matrIQ-Laser 1000 Series

Tunable Laser Source

USER MANUAL

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complexity made simple.

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

Version 1.02

1. Contents

1 Conventions

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

WARNING

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

CAUTION

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

CAUTION

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

IMPORTANT

Refers to information about this product you should not overlook.

2   Safety Information

Before using the **matrIQ-Laser** module, ensure that the following safety information has been read and understood.

WARNING

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

CAUTION

The matrIQ-Laser instruments are sensitive to electrostatic discharge (ESD). Store the instruments in protective electrostatic packaging.

IMPORTANT

- For electromagnetic compatibility, this instrument 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 product.
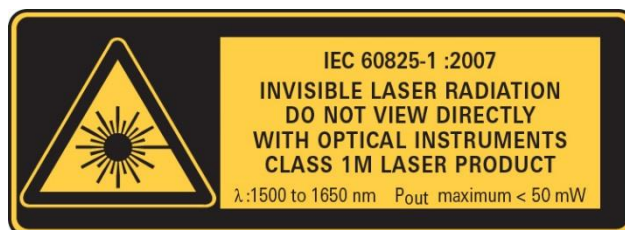
IEC 60825-1 :2007
INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY
WITH OPTICAL INSTRUMENTS
CLASS 1M LASER PRODUCT
λ :1500 to 1650 nm P_{out} maximum < 50 mW

WARNING

DO NOT INSTALL OR TERMINATE FIBERS WHILE A LIGHT SOURCE IS ACTIVE. CARE MUST BE TAKEN TO ENSURE THAT THE INSTRUMENT HAS BEEN TURNED OFF BEFORE INSPECTING THE END FACE(S) OF THE INSTRUMENT, OR ANY OPTICAL PATCH CORDS CONNECTED TO THIS INSTRUMENT. NEVER LOOK DIRECTLY INTO A LIVE FIBER AND ENSURE THAT YOUR EYES ARE PROTECTED AT ALL TIMES.

3 Introducing the matrIQ-Laser – Tunable Laser Source

3.1 matrIQ-Laser Overview & Features

matrIQ-Laser is a Continuous Wave (CW), tunable laser source offering high-power output, narrow 100 kHz linewidth and 0.01 pm resolution tunability.
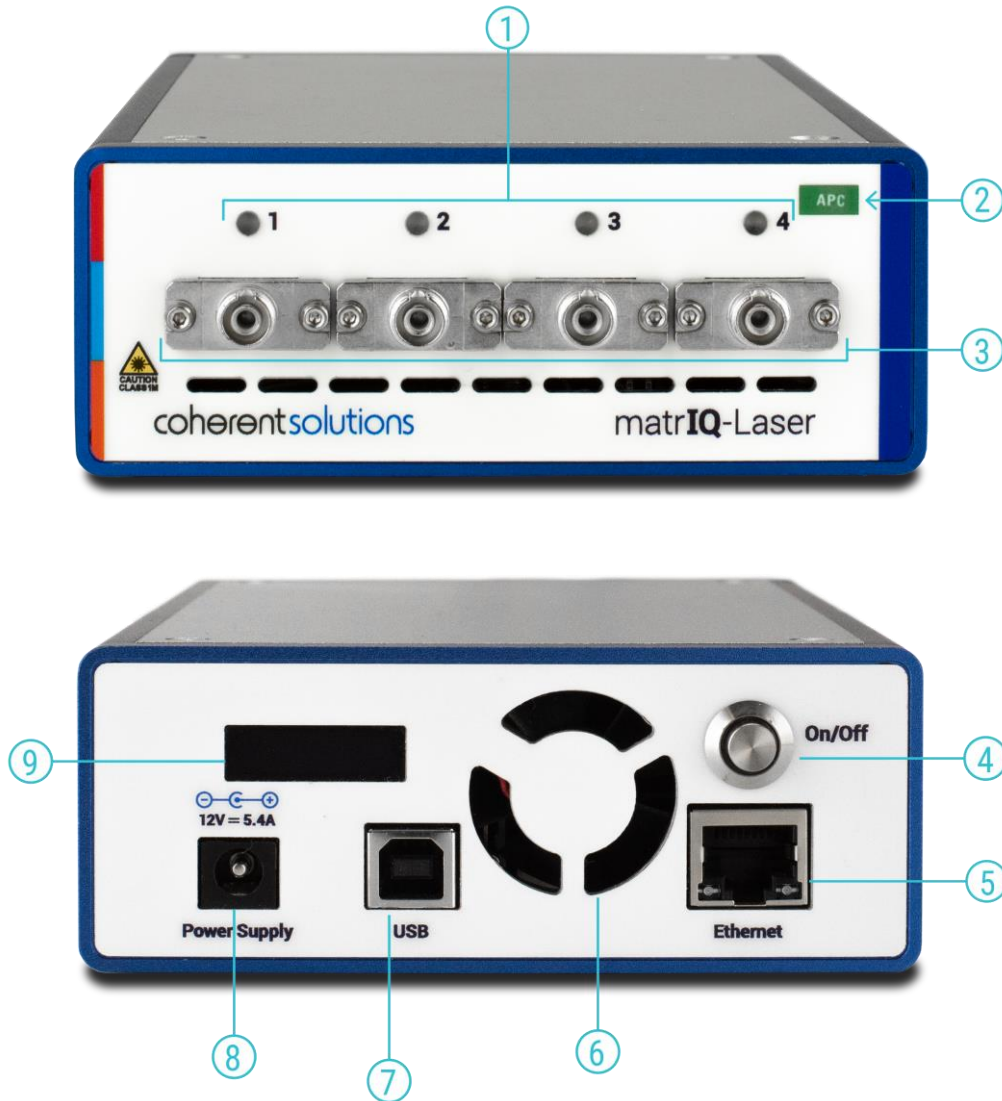
1   Status LEDs
2   Optical Connector type
3   Laser Output ports
4   On/ Off push button
5   Ethernet port
6   Ventilation fan (DO NOT OBSTRUCT)
7   USB Type B port
8   Power supply port
9   IP Address LCD Screen

4   Connecting Optical Input

IMPORTANT

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. Coherent Solutions is not responsible for damage or errors caused by bad fiber cleaning or handling.

