cause ESD damage to the product:

- > Always follow proper grounding and ESD management practices.
- > Store the unused product in the original protective electrostatic packaging that it was shipped in.
- > Use a wrist strap and grounding table mat when unpacking or handling the product.



## 4 Introducing the LASER 1200 Series

The LASER 1200 Series is a highly customizable DFB laser source available in a wide range of wavelengths and powers. Depending on the selection of DFB sources, the module will either be a single, or double slot configuration.



### Programming interfaces

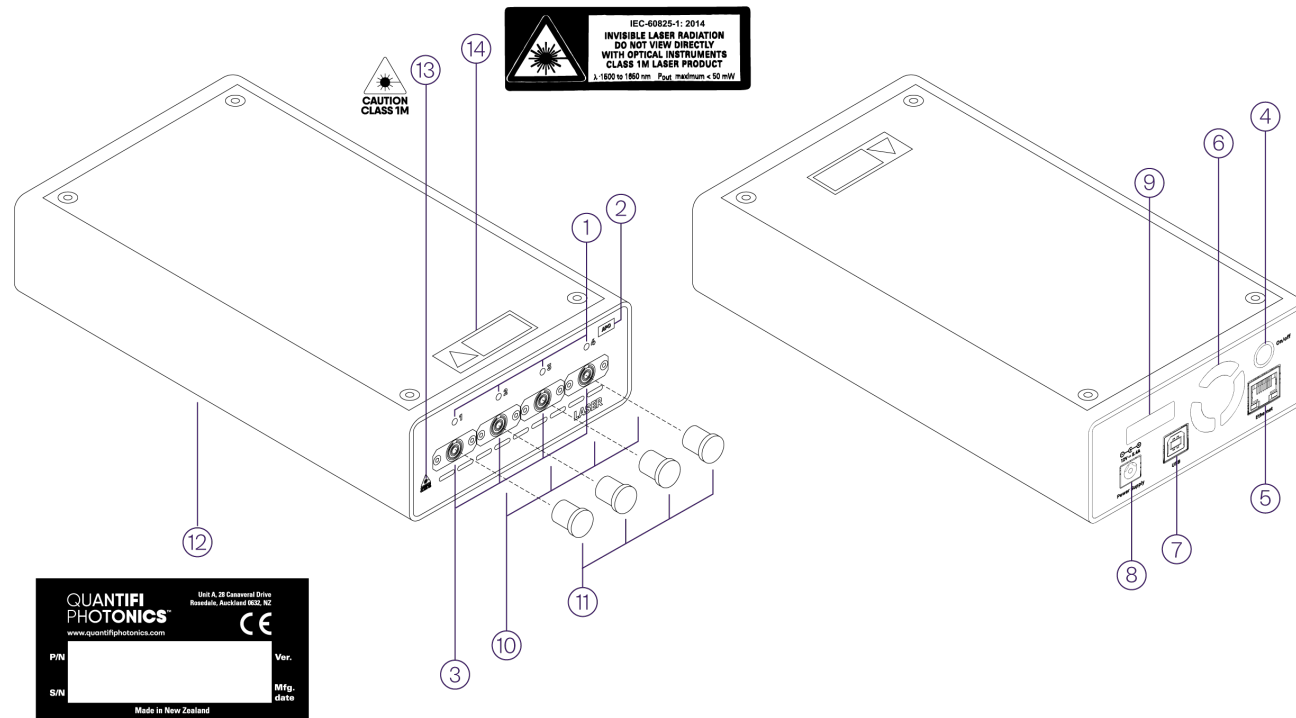
Through its programming interfaces you can take advantage of the SCPI-compliant command language and choose from programming tools such as LabView, C++, Python, or any of the other popular programming languages used to control automatic test equipment (ATE).

### CohesionUI™

Quantifi Photonics' web-based graphical user interface CohesionUI is hosted on Microsoft Windows® and enables you to control your device from any supported web browser.

## 4.1 Hardware description




### 4.1.1 LASER 1200 Series



Front		Rear	
1	Status LEDs	4	On/ Off push button
2	Optical connector type	5	Ethernet port
3	Laser output ports	6	Ventilation fan (DO NOT OBSTRUCT)
10	Class 1M laser radiation paths	7	USB type B port
11	Protective caps	8	Power supply port
12	Laser MATRIQ instrument information	9	IP address LCD screen
13	Laser warning symbol		
14	IEC laser hazard safety label		

## 4.2 Status LEDs

The LED shows the status of the channel:

LED	Meaning
 OFF	Product is powered OFF
	Product is powered ON and the laser is DISABLED / OFF
 solid RED	Product is powered ON and the laser is ENABLED / ON Do <b>NOT</b> look into the fiber or inspect it while the laser is ENABLED / ON!
 flashing red	During startup: Indicates the initialization of the LASER instrument.
	After startup, if flashing persists for more than 15 seconds: Indicates an error.

## 5 Setting up hardware

Follow the instructions in this section when setting up your instrument.

### CAUTION

The product is sensitive to electrostatic discharge (ESD). To prevent damage from ESD:

- > Do not remove the product from the antistatic packaging until required to do so.
- > Wear a grounded wrist strap at all times when handling the product.

### CAUTION

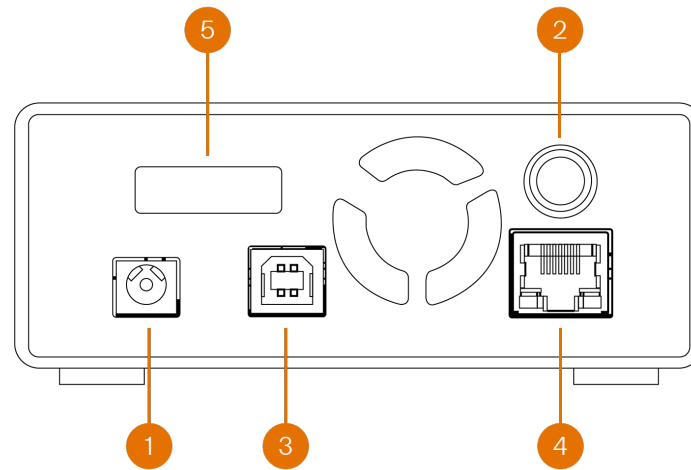
Skin contact may leave corrosive residue and damage a connector:

- > Always clean optical end faces before mating.

### NOTE

- > You must use the external power supply that has been supplied by Quantifi Photonics with the unit. Any attempt to use a different external power supply may cause product damage and will void your warranty.
- > The external power supply that has been supplied with the unit can only be used with that unit. Do not use it with any other product.
- > DO NOT attempt to remove or adjust any component of the product while the power is on. Ensure the product is powered OFF, and that the correct handling procedure detailed herein is followed when you remove or install any products.
- > Please check for the fiber end-face type of the optical ports, such as PC or APC, and only use the same type optical connector to avoid damaging the end-face.
- > For advice on connector and fiber care, please refer [Working with optical fibers](#).
- > After a cold boot, wait at least 30 minutes before starting to use the error detection or pattern generation modules.

## 5.1 Set up your product and power ON



► To set up your instrument and power ON:

To allow for optimal air flow and avoid thermal issues, do not block the ventilation fans in the front and back of the instrument and set up your instrument with a minimum clearance of 2 inches (50.8mm) around it.

1. Insert the power cord - you must use the IEC cable supplied with the unit.
2. Power the instrument ON by pushing the ON button.
3. Connect to a client computer using a USB cable,

**OR**

4. Connect to your network or client computer using an Ethernet cable.
5. The instrument IP address will appear on the LCD screen. When the unit is connected via both Ethernet and USB cable, both the Ethernet and USB IP addresses are displayed.

After powering ON, please wait at least **1 minute** before attempting to communicate with the unit. This gives the unit time to finish boot procedures and initialize the communication server.

## 5.2 Instrument IP address

To access your instrument from a client computer, you need the IP address of the instrument.

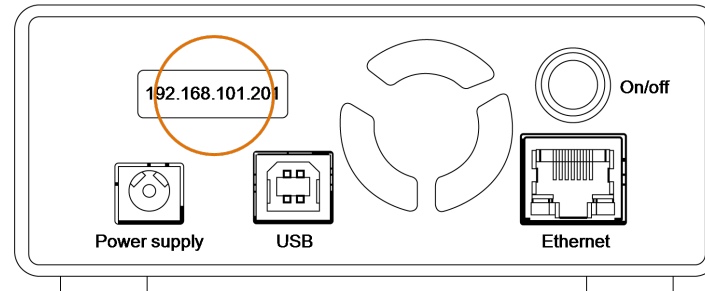
Your instrument can have two different IP addresses depending on your chosen connection method (USB or Ethernet):

- The default **USB IP address** is **192.168.101.201**. This is a static address set during instrument calibration.
- The default **Ethernet IP address** is dynamically assigned by the DHCP.

### ► To view an instrument's IP address:

With your instrument powered ON, you can view the current IP address on the LCD display.

If your instrument is connected with both, Ethernet and USB cables, both the USB and Ethernet IP address are displayed.



### ► To change an instrument's IP address:

You can change the instrument's static USB IP address and you can assign a static Ethernet IP address using CohesionUI (refer to [Change the instrument IP address](#)).

