

Power

1600 SERIES INLINE POWER METER

PXIE USER MANUAL



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1 Conventions

Before using the instruments described in this document, 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 module that you should not overlook.

NOTE

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

2 Safety information

Before using the Power 1600 Series PXle, ensure that the following safety information has been read and understood.

2.1 Optical laser radiation precautions

WARNING

Do not install or terminate fibers while the light source is active. Care must be taken to ensure that the module has been **turned OFF before inspecting the end face(s) of the instrument, or any optical patch cords** connected to this module. Never look directly into a live fiber; ensure that your eyes are protected at all times.

CAUTION

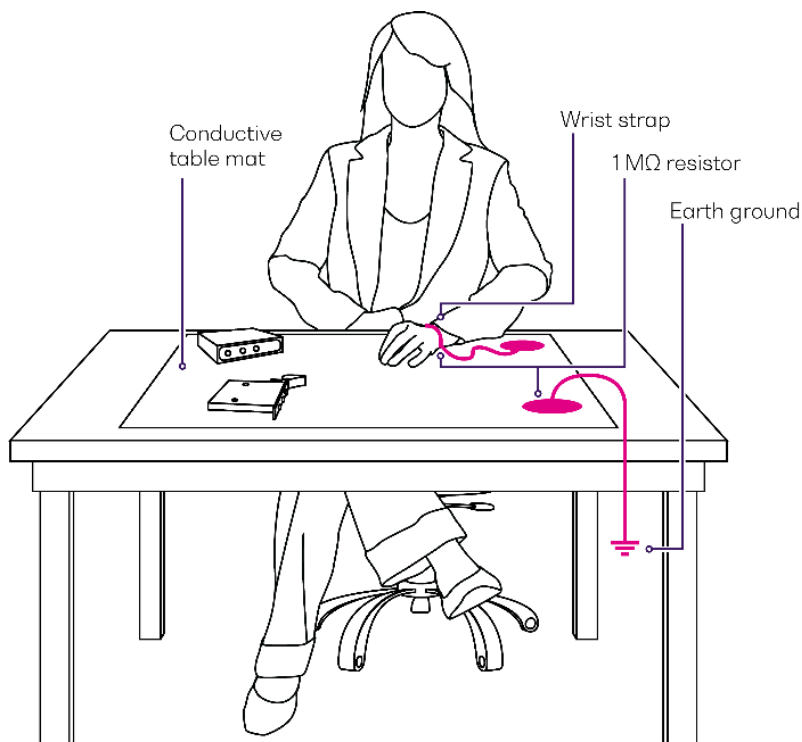
The use of controls, adjustments, and procedures other than those specified herein may result in exposure to hazardous situations involving optical radiation.

2.2 Electrostatic discharge precautions

CAUTION


The Power PXle is sensitive to electrostatic discharge (ESD). Store the unused module in the original protective electrostatic packaging that the Power PXle was shipped in.

Ensure that a wrist strap and grounding table mat is used when unpacking or handling the Power 1600 Series PXle. Proper grounding and ESD management practices should always be followed to ensure that no ESD damage is caused to the Power 1600 Series PXle.



2.3 Electromagnetic compatibility

CAUTION

- For electromagnetic compatibility, this module 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.
- Wherever the  symbol is printed on the unit, refer to the instructions provided in the device documentation for related safety information. Ensure that the required conditions are met and understood before using the module.

3 Connecting optical fibers

CAUTION

To ensure maximum power and to avoid erroneous readings always inspect fiber end faces. Make sure they are cleaned as detailed below before inserting into any port. **Quantifi Photonics is not responsible for damage or errors caused by bad fiber cleaning or handling.**

IMPORTANT

The type of optical connectors on the Power 1600 Series PXle can be found printed on the front plate of the module. **Joining mismatched connectors will damage the ferrules and fibre faces.**

To keep connectors clean and in good condition, Quantifi Photonics strongly recommends inspection with a fiber inspection probe before connecting them. Failure to do so will result in permanent damage to the connectors and degradation of future measurements.

Quantifi Photonics uses high quality connectors in compliance with EIA-455-21A standards.

3.1 Cleaning and connecting optical fibers

To connect the fiber-optic cable to the port:

1. Inspect the fiber using a fiber inspection microscope. If the fiber is clean, proceed to connect it to the desired port.
2. If the fiber is dirty, clean it as detailed below.
3. Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.
4. Use compressed air to dry completely.
5. Visually inspect the fiber end to ensure its cleanliness.
6. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces. If the connector features a key, ensure that it is correctly mated into the corresponding notch of the port bulkhead.
7. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact. If your connector features a screw sleeve, tighten the connector enough to firmly maintain the fiber in place. **Do not over tighten, as this will damage the fiber and the port bulkhead.**

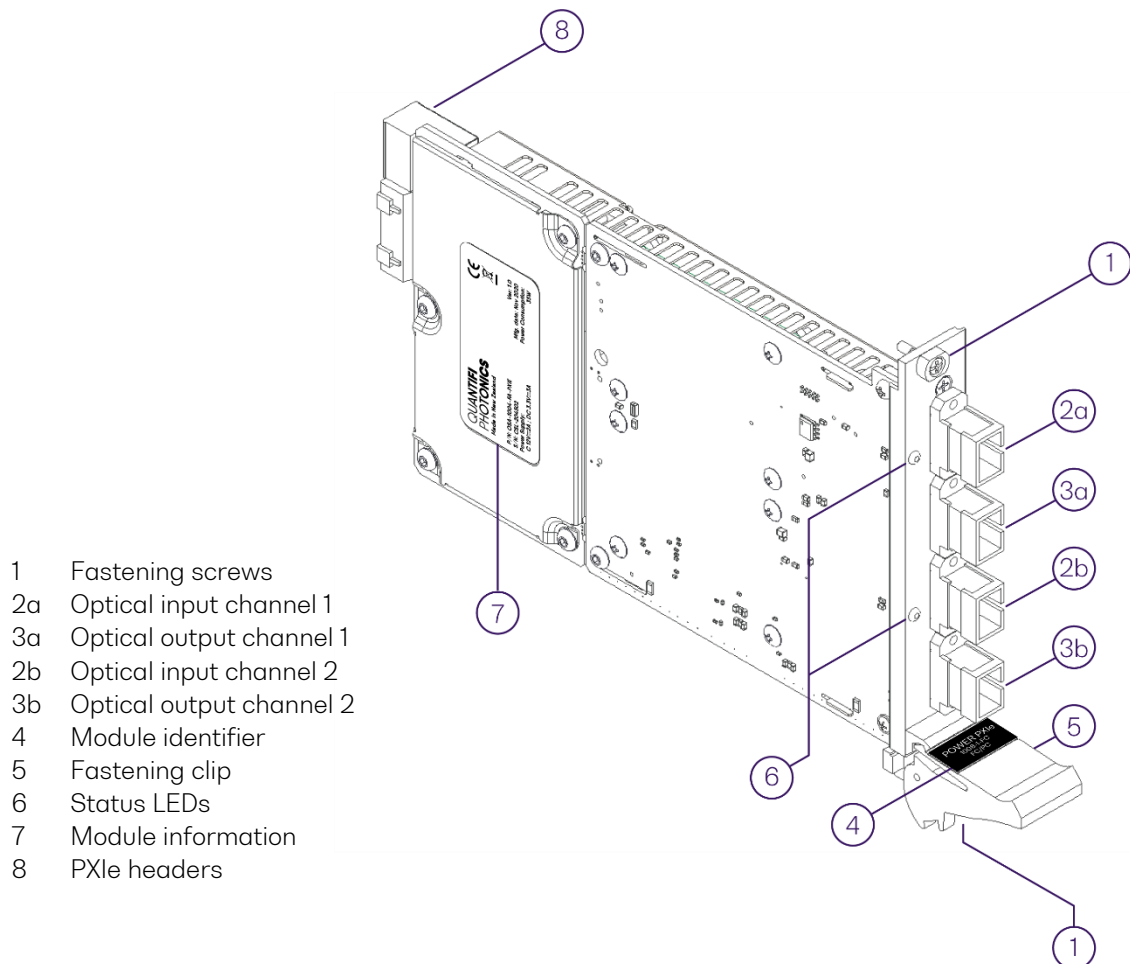
NOTE

If your fiber-optic cable is not properly aligned and/or connected, you will notice large signal loss and reflection.

4 Introducing the Power 1600 Series PXle

The Power 1600 Series PXle module enables cost-effective test and measurement in a compact form factor. It provides quick and accurate inline power monitoring with up to two channels, low insertion loss and suitability for high power measurements (from -50 dBm to +20 dBm).

4.1 Power 1600 Series PXle overview & features



4.2 Status LED

The Status LED is used to denote the operational state of the Power 1600 Series PXle module.

- **Solid red** - Indicates that there is an error during the initialization of the Power PXle module.
- **Blinking red** - Indicates that there is an error, and the module is busy.
- **Solid green** - Indicates that the power meter is operational.
- **Blinking green** - Indicates that the power meter is busy processing commands such as dark-nulling or tracing.

5 Handling the Power 1600 Series PXle

CAUTION

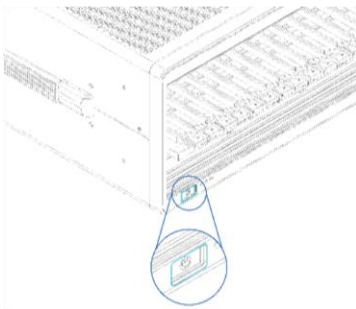
- Do not remove the Power 1600 Series PXle module from the antistatic packaging until instructed during the following installation procedure.
- **The Power PXle is sensitive to ESD. Ensure you are wearing a grounded wrist strap at all times when handling the Power PXle to prevent damage from electrostatic discharge.**
- Take care not to handle the optical connectors on the module, as once they are exposed to skin contact this may leave corrosive residue and damage the connector.

5.1 Power 1600 Series PXle installation

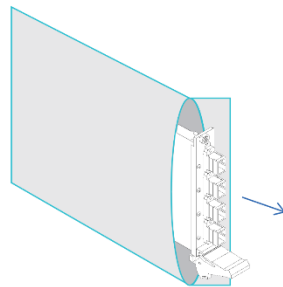
WARNING

DO NOT attempt to remove or adjust any component of the PXle chassis while the power is on. Ensure the chassis is powered OFF, and that the correct handling procedure detailed herein is followed when removing or installing any modules.

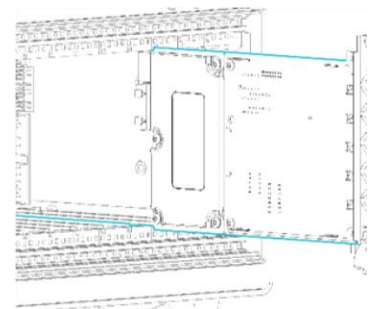
STEP 1: Power OFF the Chassis



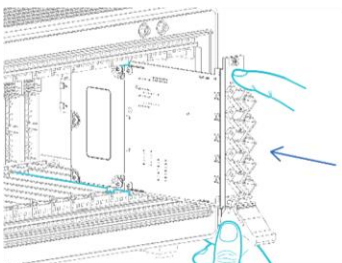
STEP 2: Remove the module from the antistatic bag. Retain bag



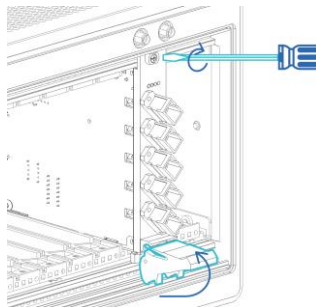
STEP 3: Align module with slot guide rails



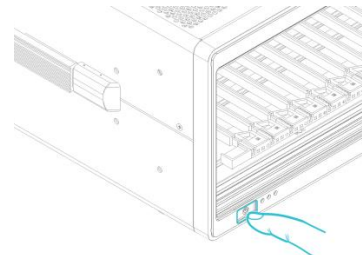
STEP 4: Push module into slot until resistance is felt from the backplane connection



STEP 5: Engage the fastening clip. Secure all fastening screws



STEP 6: Power ON the chassis

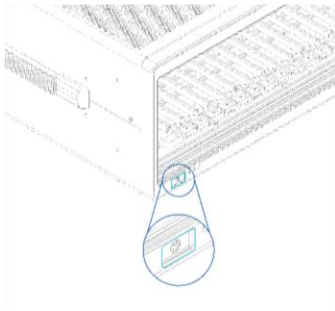


IMPORTANT

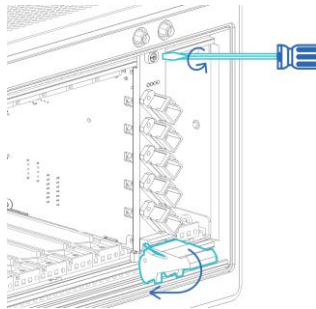
After powering on the PXle chassis, please wait at least **2 minutes** before attempting to communicate with the module. This will allow the chassis enough time to finish boot procedures and initialize the communication server.

