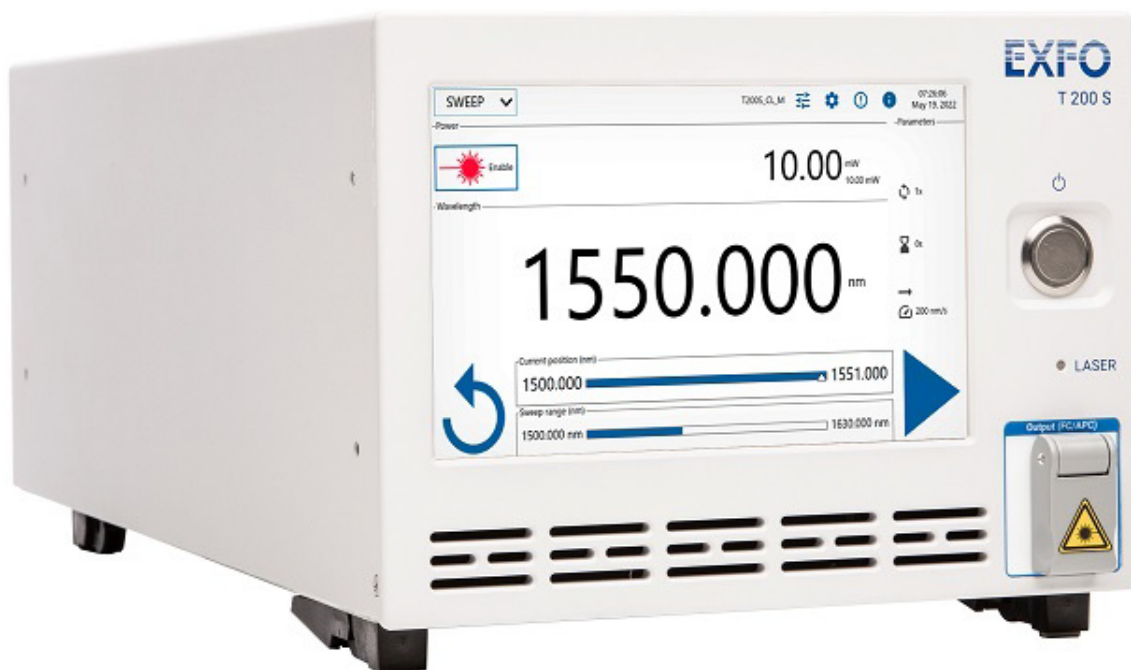


# T200S

Tunable Laser Source



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### ***Trademarks***

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### ***Units of Measurement***

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

### ***Patents***

The exhaustive list of patents is available at [www.EXFO.com/patent](http://www.EXFO.com/patent).

Document version: 1.0.0.3

Information in this document applies to the T200S embedded software package version 1.1.x

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## Regulatory Information

### USA Electromagnetic Interference Regulatory Statement

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user documentation, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

### Canada Electromagnetic Interference Regulatory Statement

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference.

Cet équipement génère, utilise et peut émettre de l'énergie radio-fréquence et, s'il n'est pas installé et utilisé conformément à la documentation de l'utilisateur, il peut occasionner une interférence néfaste aux communications radio. L'utilisation de cet équipement dans une zone résidentielle est susceptible d'occasionner une interférence néfaste.

**Caution:** This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

**Attention:** Cet appareil n'est pas destiné à être utilisé dans des environnements résidentiels et peut ne pas assurer la protection adéquate à la réception radioélectrique dans ce type d'environnements.

This is a class A, group 1 product.

- Class A equipment: Equipment that is, by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business shall be classified as class A and shall comply with the class A limits specified in the applicable ICES standard. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.

Classe A: Matériel qui, en raison de ses caractéristiques, ne sera fort probablement pas utilisé dans un milieu domiciliaire ni par des entreprises établies à domicile. Parmi les caractéristiques considérées dans cette évaluation, il y a le prix, les méthodes de commercialisation et de publicité, la mesure dans laquelle les fonctions de l'appareil font qu'il ne se prête pas à des applications convenant au milieu domiciliaire ou toute

combinaison de ces caractéristiques qui aurait pour conséquence d'en prévenir effectivement l'utilisation à domicile. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Group 1 equipment: group 1 contains all equipment which is not classified as group 2 equipment, and includes equipment such as laboratory and scientific equipment, industrial process, measurement and control equipment.

Group 2 equipment: group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material for inspection/analysis purposes, or for transfer of electromagnetic energy.

Appareils du groupe 1 : le groupe 1 réunit tous les appareils compris dans le domaine d'application de la présente Norme, qui ne sont pas classés comme étant des appareils du groupe 2. Le groupe 1 inclut les appareils scientifiques et de laboratoire, les processus industriels, appareils de mesure ou de contrôle.

Appareils du groupe 2 : le groupe 2 réunit tous les appareils ISM à fréquences radioélectriques dans lesquels de l'énergie à fréquences radioélectriques dans la plage de fréquences comprises entre 9 kHz et 400 GHz est produite et utilisée volontairement ou uniquement utilisée localement sous forme de rayonnement électromagnétique, de couplage inductif et/ou capacitif, pour le traitement de la matière, à des fins d'examen ou d'analyse ou pour le transfert d'énergie électromagnétique.

### **Supplier's Declaration of Conformity (SDoC)**

The SDoC for your product is as follows:

CAN ICES-001 (A) / NMB-001 (A)

### **EU and UK Electromagnetic Compatibility Regulatory Statement**

Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. Your product is suitable for use in industrial electromagnetic environments.

### **EU and UK Declaration of Conformity**

The full text of the declaration of conformity is available at the following Internet address:  
*[www.exfo.com/en/resources/legal-documentation](http://www.exfo.com/en/resources/legal-documentation)*.

### **EU Economic Operator**

**EXFO Solutions SAS**  
2, rue Jacqueline Auriol,  
Saint-Jacques-de-la-Lande,  
35091 Rennes Cedex 9  
FRANCE

# 1 Introducing the T200S Tunable Laser Source

The T200S is a continuously tunable laser source that cover the C- and L-band of telecom application. The embedded software enables you to control the product operations through a graphical user interface or through remote commands and queries.

## Technical Specifications

This section describes the T200S technical specifications and requirements.

### Optical Measurement Specifications



#### IMPORTANT

To obtain this product's most recent technical specifications, visit the EXFO Web site at [www.exfo.com](http://www.exfo.com).

### Hardware Specifications

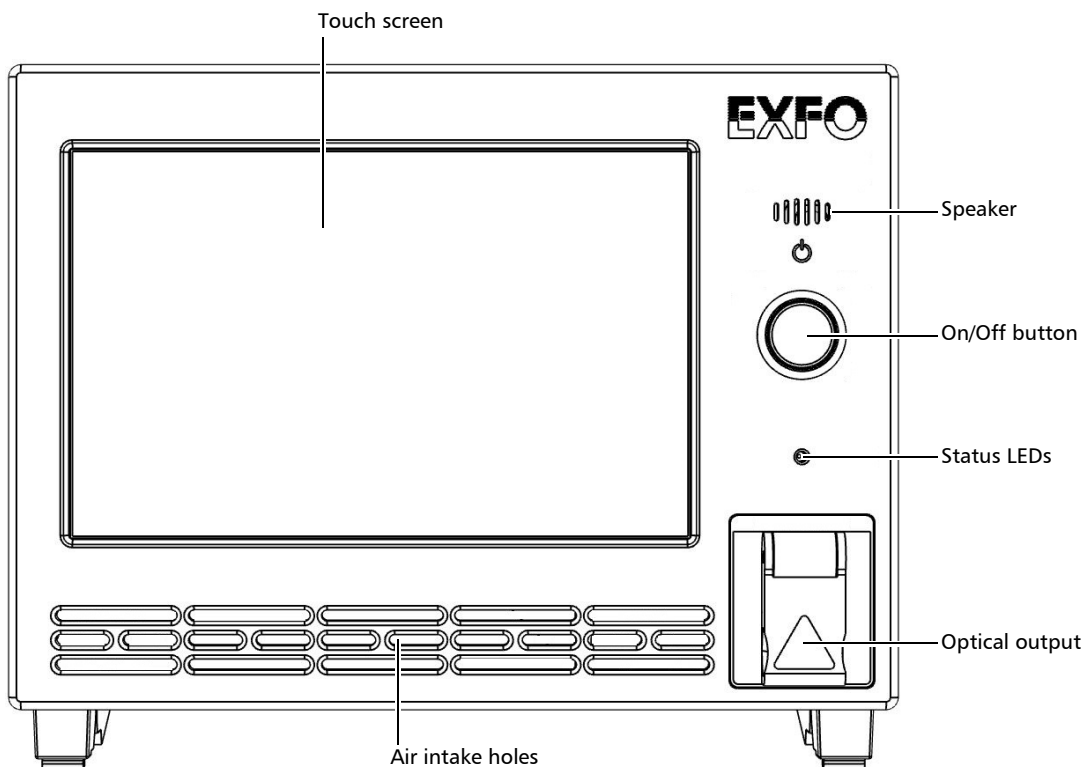
Hardware			
<b>Interfaces for External Devices</b>	USB-A 2.0 (x2)		Mouse, keyboard, or USB key for software update
	USB-A 3.0 (x1)		
<b>Remote Interface</b>	Ethernet	RJ45 (x1)	1 Gbit/s. A shielded Ethernet cable is required.
<b>Electrical Interfaces</b>	In (BNC)	Trig in	0-5 V TTL
	Out (BNC)	Trig out	0-5 V TTL
		Power out	
		$\lambda$ out	
	Maximum cable length		10 m (32.8 ft)
<b>Electrical Specifications</b>	Input power		see <i>Electrical Safety Information</i> on page 10.
	Fuses (x2)		T4AH250V
	Maximum power consumption		72 W
<b>Physical Specifications</b>	Dimensions (H x W x D)		173 mm x 217 mm x 473 mm (6.8 in x 8.5 in x 18.6 in)
	Weight		9 kg (19.8 lb)

## T200S Overview

The T200S is delivered with the following accessories:

- 1 power supply cable
- 1 patchcord
- 1 printed manual *Getting Started with T200S*
- 1 USB key containing the system package version installed on your T200S, remote examples (if any) and user documentation.