#### Multi-instrument control

If you have several Quantifi Photonics instruments with static IP addresses on your network, make sure to assign a unique IP address to each instrument before connecting. For details, refer to [Change the instrument IP address](#)

## 6 Installing software

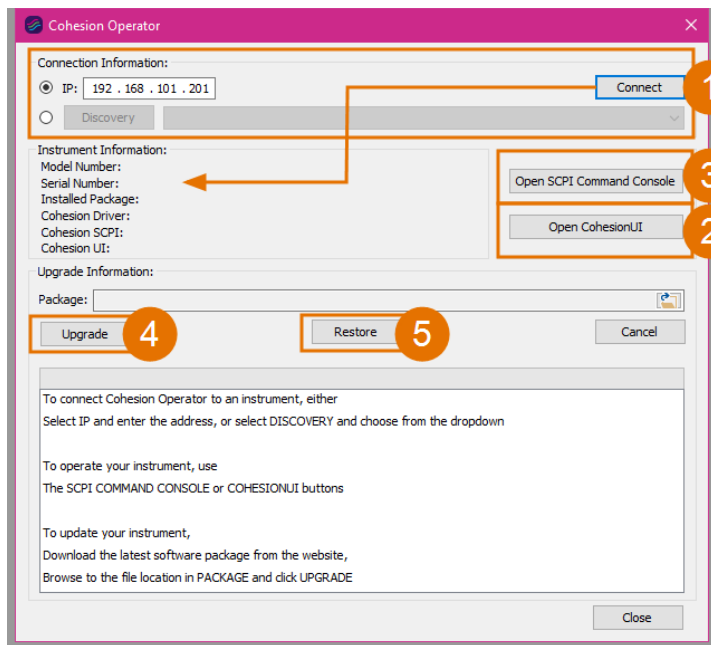
To work with Quantifi Photonics MATRIQ and EPIQ instruments, you need to install the latest version of the **Cohesion Operator** software package on any computer that you use to connect with your LASER instrument (client computer).

For details on system requirements and supported browsers, refer [System requirements](#).

The software package is included on the USB media device that we provide with your instrument, or you can download it from [quantifiphotonics.com](http://quantifiphotonics.com) (go to Resources > Drivers, software and manuals > MATRIQ Series).

Cohesion Operator enables you to:

1. Connect with MATRIQ and EPIQ instruments that are available on your network to retrieve instrument information and validate the instrument's IP address (refer [Check firmware version and other information](#)).
2. Access an instrument using CohesionUI, a web-based graphical user interface (refer to [Access instruments with CohesionUI](#)).
3. Work with an instrument using the SCPI Command Console (refer to [SCPI Command Console](#)).
4. Upgrade instrument firmware (refer to [Upgrade firmware](#)).
5. Restore an instrument to factory settings (refer to [Restore factory settings](#)).





## 6.1 Install the Cohesion Operator software package

- ▶ To install the software package on a client computer:
  1. (recommended) Save your work and close all programs.
  2. If using the **USB media device**, insert it in the computer.
  3. Double-click **CohesionOperator-<version>.exe** and follow the prompts.

A Windows Security Alert may prompt you to allow network access. We recommend that you allow access to both, private and public networks, to enable any network configuration.

The installation wizard will install required drivers, applications, and desktop icons on the computer.

### Multi-instrument control

If another Quantifi Photonics instrument is already connected to the client computer via USB, make sure each instrument has a unique USB IP address to avoid any addressing conflicts. For details, refer to [Instrument IP address](#)

- ▶ To open the Cohesion Operator application:
  - > Double-click the **Cohesion Operator** desktop icon or open **Cohesion Operator** from the Start menu.

## 6.2 Check firmware version and other information

Using Cohesion Operator, you can check the firmware version and other details of MatriQ and EPIQ instruments that are available on your network.

▶ To check details in Cohesion Operator:

1. Select the instrument.
2. Click **Connect**.
3. Current instrument information will be displayed.

**Installed Package** refers to the currently loaded firmware version.

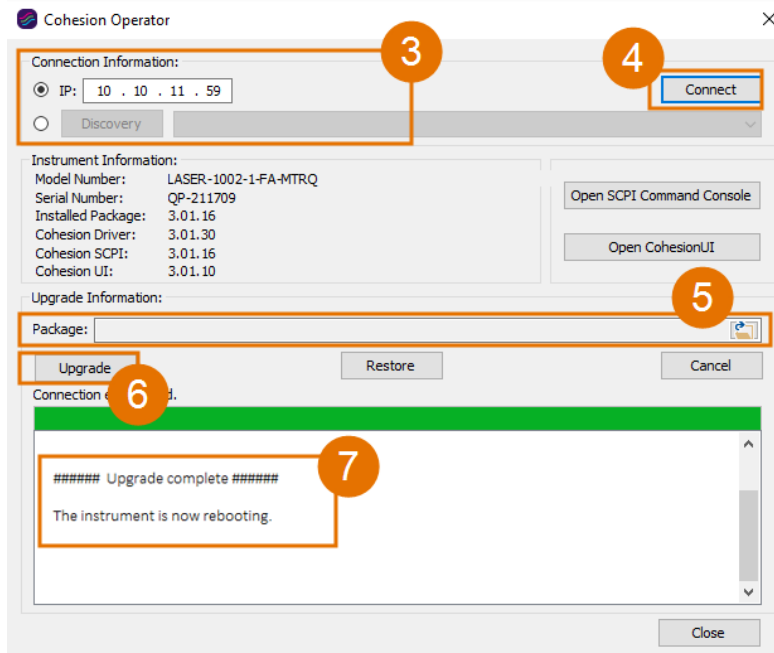
Alternatively, you can check instrument information in CohesionUI, refer to [View system information](#).

## 6.3 Upgrade firmware

We recommend that you upgrade firmware via a USB connection to prevent possible connection loss when using an Ethernet connection.

► To upgrade an instrument with the latest firmware:

1. Get the latest MatriQ firmware package **CohesionMatriQ-<version>.qfw**, for example by downloading it from [quantifiphotonics.com](http://quantifiphotonics.com) (go to **Resources > Drivers, software and manuals > MatriQ Series**), and save it to your network.
2. Open the Cohesion Operator, for example by double-clicking the **Cohesion Operator** desktop icon.



3. Select the instrument by entering its **IP address** or by selecting it from the **Discovery** drop down list.
4. To confirm that you have selected the correct instrument, click **Connect**.  
This will retrieve instrument information, with **Installed Package** showing the current firmware version.
5. In **Package**, click the Browse button, navigate to the previously downloaded firmware package and select it.
6. Click **Upgrade**.  
The instrument will be upgraded to the selected firmware package. This can take a few minutes and the instrument might reboot several times

in the process.

7. A message shows when the upgrade is complete.

To verify the new firmware version, click **Connect** (4) to retrieve the latest instrument information.

**NOTE**

If an upgrade attempt is unsuccessful, the Cohesion Operator will stop the upgrade process and restore the instrument to its previous firmware version. Messages will be displayed accordingly.

## 6.4 Restore factory settings

We recommend that you restore factory settings via a USB connection to prevent possible connection loss when using an Ethernet connection.

▶ To restore factory settings:

1. Open the Cohesion Operator, for example by double-clicking the **Cohesion Operator** desktop icon.
2. Select the instrument by entering its **IP address** or by selecting it from the **Discovery** drop down list.
3. To confirm that you have selected the correct instrument, click **Connect**.  
This will retrieve instrument information, with **Installed Package** showing the current firmware version.
4. Click **Restore**.  
The instrument will be returned to factory settings, including IP address settings.

## 7 CohesionUI - Overview

CohesionUI is a web-based graphical interface that you can use to work with your Quantifi Photonics products.

CohesionUI is part of the MATRIQ firmware package running on your LASER instrument.

From the menu on the left you can navigate to the following pages:

1. **HOME:** This is your main page. From here you can access all controls for your LASER instrument
2. **SETTINGS:** Here you can change CohesionUI settings and/or instrument IP address
3. **INFO:** Here you can display instrument information, e.g. model number and firmware version

The screenshot displays the CohesionUI interface for a LASER instrument. The top navigation bar is green and contains the word "LASER" on the left and the instrument ID "1001-2-FC CSL-193902 HW0.01.00FW0.01.33" on the right, with a sub-label "ACTUAL | SET VALUE". A dark purple sidebar on the left contains navigation options: HOME, MODULES, SETTINGS, Large Format, and INFO. The main content area is divided into two panels, CHANNEL 1 and CHANNEL 2, each with a dark purple header. Each channel panel contains a table of settings:

Channel	STATE	FREQUENCY	FINE TUNE OFFSET	POWER
CHANNEL 1	OFF	193.414500 THz 193.414500 THz	0.000000 THz	-99.00 dBm 10.00 dBm
CHANNEL 2	OFF	191.100000 THz 191.100000 THz	0.000000 THz	-99.00 dBm 10.00 dBm

## 7.1 Access instruments with CohesionUI

You can open CohesionUI for Quantifi Photonics MATRIQ and EPIQ instruments:

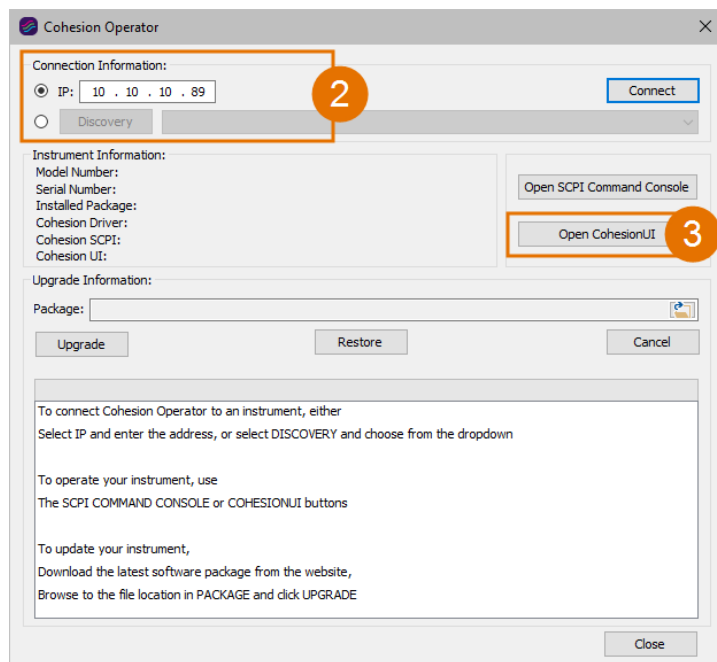
- from Cohesion Operator, or
- in a supported browser by entering the instrument IP in the address bar.