5.2 Power 1600 Series PXle uninstallation

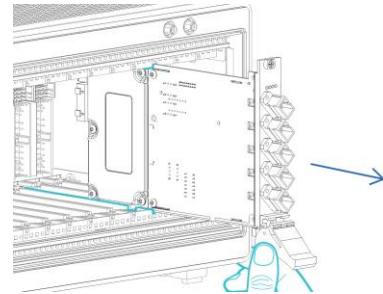
STEP 1: Power OFF the chassis



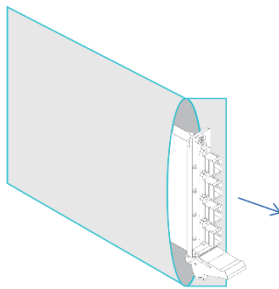
STEP 2: Unsecure the fastening screws and fastening clip



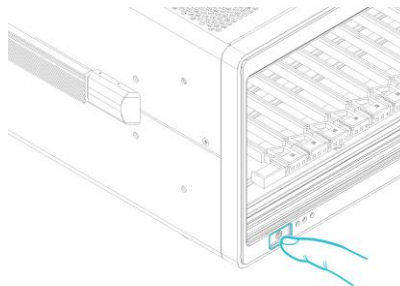
STEP 3: Pull out the module.
USE THE FASTENING CLIP TO PULL. DO NOT PULL ON THE CONNECTORS



STEP 4: Store module in antistatic bag



STEP 5: Power ON the chassis



6 Software installation for Power 1600 Series PXle

6.1 Cohesion Installer information for PXle modules

⚠ IMPORTANT

The software must be installed on the PXle controller for the PXle Chassis in which the Quantifi Photonics modules will be installed, or the controller PC in the case of a MXI setup.

Minimum System Requirements: 64-bit OS, Windows 7 or above.

Recommended System Requirements: 64-bit Windows 10.

The **Cohesion Installer** is a **single installation package** that contains all the required drivers and software, to support and control Quantifi Photonics modules on the PXle Platform.

6.1.1 Installation overview

For the PXle controller to communicate with the Power PXle module installed in the chassis, software and driver installations are necessary. This software is contained in the **Cohesion Installer** single installer package.

- **CohesionDriver:** Drivers for Quantifi Photonics PXle Modules
- **CohesionSCPI:** VXI11 compliant server for remote SCPI communication
- **CohesionUI:** Web-based Graphical User Interface

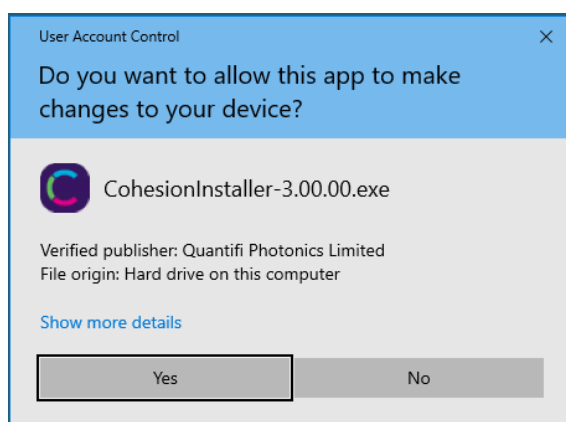
⚠ IMPORTANT

It is recommended that you **save all work and close any open programs** before attempting to install the required software packages above.

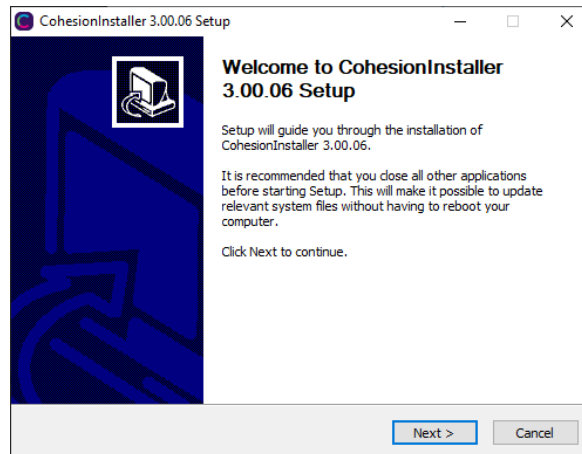
6.1.2 Installation process

Windows 10 64-bit:

1. Locate and run the installer **CohesionInstaller<version_number>.exe** from the provided USB media device (or download from the Quantifi Photonics [website](#)).

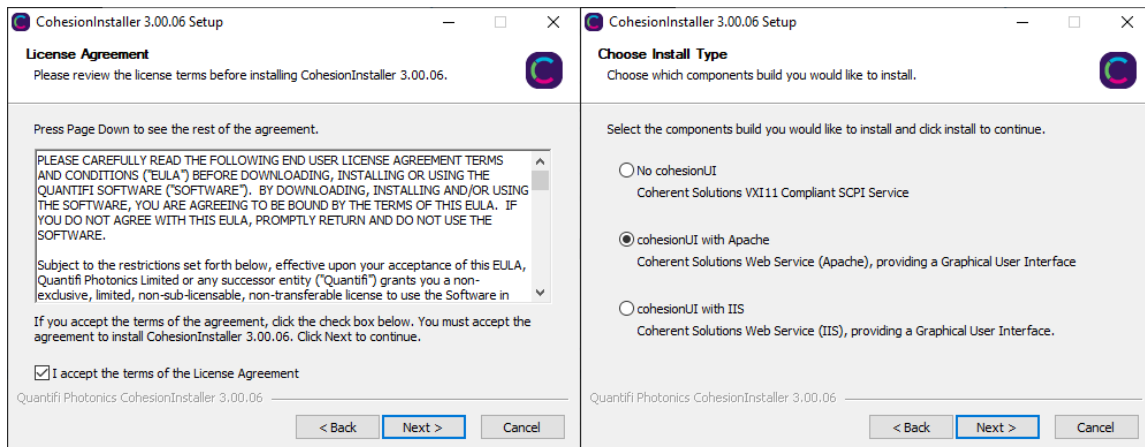


- Follow the on-screen installation prompts.

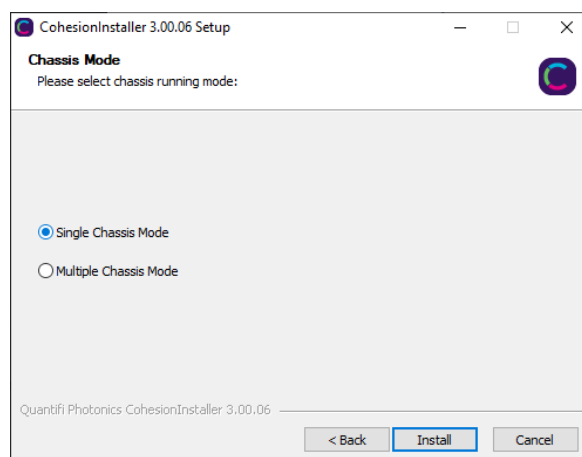


- Continue with the installation by following the on-screen installation prompts.

Choose the default installation type – **CohesionUI with Apache**.



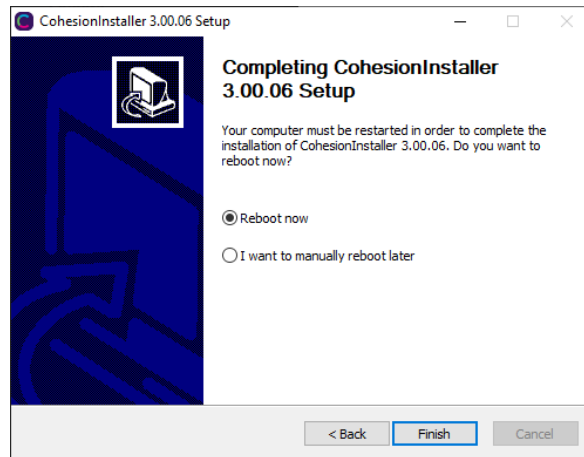
- Installation will continue with the **Chassis Mode** selection. The default setting is **Single Chassis Mode**. If unsure, proceed with the default mode setting.



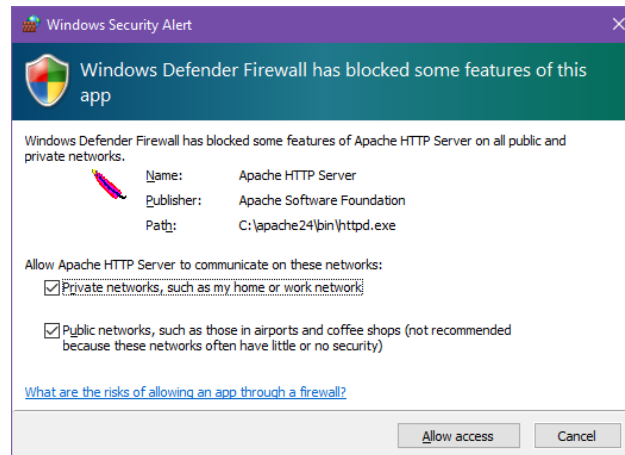
⚠ IMPORTANT

To operate in Multiple Chassis Mode, additional hardware modules are required. The Chassis Mode can be changed at any time, so it is recommended to select **Single Mode** until all other configuration requirements have been met.

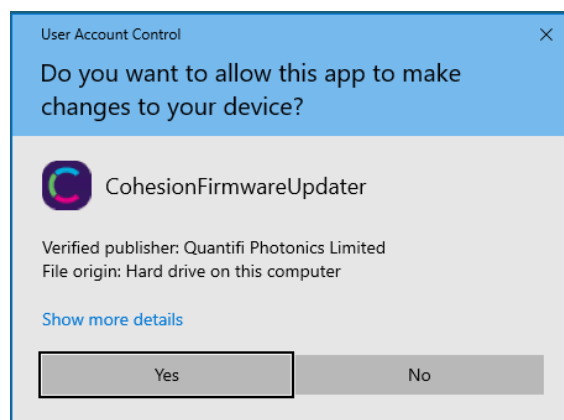
5. At the end of the installation, it is recommended to select the **Reboot now** option, and click **Finish** to complete the installation process.



6. Windows Security Alert may prompt the user for network access. It is recommended that both options be ticked, to allow any network configuration.



7. After rebooting the system, on startup a User Account Control prompt will be displayed to run the Cohesion Firmware Updater Utility. Click **Yes** and proceed with the application.



6.2 Quantifi Photonics PXIe system utility applications

Contained within the **CohesionInstaller** are two utility applications:

- **Cohesion Manager**
- **Cohesion Firmware Updater**

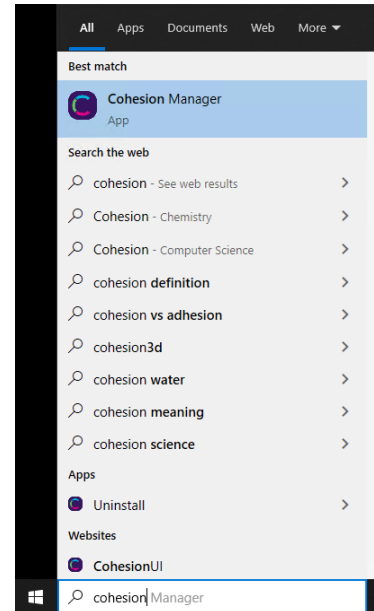
6.2.1 Cohesion Manager utility

The Cohesion Manager utility serves as a single window application to give the user an overview of the status of all the Cohesion Software Services running on the system.

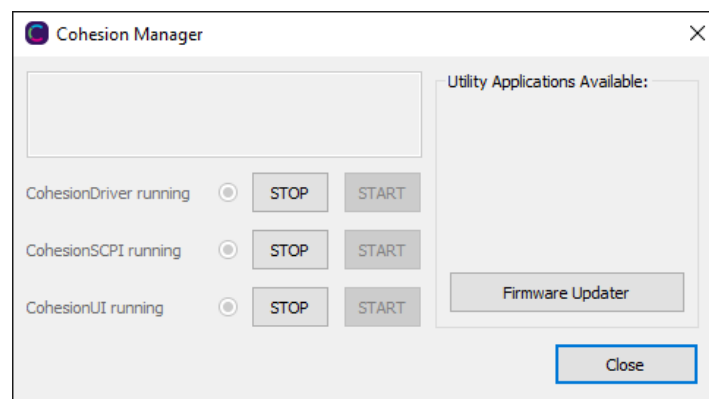
The Cohesion Manager can be accessed via the Windows Start Menu.

Cohesion Manager is designed as a single reference source to check the status of all the running services in one contained window. The utility also allows the user to start or stop the **CohesionDriver service**, **CohesionSCPI service**, or **CohesionUI service** independently.

By default, all these Cohesion Software Services will start automatically on startup of the Windows OS and need to be running to facilitate proper communication with the Quantifi Photonics PXIe modules. If there is an issue in detecting or communicating with the modules, run the Cohesion Manager to check the status of the software services.



- **(Required) CohesionDriver** – The CohesionDriver service which directly manages the installed Quantifi Photonics modules.
- **(Required) CohesionSCPI** – The CohesionSCPI service which is the VXI11 compliant SCPI interface for TCP communication with the installed Quantifi Photonics modules.
- **(Optional) CohesionUI** – An optional web service providing a graphical interface for simplified operation of the installed Quantifi Photonics modules.