### Front panel



#### **On/Off button**

The On/Off button enables you to turn on or off the T200S (see *Turning on the T200S and Accessing the GUI* on page 16 and *Turning off the T200S* on page 18).

#### **Status LEDs**

The status led is lit if the laser diode is enabled.

#### **Touch screen**

The touch screen enables you to perform all possible operations on the T200S.

#### **Speaker**

Reserved for future use.

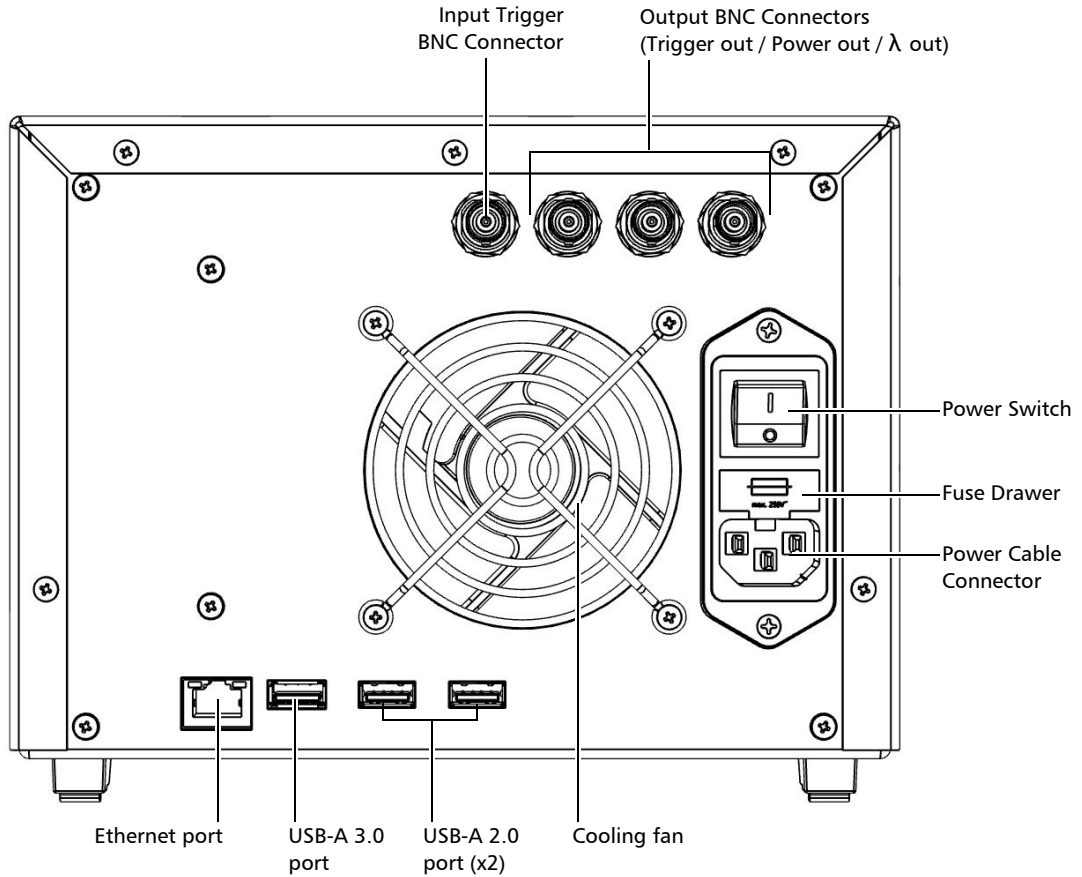


**Optical output connector**

The FC/APC optical output connector is protected by a safety cap.

The laser warning symbol indicate the location of the laser source. For more details, see *Laser Safety Information* on page 8.

**Rear panel**



**BNC Connectors**

The BNC connectors enable you to synchronize T200S sweeps with external instruments (see *Hardware Specifications* on page 1 for more details on signal levels).

- **Trig in:** input BNC connector for starting sweep in synchronization with an external trigger input signal. For more details, see *Triggering the Sweep Sequence* on page 34.
- **Trig out:** output BNC connector for outputting a trigger signal during wavelength/frequency emission. For more details, see *Generating an Output Trigger Signal during Emission* on page 29 and *Generating an Output Trigger Signal During Sweep* on page 36.
- **Power out:** output BNC connector for power monitoring. For more details, see *Monitoring the Laser Output Power* on page 41.
- **λ Out:** output BNC connector for wavelength monitoring. It provides an analog reading related to the wavelength in nm. For more details, see *Monitoring the Wavelength Electrical Level* on page 38.

### USB-A Ports

The **SS**  label identifies the USB-A 3.0 ports, the  identifies the USB-A 2.0 ports.

These ports enable you to connect USB devices such as:

- a keyboard and mouse if needed
- a USB key for software update

For more details on USB connections, see *Connecting a Mouse and Keyboard to the T200S* on page 16.

### Ethernet Port

The  label identifies the Ethernet port, which enables you to:

- Connect the T200S to your network. For more details, see *Connecting the T200S to your Company Network* on page 21.
- Perform remote control operations on the T200S. For more details, see *Remotely Controlling the T200S* on page 43.

### Cooling Fan

The cooling fan extract warm air from inside (air enters in front of the T200S). A cover grid protects the fan.

### Power Input

The power input part includes the following elements:

- **Power Switch**
- **Power Cable Connector**









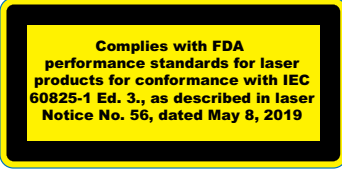



The T200S is equipped with a self-regulating power supply.

- **Fuse Drawer**

The fuse drawer contains two fuses to protect the T200S from overcurrent (for fuse type, see *Hardware Specifications* on page 1).

For details on how to replace the fuses, see *Replacing Fuses* on page 58.

**Labels and Markings**

Label	Description
	<p>Identification of the product.</p>
	<p>Manufacturer identification. Contact information of the manufacturer.</p>
	<p>Fuse type. See <i>Hardware Specifications</i> on page 1.</p>
	<p>Indicates an injury hazard. It appears on a location that requires special instructions for proper use: see <i>Electrical Safety Information</i> on page 10.</p>
	<p>WEEE symbol for recycling. See <i>Recycling and Disposal</i> on page 59.</p>
	<p>Safety certification label.</p>
<p>CAN ICES-001 (A) / NMB-001 (A)</p>	<p>Canadian certification. See <i>Regulatory Information</i> on page v.</p>
	<p>UK conformity assessment. See <i>Regulatory Information</i> on page v.</p>
	<p>CE marking. See <i>Regulatory Information</i> on page v.</p>
	<p>Laser safety label The product is a class 1M laser product. For more details, see <i>Laser Safety Information</i> on page 8.</p>
	<p>EFUP label (RoHS China) See <i>Chinese Regulation on Restriction of Hazardous Substances (RoHS)</i> on page 139.</p>
	<p>Windows license label. The T200S embeds Windows 10.</p>
	<p>Warranty seal. The T200S cover must not be open, otherwise the warranty is not valid anymore.</p>

### Conventions

Before using the product described in this guide, you should understand the following conventions:



#### **WARNING**

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



#### **CAUTION**

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



#### **CAUTION**

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



#### **IMPORTANT**

Refers to information about this product you should not overlook.

## 2 **Safety Information**



### **WARNING**

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.



### **WARNING**

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.



### **WARNING**

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



### **WARNING**

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.




### **IMPORTANT**

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.




### **IMPORTANT**

When you see the following symbol on your unit , make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.



### **IMPORTANT**

When you see the following symbol on your unit , it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.

## Safety Information

### Laser Safety Information

---



### IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

## Laser Safety Information

Your instrument is in compliance with standard IEC 60825-1: 2014.



### WARNING

Viewing the laser output with telescopic optical instruments (for example, telescopes and binoculars) may pose an eye hazard and thus the user should not direct the beam into an area where such instruments are likely to be used.

Laser radiation may be encountered at the optical output port.

The following label indicates that the product contains a Class 1M source:



INVISIBLE LASER RADIATION  
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS  
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS  
CLASS 1M LASER PRODUCT











RAYONNEMENT LASER INVISIBLE  
NE PAS OBSERVER DIRECTEMENT À L'AIDE D'INSTRUMENTS D'OPTIQUE  
NE PAS EXPOSER LES UTILISATEURS DE DISPOSITIF OPTIQUE  
TÉLESCOPIQUE  
APPAREIL À LASER DE CLASSE 1M

Pout max.: / Psortie max. :  $\leq 50$  mW

Complies with FDA performance standards for laser products except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

## Other Safety Symbols on Your Unit

One or more of the following symbols may also appear on your unit.

Symbol	Meaning
	Direct current
	Alternating current
	The unit is equipped with an earth (ground) terminal.
	The unit is equipped with a protective conductor terminal.
	The unit is equipped with a frame or chassis terminal.
	On (Power)
	Off (Power)
 OR 	On/off (Power)
	Fuse

### Electrical Safety Information

This unit uses an international safety standard three-wire power cable. This cable serves as a ground when connected to an appropriate AC power outlet.



#### WARNING

- If you need to ensure that the unit is completely turned off, disconnect the power cable.
- Use only the certified power cord that is suitably rated for the country where the unit is used.
- Replacing detachable MAINS supply cords by inadequately RATED cords may result in overheating of the cord and create a risk of fire.

The color coding used in the electric cable depends on the cable. New plugs should meet the local safety requirements and include:

- adequate load-carrying capacity
- ground connection
- cable clamp



#### WARNING

- Use this unit indoors only.
- Do not remove unit covers during operation.
- Operation of any electrical instrument around flammable gases or fumes constitutes a major safety hazard.
- To avoid electrical shock, do not operate the unit if any part of the outer surface (covers, panels, etc.) is damaged.
- Only authorized personnel should carry out adjustments, maintenance or repair of opened units under voltage. A person qualified in first aid must also be present. Do not replace any components while the power cable is connected.
- Use only fuses with the required rated current and specified type . Do not use repaired fuses or short-circuited fuse holders. For more information, see the section about replacing the fuses in this user documentation.
- Unless otherwise specified, all interfaces are intended for connection to Safety Extra Low Voltage (SELV) circuits only.
- Capacitors inside the unit may be charged even if the unit has been disconnected from its electrical supply.