To open CohesionUI, you need the IP address of the instrument. For details, refer [Instrument IP address](#).

► To open CohesionUI from Cohesion Operator:

1. Open **Cohesion Operator** on a client computer, for example by double-clicking the Cohesion Operator desktop icon
2. Select the instrument by entering its **IP address** or by selecting it from the **Discovery** dropdown.
3. Click **Open CohesionUI**.

CohesionUI will open in your standard browser.



► To open CohesionUI in a browser:

1. Launch a supported **browser** (for details refer [System requirements](#)).
2. Enter the instrument **IP address** in the address bar.  
CohesionUI will launch in the browser.





## 7.2 Set values

In CohesionUI you can set values for parameters where applicable.

- ▶ To set a value:
  1. Click on a parameter and enter a value.
  2. Confirm the value.
  3. Alternatively, you can use + and - to increase or decrease the value.  
You can edit the step size in the SETTINGS menu (refer [Manage CohesionUI settings](#)).
- ▶ To set a pre-defined value, for example **MIN**, **MAX** or **DEF**:
  4. Click on a parameter and select a value from the dropdown menu.
  5. Confirm the value.

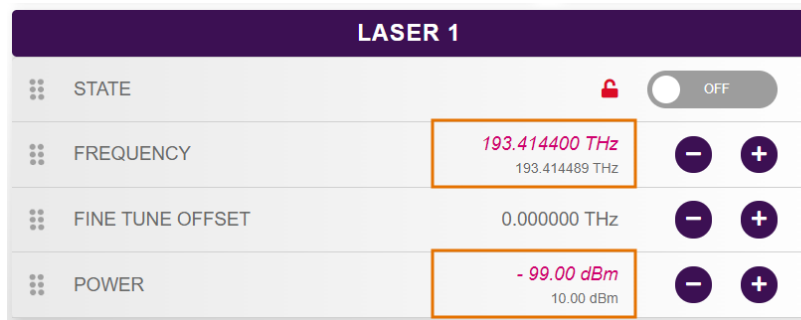
The screenshot displays the CohesionUI interface with a sidebar on the left containing navigation options: HOME, MODULES, SETTINGS, Large Format, \_CONSOLE, and INFO. The main area shows four channel settings panels:

- CHANNEL 1:** Shows the 'FINE TUNE OFFSET' parameter with a value of 0.00009 THz. A callout '1' points to the input field, and '2' points to the confirm button.
- CHANNEL 2:** Shows the 'FINE TUNE OFFSET' parameter with a value of 0.000000 THz. Callout '3' points to the minus/plus buttons.
- CHANNEL 3:** Shows the 'FINE TUNE OFFSET' parameter with a value of 0.00009 THz. Callout '4' points to the dropdown menu (MIN, MAX, DEF), and '5' points to the confirm button.
- CHANNEL 4:** Shows multiple parameters: STATE (OFF), FREQUENCY (193.548400 THz), FINE TUNE OFFSET (0.000000 THz), POWER (-99.00 dBm), and WHISPER MODE (OFF).

### 7.3 SET values and ACTUAL values

In some cases you can manually set a value that will be displayed alongside the actual value as follows:

- **ACTUAL:** The actual value of the parameter as queried by the product.
- **SET:** The intended value of a given parameter as set by the user.



For details on how to set values, refer [Set values](#).

## 7.4 Manage CohesionUI settings

On the **SETTINGS** page you can configure CohesionUI settings and unit preferences.

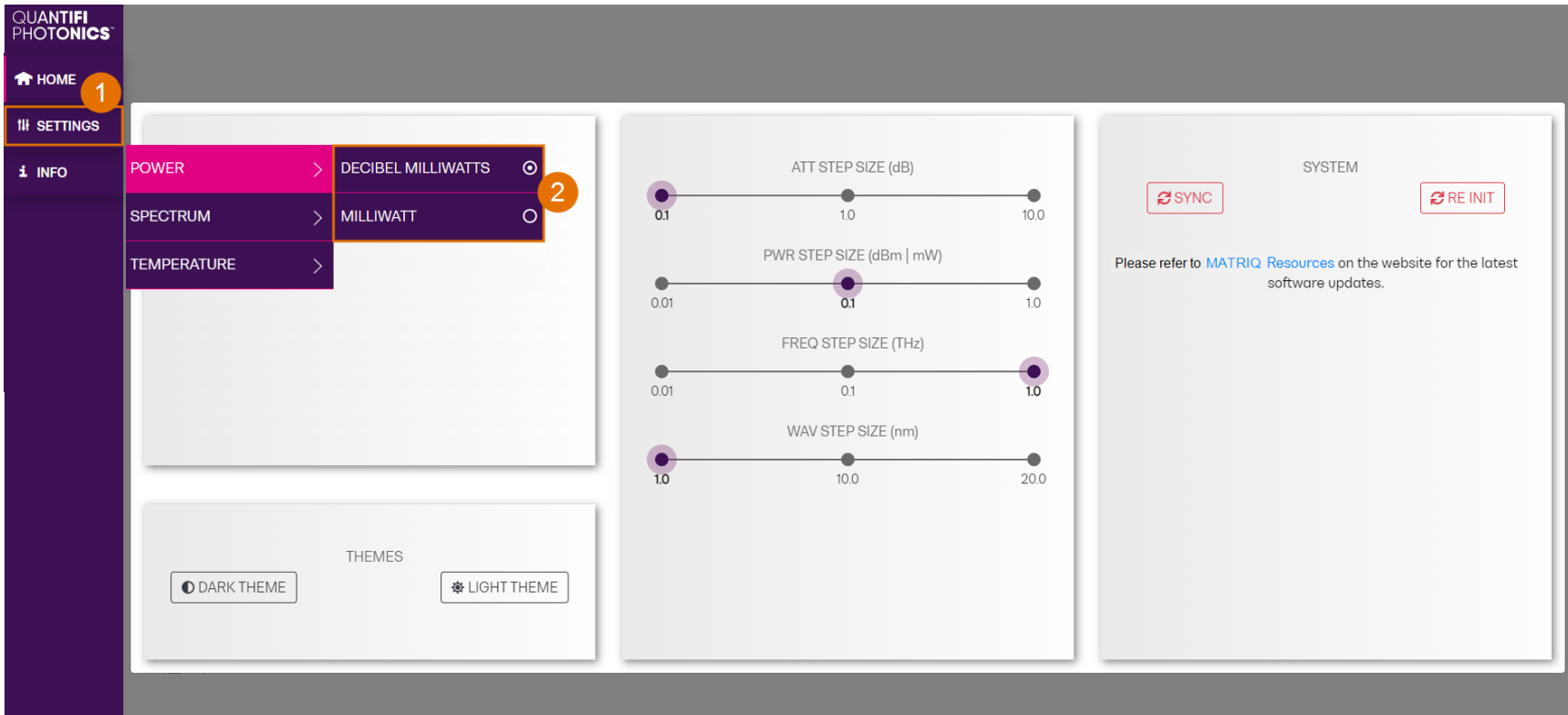
► To view all settings and unit preferences and adjust as required:

1. Click **SETTINGS**.
2. Change settings or unit preferences as required, for example temperature units.  
Please note that the units displayed on this page are not always relevant for each product.
3. **Step size** refers to the amount by which a value is increased or decreased when clicking the **+** or **-** button.

The screenshot displays the 'SETTINGS' page of the Quantifi Photonics interface. The page is divided into three main sections:

- Left Sidebar:** Contains navigation links for 'HOME', 'SETTINGS' (highlighted with a '1'), and 'INFO'.
- POWER and SPECTRUM Settings:** Includes sliders for 'POWER' (dBm to mW) and 'SPECTRUM' (THz to nm). A '2' is placed over the 'TEMPERATURE' section.
- TEMPERATURE:** A slider for temperature units, currently set to '°C', with '°F' and 'K' also visible.
- THemes:** Two buttons for 'DARK THEME' and 'LIGHT THEME'.
- Step Size Settings (Section 3):** A group of sliders for 'ATT STEP SIZE (dB)', 'PWR STEP SIZE (dBm | mW)', 'FREQ STEP SIZE (THz)', and 'WAV STEP SIZE (nm)'. A '3' is placed over this section.
- SYSTEM:** Contains 'SYNC' and 'RE INIT' buttons, and a message: 'Please refer to [MATRIQ Resources](#) on the website for the latest software updates.'