CAUTION

The type of optical connectors on the matrIQ-Laser instrument can be found printed on the front plate of the module. Joining mismatched connectors will damage the ferrules and fibre faces.

4.1   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. If the fiber is dirty, clean it as detailed below.
2. Clean fiber ends as follows:
   a   Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.
   b   Use compressed air to dry completely.
   c   Visually inspect the fiber end to ensure its cleanliness.
3. 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.
4. 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.

Coherent Solutions uses high quality connectors in compliance with EIA-455-21A standards.

To keep connectors clean and in good condition, Coherent Solutions strongly recommends inspecting them 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.

5   matrIQ USB Driver Installation

IMPORTANT

Client computers running **Windows 10 Version 1903 or later do not need to have any drivers manually installed** to communicate with a matrIQ instrument. **The drivers come pre-installed on the system**.

The following installation instructions only apply to prior versions of Windows.

In order to use the **matrIQ-Laser** with a client computer, some drivers are required.

IMPORTANT

It is recommended to connect the matrIQ-Laser to a client computer that has an active Internet connection. This means that any required drivers for communication with the matrIQ-Laser will automatically be downloaded and installed.

If no active Internet connection is available, the following procedure will have to be carried out to install the necessary USB Drivers.

1. Connect the **matrIQ-Laser** to an available USB port on a computer using the provided USB-A to USB-B cable

2. Power on the **matrIQ-Laser.**

3. Open **Device Manager** on the computer. Expand the **Ports (COM & LPT)** dropdown and find the corresponding COM Port for the **matrIQ-Laser.**
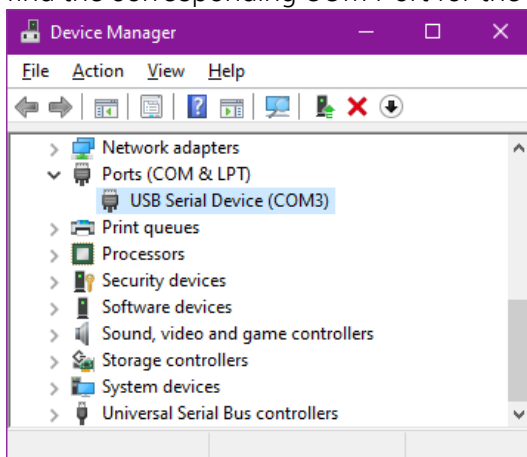
4. On the provided USB Media drive, navigate to the following files.

Name ^	Date modified	Type	Size
ndis5	24/05/2018 2:05 PM	Security Catalog	11 KB
ndis5	24/05/2018 11:14 AM	Setup Information	3 KB
ndis6	24/05/2018 2:05 PM	Security Catalog	11 KB
ndis6	24/05/2018 11:13 AM	Setup Information	3 KB

5. Right click on the ndis5(.inf) file, and select **Install**.
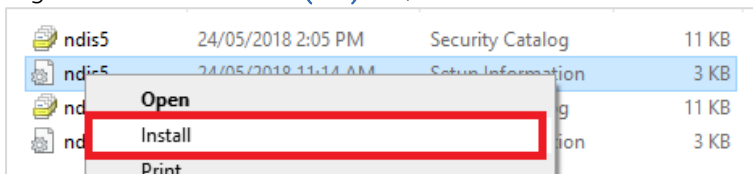
6. Follow the on screen UAC prompt, and click **Yes**. Click **Install** from Coherent Solutions Ltd.
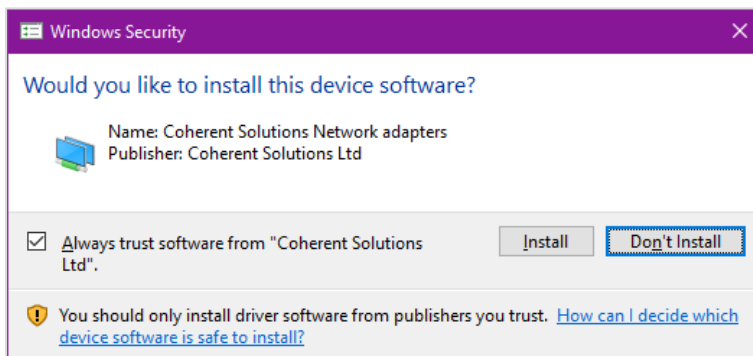
7. Once complete, click **OK**.
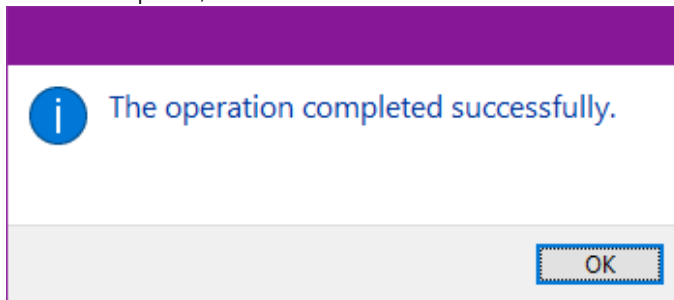
8. Open **Device Manager**, and expand the Network adapters dropdown and locate an adapter named **NDIS** device. This is the correct corresponding device for the **matrIQ-Laser.**
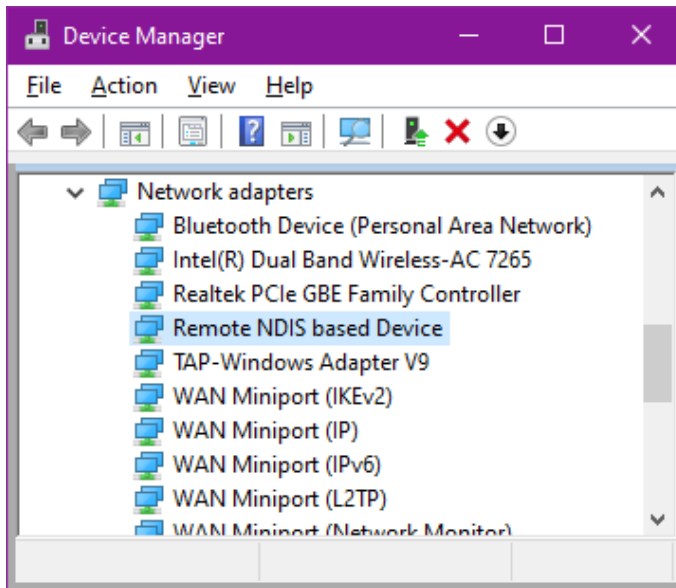
9. If the computer is ever connected to the Internet, it is recommended to run a driver update which will automatically search and install any available matrIQ drivers.
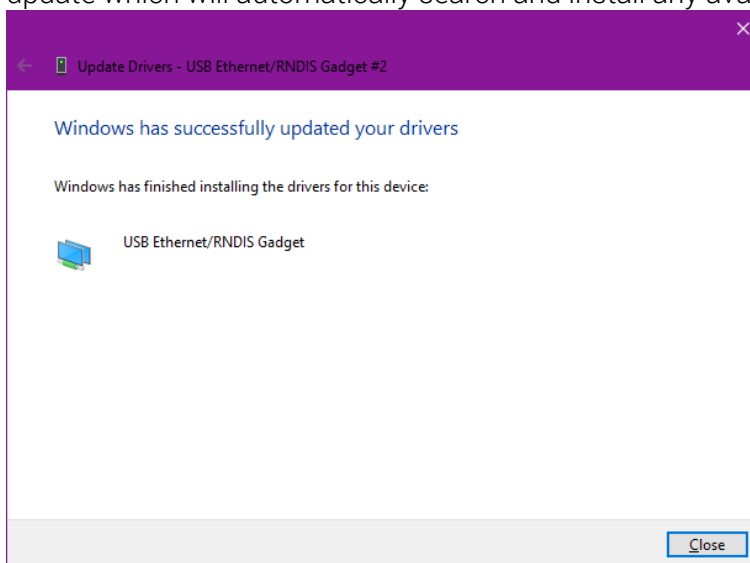
6 cohesionUI™