## CAUTION

Position the unit so that the air can circulate freely around it.

Equipment Ratings		
Temperature	Operation	+15 °C to +35 °C (+59 °F to +95 °F)
	Storage	-20 °C to +50 °C (-4 °F to 122 °F)
Performance guaranteed temperature		+18 °C to +28 °C (+64.4 °F to +82.4 °F)
Relative humidity		< 80% (non condensing)
Maximum operation altitude		< 2000 m (6562 ft)
Pollution degree		2
Overvoltage category		II
Measurement category		Not rated for measurement categories II, III, or IV
Input power <sup>a</sup>		100–240 V ~; 50/60 Hz; 0.65–0.3 A

a. Not exceeding  $\pm 10\%$  of the nominal voltage.



## CAUTION

► The use of voltages higher than those indicated on the label affixed to your unit may damage the unit.



# 3 Getting Started with Your T200S

This section explains how to properly install and connect your T200S.

## Unpacking and Installing the T200S

The T200S is designed for indoor use only, and is not dedicated to wet locations. It must be operated under proper environment conditions, as explained in the following procedure.

This section explains how to install the T200S as a bench top instrument.

To install the T200S into a rack, EXFO provides a specific rack mount shelf (for more details, contact your sales representative). The procedure to install the T200S into a 19" rack is available in the manual delivered with the rack mount kit.



### CAUTION

- Make sure the location where the T200S will be installed meets the environmental characteristics listed in *Electrical Safety Information* on page 10.
- Do not install the T200S near any source of heat or cold.
- To ensure proper ventilation and cooling, make sure there is sufficient clearance at the front and at the rear of the T200S in the place where it will be installed.

#### To unpack and install the T200S:

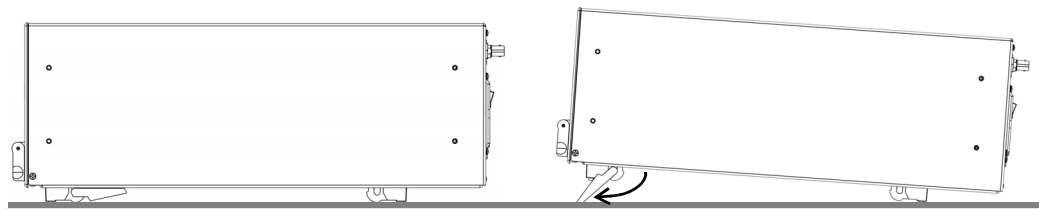
1. Open the package with care and remove the protective foam.



### IMPORTANT

When unpacking, handle the device with care and do not damage the original shipping container in case the T200S needs to be returned to EXFO.

2. Pull out the T200S vertically from its packaging and keep it horizontal.
3. Set the T200S on a flat stable surface free of excessive vibration.
4. Allow the flow of air to circulate freely at the front and rear of the T200S and remove any equipment or paper that could block the air flow. Ventilation holes are located on the front and rear sides of the T200S.
5. On the rear panel (see *Rear panel* on page 3), make sure the power switch is set to **O**.
6. To tilt the T200S upward (bench-top use only), deploy the two retractable legs located below it, as illustrated in the following figure.



### Connecting the T200S to a Power Source

The T200S has a chassis connected to ground via the power supply cable. A protective ground connection by way of the grounding conductor in the power cable is essential for safe operation.



#### WARNING

- Make sure the wall socket on which the T200S will be plugged is protected by a 16 A max circuit breaker.
- Make sure the T200S power source does not apply more than 265 Volts RMS between the supply conductors and the ground.
- To avoid the possibility of injury, make sure the socket outlet in which the power supply cable will be plugged is equipped with a protective ground contact, and that the electrical installation fulfills the local safety requirements.

#### **To connect the T200S to a wall socket:**

1. Make sure the power switch is set to **O**.
2. On the rear panel, connect the power supply cable provided with the instrument to the mains socket located on the rear panel of the T200S.
3. Plug the other end of the power supply cable to the proper voltage wall socket outlet (to know the voltage requirement, see *Electrical Safety Information* on page 10).
4. On the rear panel, set the power switch to **I**.

## Connecting External Optical Devices to the T200S

This section explains how to connect external optical components and instruments to the T200S.



### CAUTION

The standard output connector is an FC/APC connector. Never connect another type of connector to the optical output. To connect other types of connectors such as FC/PC, make sure to use the appropriate FC/APC converter.



### WARNING

- The use of optical instruments with this product increases eye hazard: see *Laser Safety Information* on page 8.
- The laser radiation is not visible to the human eye: always replace the protective cap on the laser output connector after use to avoid involuntary exposure to laser radiation.

#### **To connect an external optical device:**

1. Disable the laser output before connecting or disconnecting a fiber optic cable on the product.
2. Make sure fiber-optic connectors are clean (see *Cleaning the Optical Connector* on page 54). Keeping fiber-optic connectors clean at all times is essential to achieve optimum system performance.
3. On the front panel, lift the protective cap and connect an external optical component or instruments to the T200S via the FC/APC fiber-optic connector. To protect the laser output connector, leave a fiber-optic cable connected to the product while making connections to other devices.

# Connecting a Mouse and Keyboard to the T200S

To operate the T200S GUI, you can use the touchscreen or connect a USB mouse and keyboard to the USB-A 2.0 and USB-A 3.0 ports located on the rear panel of the T200S (see *T200S Overview* on page 2).

### **To connect a mouse and keyboard:**

Connect the USB mouse and keyboard to one of the available USB-A ports of the T200S mainframe (you do not need to restart the T200S).

All operations available using the multi-touch screen are also accessible using the mouse and keyboard (QWERTY keyboard).

# Turning on the T200S and Accessing the GUI

At startup, the T200S initializes before warming up and performing internal referencing. You can decide to skip the warming-up and full referencing operation during startup: in this case, you can fully use the T200S but performances are not guaranteed.

The touch screen display enables you to access all the T200S functions.



## CAUTION

During the startup routine, the T200S produces a laser beam. To avoid eye damage, do not look into the laser output or into the end of an optical cable.

### **To access the T200S graphical user interface:**

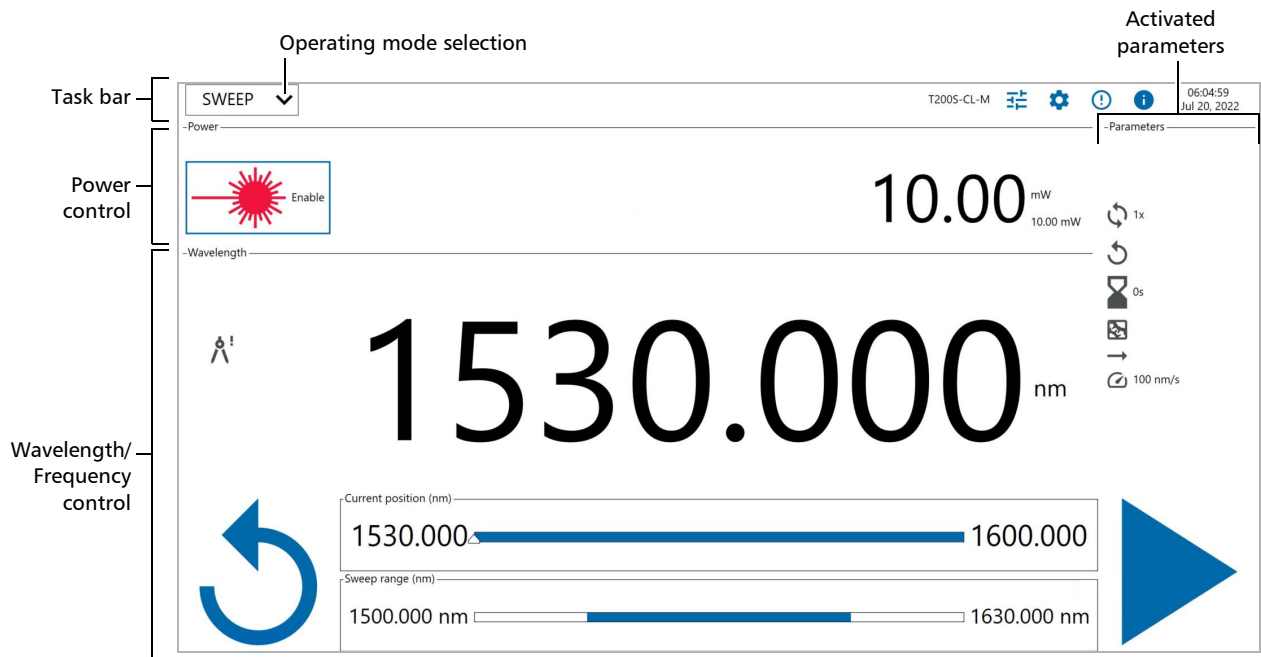
1. Make sure the T200S is properly installed: see *Unpacking and Installing the T200S* on page 13.
2. On the T200S front panel, press the on/off button (see *Front panel* on page 2).
3. If you start the T200S for the first time, accept the license agreement.









The startup routine starts.






4. Do one of the following:

- Wait until the end of the full startup procedure. The full startup procedure takes approximately 1 hour.
- Skip the warm-up operation by touching the **Skip** button when it appears on screen. In this case, the startup procedure takes approximately 1 minute.

The startup procedure completes. The laser beam is enabled and the T200S is ready to be used.



Area	Available button	Description
<b>Task bar</b>		Enables you to select the T200S operating mode. For more details, see <i>Setting the Emission Wavelength/Frequency</i> on page 25.
		
		
		Opens the operating mode setting menu. For more details, see <i>Setting the Emission Wavelength/Frequency</i> on page 25.
		Opens the T200S settings window, to define general parameters, connect the T200S, update the T200S or perform wavelength reference.
		Opens the event log. For more details, see <i>Displaying the List of Errors and Warnings</i> on page 64.
		Opens the T200S information window. For more details, see <i>Viewing System Information</i> on page 65.
<b>Power control area</b>	Displays the laser power.	
		Enables/Disables the laser diode. For more details, see <i>Enabling/Disabling the Laser Output</i> on page 39.