- ▶ To adjust unit preferences one at a time:
  1. Hover over **SETTINGS**.
  2. Select a unit from the dropdown, for example the power unit.



## 7.5 Change the instrument IP address

Your instrument can have two different IP addresses depending on your chosen connection method (USB or Ethernet):

- The default **USB IP address** is **192.168.101.201**. This is a static address set during instrument calibration.
- The default **Ethernet IP address** is dynamically assigned by the DHCP.

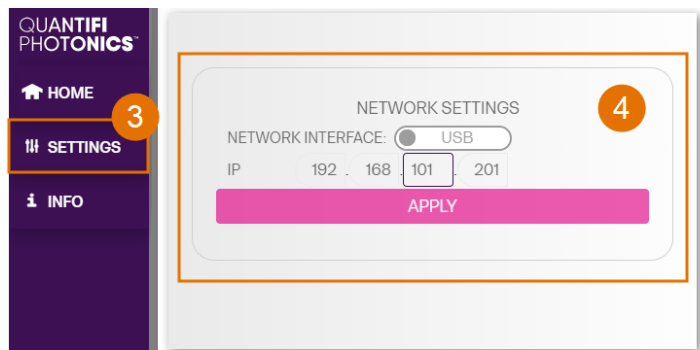
You can change the instrument's static USB IP address, and assign a static Ethernet IP address if required.

### Multi-instrument control

If you have several Quantifi Photonics instruments with static IP addresses on your network, make sure to assign a unique IP address to each instrument before connecting.

► To change the **USB IP address**:

1. Connect with the instrument from a client computer via USB. Ensure that this is the only Quantifi Photonics instrument currently connected via USB.
2. Open CohesionUI using the currently assigned USB IP address (for details refer to [Access instruments with CohesionUI](#)).
3. Go to **SETTINGS**.
4. In **NETWORK SETTINGS**:
  - Select **Network Interface: USB**.
  - In **IP**, the currently assigned IP address is displayed. Enter the new IP address by changing the **3rd octet** of the IP address. To avoid any addressing conflicts, make sure that this is a unique IP address that is not shared with any other instrument on the network.
  - Click **APPLY**. The new IP address will show in CohesionUI and on the display.



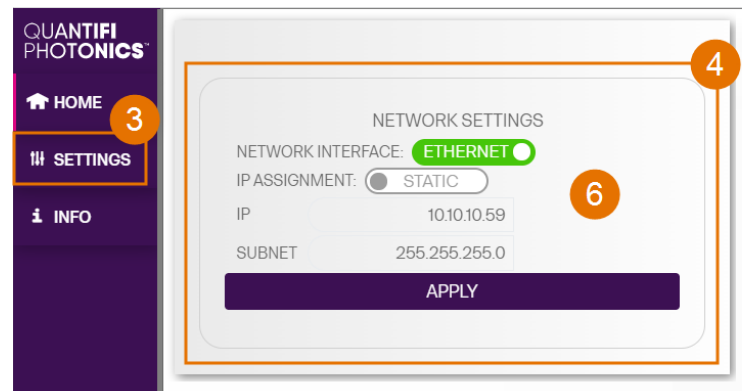
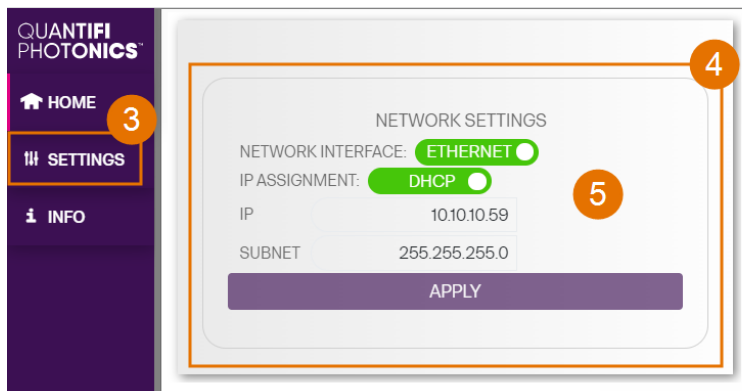
► To change the **Ethernet IP address**:

1. Connect with the instrument from a client computer via USB. Ensure that this is the only Quantifi Photonics instrument currently connected via USB.
2. Open CohesionUI using the currently assigned USB IP address (for details refer [Access instruments with CohesionUI](#)).
3. Go to **SETTINGS**.
4. In **NETWORK SETTINGS**, select **Network Interface: Ethernet**.
5. Select **IP ASSIGNMENT: DHCP** to enable the DHCP to automatically assign the Ethernet IP address (this is the default setting) and click **APPLY**.

OR

6. Select **IP ASSIGNMENT: STATIC** to assign a static Ethernet IP address.  
Enter the new IP address by changing the **3rd octet** of the IP address and click **APPLY**.  
To avoid any addressing conflicts, make sure that this is a unique IP address that is not shared with any other instruments on the network.

The new IP address will show in CohesionUI and on the display.



## 7.6 View system information

You can easily access instrument information, for example the model number and firmware version.

- ▶ To display instrument information in CohesionUI:
  1. Refer to the top right corner in CohesionUI.
  2. For more details, click **INFO** to display the information panel.
  3. The information panel lists the instrument's serial number, and software and firmware versions.

## 8 Controlling your LASER with CohesionUI

You can use Quantifi Photonics' graphical user interface CohesionUI to work with your LASER instrument. For details on how to get started with CohesionUI, refer to [CohesionUI - Overview](#).

In CohesionUI you can:

- Set channel parameter values.
- Toggle the laser ON/OFF.

### 8.1 Setting channel parameter values

Specific control parameters for a given channel in the LASER instrument can be set by clicking the parameter button, or by using the + and – control buttons to increase or decrease the value field by a set amount. This step size is set in the SETTINGS menu. Alternatively, the parameter can also be set to the MIN and MAX value by clicking the dropdown in the name of the parameter.

This applies to the following parameters:

- **WAVELENGTH (FREQUENCY):** The desired wavelength (frequency) of light that the LASER instrument should output. This corresponds to the spectral location of the central peak of the laser.
- **POWER:** The desired output power of the LASER instrument.

The screenshot displays the CohesionUI interface for a LASER-1203 instrument. On the left is a dark purple sidebar with navigation options: HOME, MODULES, SETTINGS, Large Format, and INFO. The main area is titled 'LASER-1203' and contains two channel control panels, CHANNEL 1 and CHANNEL 2. Each panel has a 'STATE' toggle set to 'OFF'. Below the state are four parameters: 'FREQUENCY', 'FINE TUNE OFFSET', and 'POWER'. Each parameter has a numerical value, a dropdown menu, and two circular buttons with minus and plus signs. In CHANNEL 1, the 'POWER' parameter is highlighted with an orange border, showing a value of -99.00 dBm and a minimum of 5.00 dBm. In CHANNEL 2, the 'POWER' parameter shows a value of -99.00 dBm and a minimum of 10.00 dBm.

In the above example, the **POWER** for CHANNEL 1 has been set to **5.00 dBm** by manual input. Alternatively clicking the MIN button in the dropdown menu will set the power to the minimum value. To apply the changes, click the tick mark.



Note that after setting the desired output power and clicking the tick mark, the displayed POWER value will be the ACTUAL power value. The set value is stored in memory and is applied when the laser STATE is toggled ON.

## 8.2 Toggling the laser ON/OFF

To toggle the laser in a specific channel of the LASER instrument **ON** or **OFF**, click the **STATE** button.

The screenshot displays the control interface for the LASER-1203 instrument. On the left is a dark purple sidebar with navigation options: HOME, MODULES, SETTINGS, Large Format, and INFO. The main area is titled 'LASER-1203' and is divided into two panels: CHANNEL 1 and CHANNEL 2. Each channel panel contains a list of parameters: STATE, FREQUENCY, FINE TUNE OFFSET, and POWER. Channel 1 has its STATE button set to 'ON' (indicated by a red circle with a white triangle), while Channel 2's STATE button is 'OFF' (indicated by a grey circle with a white triangle). The frequency and power values are shown in red text, with the actual values below the set values.

Channel	STATE	FREQUENCY (THz)	FINE TUNE OFFSET (THz)	POWER (dBm)
CHANNEL 1	ON	193.414500 THz (Set: 193.414500 THz)	0.000000 THz	5.00 dBm (Actual: 5.00 dBm)
CHANNEL 2	OFF	191.100000 THz (Set: 191.100000 THz)	0.000000 THz	-99.00 dBm (Actual: 10.00 dBm)

In the above example the laser in CHANNEL 1 has been set to 193.4145 THz, 5.00 dBm of output power and STATE has been toggled ON.

After toggling the STATE button from OFF to ON, the Laser product will take up to 30 seconds to stabilise its power and frequency. CohesionUI will be unresponsive during this time.

## 9 Controlling your LASER with SCPI commands

Remote communication with the CohesionSCPI service is achieved through the Standard Commands for Programmable Instruments (SCPI).

Support for VISA I/O API over TCP/IP is provided by the VXI-11 compliant CohesionSCPI service. With VISA communication drivers installed on the client, the implementation of VISA programming within environments such as MATLAB becomes available.

This section details the programming and measurement conventions to follow while executing the commands for the CohesionSCPI service.