⚠ IMPORTANT

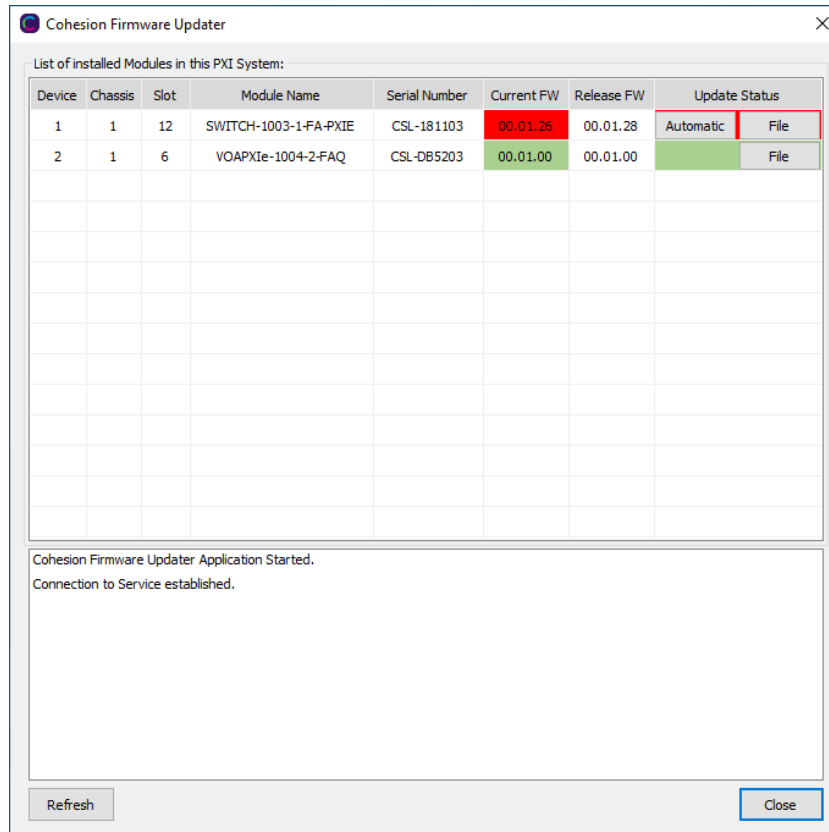
The **Driver and SCPI services** need to be running to facilitate communication with any installed Quantifi Photonics module, **therefore they are listed as REQUIRED**.

On the right side of the Cohesion Manager window a list of all the installed Quantifi Photonics system utilities is displayed.

6.2.2 Cohesion Firmware Updater utility

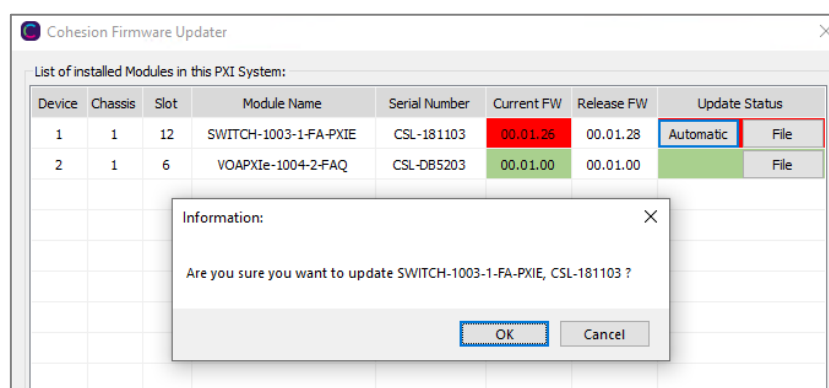
The Cohesion Firmware Updater utility serves as a single window summary application to display the current firmware status of all the Quantifi Photonics PXIe modules installed in the chassis.

The Cohesion Firmware Updater utility can be accessed via the Cohesion Manager application (see section 6.2.1 for more information).

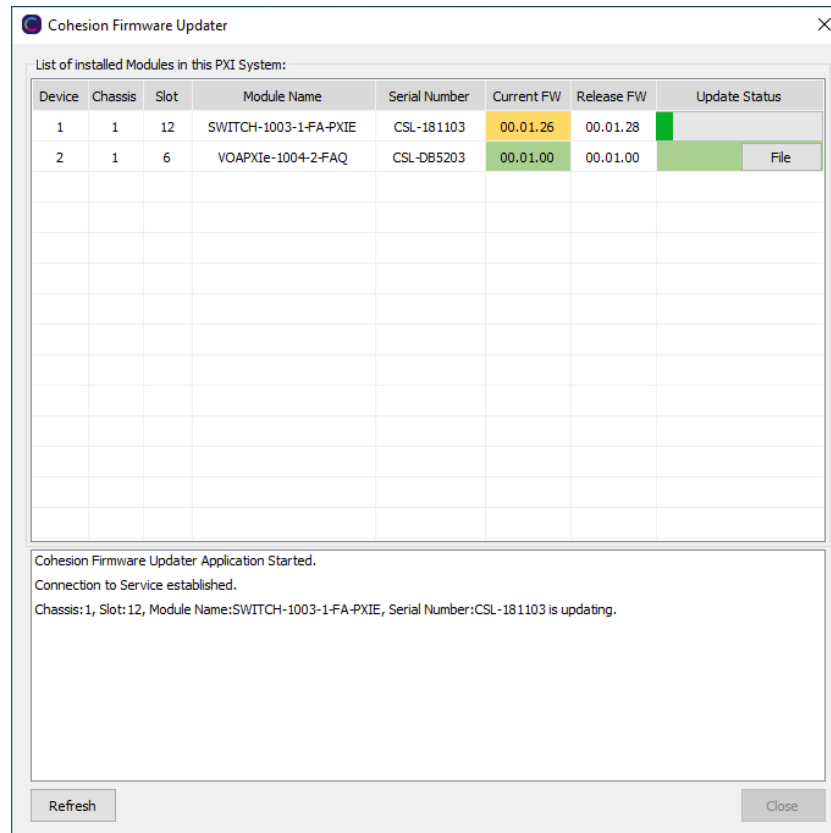


Whenever a new version of the CohesionInstaller is installed on the system, the Cohesion Firmware Updater utility will automatically launch after the system is rebooted. It will show the user the firmware status of all installed Quantifi Photonics modules and allow the user to update the firmware to a new version if applicable.

If a module's firmware is out of date, it is highly recommended to update the firmware to the new available version. Clicking the **Automatic** button will update the module(s) to the latest supported firmware for the installed packages on the system.



After clicking **OK**, the firmware update progress will be shown in the **Update Status** column. The **File** button is reserved for updating a module to a specific firmware version if required.



7 CohesionUI application

CohesionUI is a web-based application that you can use to control any Power 1600 Series PXle module from Quantifi Photonics. Its cutting-edge design offers a sleek modern interface, cross-device compatibility, multi-instrument control, customizable views, and remote access.

7.1 Accessing CohesionUI

To use CohesionUI, you need the IP address of the host chassis, with which you can access the chassis either locally or remotely. For local access, use the embedded PXle controller operating system, and for remote access, use any compatible device that is connected to the PXle chassis via an ethernet connection.

To obtain the IP address, open the **Command Prompt** window on the chassis controller and then run the `ipconfig` command. Note down the IPv4 address that is displayed. For the local IP address, you can use 127.0.0.1 instead.

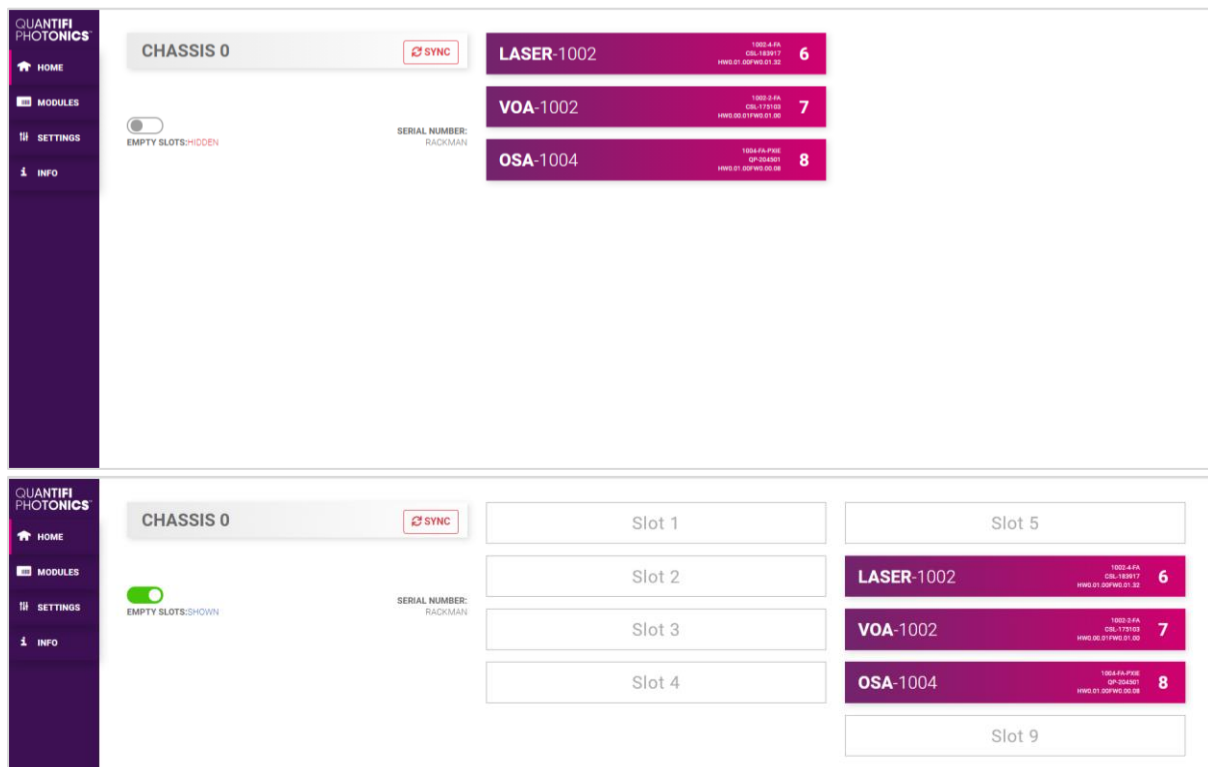
To access CohesionUI locally or remotely, open a compatible browser (Google Chrome or Microsoft Edge) and use the IP address 127.0.0.1 as the URL. Alternatively, you can double-click the desktop icon for CohesionUI or select it from the **Start** menu.



7.2 Home page

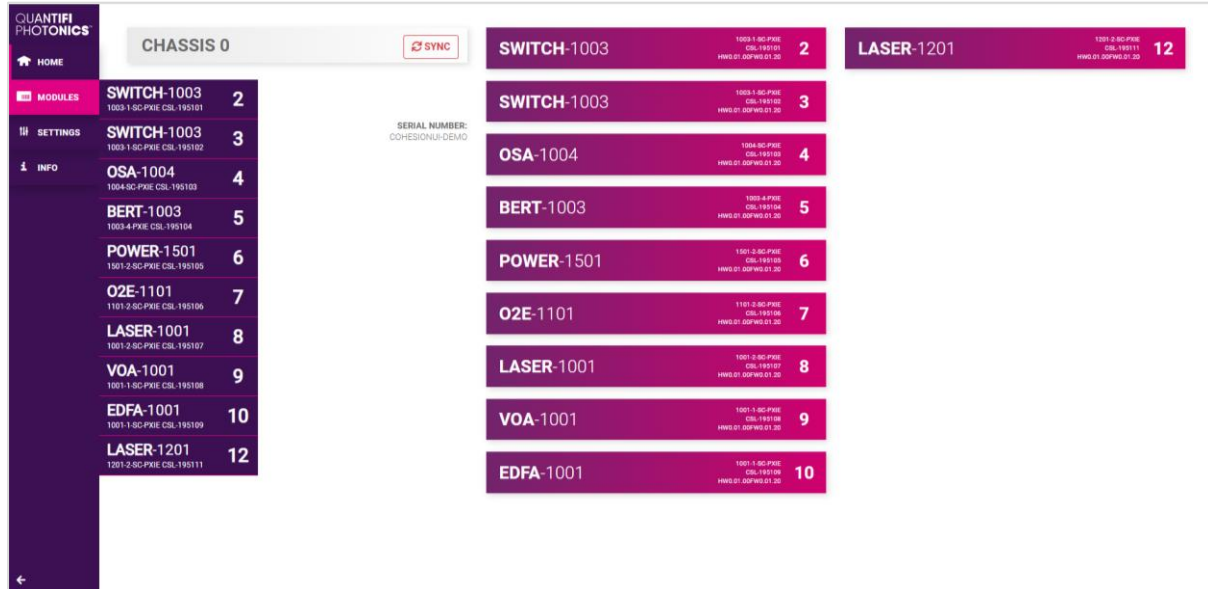
The main landing page in CohesionUI is called the **HOME** page. It displays a graphical representation of the module arrangement in the PXle chassis.