Area	Available button	Description
<b>Wavelength/ Frequency control area</b>	Displays the laser wavelength/frequency and enables you to operate it, depending on the selected operating mode.	
		Appears if the T200S needs internal referencing. This button performs an internal wavelength referencing. For more details, see <i>Performing Internal Wavelength Referencing</i> on page 37.
		Appears if a warning occurred. This button displays the last issued warning. For more details, see <i>Displaying the List of Errors and Warnings</i> on page 64.
		Means that the laser is initializing.
		Means that the laser is warming up.
		Means that the laser is stabilizing.
<b>Parameters area</b>	Displays icons representing the parameters you have selected for the current operating mode.	

## Turning off the T200S

The following procedure explains how to properly turn off the T200S.

To keep the last user configuration in memory so that it is loaded at next startup, see *Handling User Configuration* on page 23.



### CAUTION

Never turn the T200S off by directly setting the power switch to **O**: the optical core would not be securely parked and could be damaged if the instrument is moved. Follow the procedure below to properly park the optical core at shutdown.

#### **To turn the T200S off:**

1. Make sure that no sweep is in progress.
2. On the T200S front panel, shortly press the on/off button.  
The T200S stops and the optical core is properly parked.
3. On the rear panel, set the power switch to **O**.



# 4 Setting Up Your T200S


This section explains how to set general and network parameters:

- *Defining the Display Colors* on page 19
- *Setting the Date and Time* on page 20
- *Connecting the T200S to your Company Network* on page 21
- *Renaming the Instrument* on page 22
- *Handling User Configuration* on page 23

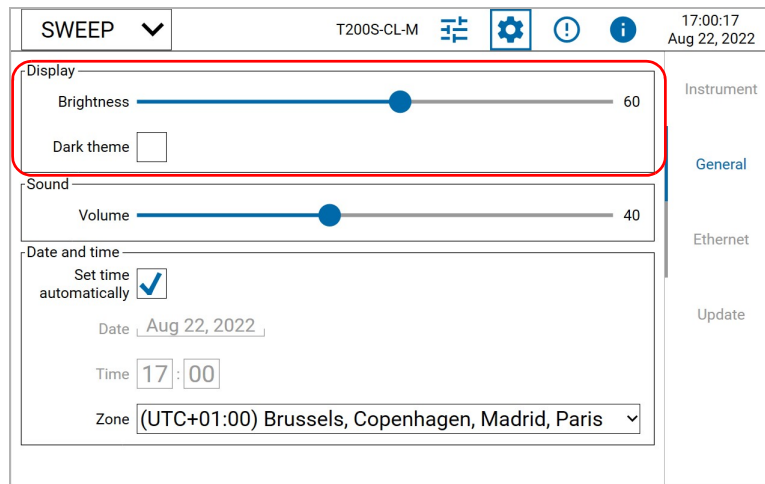
## Defining the Display Colors


You can change the theme of the display and modify its brightness as explained in the following procedures.

### To modify the brightness and theme:

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **General** tab.

The **Display** area enables you to define the colors of the T200S GUI.



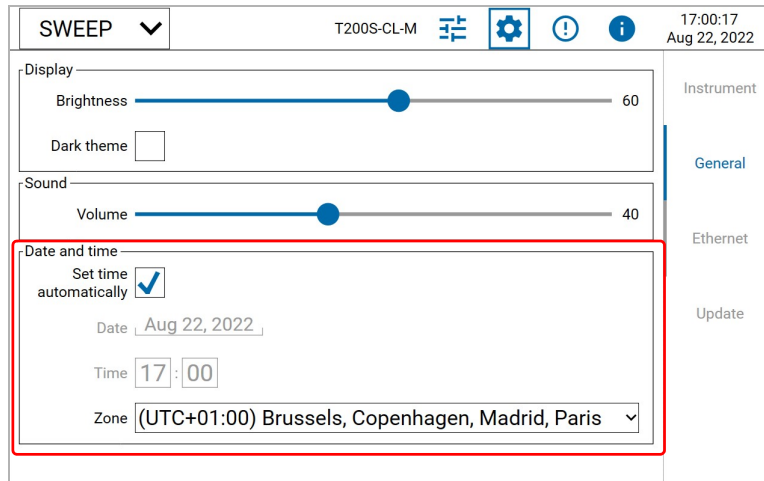
2. To increase or decrease the brightness of the T200S GUI, slide the **Brightness** cursor.
3. To shift the light colors on screen to darker colors, select the **Dark theme** check box.
4. Touch the  button to exit the **Settings** window.

If the T200S is connected to a network, it can automatically set the date and time depending on your time zone. You can also choose to manually set the date and time.

#### To set the date and time:


1. In the T200S task bar, touch the  button to display the **Settings** window and select the **General** tab.

The **Date and time** area enables you to set the date and time of the T200S.



2. To manually set the date and time:
  - 2a. Clear the **Set time automatically** check box.
  - 2b. Touch the **Date** and **Time** fields to enter the date and time of your location.
  - 2c. In the **Zone** list, select the time zone of your location.
3. If your T200S is connected to a network and you want the date and time to be automatically set by the T200S:
  - 3a. Select the **Set time automatically** check box.
  - 3b. In the **Zone** list, select the time zone of your location.

The date and time is automatically set.


4. Touch the  button to exit the **Settings** window.

## Connecting the T200S to your Company Network

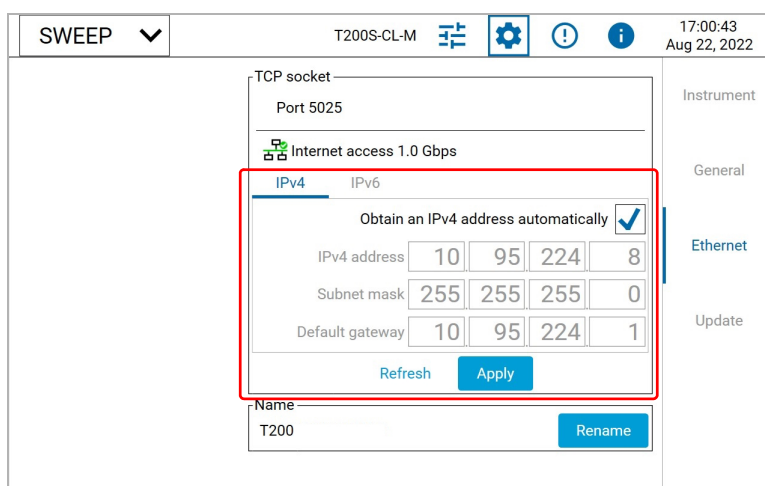
The Ethernet port enables you to connect your T200S to your company network.

It enables you to install the last operating system security updates (see *Updating the Operating System Version* on page 57) and to perform remote control operations on the T200S (see *Remotely Controlling the T200S* on page 43).




### To connect the T200S to your company network:

1. Connect an RJ45 cable from your company network to the T200S Ethernet port.
2. In the T200S task bar, touch the  button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S.



The screenshot shows the T200S settings interface. At the top, there's a status bar with 'SWEEP', 'T200S-CL-M', a gear icon, a warning icon, an info icon, and the time '17:00:43 Aug 22, 2022'. The main content area is titled 'TCP socket' and shows 'Port 5025'. Below that, there's a green icon and 'Internet access 1.0 Gbps'. The 'IPv4' tab is selected, showing 'Obtain an IPv4 address automatically' with a checked checkbox. The IPv4 address is '10.95.224.8', the subnet mask is '255.255.255.0', and the default gateway is '10.95.224.1'. There are 'Refresh' and 'Apply' buttons. At the bottom, the name is 'T200' with a 'Rename' button. On the right side, there's a vertical menu with 'Instrument', 'General', 'Ethernet', and 'Update'.

- : indicates that the connection is established and displays the connection speed.
- : indicates that the connection to the network is not established, or that the T200S is directly connected to a computer (see *Setting the T200S Ethernet Port* on page 43).
- : indicates that the port is not connected to any external device.



## IMPORTANT


Make sure that the firewall of your computer allows communication on the 5025 port.

## Setting Up Your T200S

### Renaming the Instrument

3. Select the tab corresponding to your IP address type: **IPv4** or **IPv6**
4. To manually set the connection parameters:
  - 4a. Clear the **Obtain an IP address automatically** check box.
  - 4b. Set the IPv4 or IPv6 (depending on your network configuration) address , subnet mask or prefix length and default gateway to identify your T200S.
5. To automatically retrieve the connection parameters (IP address, subnet mask and default gateway) from the connected network (DHCP), select the **Obtain an IP(v6) address automatically** check box.


The connection is automatically established. You cannot modify the connection values.

6. Touch **Apply** to validate the set connection parameters.
7. If you want to retrieve the previously applied connection parameters, touch the **Refresh** button.
8. Touch the  button to exit the **Settings** window.

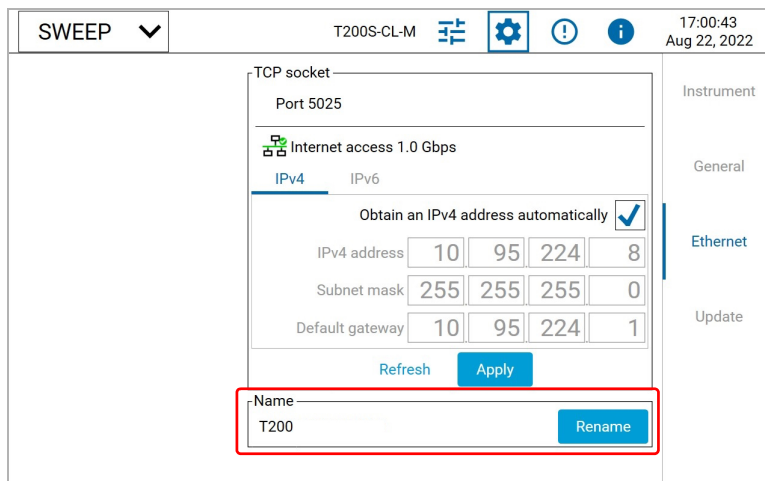
## Renaming the Instrument

The default instrument name is "T200-<serial number>". The following procedure explains how to change the instrument name.

### To change the instrument name:

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **Ethernet** tab.


The **Name** area enables you to rename the T200S.