cohesionUI is a graphical user interface (GUI) that makes it simple to control any Coherent Solutions matrIQ instrument from a PC or mobile device. Its cutting-edge design offers a sleek modern interface, cross device compatibility, multi instrument control, customizable views and remote network access.

6.1 Finding the IP address

The IP address of the matrIQ is displayed on the LCD screen on the back of the instrument. Irrespective on the operation mode of the matrIQ (access over USB or Ethernet), the appropriate IP address will be displayed on the screen.
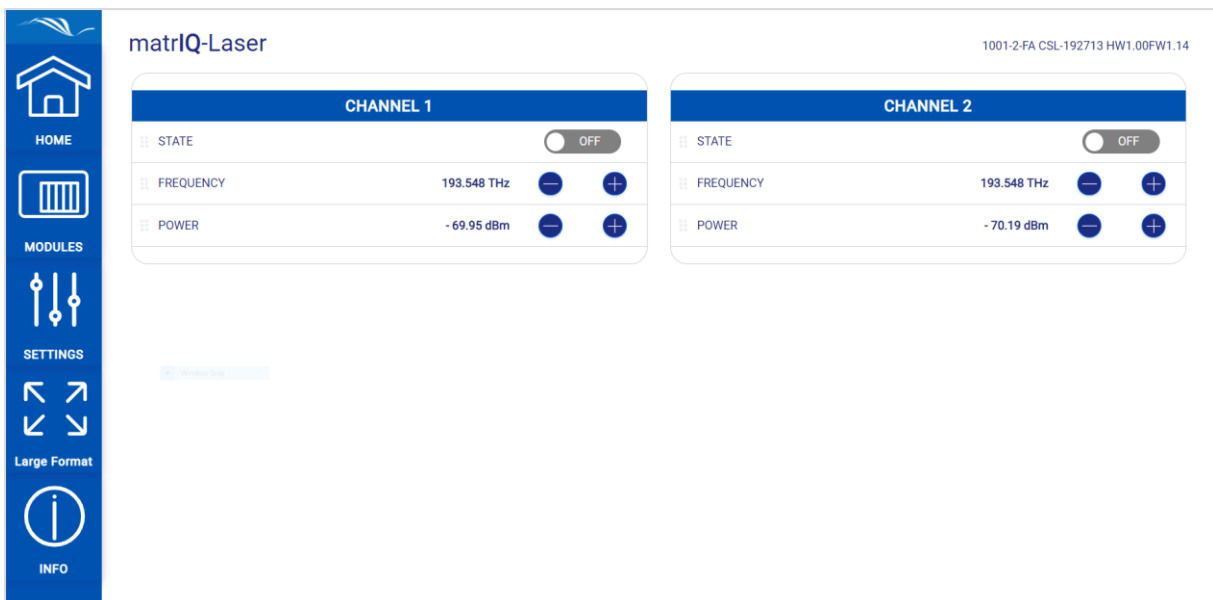
Launch Google Chrome or Microsoft Edge on a computer, and type in the matrIQ instrument IP address into the address bar of the browser eg **10.10.10.89**.
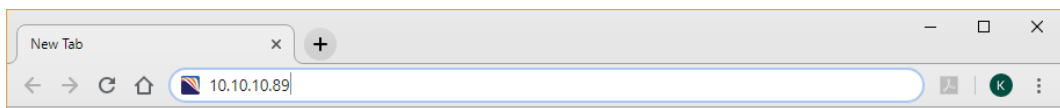
If needed, the IP address can be statically assigned to the Ethernet or USB connection. For more information see Section 7.

6.2 Home

After entering in the IP address of the matrIQ instrument and pressing enter, the cohesionUI **Home** page will be displayed. It will show a graphical representation of the module arrangement in the matrIQ instrument.