### NOTE

In NI-MAX a RIO interface will show up, however there are no communication methods available or implemented on this interface. Quantifi Photonics products are **ONLY** accessible through the **VISA TCPIP INSTR** interface provided by the CohesionSCPI service installed on the system.

### 9.1 Overview

You can operate your LASER instrument using SCPI commands.

For details on available SCPI commands, refer to:

- [Command summary](#)
- [Command descriptions](#)

### 9.2 Programming conventions

This section details the programming and measurement conventions to follow while executing the commands for the CohesionSCPI service.

Parameter	Default Unit	Alternative Units
Power	DBM	DBM
Frequency	HZ	THZ, GHZ, MHZ, KHZ
Frequency Fine	HZ	THZ, GHZ, MHZ, KHZ
Wavelength	M	NM, PM

Argument	Data Format
<wsp>	Specifies whitespace character (01 <sub>16</sub> – 09 <sub>16</sub> , 0B <sub>16</sub> – 20 <sub>16</sub> )
<value>	Is numerical data, an integer, a decimal, exponential (10e-9 or 5.8e6) or string
[VALUE1   VALUE2]	A parameter choice. The ‘ ’ separates the unique parameters available, only one of the choices can be used. In the example, either the input parameter [VALUE1] or [VALUE2] can be used, but not both. Some commands may have more than two choices available. This parameter can be omitted where the command has a default defined in the command description.

## 9.2.1 Index addressing of modules (slot, source) and units (channel)

When executing commands, it is almost always necessary to provide the index of a specific module or an index of a specific installed unit.

For the commands that require index values:

Index	Description	Value
<n>		integer 1
<m>	the channel index of a specific unit in the module	integer <1 to 4>

### Message queues

Information is exchanged in the form of messages. These messages are held in input and output queues.

The output queue stores responses to query commands. The CohesionSCPI service transmits any data in the output queue when a read request is received. Unless specified, all output response data is transmitted in ASCII format.

## 9.3 Status and event registers

### 9.3.1 Standard Event Status Register

The Standard Event Status Register (SESR) is modified by the Quantifi Photonics product with the results of the command operations.

Bit	Description
7 (MSB), 6	Not used
5	Is set when a Command Error event has been detected
4	Is set when a command Execution Error has been detected
3	Is set when a Device Dependent Error event has been detected
2	Is set when there a Query Error event has been detected
1	Not used
0 (LSB)	Is set when an Operation Complete event has been generated

### 9.3.2 Standard Event Status Enable Register (Mask)

The Standard Event Status Enable Register (SESR Mask) is used to build the Event Status Bit (ESB) within the Status Byte Register (STB). To ignore any of the events detected and set in the SESR, set the corresponding bit within the SESR Mask to 0. The STB can then be queried and the value of the ESB can be used to determine service request requirements based on the SESR Mask applied.

#### NOTE

The 0 (LSB) value within the SESR Mask is 0.

### 9.3.3 Status Byte Register

The Status Byte Register (STB) is built from all other status registers and masks. This register can be used in queries to determine if an event has been detected and where that event has been detected.

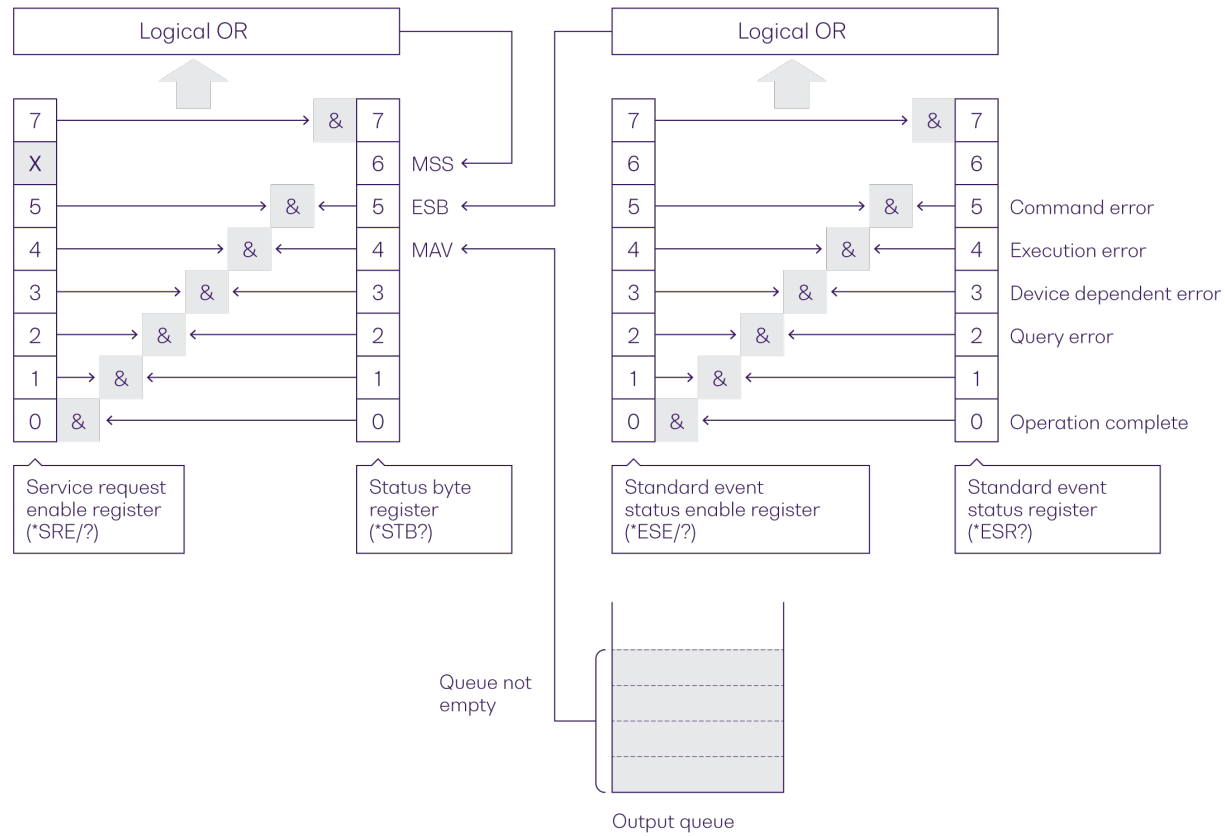
Bit	Description
7 (MSB)	Not used
6	The Master Summary Status (MSS) bit is set from the STB and SRE Mask
5	The Event Status Bit (ESB) is set from the SESR and the SESR Mask
4	Message Available (MAV) is set when there is data in the output queue
3, 2, 1, 0 (LSB)	Not used

### 9.3.4 Service Request Enable Register (Mask)

The Standard Request Enable Register (SRE Mask) is used to build the Master Summary Status Bit (MSS) within the Status Byte Register (STB). To ignore any of the events detected and set in the STB register itself, set the corresponding bit within the SRE Mask to 0. The STB can then be queried and the value of the MSS can be used to determine the type of service request required based on the SRE Mask applied.

Bit	Description
7 (MSB)	Not used
6	The Master Summary Status (MSS) bit is set from the STB and SRE Mask
5	The Event Status Bit (ESB) is set from the SESR and the SESR Mask
4	Message Available (MAV) is set when there is data in the output queue
3, 2, 1, 0 (LSB)	Not used

### 9.3.5 Status and event registers diagram



## 9.4 Command summary

### 9.4.1 Common commands

Command	Description
*IDN?	Query the instrument identification >>
*CLS	Clear session message queues >>
*OPT?	Query the modules installed in the instrument >>
*OPC?	Query the Operation Complete Status >>
*ESR?	Query the Standard Event Status Register >>

### 9.4.2 Slot commands

Slot commands	Description
:SLOT<n>	
:OPC?	Query the Operation Complete Status of the module >>
:OPTions?	Query installed modules >>
:IDN?	Query the module identification >>

### 9.4.3 Configuration commands

Configuration commands	Description
:OUTPut<n>	
:CHANnel<m>	
:STATE?	Query the optical output state of the laser >>
:STATE	Set the optical output state of the laser >>
:SOURce<n>	
:CHANnel<m>	
:POWer?	Query the laser output power >>
:POWer	Set the laser output power >>
:WAVelength?	Query the laser wavelength >>
:WAVelength	Set the laser wavelength >>
:FREQuency?	Query the laser frequency >>
:FREQuency	Set the laser frequency >>
:TEMPerature?	Query the laser temperature >>

## 9.5 Command descriptions

### 9.5.1 Common commands

Command	*IDN?	Summary >>
Syntax	*IDN?	
Description	Query the instrument identification	
Parameters	N/A	
Response	Comma separated string with the <manufacturer>,<server name>,<chassis controller name>,<server version>	
Example	*IDN? -> Quantifi Photonics Ltd,CohesionSCPI,ARCTURUS,SW3.02.11.00	

Command	*CLS	Summary >>
Syntax	*CLS	
Description	Clear session message queues	
Parameters	N/A	
Response	N/A	
Example	*CLS	

Command	*OPT?	Summary >>
Syntax	*OPT?	
Description	Query the modules installed in the instrument	
Parameters	N/A	
Response	Comma separated string of the installed modules in the chassis	
Example	*OPT? -> ,LASER-2001-1-FA-PXIE,SWITCH-1003-1-FC-PXIE,,VOA-1001-2-FA-PXIE,,,,O2E-1001-1-FC-PXIE,,,,,,,,	

Command	*OPC?	Summary >>
Syntax	*OPC?	
Description	Query the Operation Complete Status	
Parameters		
Response	<b>1</b> : all modules installed in the chassis are ready to execute commands <b>0</b> : modules installed in the chassis still have commands to execute in the input queue NOTE: Any commands sent to the module when :MODULE<slot>:OPC? is NOT equal 1, may not execute or return an error.	
Example	*OPC? -> 1	



Command	*ESR?	Summary >>	
Syntax	*ESR?		
Description	Query the Standard Event Status Register		
Parameters	N/A		
Response	Unsigned integer 8 bit value for the register <0 to 255>, as a string.		
	Bit	Description	Decimal Value
	7 (MSB)	Not used	0
	6	Not used	0
	5	Command error	32
	4	Command Execution Error	16
	3	Device Dependent Error	8
	2	Not used	0
	1	Not used	0
0 (LSB)	Operation Complete	1	
Example	<pre>*ESR? -&gt; 8 *ESR? -&gt; 32</pre>		

#### NOTE

It is recommended to use the \*ESR? command query after every command that is sent to the device. The \*ESR? query will be able to catch:

- **Device dependent Error** – the device is reporting an error in operation.
- **Execution Error** – SCPI was unable to execute the given command.
- **Command Error** – SCPI was unable to parse the given command, likely due to an incorrect command.