The screenshot shows the settings interface for a T200S instrument. At the top, there's a status bar with 'SWEEP', 'T200S-CL-M', and a gear icon. Below that, the 'Ethernet' settings are displayed. The 'Obtain an IPv4 address automatically' checkbox is checked. The IPv4 address is set to 10.95.224.8, the subnet mask is 255.255.255.0, and the default gateway is 10.95.224.1. At the bottom of the settings, there's a 'Name' field containing 'T200' and a 'Rename' button. The 'Name' field and the 'Rename' button are highlighted with a red box.

2. Touch the **Rename** button.
3. Modify the instrument name (15 characters maximum) and touch **Rename**.

The instrument name will be modified at next startup.


4. Touch the  button to exit the **Settings** window.

## Handling User Configuration

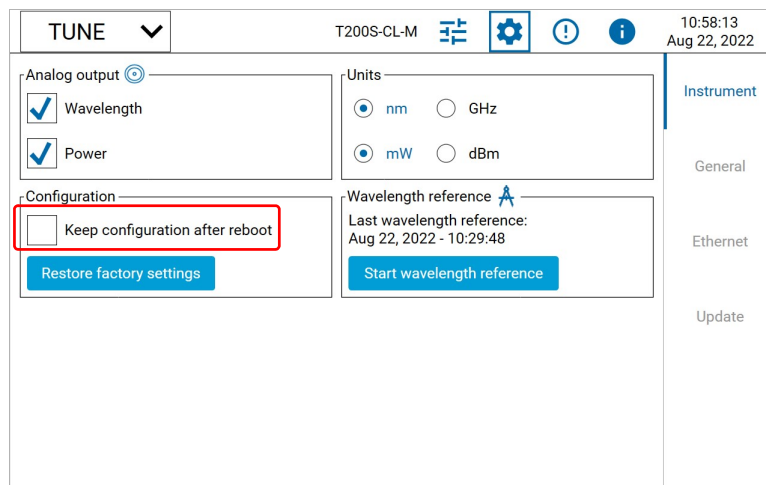
The following procedures explain how:

- Keep the last user configuration in memory (customized laser settings) so that it is loaded at next startup.
- Restore the original default parameters, which means delete all customized user settings.

### To keep the user configuration in memory before shutdown:

1. In the task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.


The **Configuration** area enables you to manage your laser configuration.



2. Select the **Keep configuration after reboot** check box.

The laser configuration will be kept in memory before shutdown, to be loaded at next startup.

Selecting this check box also modifies the default parameters of your SCPI remote control session: to start your remote control session with the instrument default parameters, clear the **Keep configuration after reboot** check box or send \*RST at the beginning of your remote control script.


3. Touch the  button to exit the **Settings** window.

## Setting Up Your T200S

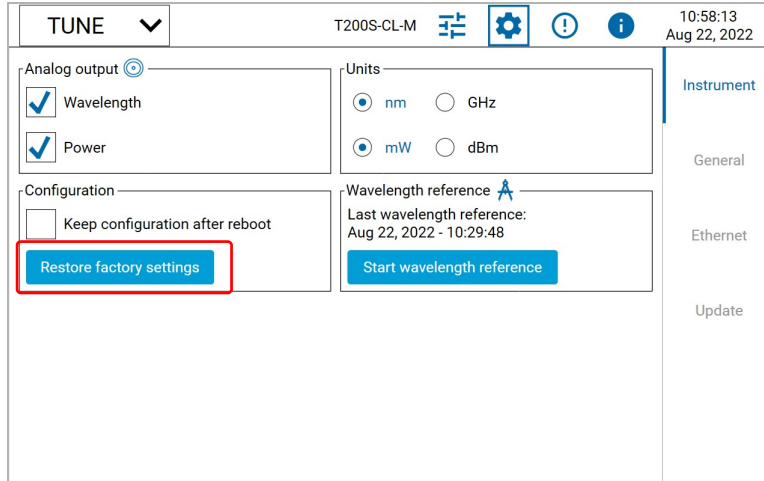
### Handling User Configuration


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#### To restore factory settings:

1. In the task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.

The **Configuration** area enables you to manage your laser configuration.



2. Touch the **Restore factory settings** button.  
All user customized settings are deleted.
3. Touch the  button to exit the **Settings** window.

# 5 Setting the Emission Wavelength/Frequency

The T200S provides the following operating modes:

➤ **SWEEP** mode

This mode enables you to perform continuous sweeps over the entire operational wavelength or frequency range.

➤ **TUNE** mode

This mode enables you to tune the laser by entering fix emission wavelength or frequency values.



## IMPORTANT

The entered wavelength/frequency is only applied if the laser is enabled. If the laser diode is turned off, you can still enter the wanted values but the laser cannot sweep. To turn on the laser diode, see *Enabling/Disabling the Laser Output* on page 39.


## Defining General Emission Settings

This section explains how to configure the wavelength/frequency emission settings that apply to all operating modes.

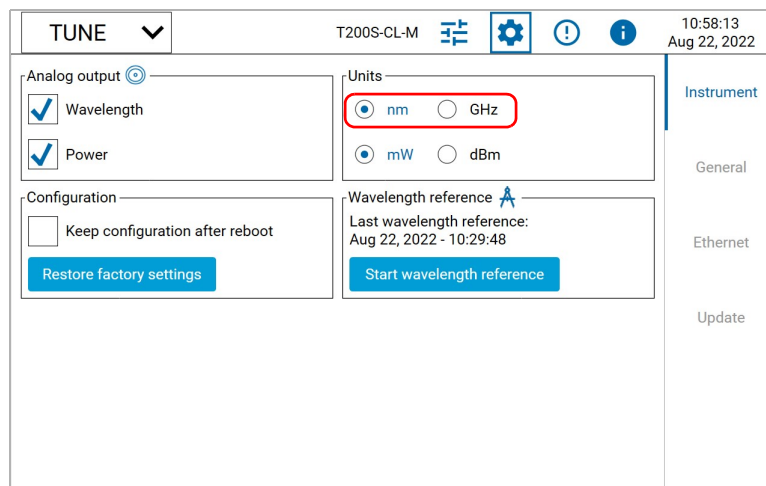
### Defining the Spectral Unit


You can define the spectral unit you want to use for all operating modes in the **Settings** window, as explained in the following procedure.

**To set the spectral unit:**

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.

The **Units** area enables you to configure the spectral (and power) units.



2. Set the spectral unit you want to use by selecting **nm** or **GHz**.
3. Touch the  button to exit the window.

### Tuning the Emission Wavelength or Frequency

The **TUNE** mode enables you to tune the laser to a fix wavelength/frequency by using one of the following method:


- Typing a precise (absolute) emission wavelength or frequency value: see *Setting the Emission Value (Absolute Tuning)* on page 27.
- Increasing or decreasing the emission wavelength/frequency laser position by applying a predefined step relatively from the absolute wavelength/frequency: see *Applying a Predefined Step (Relative Tuning)* on page 28.

### Selecting the Tune Operating Mode

Two modes are available to tune the laser:

- **High accuracy** mode


The **High accuracy** mode provides optimum accuracy when the laser moves to a wavelength/frequency value you have manually entered: when you modify the wavelength/frequency value, the laser moves to the absolute wavelength or frequency position, with optimum absolute accuracy (according to your laser optical specifications). Activating this setting may slightly slow down the move of the laser to the entered position.

If the  button is displayed on screen, high accuracy performances are not guaranteed because the T200S needs internal referencing (see *Performing Internal Wavelength Referencing* on page 37).

- **Optimized linewidth** mode

The **Optimized linewidth** mode enables you to get the minimum possible linewidth when the laser is fix and stable, and to perform fine tuning. This mode slightly increases the stabilization time, and disables the high accuracy setting (accuracy may differ from specification).



#### To select the Tune operating mode:

1. In the TUNE mode window, touch the  button.

The mode setting menu appears.

2. In the **Tune parameters** area, select the wanted operation mode:

In the **Parameters** area of the TUNE window, the corresponding icon appears:

-  icon for **High accuracy** mode.
-  icon for **Optimized linewidth** mode

The selected mode will be applied at the next tuning operation.



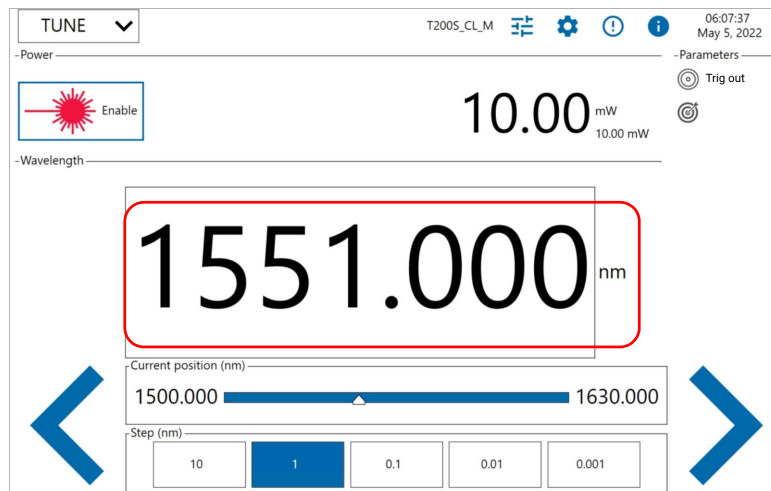
### Setting the Emission Value (Absolute Tuning)

The following procedure explains how to manually modify the absolute emission wavelength or frequency.

If you have activated the **High accuracy** mode, the wavelength/frequency is reached with optimum accuracy.


#### **To enter the emission wavelength/frequency:**

1. In the task bar, select the **TUNE** mode in the drop-down list.
2. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 39).
3. In the **Wavelength** control area, touch the wavelength/frequency value.



The keypad appears on screen.

4. Type the wanted value and touch **Enter**.

The  icon appears on screen and the emission value is grayed: the laser is stabilizing.

Once stable, the icon disappears and the emission value appears in black.

## Setting the Emission Wavelength/Frequency


Tuning the Emission Wavelength or Frequency

### Applying a Predefined Step (Relative Tuning)

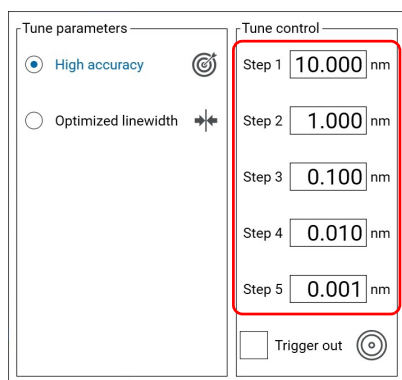
This section explains how to configure the step values and then manually increase or decrease the emission wavelength/frequency step by step: this moves the laser relatively from the absolute wavelength/frequency position (see *Setting the Emission Value (Absolute Tuning)* on page 27), which means that the high accuracy specification cannot be met.