6.3   Modules

The controls for a given channel of the matrIQ instrument can be accessed by hovering over the **Modules** button. A specific channel in the instrument can be accessed by clicking the appropriate dropdown menu item.
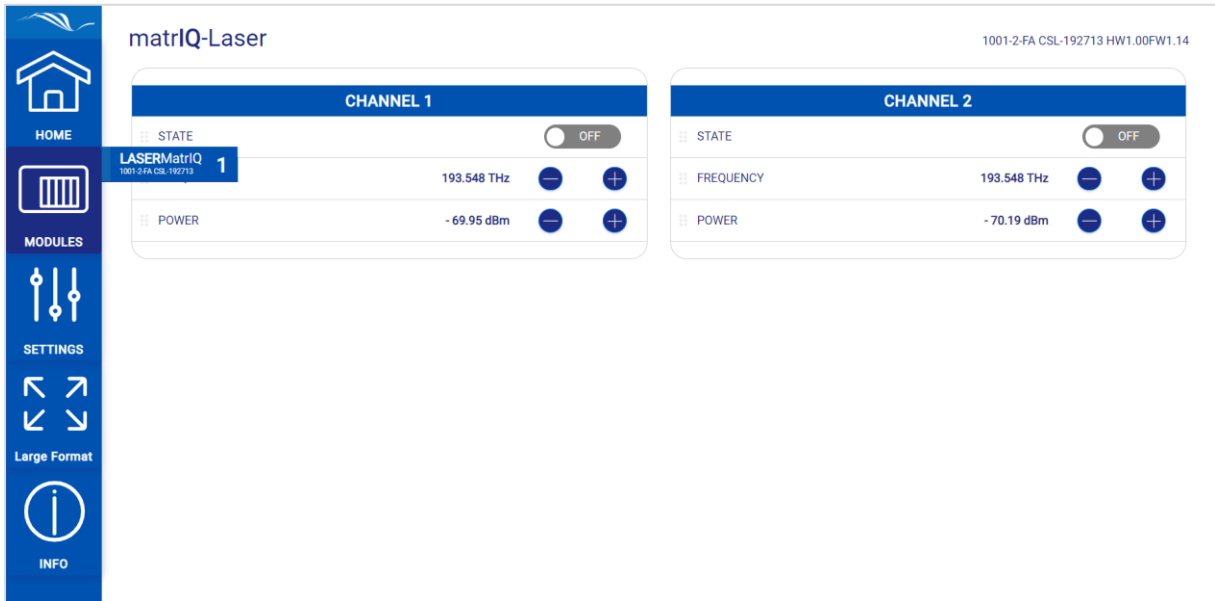
6.4   Settings

The settings for the instrument can be accessed by either hovering over the **Settings** button or clicking the button. Both actions will allow access to the units displayed in the module controls.

Note: Whenever the chassis is power cycled, cohesionUI will revert to default unit values in settings.
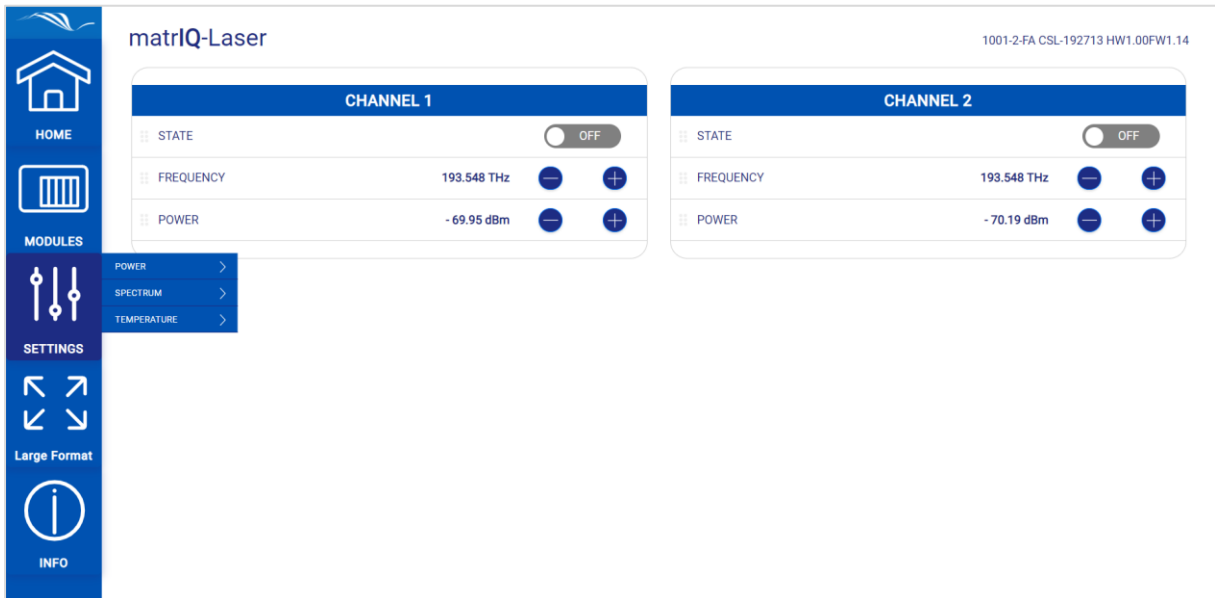
In the Settings menu, the step size value can be set. This is the amount by which the attenuation, frequency, wavelength or power will increment and decrement by when the **+** or **-** buttons are clicked.

There is a control panel to upgrade the firmware or cohesionUI running on the instrument.

The network configuration control panel enables the user to set the preferred communication interface (Ethernet or USB).

Note: The Network interface controls are only available when connected over USB.