## 9.5.2 Slot commands

Command	:SLOT<n>:OPC?	Summary >>
Syntax	:SLOT<n>:OPC?	
Description	Query the Operation Complete Status of the module	
Parameters	N/A	
Response	<p><b>1</b>: the module is ready to accept a new command</p> <p><b>0</b>: the module is busy performing a previous operation</p> <p>NOTE: Any commands sent to the module when :SLOT&lt;n&gt;:OPC? is NOT 1, may not execute or return an error.</p>	
Description	:SLOT1:OPC? -> 1	

Command	:SLOT<n>:OPTions?	Summary >>
Syntax	:SLOT<n>:OPTions?	
Description	Query installed modules	
Parameters	N/A	
Response	A comma separated array, or a single integer value based on the arguments given	
Example	:SLOT1:OPT? -> 1,1,,	

Command	:SLOT<n>:IDN?	Summary >>
Syntax	:SLOT<n>:IDN?	
Description	Query the module identification	
Parameters	N/A	
Response	<p>A comma-separated string containing "&lt;manufacturer&gt;,&lt;model name&gt;,&lt;serial number&gt;,&lt;hardware version&gt;&lt;firmware version&gt;".</p> <p>Note that the hardware and firmware versions are not comma separated.</p>	
Example	<p>:SLOT1:IDN? -&gt;</p> <p>Quantifi Photonics,LaserPXIe-1002-2-FA,QuantifiPhotonics-192001,HW1.0FW1.021,QP-000000,HW0.00.01FW0.00.01</p>	

### 9.5.3 Configuration Commands

Command	:OUTPut<n>:CHANnel<m>:STATE?	Summary >>
Syntax	:OUTPut<n>:CHANnel<m>:STATE?	
Description	Query the optical output state of the laser	
Parameters	N/A	
Response	Returns the current output state of the laser	
Example	:OUTP1:CHAN1:STATE? -> ON	

#### NOTE

If the laser STATE is ON while setting POWER, WAVelength, FREQuency or FREQuency:FINE, there will be a minimal non-stable output generated during the transition to the new value when the configuration commands are executed.

It is recommended that the **:SLOT<n>:OPC?** command is run after setting any one of these parameters, to ensure the module is ready for the next operation.

Command	:OUTPut<n>:CHANnel<m>:STATE	Summary >>
Syntax	:OUTPut<n>:CHANnel<m>:STATE<wsp> [ON OFF]	
Description	Set the optical output state of the laser	
Parameters	<b>ON</b> : Enable the laser output <b>OFF</b> : Disable the laser output	
Response	N/A	
Example	:OUTP1:CHAN1:STATE ON	

Command	:SOURCE<n>:CHANNEL<m>:POWER?	Summary >>
Syntax	:SOURCE<n>:CHANNEL<m>:POWER?<wsp>[MIN MAX DEF SET ACT ALL]	
Description	Query the laser output power	
Parameters	<b>MIN</b> : Returns the minimum programmable value <b>MAX</b> : Returns the maximum programmable value <b>DEF</b> : Returns the default value <b>SET</b> : Returns the desired set value <b>ACT</b> : Returns the current value (default) <b>ALL</b> : Returns all of the above parameters	
Response	A single value, or a comma-separated array of values	
Example	:SOURCE1:CHAN1:POW? -> 13.00  :SOURCE1:CHAN1:POW? MAX -> 15.00  :SOURCE1:CHAN1:POW? ALL -> 10.00,15.00,10.00,13.00,13.00	
Command	:SOURCE<n>:CHANNEL<m>:POWER	Summary >>
Syntax	:SOURCE<n>:CHANNEL<m>:POWER<wsp><value>	
Description	Set the laser output power	
Parameters	<value>: A valid numerical value which is in the range between the MIN and MAX power values	
Response	N/A	
Example	:SOURCE1:CHAN1:POW 13.00	
Command	:SOURCE<n>:CHANNEL<m>:WAVELENGTH?	Summary >>
Syntax	:SOURCE<n>:CHANNEL<m>:WAVELENGTH?<wsp>[MIN MAX DEF SET ACT ALL]	
Description	Query the laser wavelength	
Parameters	<b>MIN</b> : Returns the minimum programmable value <b>MAX</b> : Returns the maximum programmable value <b>DEF</b> : Returns the default value <b>SET</b> : Returns the set (default) value <b>ACT</b> : Returns the actual value of the SET wavelength <b>ALL</b> : Returns all of the above parameters	
Response	A single value, or a comma-separated array of values	
Example	:SOURCE1:CHAN1:WAV? -> 1.550116e-06  :SOURCE1:CHAN1:WAV? MAX -> 1.568773e-06  :SOURCE1:CHAN1:WAV? ALL -> 1.527605e-06,1.568773e-06,1.548928e-06,1.550000e-06,1.550116e-06	

Command	:SOURce<n>:CHANnel<m>:WAVelength	Summary >>
Syntax	:SOURce<n>:CHANnel<m>:WAVelength<wsp><value>	
Description	Set the laser wavelength	
Parameters	<value>: A valid numerical value which is in the range between the MIN and MAX wavelength values	
Response	N/A	
Example	:SOUR1:CHAN1:WAV 1.550000e-06	

Command	:SOURce<n>:CHANnel<m>:FREQuency?	Summary >>
Syntax	:SOURce<n>:CHANnel<m>:FREQuency?<wsp>[MIN MAX DEF SET ACT LOCK ALL]	
Description	Query the laser frequency	
Parameters	<b>MIN</b> : Returns the minimum programmable value <b>MAX</b> : Returns the maximum programmable value <b>DEF</b> : Returns the default value <b>SET</b> : Returns the set (default) value <b>ACT</b> : Returns the actual value of the SET wavelength <b>LOCK</b> : Queries whether the laser is currently at the SET frequency <b>ALL</b> : Returns all of the above parameters	
Response	A single value, or a comma-separated array of values  The LOCK parameter will return as TRUE or FALSE.	
Example	:SOUR1:CHAN1:FREQ? -> 1.92000000e+14  :SOUR1:CHAN1:FREQ? MAX -> 1.96249984e+14  :SOUR1:CHAN1:FREQ? ALL -> 1.91099960e+14,1.96249984e+14,1.93548387e+14,1.92000000e+14,1.92000000e+14,FALSE	

#### NOTE

You may use the **:SOURce<n>:CHANnel<m>:FREQuency? ACT** command to get the actual operating frequency of the laser, which includes the channel frequency as well as the fine-tuned frequency.

Command	:SOURce<n>:CHANnel<m>:FREQuency	Summary >>
Syntax	:SOURce<n>:CHANnel<m>:FREQuency<wsp><value>	
Description	Set the laser frequency	
Parameters	<value>: A valid numerical value which is in the range between the MIN and MAX frequency values	
Response	N/A	
Example	:SOUR1:CHAN1:FREQ 1.92e+14	

Command	:SOURce<n>:CHANnel<m>:TEMPerature?	Summary >>
Syntax	:SOURce<n>:CHANnel<m>:TEMPerature?	
Description	Query the laser temperature	
Parameters	N/A	
Response	Temperature in Celsius	
Example	:SOUR1:CHAN1:TEMP? -> 49.99000168	

## 9.6 Programming examples

The following is a simple example of how to control the LASER 1200 Series using SCPI commands. See the previous section for specific details and extra parameters that the listed commands accept.

**After any command, it is recommended to query the \*ESR? command.** This will allow debugging of unreceived or incorrect commands that were sent to the product.

```
#Identifying the LASER product
:*IDN?                               #Query to confirm the correct instrument is setup
:*OPT?                               #Query the available instrument module configuration
:SLOT1:IDN?                          #Query the identification information for a specific module

#Configurig the LASER product
:SOURce1:CHANnel1:POWer 10 DBM       #Set the laser output power to 10 dBm
:SOURce1:CHANnel1:FREQuency 193.4145 THZ #Set the Laser frequency to 193.4145 THz (1550 nm)
:OUTPut1:CHANnel1:STATE ON          #Turn the laser ON

#Querying the Laser product configuration values
:SOURce1:CHANnel1:POWer?             #Query the laser actual power
:SOURce1:CHANnel1:FREQuency?        #Query the laser set frequency
```

After setting the Laser STATE to ON, **allow 30 seconds for the laser power and frequency to stabilize and reach the set point.** Any POWER or FREQUENCY (WAVELENGTH) queries during this time may return incorrect information.