- In **High accuracy** mode, you can define the wanted step values. Tuning the laser using steps (reached relatively from the absolute wavelength/frequency position) cancels high accuracy.
- In **Optimized linewidth** mode, the steps are set to 0.005 nm and 0.001 nm (or 0.5 GHz and 0.1 GHz) and cannot be modified.

#### To define the tuning steps (High accuracy mode only):

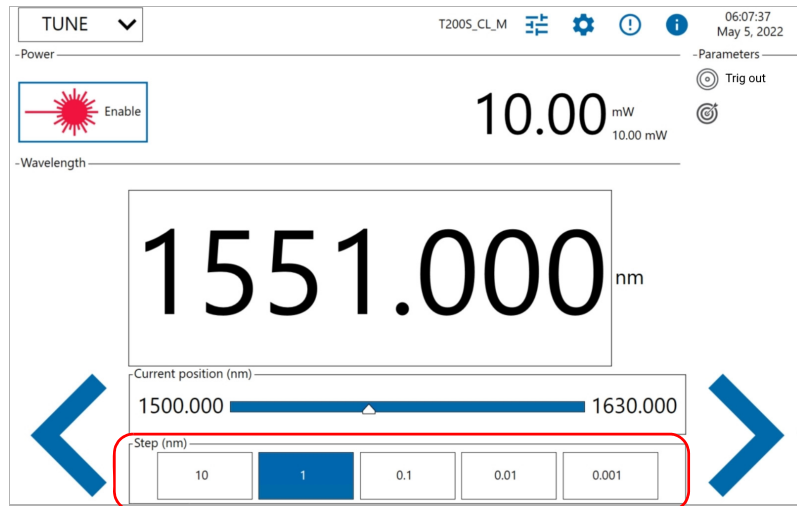
1. In the **TUNE** mode window, touch the  button.

The mode setting menu appears.





2. Make sure the **Tune parameters** setting is set to **High accuracy**.
3. In the **Tune control** area, touch a step value and type the wanted value by using the keypad.
4. Define the wanted step value for each of the five available steps.
5. Touch anywhere on the screen outside the menu to exit the mode setting menu.

The defined steps are displayed in the **Step** area of the TUNE mode window.



#### To apply the defined steps to the emission wavelength/frequency:


1. In the TUNE mode window, in the **Step** area, select the step value that you want to use as increment or decrement step.
2. Decrement or increment the wavelength/frequency step by step by touching the  and  buttons.


The wavelength/frequency is increased or decreased by the selected step value, without high accuracy (relatively from the absolute wavelength/frequency position).

## Generating an Output Trigger Signal during Emission

In TUNE mode, the T200S can generate a trigger signal once the laser has stabilized on the selected position (for more details on signal levels, see *Technical Specifications* on page 1).

#### To activate the output trigger:

1. In the TUNE mode window, touch the  button.  
The mode setting menu appears.
2. In the **Tune Control** area, select the **Trigger Out** check box.

The  icon appears in the **Parameters** area of the TUNE window to indicate that the trigger is activated.

The trigger signal is high when the laser is in a stable wavelength/frequency position. If you modify the laser position, the trigger signal is disabled (low) until the laser reaches the new position.

## Setting the Emission Wavelength/Frequency

### Performing a Sweep Sequence

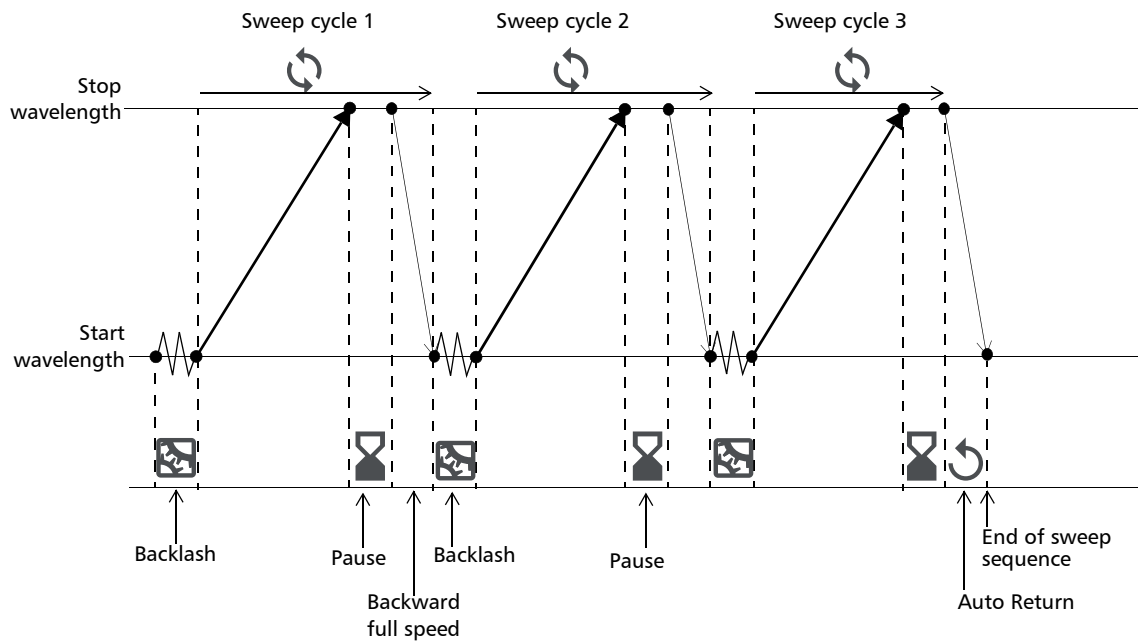
The **SWEEP** mode enables you to make the laser perform a continuous sweep over a defined wavelength or frequency range: starting from the start wavelength, the laser continuously sweep until it has reached the stop wavelength, according to the parameters (speed, pause, cycles) you have set.

You can start the sweep manually or with a trigger signal.


### Configuring the Continuous Sweep

The Sweep mode settings menu enables you to define all parameters requested for the sweep sequence.

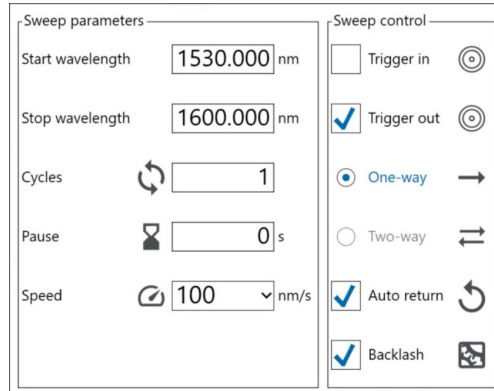
The following figure illustrates the SWEEP mode parameters in a one-way sweep (3 cycles):






#### To configure the sweep sequence:

1. In the task bar, select the SWEEP mode in the drop-down list.
2. In the SWEEP mode window, touch the  button.

The Sweep mode settings menu appears.









3. In the **Sweep parameters** area, configure the sweep as explained in the following table:

Parameter	Description
<b>Start/Stop wavelength/frequency</b>	Sweeping range of the laser during sweep. At start of the sweep, the laser is automatically positioned at the start value and moves to the stop value.
<b>Cycles</b> 	Number of sweeps you want the laser to perform. If you enter 0, the laser sweeps indefinitely until you touch the Stop button.
<b>Pause</b> 	Duration of the pause time at the end of each sweep.
<b>Speed</b> 	Maximum speed at which the laser sweeps the defined wavelength/frequency range. The entire wavelength/frequency range is not swept at the speed you select here: the laser first accelerates to reach the selected speed, and decelerates before reaching the stop wavelength/frequency. If the span is too short for the selected speed, maximum speed will not be reached. For example, the laser needs approximately 10 nm to reach 200 nm/s.

## Setting the Emission Wavelength/Frequency

### Performing a Sweep Sequence

4. In the **Sweep control** area, configure the sweep as explained in the following table:

Parameter	Description
<b>Trigger in</b> 	<ul style="list-style-type: none"> <li>➤ <input checked="" type="checkbox"/>: the laser sweep is controlled by an input trigger. For more details, see <i>Triggering the Sweep Sequence</i> on page 34.</li> <li>➤ <input type="checkbox"/>: the laser sweep is controlled manually.</li> </ul>
<b>Trigger out</b> 	<ul style="list-style-type: none"> <li>➤ <input checked="" type="checkbox"/>: the T200S generates an output trigger signal when it sweeps. For more details, see <i>Generating an Output Trigger Signal During Sweep</i> on page 36.</li> <li>➤ <input type="checkbox"/>: the T200S does not generate output trigger signal when it sweeps.</li> </ul>
<b>One-way</b> 	The T200S sweeps from the start to the stop specified wavelength/frequency at the specified sweep speed and returns to the initial wavelength at maximum speed.
<b>Two-way</b> 	Not available.
<b>Auto return</b> 	<ul style="list-style-type: none"> <li>➤ <input checked="" type="checkbox"/>: the laser automatically goes back to the start wavelength/frequency at maximum speed when the laser reaches the stop wavelength/frequency at the end of the sweep sequence. If you touch the <b>Stop</b> button during the sweep sequence, the auto return does not apply: the laser stays at its actual position.</li> <li>➤ <input type="checkbox"/>: the laser stays at the same position when it reaches the stop wavelength/frequency at the end of the sweep sequence.</li> </ul>
<b>Backlash</b> 	<ul style="list-style-type: none"> <li>➤ <input checked="" type="checkbox"/>: the mechanical backlash is always eliminated before the start of a sweep.</li> <li>➤ <input type="checkbox"/>: no control on the mechanical backlash is performed.</li> </ul>




The selected parameters appear in the **Parameters** area of the SWEEP window.

## Manually Controlling the Sweep Sequence

The following procedures explain how to manually control the sweep: you can arm, start and stop a sweep sequence.