White numbers are displayed beside each module corresponding the slot in which they are installed. The **EMPTY SLOTS** button will toggle the page view to hide (HIDDEN), or to show (SHOWN) the empty slots in the PXle chassis. The default setting is HIDDEN.



7.3 Modules list

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



7.4 Set and actual values

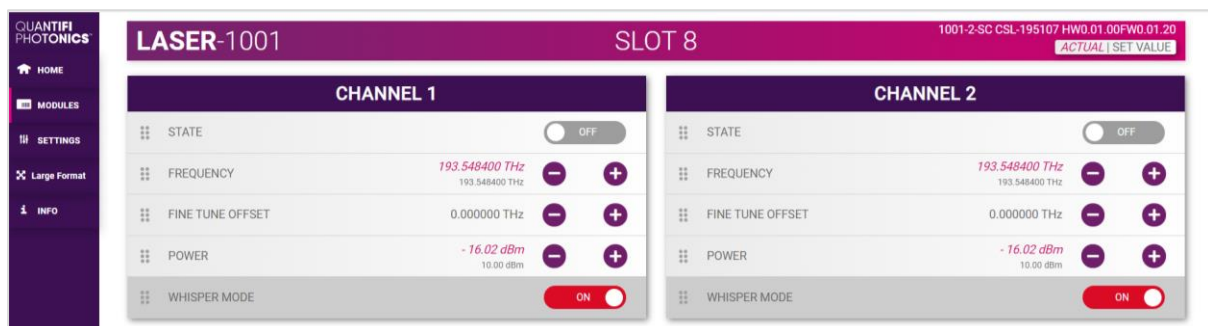
Some Quantifi Photonics products will allow the user to set a given parameter's value and then read that parameter (eg. Laser, VOA, O2E, etc). In order to help the user to distinguish between a set value and an actual read value, CohesionUI will format these values differently according to the legend in the top right corner of the window.

- **ACTUAL**: The actual value of the parameter, defined by querying the module.
- **SET**: The intended value of a given parameter, defined by user input.

In the following example, the POWER is **SET** to 10.00 dBm, but the **ACTUAL** value is **-16.02 dB**. Thus, the user can see both the current and user defined value of a given parameter.

The **SET** and **ACTUAL** values are only displayed for appropriate parameters which require user input.

For parameters that report a value and do not depend on user input, only an **ACTUAL** value is displayed.



7.5 Settings page

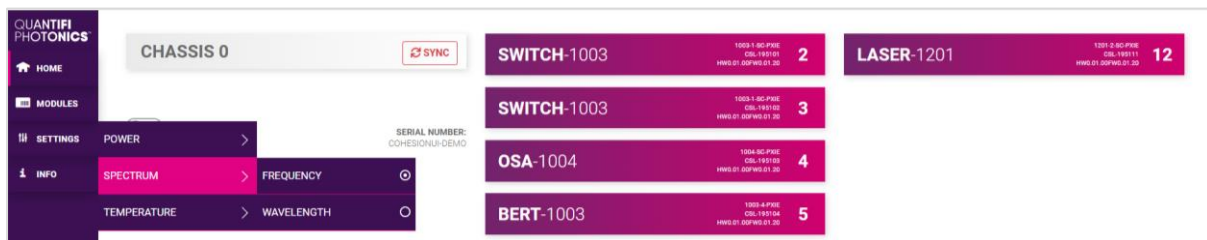
The **SETTINGS** page is used to configure the CohesionUI settings and unit preferences or to synchronize / reinitialize the system. These controls can be accessed by clicking the **SETTINGS** button.

Step size refers to the amount by which the attenuation, frequency, or power is increased or decreased when the + or - button is clicked.



NOTE

- The unit preferences and settings can be set by hovering over the **SETTINGS** button in the left side menu. This will bring up a dropdown menu that lists all settings for a quick access.
- Whenever the chassis is power cycled, CohesionUI reverts to default settings.



7.5.1 System controls for PXIe modules

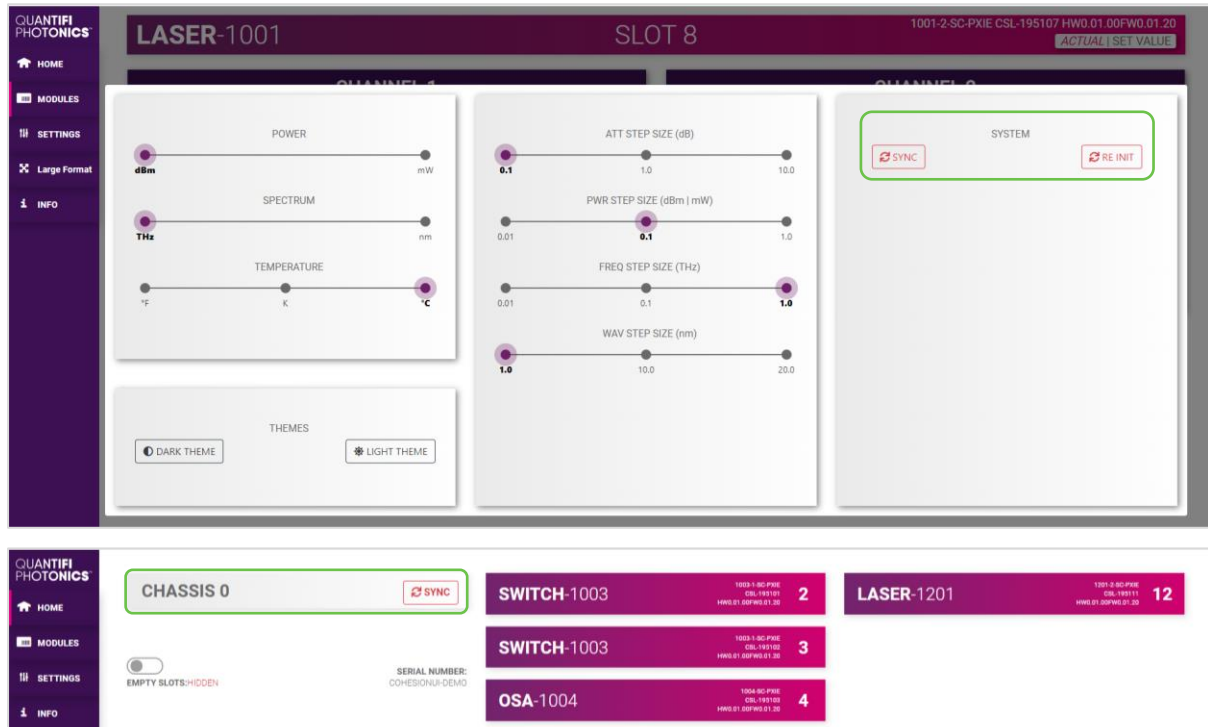
On the SETTINGS window there is a SYSTEM controls section. These controls are to facilitate re-discovery of any Quantifi Photonics PXIe modules there may have been installed after initial startup, or if no modules are displayed in the CohesionUI window. This is useful for users who are operating in a multi-chassis MXI setup, instead of the standard PXIe embedded controller setup.

There are two actions in the SYSTEM controls section:

- SYNC:** Synchronize CohesionUI with the latest information from the CohesionSCPI service.
- RE-INIT:** Re-initialize CohesionUI by synchronizing the CohesionSCPI service with the CohesionDriver service.

The **SYNC** button is also displayed on the **HOME** page beside every chassis in the setup. This allows any chassis to be synchronized independently. After clicking the **SYNC** button,

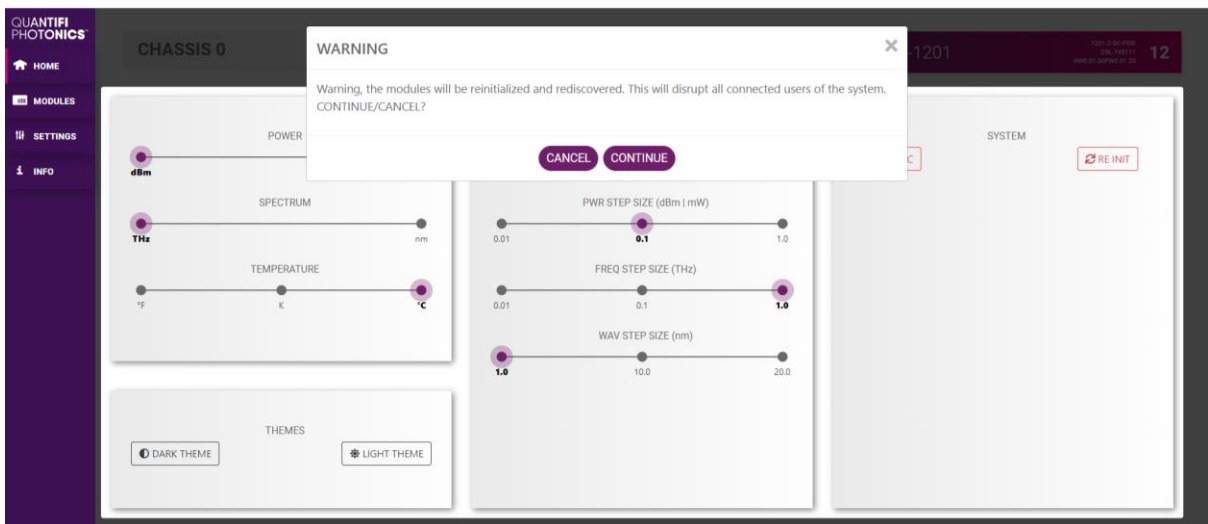
CohesionUI will disable the page while it is synchronizing with the CohesionSCPI service. Once it is complete, the page will be functional again.



Clicking the **RE-INIT** button will bring up a prompt to continue, since this action will temporarily disconnect all modules while the re-initialization with the CohesionDriver service is in progress. Once it is complete, the page will be functional again.

NOTE

The **RE-INIT** action will disconnect any connected users to the PXIe system while the action is being completed. All modules will be disabled during this time.



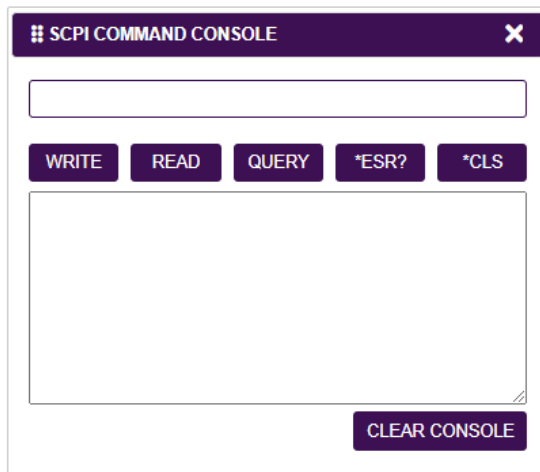
7.6 SCPI Command Console

The CohesionUI SCPI Command Console enables you to communicate with Quantifi Photonics PXI modules via SCPI commands. It enables you to test commands and verify their syntax.

For details on available SCPI commands, refer to the programming guide in this manual.

To open the SCPI Command Console:

- On the CohesionUI menu, click **CONSOLE**.
The console will appear in the bottom right corner.

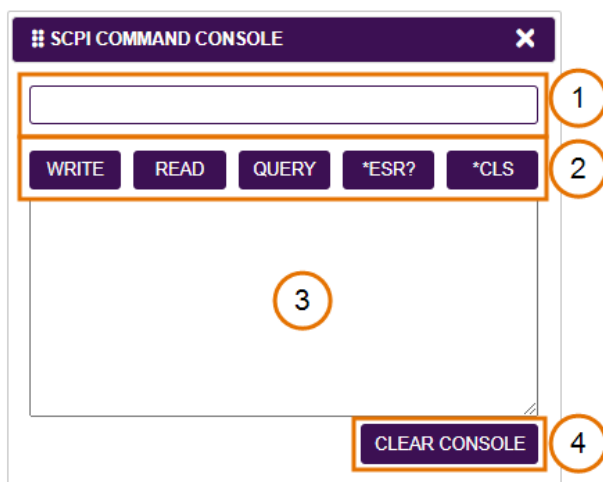


You can move the console by clicking on the title bar and dragging it to any position on the screen. On closing and re-opening, the console will re-appear at its last position.

The console remains open when navigating between different modules. It floats on top of the UI so that you can observe the effect of SCPI commands on a module in real-time.

To communicate with a module via the SCPI Command Console:

1. Enter a command.
2. Select action(s).
3. Review the action response in the output area.
4. (optional) Clear the output area.