6.5   Info

The **Info** button can be clicked at any time to pull up a display bar on the right side of the screen This will show the manufacturer, model and serial number of the instrument, the cohesionUI version number and the Firmware version.
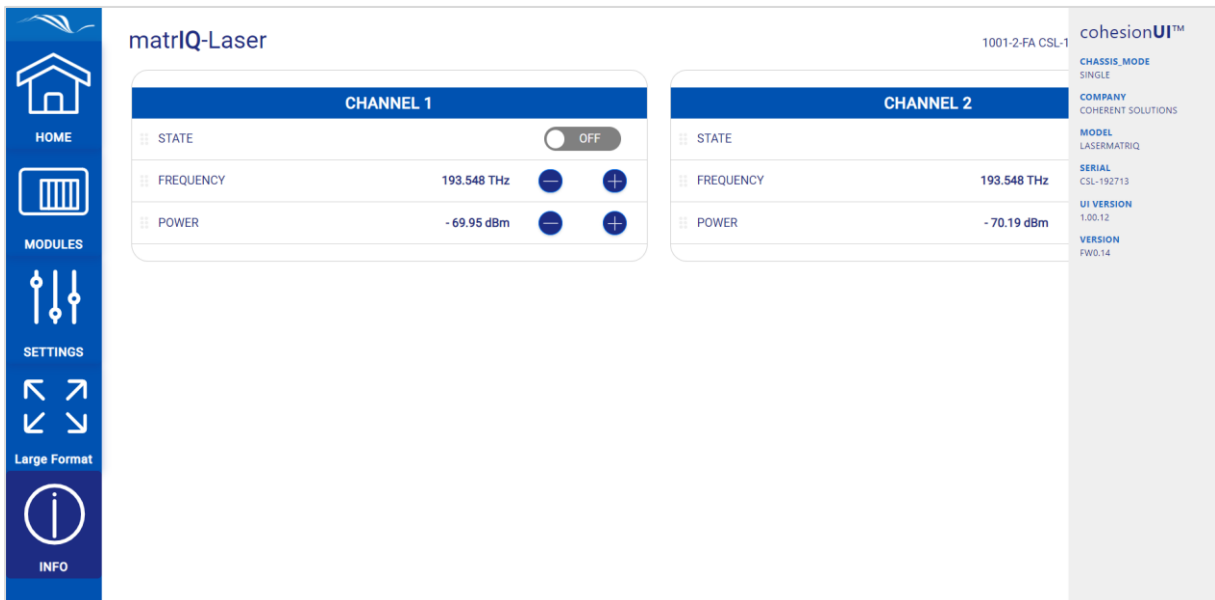
7 Network and Update settings

7.1 Updating Firmware and cohesionUI

The Firmware or cohesionUI versions running on the matrIQ instrument can be updated using the update utility on the **Settings** page.

For the latest firmware and cohesionUI version files email support@coherent-solutions.com, along with the matrIQ instrument serial and model numbers.

7.1.1 Resetting the matrIQ instrument

If for any reason there is an issue with the matrIQ instrument, it can be reverted to factory settings using the FACTORY RESET utility.

Note: Any IP address settings will be reverted to factory settings when the matrIQ instrument is reset.

7.2   Configuring the Network Interface settings

The matrIQ instruments can operate over either an Ethernet or USB connection. To communicate with the instrument, the IP address is required.

Note: The Network interface controls are only available when connected over USB. When connected over Ethernet these settings will be locked, as shown above.

In order to configure ANY network interface settings, the **matrIQ instrument will have to be connected via a USB cable** to a computer.

7.2.1   Setting the USB IP address

When connected via USB, the default IP address is **192.168.101.201**. This is a static address set during instrument calibration. If necessary, this address can be changed.

Typing in the default IP address of 192.168.101.201 in a supported web browser will open the cohesionUI page for the instrument. Navigating to the **Settings** page, the Network Interface configuration controls will be available.

The **value in the 3ʳᵈ octet of the IP address can be changed** to any available value. It is important to make sure that any other instruments connected to the computer do not share this new IP address, as there will be an addressing conflict.

Clicking APPLY will write the new IP address to the instrument settings. Once set, the new IP address will be displayed on the LCD screen on the back of the instrument.

7.2.2   Setting the Ethernet IP address

When connected via Ethernet, the default IP addressing method is dynamic, as the DHCP will automatically assign the instrument an IP address. This address can be found on the back of the instrument on the LCD screen.

Typing in the assigned IP address in a supported web browser will open the cohesionUI page for the instrument. Navigating to the **Settings** page, the Network Interface configuration controls will be available.

The addressing method can be changed to a static method, where the matrIQ instrument will always have the same IP address over Ethernet.

Typing in a **valid IP address and Subnet mask**, and then clicking APPLY will save the IP address into the settings of the instrument.

To test if the IP addressing has worked, power OFF the instrument, and disconnect the USB cable.

Connecting an Ethernet cable and powering ON the instrument should then show the new statically assigned IP address on the LCD screen at the back of the instrument.

8   matrIQ-Laser control with cohesionUI

To control the matrIQ-Laser through cohesionUI, click the desired channel from the dropdown while hovering on the **Modules** button, or click **Home** to display controls for all channels.
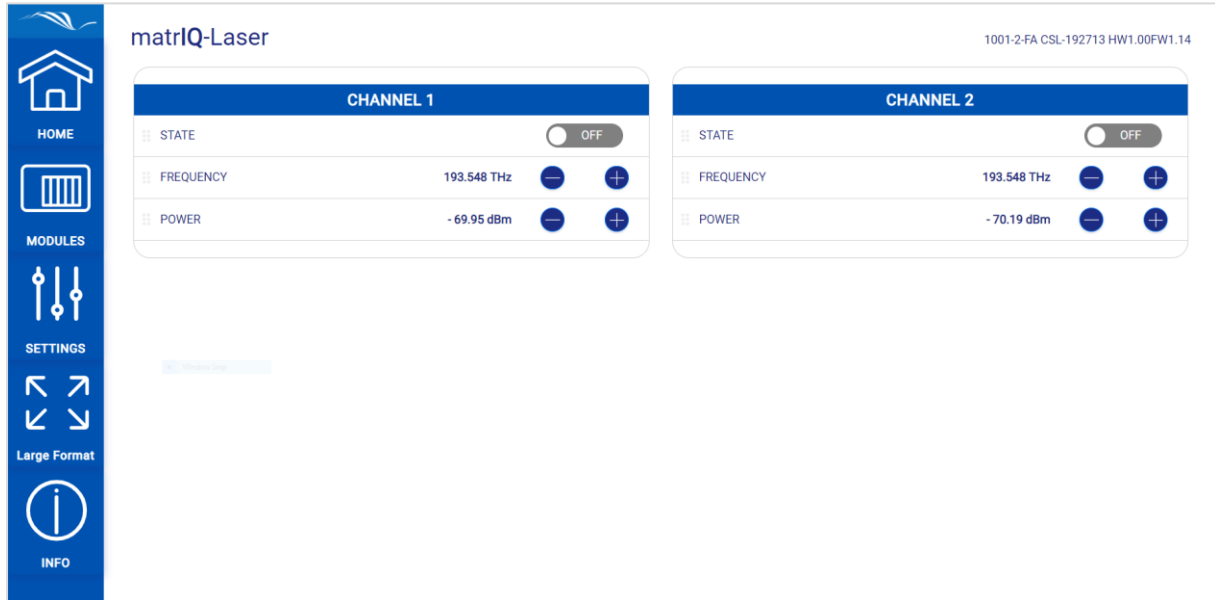
All information relating to the instrument such as the model number, serial number and firmware versions are displayed in the top right corner of the window.