When you start a sweep sequence, the laser first moves to the start wavelength/frequency before sweeping. Arming the laser before starting the sweep enables you to set the laser to the start position, to make sure the laser sweeps the defined wavelength/frequency range as soon as you start the sweep.

### **To perform a manual sweep sequence:**

1. In the SWEEP mode window, touch the  button.  
The Sweep mode settings menu appears.
2. In the **Sweep Control** area, clear the **Trigger In** check box.
3. Touch anywhere outside the menu to exit.
4. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 39).
5. If you want to arm the laser to the start position before sweeping, touch the  button.  
The laser moves to the start position and is ready to perform a sweep sequence.
6. Touch the  button to start the sweep sequence.
  - If the laser was previously armed to the start position, it directly starts the sweep sequence from the start wavelength/frequency according to the parameters you have defined in the Sweep mode settings menu.
  - If the laser was not armed, the laser first moves to the start wavelength/frequency before starting the sweep sequence.

The laser automatically stops sweeping when the cycle sequence is finished, and if the **Auto-Return** parameter is selected, the laser moves to the start position.

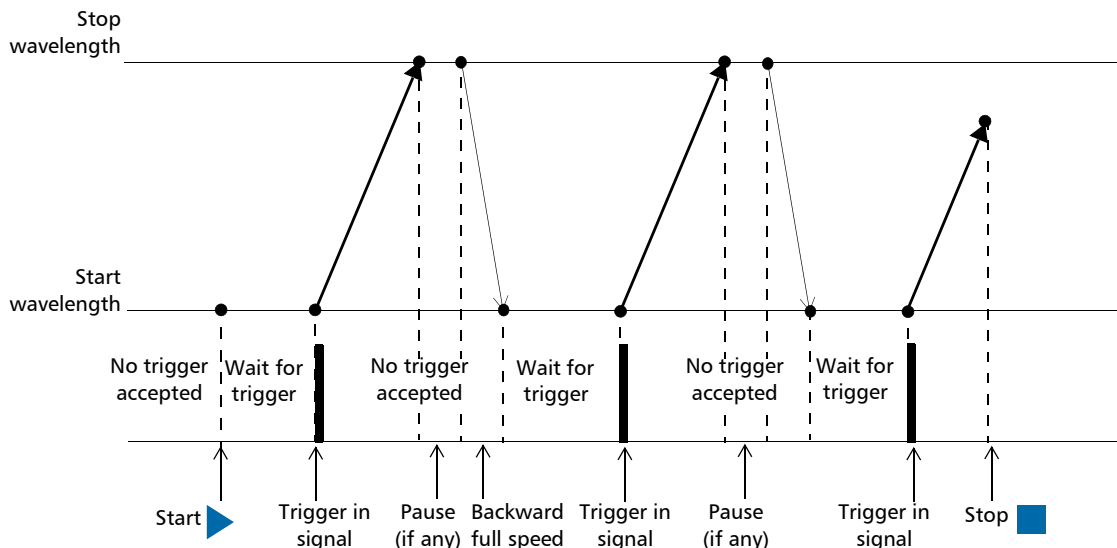
### **To stop the sweep sequence in progress:**

- To stop the sweep sequence in progress or to disarm the laser, touch the  button.  
The laser stops the sequence and stays at the current wavelength/frequency position. If the **Auto-Return** parameter is selected, the laser does not move to the start position.


### Triggering the Sweep Sequence

The following procedure explains how to control the sweep by using an input trigger: the laser starts sweeping when it receives a rising edge trigger signal. When it reaches the stop, it waits for a trigger to sweep again (for more details on signal levels, see *Technical Specifications* on page 1).



The following figure illustrates a triggered one-way sweep:



#### To perform a sweep sequence with a trigger signal:

1. Connect the external trigger generator to the Trigger In BNC connector located on the T200S rear panel (see *Rear panel* on page 3).
2. In the SWEEP mode window, touch the  button.  
The Sweep mode settings menu appears.
3. In the **Sweep Control** area, select **Trigger In**.

The  icon appears in the **Parameters** area of the SWEEP window.

4. Touch anywhere outside the menu to exit.
5. Enable the laser output (see *Enabling/Disabling the Laser Output* on page 39).
6. If you want to arm the laser to the start position before sweeping, touch the  button.  
The laser moves to the start position and is ready to perform a sweep.
7. Touch the  button to start the triggered sweep cycle.
  - If the laser was not armed, the laser first moves to the start wavelength/frequency before waiting for a trigger signal.
  - If the laser was previously armed to the start position, it directly waits for a trigger.




When it receives a rising edge, the laser starts sweeping from the start wavelength/frequency according to the parameters you have defined in the Sweep mode settings menu.

Then the behavior depends on the selected parameters: when the laser reaches the stop wavelength/frequency, it pauses during the time set in the **Pause** parameter, moves back to the start position and waits for the next trigger to start the following sweep.

When it has completed the number of cycles, the sweep stops and if the **Auto-Return** parameter is selected, the laser moves to the start position.

#### **To stop the sweep sequence:**

- To stop the sweep sequence in progress or to disarm the laser, touch the  button.

The laser stops the sequence and stays at the current wavelength/frequency position. Triggers are not taken into account anymore.

If the **Auto-Return** parameter is selected, the laser does not move to the start position.

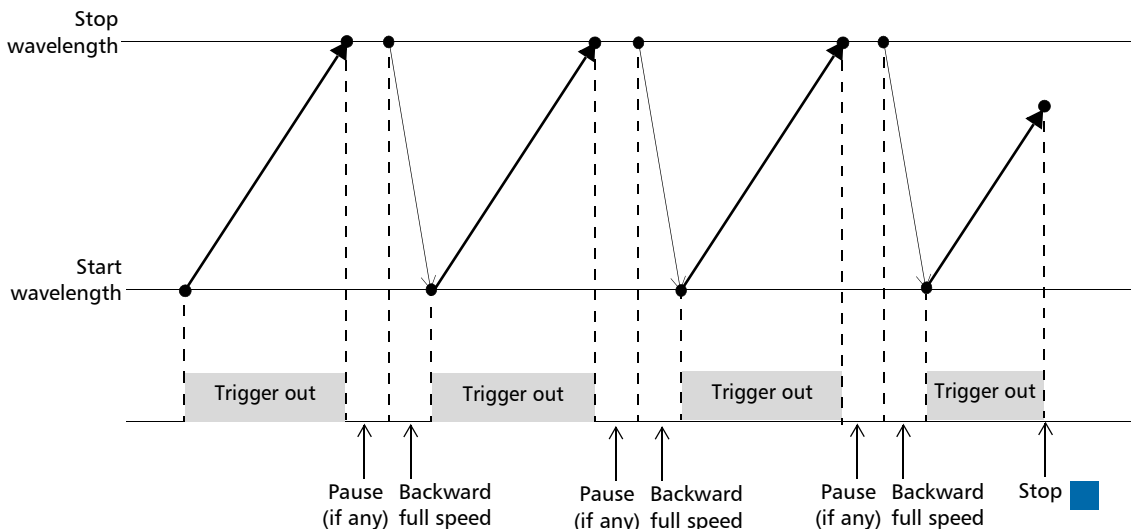
## Setting the Emission Wavelength/Frequency

### Performing a Sweep Sequence


## Generating an Output Trigger Signal During Sweep

In SWEEP mode, the T200S can generate a trigger signal when the laser is sweeping (for more details on signal levels, see *Technical Specifications* on page 1).

The following figure illustrates the trigger out signal on a one-way sweep:




### To activate the output trigger:

1. In the SWEEP mode window, touch the  button.

The mode setting menu appears.

2. In the **Sweep Control** area, select the **Trigger Out** check box.

The  icon appears in the **Parameters** area of the SWEEP window to indicate that the trigger is activated.

The trigger signal is high when the laser is sweeping the defined wavelength/frequency range.


When the laser pauses or moves back to the start position, the trigger signal is disabled (low).

## Performing Internal Wavelength Referencing

The T200S internal referencing ensures optimum adjustment of the laser source as soon as the laser starts.



The T200S automatically performs internal referencing during the startup routine (see *Turning on the T200S and Accessing the GUI* on page 16).

In addition, you can perform a new internal referencing at any time, as explained in the following procedure.

If the  button appears on screen, it means that the T200S needs internal referencing: the T200S is fully usable but performances are not guaranteed.

### **To perform an internal wavelength referencing:**

Do one of the following:


- In the task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.  
In the **Wavelength reference** area, touch the **Start wavelength reference** button.
- Touch the  button if it is displayed on screen.

The referencing process starts, any other operation on the T200S is disabled. Once completed, the information message disappears.

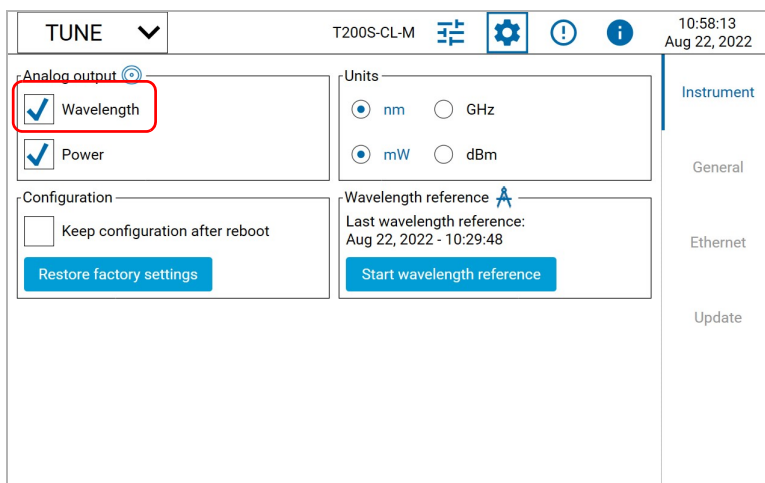
# Monitoring the Wavelength Electrical Level

The  $\lambda$  out BNC connector enables you to output the laser wavelength as an analog signal to be displayed on an external instrument (for more details on signal levels, see *Hardware Specifications* on page 1).

### To monitor the laser wavelength:


1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for  $\lambda$  out BNC connector in *Hardware Specifications* on page 1.
2. Connect the external instrument to the  $\lambda$  out BNC connector located on the rear panel of the T200S.
3. In the task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.

The **Analog Output** area enables you to select the BNC connector.