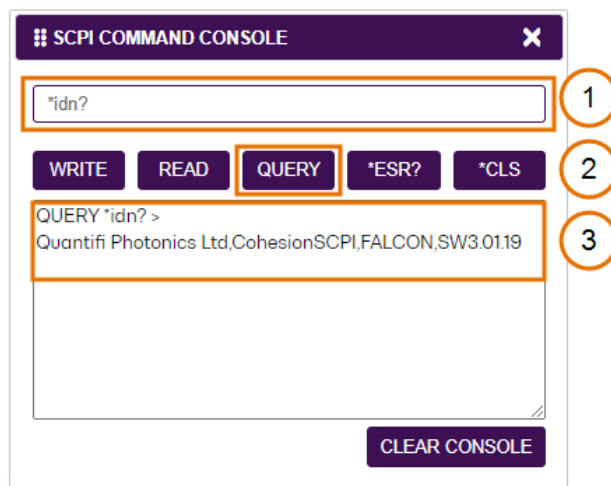


You can choose from these SCPI command actions:

Action	Meaning	FAILED response
WRITE	Send the command to the instrument	The command is invalid. Please check the command and syntax.
READ	(after WRITE) Request the response from the instrument	Response buffer is empty.
QUERY	WRITE and READ	
*ESR?	Query the status event status register (ESR) – this will give you more details and specific information about command failures. For details on error codes, please refer to the programming guide in this manual.	
*CLS	Clear the response buffer and start fresh – useful when getting out of sync with WRITE and READ actions	

Example 1: Send instrument identification query ***idn?**

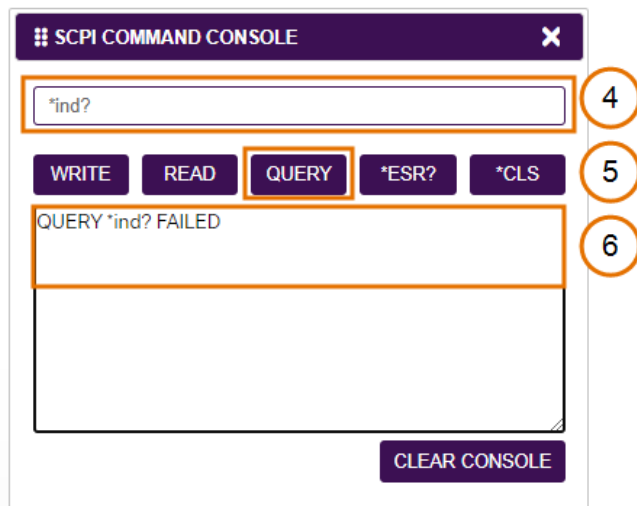
1. Enter the command: ***idn?**
2. Click **QUERY**.
3. The module returns the requested information.



Example 2: What happens when I send an incorrect command?

4. Enter an incorrect command, for example: ***ind?**
5. Click **QUERY**.

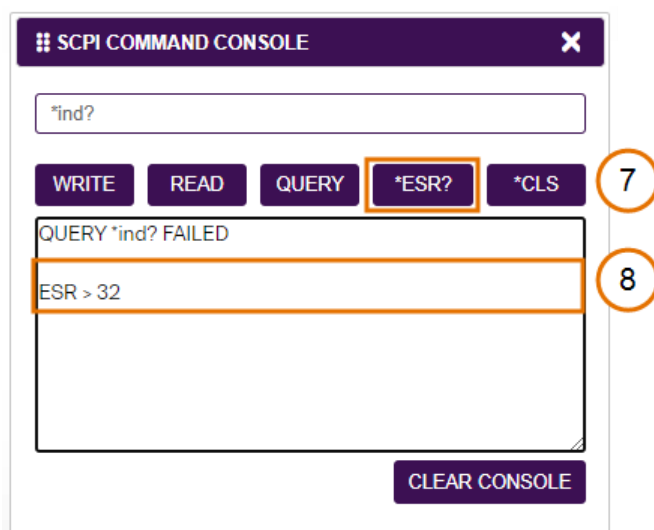
6. The module returns FAILED.



Example 3: Investigate a command failure

7. Click ***ESR?** to query the event status register and request information about the command failure.
8. The instrument returns the error code, for example **32**.

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



7.7 Info panel

Clicking the **INFO** button will display an information panel on the right side of the page. Information such as the chassis operation mode, manufacturer, model, and serial number of the chassis, CohesionUI version number, and the version of CohesionSCPI service running on the chassis is displayed in this panel.

QUANTIFI PHOTONICS

HOME

MODULES

SETTINGS

INFO

CHASSIS 0

EMPTY SLOTS: HIDDEN

SERIAL NUMBER:

COHESIONUI-DEMO

SWITCH-1003

1003-1-80-PXle

CSL-190110

HWVS-01-000HW-01-20

2

SWITCH-1003

1003-1-80-PXle

CSL-190110

HWVS-01-000HW-01-20

3

OSA-1004

1004-4-PXle

CSL-190110

HWVS-01-000HW-01-20

4

BERT-1003

1003-4-PXle

CSL-190110

HWVS-01-000HW-01-20

5

POWER-1501

1001-0-80-PXle

CSL-190110

HWVS-01-000HW-01-20

6

O2E-1101

1101-0-80-PXle

CSL-190110

HWVS-01-000HW-01-20

7

LASER-1001

1001-0-80-PXle

CSL-190110

HWVS-01-000HW-01-20

8

VOA-1001

1001-1-80-PXle

CSL-190110

HWVS-01-000HW-01-20

9

EDFA-1001

1001-1-80-PXle

CSL-190110

HWVS-01-000HW-01-20

10

LASER-1201

COHESIONUI™

COMPANY

QUANTIFI PHOTONICS LTD

MODEL

COHESIONSCRIPT

SERIAL

COHESIONUI-DEMO

UI VERSION

3.00.02

SERVER VERSION

3.00.05

DRIVER VERSION

3.01.04

CHASSIS MODE

SINGLE

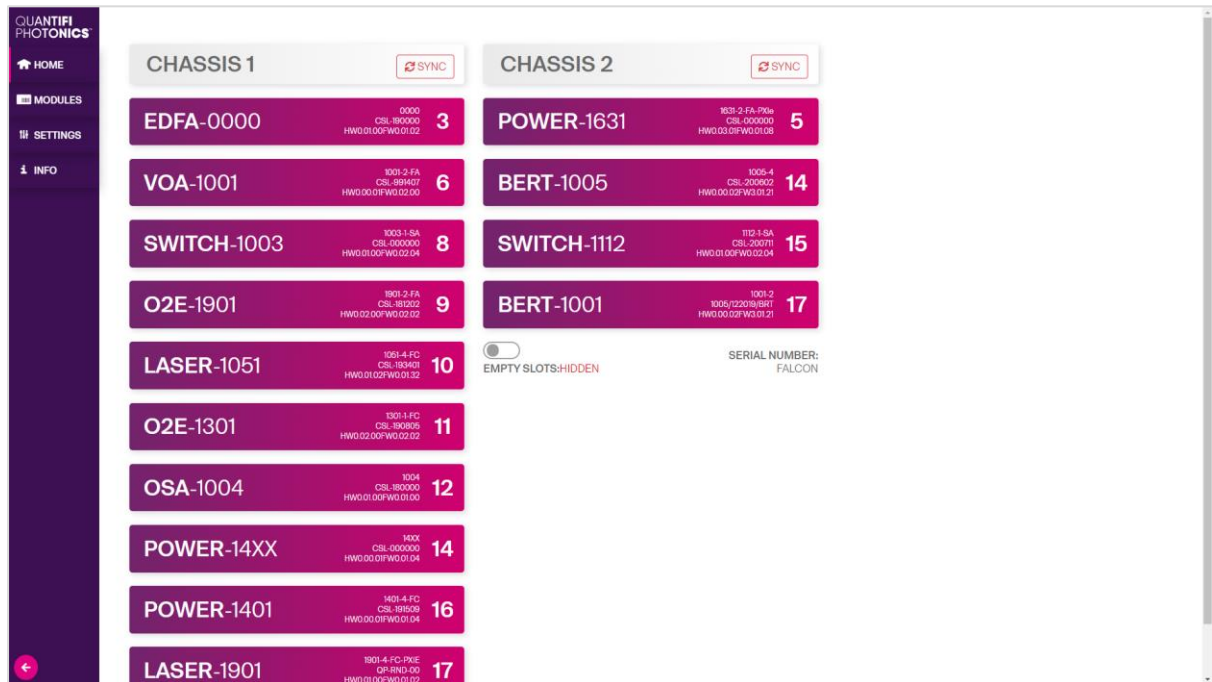
Quantifi Photonics Ltd.

Version 1.10

26

8 Power 1600 Series PXIe control with CohesionUI

To control the Power PXIe module through CohesionUI, click the desired module installed in the chassis or the desired channel. Alternatively, hovering over the **MODULES** menu button on the left will bring up a dropdown menu that the Power PXIe module can also be selected from.



After clicking the desired Power PXIe module, its control page is displayed. All information relating to the module such as model number, serial number and firmware versions are displayed in the top right corner of the window.



8.1 Setting channel parameter values

Specific control parameters for a given channel in the Power PXle module 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.

This applies to the following parameters:

- **SENSE OFFSET:** A compensation factor that can be applied to the actual measured optical power input.
- **OUTPUT OFFSET:** A compensation factor that can be applied to the actual measured optical power output
- **AVERAGING TIME:** The amount of time the optical power is logged for before calculating an average power reading.
- **WAVELENGTH:** The wavelength (frequency) of the input light. This is used to set the correct responsivity for calculating optical input power.

Alternatively, the parameter can also be set to the **MIN** and **MAX** value by clicking the dropdown in the name of the parameter.



In the above example, the **SENSE OFFSET** for CHANNEL 1 has been set to **0 dB** by manual input. To apply the changes, click the tick mark.

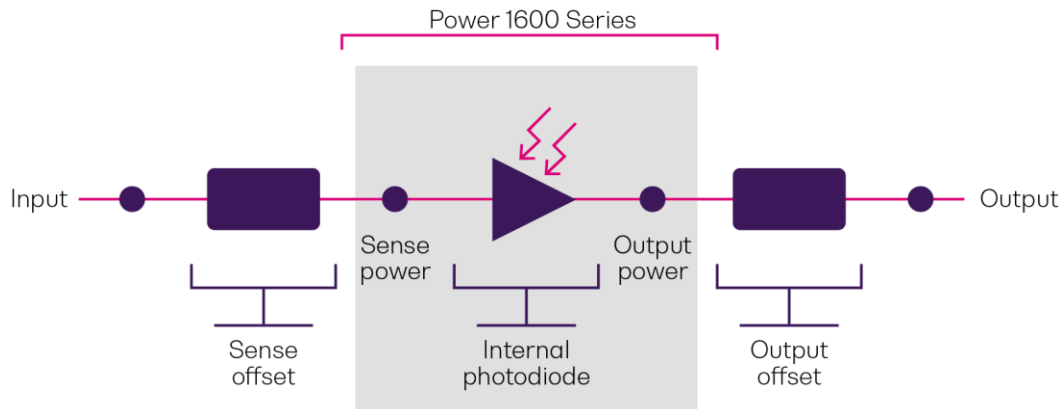
SENSE POWER and OUTPUT POWER values represent the actual measured optical power input and output accordingly. These values are read-only and cannot be edited.

⚠ IMPORTANT

The tick mark **MUST** be clicked in order for any changes or values that were entered to be applied successfully.

8.2 No offset functional diagram

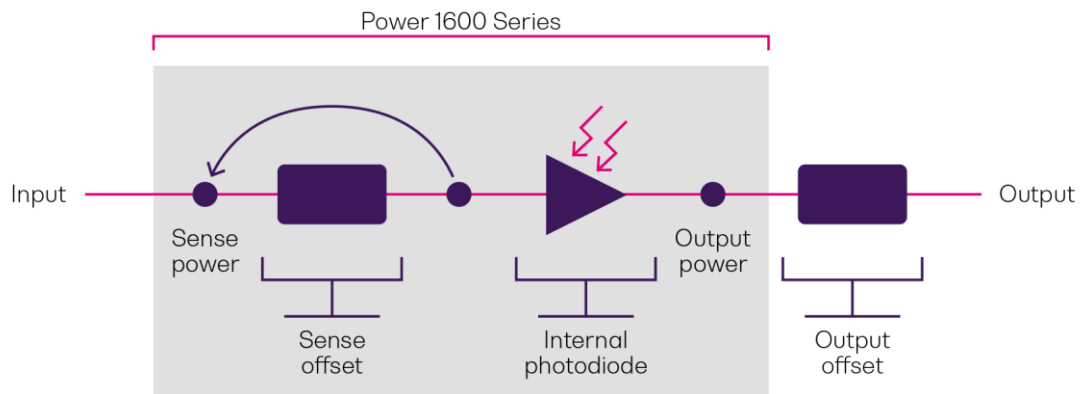
The functional diagram below illustrates how the Power 1600 Series PXle operates without offsets:



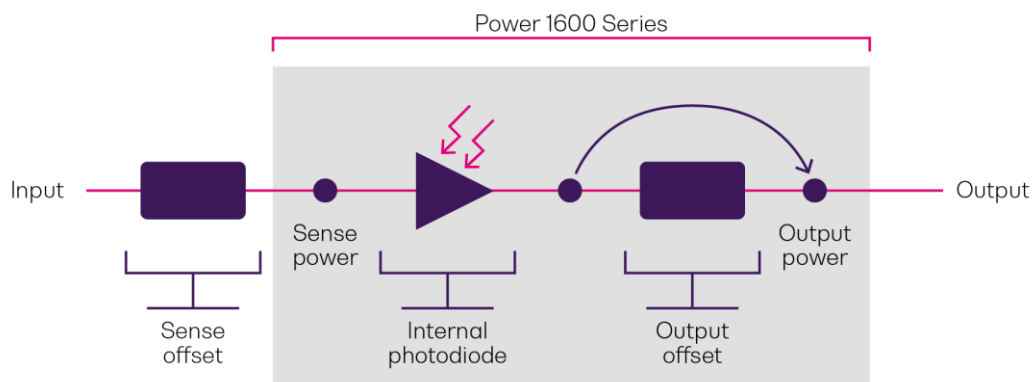
8.3 Offset functional diagrams

The functional diagrams below illustrate how the Power 1600 Series PXle accounts for input (sense) and/or output offsets:

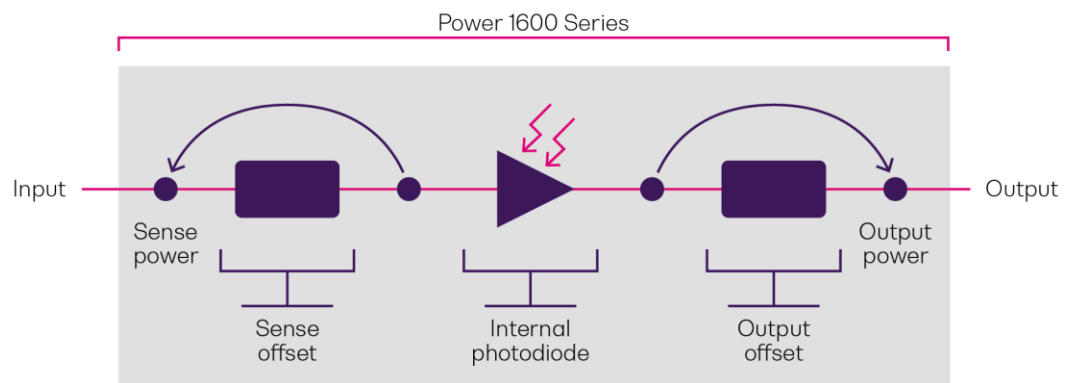
- **Input offset only:**



- **Output offset only:**



- Both offsets:



9 Programming guide

Introduction

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 guide provides general information on the commands available to communicate with the CohesionSCPI service remotely using the VISA I/O.

⚠ IMPORTANT

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 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	NM	NM, PM

Argument	Data Format
<wsp>	Specifies whitespace character (01 ₁₆ – 09 ₁₆ , 0B ₁₆ – 20 ₁₆).
<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.

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

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

For the commands that require index values:

- <c>: is the chassis index in which the specific blade module is installed; this is an integer, inclusive of 0.
- <n>: is the slot (or source) index of the specific blade module, this is an integer, <1 to 18>
- <m>: is the channel index of a specific unit in the module, this is an integer, <1 to 6>.

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.

9.2 Status and event registers

9.2.1 Standard Event Status Register

The Standard Event Status Register (SESR) is modified by the Power PXIe 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

9.2.2 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 default bit values within the SESR Mask are all 0.

9.2.3 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

9.2.4 Service Request Enable Register (Mask)

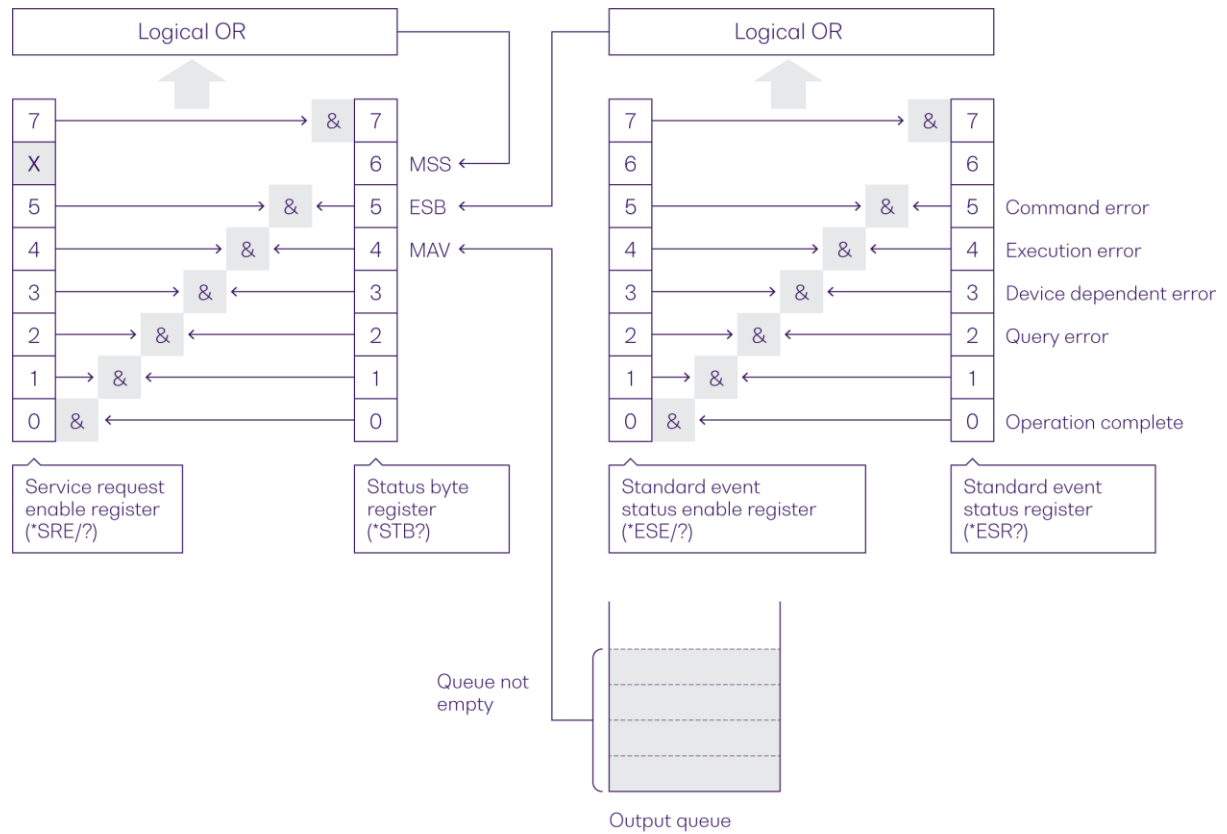
The Standard Request Enable Register (SRE Mask) is used to build the Master Summary Status Bit (MSS) within the Status Byte Register (STB). To ignore any of the events detected and set in the STB register itself, set the corresponding bit within the SRE Mask to 0. The STB can then be queried and the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

NOTE

The default bit values within the SESR Mask are all 0.

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

9.2.5 Status and event registers diagram



9.3 Common system command summary

Common commands	Description
*CLS	-Clear Status command
*IDN?	-Query the chassis identification
*OPC?	-Query the Operation Complete Status
*OPT?	-Query the modules managed by the CohesionSCPI service
*ESR?	-Query the Standard Event Status Register

9.4 Common system command descriptions

Command	*CLS
Syntax	*CLS
Description	Clear Status command
Parameters	No parameters
Response	No response
Example	*CLS

Command	*ESR?		
Syntax	*ESR?		
Description	Query the Standard Event Status Register		
Parameters	No parameters		
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	Execution Error	16
	3	Device dependent Error	8
	2	Not used	0
	1	Not used	0
0 (LSB)	Not used	0	
Example	*ESR? -> 8		
	*ESR? -> 32		

⚠ IMPORTANT

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.

Command	*IDN?
Syntax	*IDN?
Description	Query the chassis identification
Parameters	No parameters
Response	Comma separated string with the <manufacturer>,<server name>,<chassis controller name>,<server version>
Example	*IDN? -> Quantifi Photonics, CohesionSCPI service, PXIE-8133, FW2.0.15

Command	*OPC?
Syntax	*OPC?
Description	Query the Operation Complete Status
Parameters	No parameters
Response	1 is returned if all the modules installed in the chassis are ready to execute commands 0 is returned if any module installed in the chassis still has a command to execute in the input queue
Example	*OPC? -> 1

Command	*OPT?
Syntax	*OPT?
Description	Query the modules managed by the CohesionSCPI service
Parameters	No parameters
Response	Response will be a comma separated string of the installed modules in the chassis
Example	*OPT? -> ,Switch-1002-2-FA-PXIe,Switch-1003-1-FC-PXIe,,VOA-1001-2-FA-PXIe,,,,,O2E-1001-1-FC-PXIe,,,,,,,,,

9.5 Specific command summary

Slot commands	Description
: SLOT<n> : OPC? : TeST? : ReSeT : OPTions? : IDN? : TRIGger<n> : DELay/? : MODE/? : SOURce/? : ARM/?	- Query the status of the Operation Complete bit - Perform a self-test of the module - Perform a reset on the device, restoring the module to default values - Query the modules installed on the slot - Query the Identifier for the slot; returns the manufacturer, part number, serial number, hardware, and firmware versions - Set or query the Trigger Delay - Set or query the Trigger Line event mode - Set or query the Trigger Line(s) used for events - Set or query the Trigger ARMed state ready for an event
Configuration commands	Description
: OUTPut<n> : CHANnel<m> : POWER? : OFFSEt/? : SENSE<n> : CHANnel<m> : POWer? : OFFSEt/? : NULLing : TIMEnulling? : AVERagingtime/? : WAVelength/? : TRACE : CoMPlete? : POINts? : RATE? : TRIGger : TRACE<m>?	- Query the measured power - Set or query the power measurement offset - Query the measured power - Set or query the power measurement offset - Perform dark current nulling on the channel - Query the dark nulling time remained to complete - Set or query the measurement averaging time - Set or query the optical wavelength configuration - Query the status of the Trace Complete bit - Set or query the number of trace buffer data elements - Set or query the trace buffer sampling rate - Set the trace trigger mode - Query the trace buffer

9.6 Specific command descriptions

9.6.1 Slot commands

Command	:SLOT<n>:OPC?
Syntax	:SLOT<n>:OPC?
Description	Query the status of the Operation Complete bit
Parameters	No parameters
Response	1 is returned if the module is ready to execute a new operation 0 is returned if the module is busy
Example	:SLOT2:OPC? -> 1

Command	:SLOT<n>:TeST?
Syntax	:SLOT<n>:TeST?
Description	Perform a self-test of the module
Parameters	No parameters
Response	1 is returned if self-test reports an error with the module 0 is returned if self-test passed for the module
Example	:SLOT1:TST? -> 0

Command	:SLOT<n>:ReSeT
Syntax	:SLOT<n>:ReSeT
Description	Perform a reset on the device, restoring the module to default values
Parameters	No parameters
Response	No response
Example	:SLOT1:RST

Command	:SLOT<n>:OPTions?
Syntax	:SLOT<n>:OPTions?
Description	Query the modules installed on the slot
Parameters	No parameters
Response	Comma separated string of detectors installed in the Power PXle. If a module is not installed in a channel, it will not return any identification string
Example	:SLOT2:OPT? -> 1,1,,

Command	:SLOT<n>:IDN?
Syntax	:SLOT<n>:IDN?
Description	Query the Identifier for the slot; returns the manufacturer, part number, serial number, hardware and firmware versions
Parameters	No parameters
Response	Comma separated string containing the <manufacturer>, <part number>, <serial number>, <hardware version> <firmware version>
Example	:SLOT2:IDN? -> Quantifi Photonics, POWER-1500-2-FC-PXIE, QuantifiPhotonics-192001, HW1.0FW1.02 Hardware and firmware versions are not separated by a comma

Command	:TRIGger<n>:DELAy
Syntax	:TRIGger<n>:DELAy?<wsp><value>
Description	Set the Trigger Delay of the module (in seconds)
Parameters	<value>: A valid numerical value for the desired delay (default units of seconds)
Response	No response
Example	:TRIG3:DEL 0.5

Command	:TRIGger<n>:DELay?
Syntax	:TRIGger<n>:DELay?<wsp>[MIN MAX DEF SET ALL]
Description	Query the Trigger Delay of the module (in seconds)
Parameters	MIN: Returns the minimum programmable value MAX: Returns the maximum programmable value DEF: Returns the default programmable value SET: Returns the current set value ALL: Returns all the above values in a comma separated string
Response	Depending on the parameters the response will be a single value, or a comma separated string of values
Example	:TRIG3:DEL? -> 0.0000,10.0000,0.0000,0.5000

⚠ IMPORTANT

Any changes to the Trigger Mode will automatically disable the current ARM state.