8.1   Setting Channel parameter values

Specific control parameters for a given channel in the matrIQ-Laser can be set, either by clicking the parameter button, or using the **+** and **−** control buttons to increment or decrement the value field by a set amount. This step size is set in the **Settings** menu. This applies to the following parameters:

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

Alternatively, the parameter can also be set to the MIN and MAX value by clicking the dropdown in the name of the parameter.
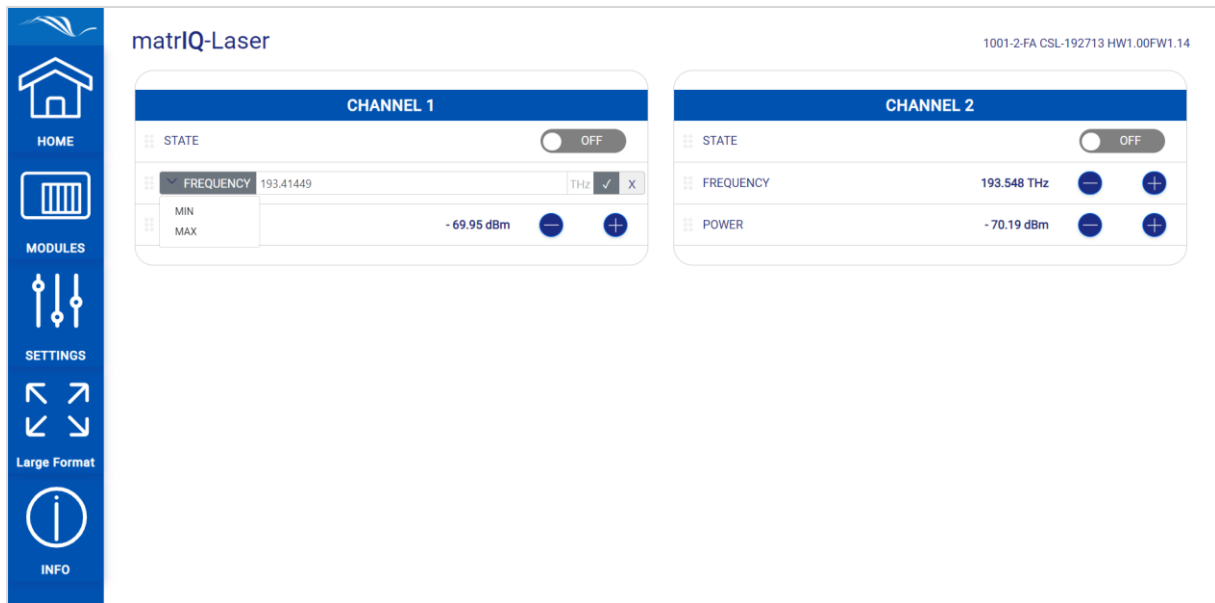
In the above example, the FREQUENCY for CHANNEL 1 has been set to **193.41449 THz** by manual input. Alternatively, clicking the MIN button in the dropdown menu will set the frequency to the minimum value.

To apply the changes, click the tickmark.

Note that after setting the desired output power and clicking the tickmark, 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.

IMPORTANT

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

8.2 Toggling the matrIQ-Laser ON/OFF

To enable the laser in a specific channel of the matrIQ-Laser ON or OFF, click the STATE button.

In the above example, the laser in CHANNEL 1 has been set to 193.41449 THz, 10 dBm of output power and STATE has been toggled ON.

IMPORTANT

After **toggling the STATE button from OFF to ON**, the matrIQ-Laser will take upto **25 seconds to stabilise** its power and frequency. Note that the cohesionUI will be unresponsive during this time.

9   Programming Guide

Introduction

Remote communication with the CSLServer 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 CSLServer. 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 CSLServer remotely using the VISA I/O.

9.1   Programming Conventions

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

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 ($01_{16} - 09_{16}$, $0B_{16} - 20_{16}$).
<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.

Index Addressing of Modules (slot, source) and Units (channel)

When executing commands, it is almost always necessary to provide the index of a specific laser module.

For the commands that require index values:

- <m>: is the channel index of a specific unit in the module, this is an integer, <1, 2, 3, 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 CSLServer transmits any data in the output queue when a read request is received. Unless explicitly specified otherwise in the command description, all output response data is transmitted in ASCII format.