## 10 Programming examples and applications

Remote communication with the CohesionSCPI service is achieved through the Standard Commands for Programmable Instruments (SCPI). Support for VISA I/O API over TCP/IP is provided by the VXI-11 compliant CohesionSCPI service. With VISA communication drivers installed on the client, the implementation of VISA programming within environments such as MATLAB becomes available.

### NOTE

In NI-MAX a RIO interface will show up, however there are no communication methods available or implemented on this interface.

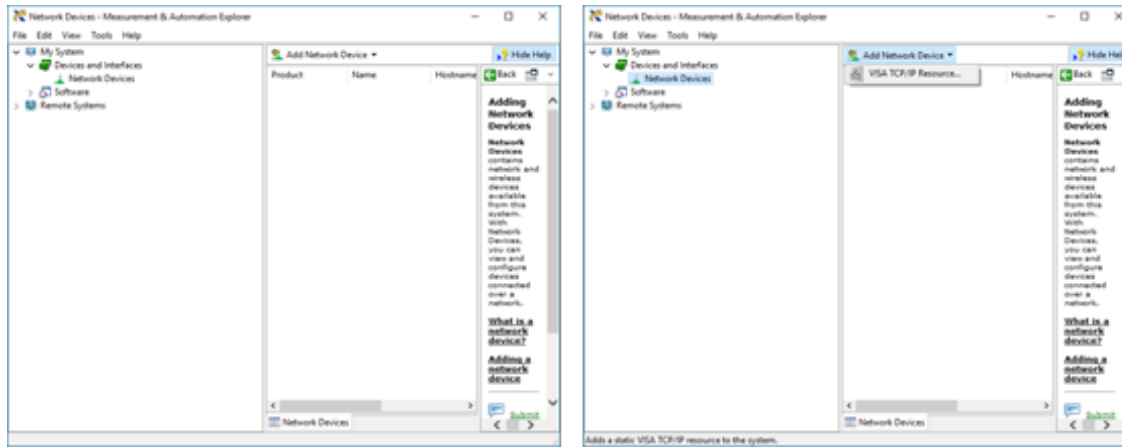
Quantifi Photonics products are **ONLY** accessible through the **VISA TCPIP INSTR** interface provided by the CohesionSCPI service installed on the system.



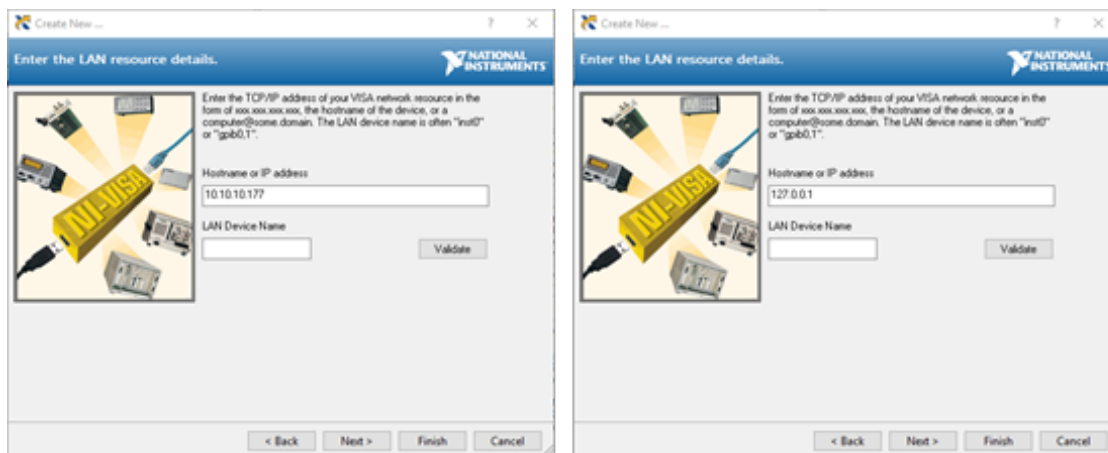
## 10.1 Setting up NI-MAX application

To communicate with any Quantifi Photonics product, the chassis / benchtop product 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**.



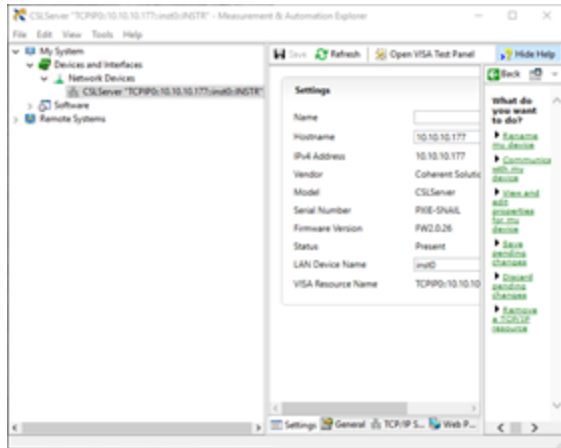
3. Select **Manual Entry of LAN Instrument**. Enter in the Hostname or IP Address. Note when operating locally, enter in the localhost IP address of **127.0.0.1**. Click **Finish** to end the setup process.



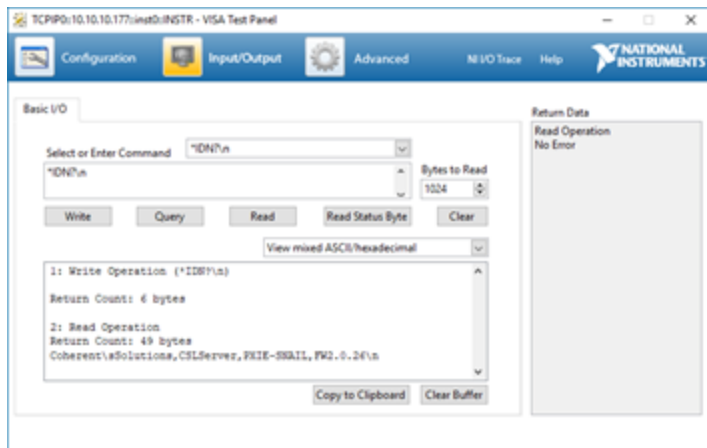
## 10.2 Setting up NI-VISA application

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 right-hand 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



## 10.3 Python® 2.7 code example

The following example shows how to communicate with the Quantifi Photonics product using Python code.

```
# 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))
```

## 10.4 MATLAB® code example

To communicate with the 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 MatriQ Platform, 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.

### NOTE

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 MatriQ instrument using MATLAB code.

```
% 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.
```

## 10.5 SCPI Command Console

The SCPI Command Console enables you to communicate with Quantifi Photonics devices via SCPI commands. You can easily test commands and verify their syntax.

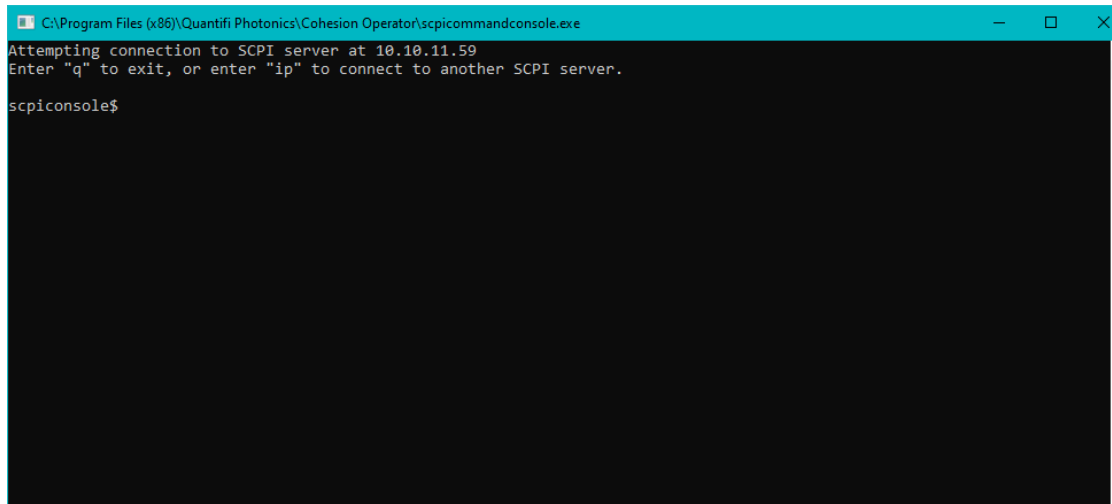
For available SCPI commands, refer to the user manual of the Quantifi Photonics device you are communicating with.

The two most common error codes are:

**17: IO writer error:** The command was invalid or not accepted by the instrument.

**15: IO timeout:** there was no response available before expiry of the reading wait time.

- ▶ To open the SCPI Command Console:
  - > Open the Cohesion Operator, for example by double-clicking the **Cohesion Operator** desktop icon.
  - > Select the instrument by entering its **IP address** or by selecting it from the **Discovery** drop down list.
  - > Click **Open SCPI Command Console**.



```
C:\Program Files (x86)\Quantifi Photonics\Cohesion Operator\scpicommandconsole.exe
Attempting connection to SCPI server at 10.10.11.59
Enter "q" to exit, or enter "ip" to connect to another SCPI server.
scpicommandconsole$
```

1. To verify that you are communicating with the right device:

- > Enter `*idn?` and press **<ENTER>**.
- > The device will return identification details.