Command	:TRIGger<n>:MODE
Syntax	:TRIGger<n>:MODE<wsp>[OR AND]
Description	Set the Trigger Line event mode of the module
Parameters	OR: Any of the configured lines will trigger an event AND: Only upon all configured
Response	No response
Example	:TRIG3:MODE OR

Command	:TRIGger<n>:MODE?
Syntax	:TRIGger<n>:MODE?
Description	Query the Trigger Line event mode of the module
Parameters	No parameters
Response	Response will be the current user set mode
Example	:TRIG3:MODE? -> OR

Command	:TRIGger<n>:SOURce
Syntax	:TRIGger<n>:SOURce<wsp><<value1>[,<value2>,...,<value8>] CLEAR>
Description	Set the Trigger Line(s) used for events
Parameters	<value1 ... 8>: Up to 8 integer values representing valid PXI trigger lines to add to the event source list CLEAR: Will remove all lines from the source list
Response	No response
Example	:TRIG3:SOUR 0, 6, 7

Command	:TRIGger<n>:SOURce?
Syntax	:TRIGger<n>:SOURce?
Description	Query the Trigger Line(s) used for events
Parameters	No parameters
Response	The response will be a comma separated array of the current source list. NONE is returned if the source list is cleared
Example	:TRIG3:SOUR? -> 0, 6, 7

Command	:TRIGger<n>:ARM
Syntax	:TRIGger<n>:ARM<wsp><ENABLE DISABLE>
Description	Set the Trigger ARMed state
Parameters	ENABLE: Enable the Trigger ARM, which will trigger on the next event DISABLE: Disable the Trigger ARM
Response	No response
Example	:TRIG3:ARM -> ENABLE

Command	:TRIGger<n>:ARM?
Syntax	:TRIGger<n>:ARM?
Description	Query the Trigger ARMed state
Parameters	No parameters
Response	The response will be the current state of the Trigger ARM
Example	:TRIG3:ARM? -> ENABLE

9.6.2 Configuration commands

Command	:OUTPut<n>:CHANnel<m>:POWER?
Syntax	:OUTPut<n>:CHANnel<m>:POWER?<wsp>[MIN MAX DEF ALL]
Description	Query the measured output power
Parameters	MIN: Returns the output power offset to the minimum value MAX: Returns the output power offset to the maximum value DEF: Returns the output power offset to the default value ALL: Returns all the above parameters in a comma separated string
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	:OUTP1:CHAN1:POWER? ALL -> -50.00,22.00,0.00

Command	:OUTPut<n>:CHANnel<m>:POWER:OFFSet
Syntax	:OUTPut<n>:CHANnel<m>:POWER:OFFSet<wsp>[<value> MIN MAX DEF]
Description	Set the measured output power offset
Parameters	<value>: A valid number to set the power offset to (default units of dB) MIN: Set the output power offset to the minimum value MAX: Set the output power offset to the maximum value DEF: Set the output power offset to the default value
Response	No response
Example	:OUTP1:CHAN2:POW:OFFS 12.5

Command	:OUTPut<n>:CHANnel<m>:POWER:OFFSet?
Syntax	:OUTPut<n>:CHANnel<m>:POWER:OFFSet?<wsp>[MIN MAX SET DEF ALL UNIT]
Description	Query the measured power offset
Parameters	MIN: Query the measured output power offset minimum value MAX: Query the measured output power offset maximum value SET: Query the measured output power offset set value DEF: Query the measured output power offset default value ALL: Query all the above parameters in a comma separated string UNIT: Query the measured output power offset measurement unit
Response	Returns the channel power measurement offset (with default units of dBm)
Example	:OUTP1:CHAN2:POW:OFFS? -> -100.00,100.00,0.00,12.50

Command	:SENSe<n>:CHANnel<m>:POWER?
Syntax	:SENSe<n>:CHANnel<m>:POWER?<wsp>[MIN MAX ACT ALL]
Description	Query the measured power
Parameters	MIN: Returns the minimum power that can be measured MAX: Returns the maximum power that can be measured ACT: Returns the actual measured power (default) ALL: Returns all the above parameters in a comma separated string
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	:SENS3:CHAN2:POW? ALL -> -50.0000,22.0000,-3.0000

Command	:SENSe<n>:CHANnel<m>:POWer:OFFSet
Syntax	:SENSe<n>:CHANnel<m>:POWer:OFFSet<wsp> [<value> MIN MAX DEF]
Description	Set the measured power offset
Parameters	<value>: A valid number to set the power offset to (default units of dB) MIN: Set the power offset to the minimum value MAX: Set the power offset to the maximum value DEF: Set the power offset to the default value
Response	No response
Example	:SENS3:CHAN2:POW:OFFS 12.5

Command	:SENSe<n>:CHANnel<m>:POWer:OFFSet?
Syntax	:SENSe<n>:CHANnel<m>:POWer:OFFSet?<wsp> [MIN MAX SET DEF ALL UNIT]
Description	Query the measured power offset
Parameters	MIN: Query the measured power offset minimum value MAX: Query the measured power offset maximum value SET: Query the measured power offset set value DEF: Query the measured power offset default value ALL: Query all the above parameters in a comma separated string UNIT: Query the measured power offset measurement unit
Response	Returns the channel power measurement offset (with default units of dBm)
Example	:SENS3:CHAN2:POW:OFFS? -> -100.00,100.00,0.00,12.50

Command	:SENSe<n>:CHANnel<m>:POWer:NULLing
Syntax	:SENSe<n>:CHANnel<m>:POWer:NULLing
Description	Perform dark current nulling on the specified channel
Parameters	No parameters
Response	No response
Example	:SENS3:CHAN2:POW:NULL

Command	:SENSe<n>:CHANnel<m>:POWer:TIMEnulling?
Syntax	:SENSe<n>:CHANnel<m>:POWer:TIMEnulling?
Description	Query the time remaining for dark current nulling to complete
Parameters	No parameters
Response	Averaging time in seconds
Example	:SENS3:CHAN2:POW:TIME? -> 0.000000

Command	:SENSe<n>:CHANnel<m>:POWer:AVERagingtime
Syntax	:SENS<n>:CHAN<m>:POW:AVER<wsp> [MIN MAX DEF <value>] [S MS US NS]
Description	Set the averaging time
Parameters	MIN: Set to the minimum averaging time value MAX: Set to the maximum averaging time value DEF: Set to the default averaging time value <value>: Sets the averaging time to the user value in the specified units (default - seconds)
Response	No response
Example	:SENS3:CHAN1:POW:AVER 5.0

Command	:SENSe<n>:CHANnel<m>:POWer:AVERagingtime?
Syntax	:SENSe<n>:CHANnel<m>:POWer:AVERagingtime?<wsp> [MIN MAX DEF SET ALL]
Description	Query the averaging time
Parameters	MIN: Returns the minimum averaging time value MAX: Returns the maximum averaging time value DEF: Returns the default averaging time value SET: Returns the current set averaging time value ALL: Returns all the above values in a comma separated string
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	:SENS3:CHAN1:POW:AVER? ALL -> 0.000000,10.000000,0.100000,5.000000

Command	:SENSe<n>:CHANnel<m>:WAVelength
Syntax	:SENS<n>:CHAN<m>:WAV<wsp> [<value> MIN MAX DEF] [NM M MM UM PM]
Description	Set the optical wavelength configuration
Parameters	<value>: Set the wavelength of the channel to the given value with the specified units (default - nm) MIN: Set the wavelength of the channel to the minimum value MAX: Set the wavelength of the channel to the maximum value DEF: Set the wavelength of the channel to the default value
Response	No response
Example	:SENS3:CHAN2:WAV 1310

Command	:SENSe<n>:CHANnel<m>:WAVelength?
Syntax	:SENSe<n>:CHANnel<m>:WAVelength?<wsp> [MIN MAX DEF SET ALL]
Description	Query the optical wavelength configuration
Parameters	MIN: Return the minimum programmable wavelength MAX: Return the maximum programmable wavelength DEF: Return the default wavelength SET: Return the set wavelength ALL: Returns all the above parameters in a comma separated string
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	:SENS3:CHAN2:WAV? ALL -> 1271,1550,1550,1310

Command	:SENSe<n>:TRACE:CoMPlete?
Syntax	:SENSe<n>:TRACE:CoMPlete?
Description	Query the status of the Trace Complete bit
Parameters	No parameters
Response	1 is returned if the trace has been acquired and the buffer is ready to be read out 0 is returned if the trace acquisition is still in progress, or the buffer is not ready to be read out
Example	:SENS3:TRACE:CMP? -> 1

Command	:SENSe<n>:TRACE:PointS
Syntax	:SENSe<n>:TRACE:PointS<wsp> [MIN MAX DEF <value>]
Description	Set the number of trace buffer data elements
Parameters	MIN: Set the minimum programmable number of points MAX: Set the maximum programmable number of points DEF: Set the default number of points which is also set at power on <value>: Set the desired number of points per trigger
Response	No response
Example	:SENS3:TRACE:PTS 512

Command	:SENSe<n>:TRACE:POINTS?
Syntax	:SENSe<n>:TRACE:POINTS?<wsp>[MIN MAX DEF SET ALL]
Description	Query the number of trace buffer data elements
Parameters	MIN: Return the minimum programmable number of points MAX: Return the maximum programmable number of points DEF: Return the default number of points set at power on SET: Return the current set number of points ALL: Returns all the above parameters in a comma separated string
Response	Returns the number of points captured after each trigger
Example	:SENS3:TRACE:PTS? ALL -> 1,1024,1024,512

Command	:SENSe<n>:TRACE:RATE
Syntax	:SENSe<n>:TRACE:RATE<wsp>[<value> MIN MAX DEF]
Description	Set the trace buffer sampling rate
Parameters	<value>: Set the desired sample rate in samples per second (Hz) MIN: Set the minimum sample rate in samples per second (Hz) MAX: Set the maximum sample rate in samples per second (Hz) DEF: Set the default sample rate set at power on
Response	No response
Example	:SENS3:TRACE:RATE 5000

Command	:SENSe<n>:TRACE:RATE?
Syntax	:SENSe<n>:TRACE:RATE?<wsp>[MIN MAX DEF SET ALL]
Description	Query the trace buffer sampling rate
Parameters	MIN: Return the minimum sample rate in samples per second (Hz) MAX: Return the maximum sample rate in samples per second (Hz) DEF: Return the default sample rate set at power on SET: Return the current set sample rate in samples per second (Hz) ALL: Returns all the above parameters in a comma separated string
Response	Sample rate for the trace in seconds per sample
Example	:SENS3:TRACE:RATE? ALL -> 0.183,12000.000,12000.000,5000.000

Command	:SENSe<n>:TRACE:TRIG
Syntax	:SENSe<n>:TRACE:TRIG<wsp>[STOP IMMEDIATE FORCE]
Description	Set the trace trigger mode
Parameters	IMMEDIATE FORCE: Software trigger, start sampling immediately (default) Note: :SENS<n>:TRACE:PTS sample is required before :SENS<n>:TRACE:CMP? completes.
Response	No response
Example	:SENS3:TRACE:TRIG FORCE

⚠ IMPORTANT

The `:SENS<n>:TRACE?` command will return a comma separated string of values units of dBm.

Command	<code>:SENSe<n>:TRACE<m>?</code>
Syntax	<code>:SENSe<n>:TRACE<m>?</code>
Description	Query the Trace buffer. Note: The user should wait for <code>:SENS<n>:TRACE:CMP?</code> to complete before reading this. This command will error out if no sample points have been triggered.
Parameters	No parameters
Response	Comma separated list of values for each channel, new lines [ie '\n'] separated rows per sample.
Example	<pre> :SENS3:TRACE:PTS 10 :SENS3:TRACE:RATE 0.183 :SENS3:TRACE:TRIG :SENS3:TRACE:CMP? -> 1 :SENS3:TRACE2? -> 0.04,0.04,0.04,0.03,0.04,0.03,0.03,0.03,0.03,0.04,0.03,0.03 :SENS3:TRACE:TRIG :SENS3:TRACE:CMP? -> 1 </pre>

9.7 Trace acquisition

The Power 1600 Series PXle module has the ability to acquire traces.

The following is an example for the sampling to be started immediately upon command execution and aligned to the internal timer.

Trace acquisition can be realized with the following types of trigger events:

Name	Trigger Event	Sampling Event	Description
STOP	None	None	Triggering is disabled (or cancelled), no events will occur
FORCED IMMEDIATE	Software	Internal Clock	Triggered upon command execution and sampling aligned to internal timer
SWEXT SWEXTERNAL	Software	PXle Clock	Triggered upon command execution and sampling aligned to PXle Clock
HWINT HWINTERNAL	PXle Line	Internal Clock	Triggered upon PXle Line edge and sampling aligned to internal timer
HWEXT HWEXTERNAL	PXle Line	PXle Clock	Triggered upon PXle Line edge and sampling aligned to PXle Clock
HWCLK	PXle Line	PXle Line	Triggered upon command execution and sampling aligned to PXle Line edge

9.7.1 Triggering example

9.7.1.1 System commands

Description	Command example
1. Set the triggering delay for the slot. Delay is from 0 to 10 seconds, with a resolution of 0.001 seconds. Default is 0 seconds.	:TRIGger<n>:DELay 0
2. Set the desired triggering Line Detection Mode to AND or OR. This represents triggering upon events on single, any or specific lines/signals.	:TRIGger<n>:MODE OR
3. Set the desired triggering source(s): The sources represent the PXle trigger lines (integer values from 0 to 7) that the module can be configured for events.	:TRIGger<n>:SOURce 0
4. Arm the triggering in preparation for the next event.	:TRIGger<n>:ARM ENABLE

9.7.1.2 Module commands

Description	Command example
1. Set the module to the desired Trigger event mode. The example sets the sampling to be started upon a PXle trigger line event and samples aligned to the PXle Clock.	:SENS<n>:TRACE<m>:TRIGGER SWEXT
2. Monitor the Trace completion status.	:SENS<n>:TRACE<m>:COMPLETE? -> 1
3. Query (Read) the Trace buffer once populated (data elements depend on trace configuration).	:SENS<n>:TRACE<m>:? -> "x1,x2,x3,...,xn"

9.8 Power PXIe Multi Chassis mode operation

Multiple chassis can be connected to operate in **Multi Chassis Mode**. To operate in Multi Chassis Mode, **CohesionSCPI service must be version 1.02.06** or later.