9.2   Common System Command Summary

Common Commands	Description
*CLS *IDN? *OPC? *OPT?	-Clear Status command -Query the instrument identification -Query the Operation Complete Status -Query the modules managed by the CSLServer

9.3   Common System Command Descriptions

Command	*CLS
Syntax	*CLS
Description	Clear Status command
Parameters	None
Response	None
Example	*CLS

Command	*IDN?
Syntax	*IDN?
Description	Query the instrument identification
Parameters	None
Response	Comma separated string with the <manufacturer>,<server name>,<chassis controller name>,<server version>
Example	*IDN? -> Coherent Solutions Ltd,LaserMatrIQ-1001,CSL-123456,FW2.0.15

Command	*OPC?
Syntax	*OPC?
Description	Query the Operation Complete Status
Parameters	None
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? -> 0

Command	*OPT?
Syntax	*OPT?
Description	Query the modules managed by the CSLServer
Parameters	None
Response	Response will be a comma separated string of the installed modules in the chassis
Example	*OPT? -> LaserMatrIQ-1001-2-FA

9.4   Specific Command Summary

Slot commands	Description

:SLOT1
    :OPC?
    :OPTions?
    :IDN?
	
	-Query the status of the Operation Complete bit
	-Query the modules installed in the matrIQ
	-Query the Identifier for the matrIQ; returns the manufacturer, part number, serial number, hardware and firmware versions

Configuration commands	**Description**

:OUTPut1
    :CHANnel<m>
        :STATE/?
:SOURce1
    :CHANnel<m>
        :POWer/?
        :WAVelength/?
        :FREQuency/?
            :FINE/?
        :GRID/?
        :DITHer/?
        :TEMPerature?
	
	-Set or query the optical output state of the laser
	
	-Set or query the laser output power
	-Set or query the laser wavelength
	-Set or query the laser frequency
	-Set or query the laser frequency fine tuning
	-Set or query the grid spacing
	-Set or query the dither state
	-Query the laser temperature

9.5   Specific Command Descriptions

9.5.1   Slot Commands

Command	:SLOT1:OPC?
Syntax	:SLOT1:OPC?
Description	Query the status of the Operation Complete bit
Parameters	None
Response	1 is returned if the module is ready to execute a new operation 0 is returned if the module is busy
Example	SLOT1:OPC? -> 1

Command	:SLOT1:OPTions?
Syntax	:SLOT1:OPTions?
Description	Query the modules installed on the slot
Parameters	None
Response	The response will be a comma separated string of sources installed in the matrIQ Laser. If a module is not installed in a channel, it will not return any identification string.
Example	SLOT1:OPT? -> 1,1,,

Command	:SLOT1:IDN?
Syntax	:SLOT1:IDN?
Description	Query the Identifier for the slot; returns the manufacturer, part number, serial number, hardware and firmware versions.
Parameters	None
Response	Comma separated string containing the <manufacturer>, <part number>, <serial number>,<hardware version><firmware version>
Example	SLOT1:IDN? -> Coherent Solutions,LaserMatrIQ-1001-2-FC, CSL-998833,HW1.0FW1.02 **Note**: Hardware and firmware versions are combined and not separated by a comma

9.5.2 Configuration Commands

Command	:OUTPut1:CHANnel<m>:STATE
Syntax	:OUTPut1:CHANnel<m>:STATE<wsp>[ON|OFF]
Description	Set the optical output state of the laser
Parameters	ON: Enable the laser output OFF: Disable the laser output
Response	None
Example	OUTP1:CHAN1:STATE ON

Command	:OUTPut1:CHANnel<m>:STATE?
Syntax	:OUTPut1:CHANnel<m>:STATE?
Description	Query the optical output state of the laser
Parameters	None
Response	Returns the current output state of the laser
Example	OUTP1:CHAN1:STATE? -> ON

IMPORTANT

If the laser STATE is ON while setting POWer, WAVelength, FREQuency or FREQuency:FINE, note that 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	:SOURce1:CHANnel<m>:POWer
Syntax	:SOURce1: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	None
Example	SOUR1:CHAN1:POW 13.00

Command	:SOURce1:CHANnel<m>:POWer?
Syntax	:SOURce1:CHANnel<m>:POWer?<wsp>[MIN|MAX|DEF|SET|ACT|ALL]
Description	Query the laser output power
Parameters	MIN: Return the minimum programmable value MAX: Return the maximum programmable value DEF: Return the default value of power SET: Return the desired set value ACT: Return the current value (default). ALL: Returns all of the above parameters
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	SOUR1:CHAN1:POW? -> 13.00 SOUR1:CHAN1:POW? MAX -> 15.00 SOUR1:CHAN1:POW? ALL -> 10.00,15.00,10.00,13.00,13.00

Command	:SOURce1:CHANnel\<m>:WAVelength
Syntax	:SOURce1: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	None
Example	SOUR1:CHAN1:WAV 1.550000e-06

Command	:SOURce1:CHANnel\<m>:WAVelength?
Syntax	:SOURce1:CHANnel\<m>:WAVelength?\<wsp>\<value>[MIN|MAX|DEF|SET|ACT|LOCK|ALL]
Description	Query the laser wavelength
Parameters	MIN: Return the minimum programmable value MAX: Return the maximum programmable value DEF: Return the default value of wavelength SET: Return the set value (default) of the wavelength in the GRID ACT: Return the actual value of the SET wavelength LOCK: Query whether the laser is currently at the SET wavelength ALL: Returns all of the above parameters
Response	Depending on the parameters the response will be a single value or a comma separated string of values. The lock parameter will return as TRUE or FALSE.
Example	SOUR1:CHAN1:WAV? -> 1.550116e-06 SOUR1:CHAN1:WAV? MAX -> 1.568773e-06 SOUR1:CHAN1:WAV? ALL -> 1.527605e-06,1.568773e-06,1.548928e-06, 1.550000e-06,1.550116e-06,FALSE

Command	:SOURce1:CHANnel\<m>:FREQuency
Syntax	:SOURce1: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	None
Example	SOUR1:CHAN1:FREQ 1.92e+14

Command	:SOURce1:CHANnel\<m>:FREQuency?
Syntax	:SOURce1:CHANnel\<m>:FREQuency?\<wsp>\<value>[MIN|MAX|DEF|SET|ACT|LOCK|ALL]
Description	Query the laser frequency
Parameters	MIN: Return the minimum programmable value MAX: Return the maximum programmable value DEF: Return the default value of frequency SET: Return the set value (default) of the frequency in the GRID ACT: Return the actual value of the SET frequency LOCK: Query whether the laser is currently at the SET frequency ALL: Returns all of the above parameters
Response	Depending on the parameters the response will be a single value or a comma separated string 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