2. To switch to another Quantifi Photonics device:

- > Enter `ip` and press **<ENTER>**.
- > Enter the IP address of the Quantifi Photonics product you would like to switch to and press **<ENTER>**.
- > Confirm that you are communicating with the right product: Enter `*idn?` and press **<ENTER>**.  
The device will return identification details

3. To send a command or query to a Quantifi Photonics device:

- > Enter a command and press **<ENTER>**.
- > The device will execute the command and return an action response to the console if applicable.

4. To exit the SCPI Command Console:

- > Enter `q` and press **<ENTER>**.

Example: Send instrument identification query `*idn?`

5. Enter the command: `*idn?`

The instrument returns the requested information.

6. If you enter the command incorrectly, for example: `*ind?`

The instrument returns **error code 32**.

For details on error codes, please refer to the `*ESR?` command.

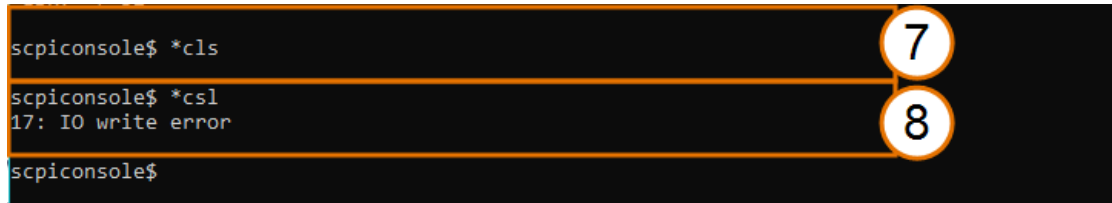
Example: Send a WRITE only command

7. If you enter a command correctly, for example: \*cls

The instrument executes the command, there will be no action response.

8. If you enter a command incorrectly, for example: \*cs1

The instrument returns **error code 17: IO write error**.



A terminal window with a black background and orange text. The prompt is 'scpiconsole\$'. The first line shows the command '\*cls' being entered. The second line shows the command '\*cs1' being entered, followed by the error message '17: IO write error'. The prompt 'scpiconsole\$' is visible again on the third line. Two orange circles with white numbers '7' and '8' are overlaid on the right side of the terminal, pointing to the first and second lines of input respectively.

```
scpiconsole$ *cls
scpiconsole$ *cs1
17: IO write error
scpiconsole$
```

## 11 Working with optical fibers

Quantifi Photonics products are equipped with high quality optical connectors in compliance with EIA-455-21A standards.

### CAUTION

Keep connectors clean and in good condition to ensure maximum power and to avoid erroneous readings:

- > Always inspect fiber end faces for cleanliness using a fiber inspection probe before inserting them into a port..
- > If required, clean fibers and faces as detailed below.

Quantifi Photonics is not responsible for damage or errors caused by bad fiber cleaning or handling.

### NOTE

To avoid damaging ferrules or fiber faces due to mismatched connectors, always check ports and connector type information before inserting a connector. All Quantifi Photonics units are labeled with connector type information.

- ▶ When connecting a fiber-optic cable to a port:
  1. Visually inspect the fiber end face using a fiber inspection microscope.
  2. If a **connector end face** is dirty:
    - > Wipe the connector end face using a reel-type cleaner and inspect again.
    - > For stubborn hard to clean connectors:
      - Use lint-free fiber-cleaning wipes soaked in a fiber optic cleaning solution.
      - Wipe the connector on the soaked part.
      - Dry the connector by wiping on the dry part of the wipe, or by using a reel-type cleaner.
    - > Repeat the process until connector inspection shows a clean fiber face.
  3. If a **bulkhead inner connector face** is dirty:
    - > Use a pen-type dry cleaner, align the cleaning tip with the port and push the cleaner until you hear the characteristic click. Inspect again.
    - > For stubborn hard to clean bulkhead connectors:
      - Use a stick-type cleaner dipped in a fiber optic cleaning solution.
      - Carefully align and insert the stick into the connector and gently rotate the stick for several seconds applying light pressure.
      - Use a pen-type cleaner to dry the connector.
    - > Repeat the process until connector inspection shows a clean fiber face.
  4. If the fiber end face is clean:
    - > Carefully align the connector and port to prevent the fiber end from touching the outside of the port or other surfaces. If the connector features a key, mate it correctly into the corresponding notch of the port bulkhead.



- > Push the connector in so that the fiber-optic cable is firmly in place with adequate contact. If your connector features a screw sleeve, tighten the connector to firmly maintain the fiber in place. Do not over-tighten, as this will damage the fiber and the port bulkhead.

**NOTE**

Failing to align and/or connect fiber-optic cables properly will result in significant signal loss and reflection.

## 12 System requirements

### Quantifi Photonics PXIe modules

Supported browsers for working with CohesionUI	Google Chrome™ Microsoft Edge®
Chassis	PXIe-compatible chassis that <ul style="list-style-type: none"><li>• supports PXIe, or</li><li>• contains PXI hybrid compatible slots</li></ul>
Recommended PXIe controller operating system	Microsoft Windows® 10 (64-bit)

### Quantifi Photonics MATRIQ / EPIQ instruments

Supported browsers for working with CohesionUI	Google Chrome™ Microsoft Edge®
Recommended client computer operating system	Microsoft Windows® 10 (64-bit)

## 13 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dust.
- Store the unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, power off the chassis immediately. Remove the unit and allow to dry completely.
- To allow for sufficient air flow and avoid thermal issues, set up your instrument with a minimum clearance of 2 inches (50.8mm) around it and do not block any ventilation fans.



### **WARNING**

The use of controls, adjustments, and procedures other than those specified herein may result in exposure to hazardous situations or impair the protection provided by this unit.

### 13.1 Annual calibration schedule

To ensure that the unit is performing as expected, we recommend it is re-calibrated every 12 months. As an optical product will naturally degrade over time, it is important to periodically re-test the unit, to confirm that it is working to specification.

All Quantifi Photonics products are calibrated during manufacture, and each product is shipped to the customer with a Calibration Certificate. On this certificate, the calibration date, as well as the next calibration due date are mentioned.

We recommend your product is returned for re-calibration before the listed due date, to ensure continued performance of the product. For re-calibration service information, or to send in a product for re-calibration service, email [support@quantifiphotonics.com](mailto:support@quantifiphotonics.com).

If the Calibration Certificate has been misplaced, or the calibration due date is not known, email [support@quantifiphotonics.com](mailto:support@quantifiphotonics.com).

## 14 Technical Support

### 14.1 Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact Quantifi Photonics:

support@quantifiphotonics.com

To accelerate the process, please provide information such as the name and the serial number (see the product identification label), as well as a description of your problem.

### 14.2 Transportation

Maintain a temperature range within specifications when transporting the unit.

#### **Transportation damage can occur from improper handling.**

The following steps are recommended to minimize the possibility of damage:

- Pack the product in its original packing material when shipping. If the original packaging is unavailable, use appropriate foam packaging to provide shock absorption and avoid displacement of the product inside the shipping box. Please avoid any shipping material making contact with the sensitive connectors of the product.
- Avoid high humidity or large temperature fluctuations.
- Keep the product out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

## 15 Warranty Information

### 15.1 General information

Quantifi Photonics Ltd (Quantifi Photonics) warrants from the date of the original shipment (the Warranty Period) that this product will conform to specifications and will be free from defects in material and workmanship for the applicable Warranty Period. Quantifi Photonics also warrants that the equipment will meet applicable specifications under normal use.

#### NOTE

The warranty can become null and void if:

- The unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-Quantifi Photonics personnel.
- The warranty sticker has been removed.
- The unit has been opened, other than as explained in this guide.
- The unit serial number has been altered, erased, or removed.
- The unit has been misused, neglected, or damaged by accident.
- The unit has been used with an external power supply not supplied by Quantifi Photonics with the unit.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL QUANTIFI PHOTONICS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

For full warranty terms and conditions, please visit [www.quantifiphotonics.com](http://www.quantifiphotonics.com).

### 15.2 Liability

Quantifi Photonics shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

Quantifi Photonics shall not be liable for damages resulting from improper usage, transportation or unauthorized modification of the product, its accompanying accessories and software.

The external power supply that has been supplied by Quantifi Photonics with the unit can only be used with that unit, do not use it with any other product.

### **15.3 Exclusions**

Quantifi Photonics reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with Quantifi Photonics products are not covered by this warranty.

This warranty excludes failure resulting from: Improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of Quantifi Photonics.

### **15.4 Certification**

Quantifi Photonics certifies that this equipment met its published specifications at the time of shipment from the factory.

### **15.5 Service and repairs**

To send any equipment for service, repair or calibration please contact the Technical Support Group: [support@quantifiphotonics.com](mailto:support@quantifiphotonics.com).

# Test. Measure. Solve.

Quantifi Photonics is transforming the world of photonics test and measurement. Our portfolio of optical and electrical test instruments is rapidly expanding to meet the needs of engineers and scientists around the globe. From enabling ground-breaking experiments to driving highly efficient production testing, you'll find us working with customers to solve complex problems with optimal solutions.

To find out more, get in touch with us today.

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