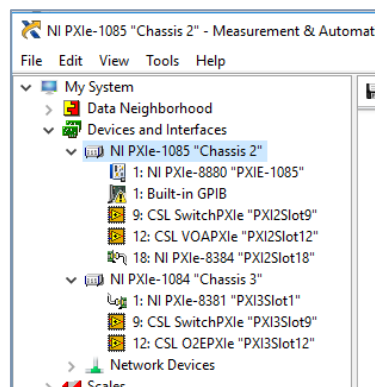
9.8.1 NI-MAX application Multi Chassis mode

⚠ IMPORTANT

The CohesionSCPI service does not manage the chassis numbers. These are controlled by the NI Platform Services (and through NI-MAX).

Even if the CohesionSCPI service is in Multi Chassis mode, if a chassis is connected but has no installed modules, it will not show up when *OPT? is run.

In the example shown below, there are two chassis connected via the PXIe-8384 to PXIe-8381 connection. Chassis #2 has the controller running CohesionSCPI service, and Chassis #3 is the 'extended' chassis.



9.8.2 SCPI Multi Chassis commands

Command	:SYSTEM:CHASSIS?
Syntax	:SYSTEM:CHASSIS?<wsp>[LIST MODE]
Description	Query the Chassis Mode configuration
Parameters	No parameters
Response	<p>LIST: Returns a comma separated list of valid chassis index numbers discovered by the CohesionSCPI service. These are chassis that have modules installed.</p> <p>MODE: Returns the current Chassis Mode the CohesionSCPI service is operating in (SINGLE or MULTI).</p> <p>None: Returns the number of chassis managed by the CohesionSCPI service. If operating in SINGLE mode, this will always return 1.</p>
Example	<p>In Single chassis mode:</p> <pre>:SYSTEM:CHASSIS? -> 1 :SYSTEM:CHASSIS? LIST -> 0 :SYSTEM:CHASSIS? MODE -> SINGLE</pre> <p>In Multi chassis mode:</p> <pre>:SYSTEM:CHASSIS? -> 2 :SYSTEM:CHASSIS? LIST -> 2,3 :SYSTEM:CHASSIS? MODE -> MULTI</pre>

⚠ IMPORTANT

Changing the CohesionSCPI service Chassis Mode will rediscover all Chassis and installed modules.

Command	:SYSTEM:CHASSIS
Syntax	:SYSTEM:CHASSIS<wsp>[SINGLE MULTI]
Description	Set the Chassis Mode configuration
Parameters	SINGLE: Set CohesionSCPI service to operate in SINGLE Chassis Mode MULTI: Set CohesionSCPI service to operate in MULTI Chassis Mode
Response	No response
Example	:SYSTEM:CHASSIS SINGLE

In Multi chassis mode, all the commands given above in the Specific Command Summary will still work, but they must be prefixed with :CHASSIS<c>.

Common command example:

Single Chassis Mode	:SLOT2:IDN?
Multi Chassis Mode	:CHASSIS1:SLOT2:IDN?

Specific command example:

Single Chassis Mode	:SOUR2:CHAN2:POW? MAX
Multi Chassis Mode	:CHASSIS1:SOUR2:CHAN2:POW? MAX

10 Example: Control of the Power 1600 Series PXle with SCPI

The following is a simple example of how to control the Power 1600 Series PXle 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.

Description	Command example
Identifying the Power PXle module	
1. Query to confirm the correct PXle chassis is setup	:*IDN?
2. Query the available module configuration	:*OPT?
3. Query the identification information for a specific slot module	:SLOT3:IDN?
Configuring the Power PXle module	
1. Set the wavelength of the power meter	:SENSe3:CHANnel1:WAVelength 1550 NM
2. With no optical input connected and the dust cap still fastened on the power meter, run dark current nulling	:SENSe3:CHANnel1:NULLing
3. Query the time remaining for nulling to be completed	:SENSe3:CHANnel1:TIMEing?
4. Set the averaging time to 0.1 s	:SENSe3:CHANnel1:AVEragingtime 0.1 S
Querying the Power PXle module configuration values	
1. Query the wavelength of the power meter	:SENSe3:CHANnel1:WAVelength?
2. Query the averaging time to 0.1 s	:SENSe3:CHANnel1:AVEragingtime?
Querying the optical power	
1. Query the measured optical power with an optical input connected to the power meter	:SENSe3:CHANnel1:POWer?
Configuring and initiating the power tracing	
1. Set the number of trace points to 1000	:SENSe3:TRACE:PTS 1000
2. Set the trace sampling rate to the MAX of 12 kHz	:SENSe3:TRACE:RATE MAX
3. Set the trace trigger mode. This will initiate a trace as soon as the conditions for the set trigger mode are met	:SENSe3:TRACE:TRIG FORCE
Querying the acquired power trace	
1. Query the status of the trace completion	:SENSe3:TRACE:CMP?
2. If the trace complete status is = 1, query the acquired trace on Channel 1	:SENSe3:TRACE1?

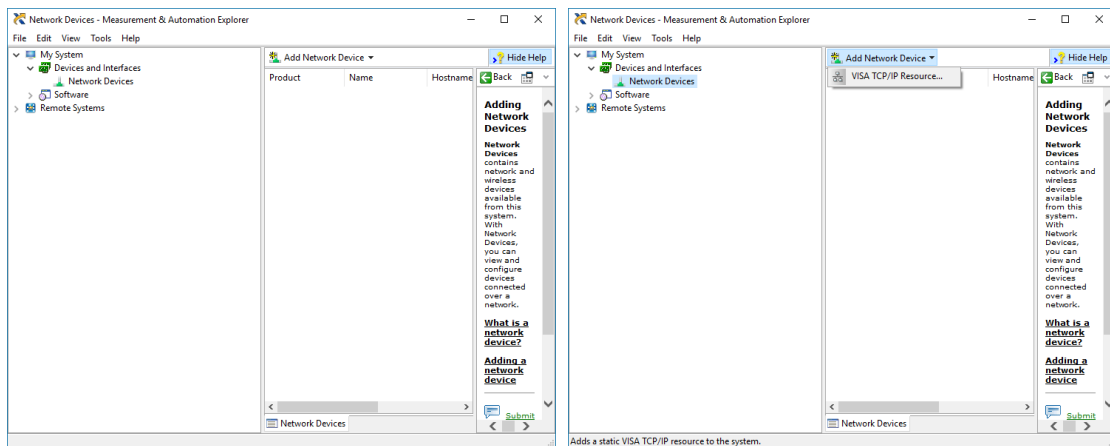
IMPORTANT

The following section details the various methods that a user may send these commands to the Power PXIe via **SCPI** commands

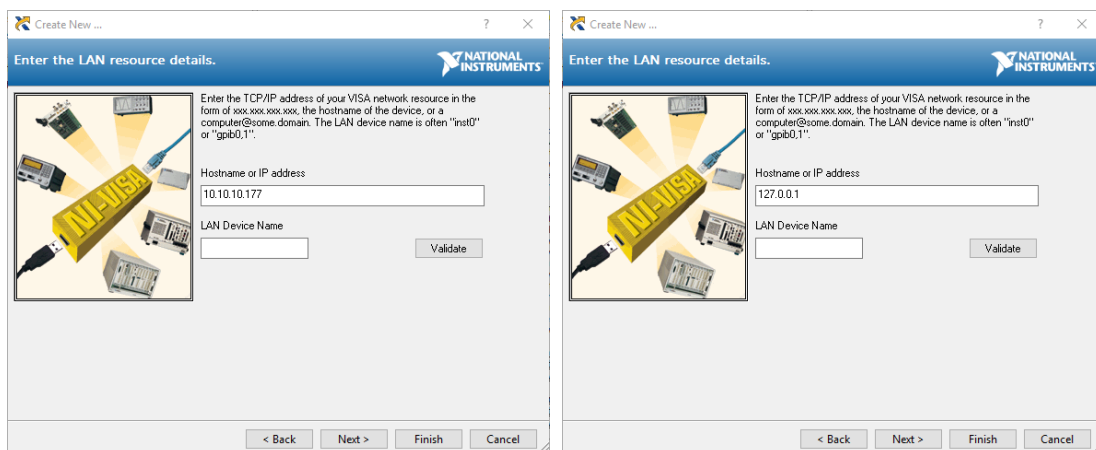
10.1 NI-MAX application

To communicate with any Power PXIe module, 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**.



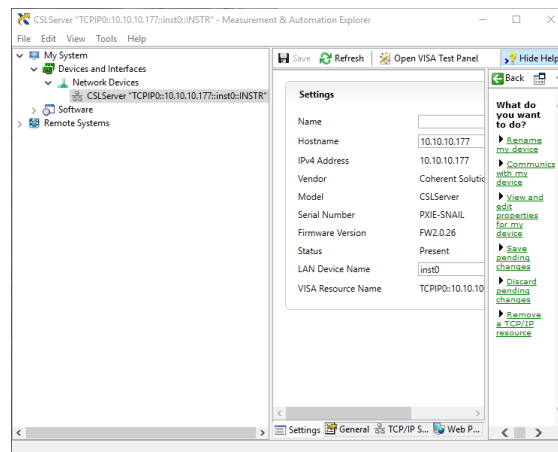
3. Select **Manual Entry of LAN Instrument**. Enter in the Hostname or IP Address. The top image is an example of operating remotely, the bottom image is an example of operating locally.
Note when operating locally, enter in the localhost IP address of **127.0.0.1**. Click **Finish** to end the setup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



10.2 NI-VISA application

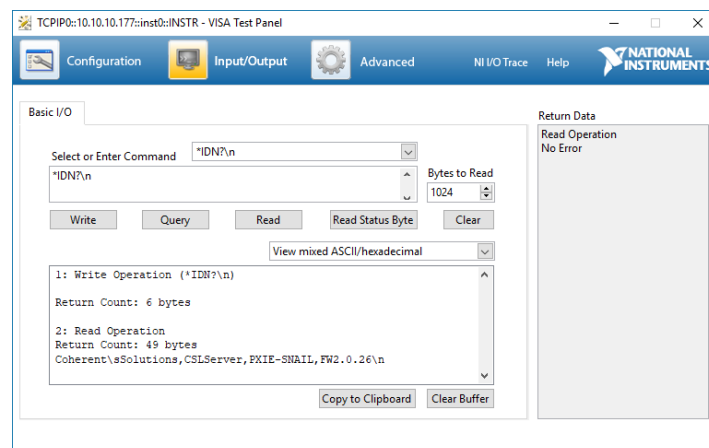
NI-VISA is used to communicate with the PXIe chassis or installed modules / instruments. The above steps must be completed before attempting to communicate using NI-VISA.

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



2. On the 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 Power PXle module 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 vx11
from vx11.vxi11 import Vxi11Exception
# replace this with the IP of your device
ip = "127.0.0.1"
try:
    print("connecting to " + ip + " ... ")
    instrument = vx11.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 Power PXIe module 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 Power PXIe 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.

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 the Power PXIe 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.
```

11 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the module free of dust.
- Store the module 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 module, power off the chassis immediately. Remove the module and allow to dry completely.

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.

11.1 Annual calibration schedule

To ensure that the Power 1600 Series PXle module 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 module, 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.

If the Calibration Certificate has been misplaced, or the calibration due date is not known, email support@quantifiphotonics.com.

12 Technical support

12.1 Contacting the Technical Support Group

To obtain after-sales service or technical support for this module, contact Quantifi Photonics.

The Technical Support Group is available to take your calls Monday to Friday, 9:00 a.m. to 5:00 p.m. (New Zealand Time).

Technical Support Group

Tel.: +64 9 478 4849

support@quantifiphotonics.com

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

12.2 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 module in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the module out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

13 Warranty

13.1 General information

Quantifi Photonics Ltd. (Quantifi Photonics) warrants from the date of the original shipment (the Warranty Period) that this module 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.

IMPORTANT

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.

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.

13.2 Liability

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

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

13.3 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.

13.4 Certification

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

13.5 Service and repairs

To send any equipment for service, repair or calibration please contact the Technical Support Group.

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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