Command	:SOURce1:CHANnel\<m\>:FREQuency:FINE
Syntax	:SOURce1:CHANnel\<m\>:FREQuency:FINE\<wsp\>\<value\>
Description	Set the laser frequency fine tuning
Parameters	\<value\>:A valid numerical value in the frequency fine tuning range. Fine tuning can increase or decrease the frequency (positive or negative value). Valid range is from -6 GHz to 6 GHz in 1 MHz increments as detailed in the specifications.
Response	None
Example	SOUR1:CHAN1:FREQ:FINE 2e+06

Command	:SOURce1:CHANnel\<m\>:FREQuency:FINE?
Syntax	:SOURce1:CHANnel\<m\>:FREQuency:FINE?\<wsp\>[MIN|MAX|DEF|SET|ALL]
Description	Query the laser frequency fine tuning
Parameters	MIN: Return the minimum programmable value MAX: Return the maximum programmable value DEF: Return the default value of the fine tuning frequency SET: Return the set value (default) of the fine tuning frequency ALL: Returns all of the above parameters
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	SOUR1:CHAN1:FREQ:FINE? ALL -> -6.00000000e+09,6.00000000e+09,

⚠ **IMPORTANT**

The Laser STATE must always be set to OFF before attempting to change the GRID spacing.

Command	:SOURce1:CHANnel\<m\>:GRID
Syntax	:SOURce1:CHANnel\<m\>:GRID\<wsp\>\<value\>
Description	Set the channel grid spacing
Parameters	\<value\>: Is the channel grid spacing within the specification range given by the MIN and MAX grid values
Response	None
Example	SOUR1:CHAN1:GRID 2.5e+09

Command	:SOURce1:CHANnel\<m\>:GRID?
Syntax	:SOURce1:CHANnel\<m\>:GRID?\<wsp\>[MIN|MAX|DEF|SET|ALL]
Description	Query the grid spacing
Parameters	MIN: Return the minimum programmable value MAX: Return the maximum programmable value DEF: Return the default value of the grid spacing SET: Return the set value of the grid spacing. ALL: Returns all of the above parameters
Response	Depending on the parameters the response will be a single value or a comma separated string of values.
Example	SOUR1:CHAN1:GRID? SET -> 2.50000000e+09 SOUR1:CHAN1:GRID? ALL -> 1.00000000e+08,4.99999990e+10, 1.00000000e+08,2.50000000e+09,

IMPORTANT

- **NOTE:** Dither functionality is only available on modules specifically outfitted with this feature.
- When a dither state control command is issued, the module will be non-responsive for a short period of time (upto 5 seconds). Only the **:SLOT<n>:OPC?** command will execute during this period, all other commands will return an error, or time out. During this time, the front panel LED will blink rapidly, before returning to normal operation.
- When the laser dither state is OFF, if either a POWer, FREQuency, or FREQuency:FINE adjustment is made, the dither will automatically be enabled to ON for these changes to take effect. The same timeout period as mentioned above will apply.
- Before turning dither OFF, ensure that the **SOUR<n>:CHAN<m>:FREQ? LOCK** or **SOUR<n>:CHAN<m>:WAVE? LOCK** return True, and that the ACT power of the laser matches the SET power.

Command	:SOURce1:CHANnel<m>:DITHer
Syntax	:SOURce1:CHANnel<m>:DITHer<wsp>[ON|OFF]
Description	Set the dither state of the laser.
Parameters	ON: Enable dither functionality on the laser OFF: Disable dither functionality on the laser
Response	None
Example	SOUR1:CHAN1:DITH OFF

Command	:SOURce1:CHANnel<m>:DITHer?
Syntax	:SOURce1:CHANnel<m>:DITHer?
Description	Query the dither state of the laser.
Parameters	None
Response	Dither state of the laser module
Example	SOUR1:CHAN1:DITH? -> ON

Command	:SOURce1:CHANnel<m>:TEMPerature?
Syntax	:SOURce1:CHANnel<m>:TEMPerature?
Description	Query the laser temperature.
Parameters	None
Response	Temperature in Celsius
Example	SOUR1:CHAN1:TEMP? -> 49.99000168

10 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 instrument 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 instrument, power off the matrIQ-Laser immediately, 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 Technical Support

11.1 Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact Coherent Solutions. The Technical Support Group is available to take your calls from Monday to Friday, 9:00 a.m. to 5:00 p.m. (New Zealand Time).

Technical Support Group
Tel.: +64 9 478 4849
Fax: +64 9 478 4851
support@coherent-solutions.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.

You may also be requested to provide software and module version numbers. This information, as well as technical support contact information, can be found in the '*About*' window.

11.2 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 instrument 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.

12 Warranty

12.1 General Information

IMPORTANT

Keep this manual close at hand as it contains important details about your product.

Coherent Solutions Ltd. (Coherent Solutions) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. Coherent Solutions also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, Coherent Solutions will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, Coherent Solutions will charge standard calibration fees.

IMPORTANT

The warranty can become null and void if:

- The unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-Coherent Solutions 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 COHERENT SOLUTIONS BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

12.2 Liability

Coherent Solutions 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.

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

12.3 Exclusions

Coherent Solutions 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 Coherent Solutions 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 Coherent Solutions.

12.4 Certification

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

12.5 Service and Repairs

Coherent Solutions commits to providing product service and repair for five years following the date of purchase.

IMPORTANT

Coherent Solutions will charge a fee for replacing optical connectors that were damaged due to misuse or bad cleaning.

To send any equipment for service or repair:

1. Contact Coherent Solutions, contact details are on the back cover. Support personnel will determine if the equipment requires service, repair, or calibration.
2. If possible, back up your data before sending the unit for repair.
3. Pack the equipment in its original shipping material. Be sure to supply a statement or report fully detailing the defect and the conditions under which it was observed.
4. Return the equipment, prepaid, to Coherent Solutions.

Note: A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. Coherent Solutions will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

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

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