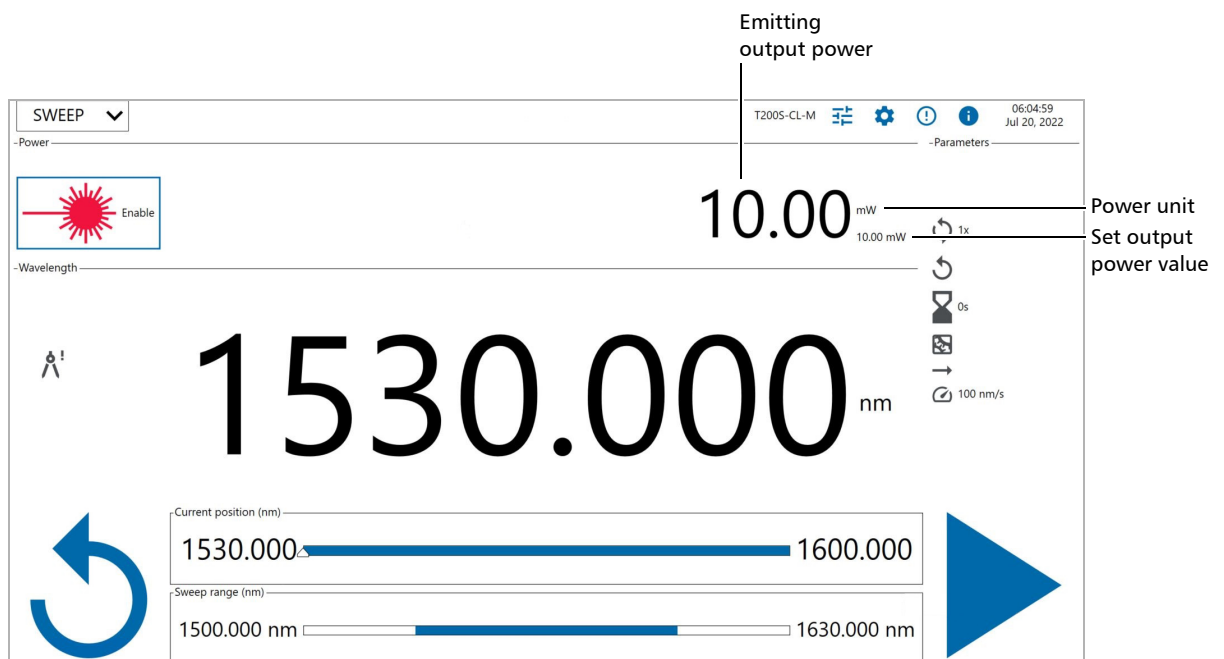
4. Select the **Wavelength** check box.

The laser wavelength is now output as analog signal that you can read on the connected instrument.

5. Touch the  button to exit the **Settings** window.

## 6 **Modifying the Optical Power**

In all operating mode, the T200S screen displays the optical output power of the laser. The optical power of T200S models is set to 10 dBm and cannot be modified.



### **Enabling/Disabling the Laser Output**

If the laser diode is turned off, you cannot move the laser or enter the wanted power value. The entered wavelength/frequency is only applied if the laser is enabled.

#### **To enable the laser output:**

Touch the  **Enable** button.

The laser status led is lit, the laser button becomes red. The laser is fully enabled after a few seconds.

#### **To disable the laser output:**

Touch the  **Enable** button.


The laser is disabled. You cannot disable the laser during a sweep.

## Modifying the Optical Power

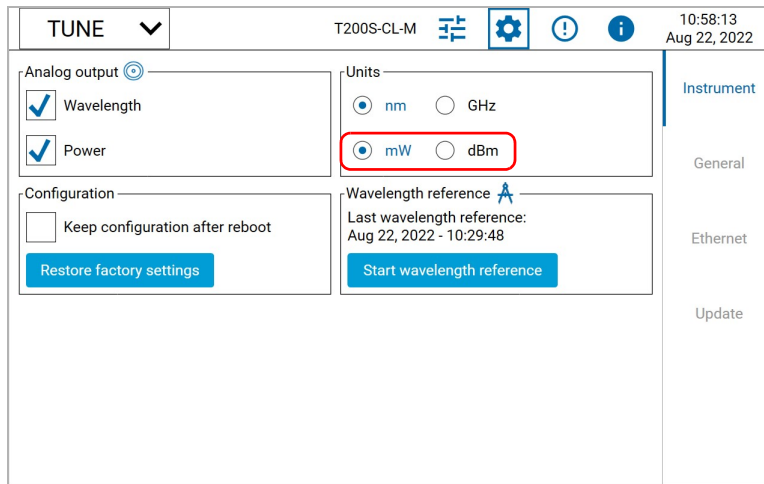
### Defining the Power Unit


You define the power unit you want to use for all operating modes in the **Settings** window, as explained in the following procedure.

#### To set the power unit:

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.

The **Units** area enables you to configure the power (and spectral) units.




2. Set the power unit you want to use by selecting **mW** or **dBm**.
3. Touch the  button to exit the window.

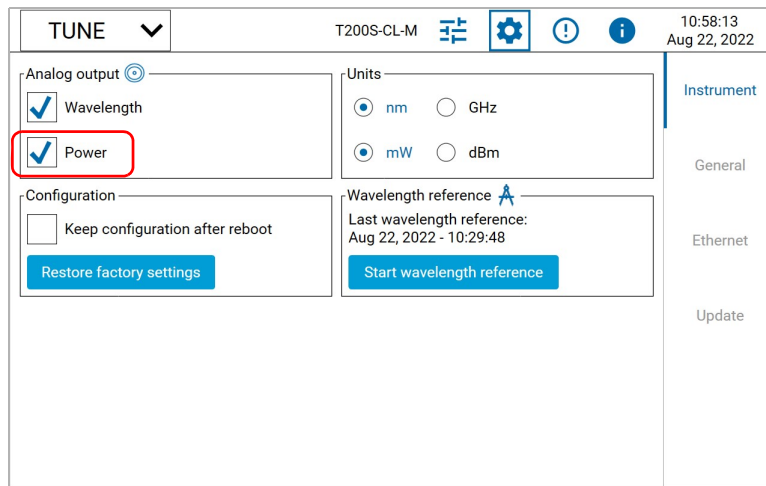
## Monitoring the Laser Output Power

The **Power out** BNC connector enables you to monitor the laser output power (for more details on signal levels, see *Hardware Specifications* on page 1).

**To monitor the laser output power:**


1. Make sure that the instrument to which you want to output the signal meets the electrical requirements detailed for **Power out** BNC connector in *Technical Specifications* on page 1.
2. Connect the external instrument to the **Power out** BNC connector located on the rear panel of the T200S.
3. In the task bar, touch the  button to display the **Settings** window and select the **Instrument** tab.

The **Analog output** area enables you to select the BNC connector.



4. Select the **Power** check box.

The laser optical power is now output as analog signal that you can read on the connected instrument.

5. Touch the  button to exit the **Settings** window.





# 7 Remotely Controlling the T200S

You can remotely control the T200S by using the Ethernet port located on the rear panel (see *Rear panel* on page 3). Maximum transfer rates are available in *Technical Specifications* on page 1.

Your unit offers a set of commands permitting remote control of the T200S. You can find all the commands and queries supported by the T200S in *SCPI Command Reference* on page 71.


This section explains how to connect the T200S to an external device such as PC for remote control and gives details on communication principles.

## Setting the T200S Ethernet Port

You can remotely control the T200S from a computer connected to the T200S directly or through your company's network.

If you do not know how to configure this port or if the connection does not work, contact your company network administrator.

### **To directly control the T200S from a computer:**

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S.


2. Connect an RJ45 cable from your computer to the T200S Ethernet port.
3. In the **Settings** window, in the **IPv4** or **IPv6** tab, clear the **Obtain an IP address automatically** check box and define a static IP address (e.g. 192.168.64.10), subnet mask (e.g. 255.255.255.0) and gateway to identify your T200S.
4. Touch **Apply** to validate the connection parameters.
5. On your computer:
  - Define a static IP address (e.g. 192.168.64.5, the three first number must be identical to the ones set for the T200S), subnet mask (e.g. 255.255.255.0) and gateway to identify your computer.
  - Use the Ethernet parameters defined in the T200S **Settings** window to set the communication with your T200S in your application.

## Remotely Controlling the T200S

### Entering/Exiting the Remote Mode

---

#### **To remotely control the T200S through your company network:**

1. In the T200S task bar, touch the  button to display the **Settings** window and select the **Ethernet** tab.

The **TCP socket** area enables you to configure the Ethernet connection of the T200S.



### **IMPORTANT**

Make sure that the firewall of your computer allows communication on the 5025 port.

2. Connect an RJ45 cable from your company network to the T200S Ethernet port.
3. In the **Settings** window, set the IP address, subnet mask and gateway to identify your T200S (see *Connecting the T200S to your Company Network* on page 21).
4. Touch **Apply** to validate the connection parameters.
5. On your computer, use the Ethernet parameters defined in the T200S Settings window to set the communication with your T200S in your application.

## Entering/Exiting the Remote Mode

The T200S enters the remote mode when it receives a command from an external controller. When the remote mode is activated, you cannot use the T200S GUI to control the T200S.

In remote mode, the T200S GUI displays the **Local** mode button on the main screen.

#### **To enter the remote mode:**

1. Use an RJ45 cable to connect the external controller to the T200S:
2. Make sure the port is properly configured for remote control: see *Setting the T200S Ethernet Port* on page 43.
3. Send a command from the remote controller. All available commands are described in *SCPI Command Reference* on page 71.

When the T200S receives a command from an external controller, it enters the remote mode: the GUI is deactivated and the **Local** button appears on the main screen.

#### **To exit the remote mode:**

To get back to the local control of the T200S, touch the **Local** button.

The GUI is now available and you can use it.

The GUI will be back to remote mode if another remote command is received by the T200S.

## Communication Principle

EXFO supplies commands that follow the guidelines determined by the SCPI consortium for your T200S.

The present section gives you information to help you use the provided commands, to remotely control your instrument.

### Standard Status Reporting

Each device has four status registers with a structure complying with the IEEE 488.2 standard. These registers allow the controller to monitor events and get useful information on the status of the devices it controls.

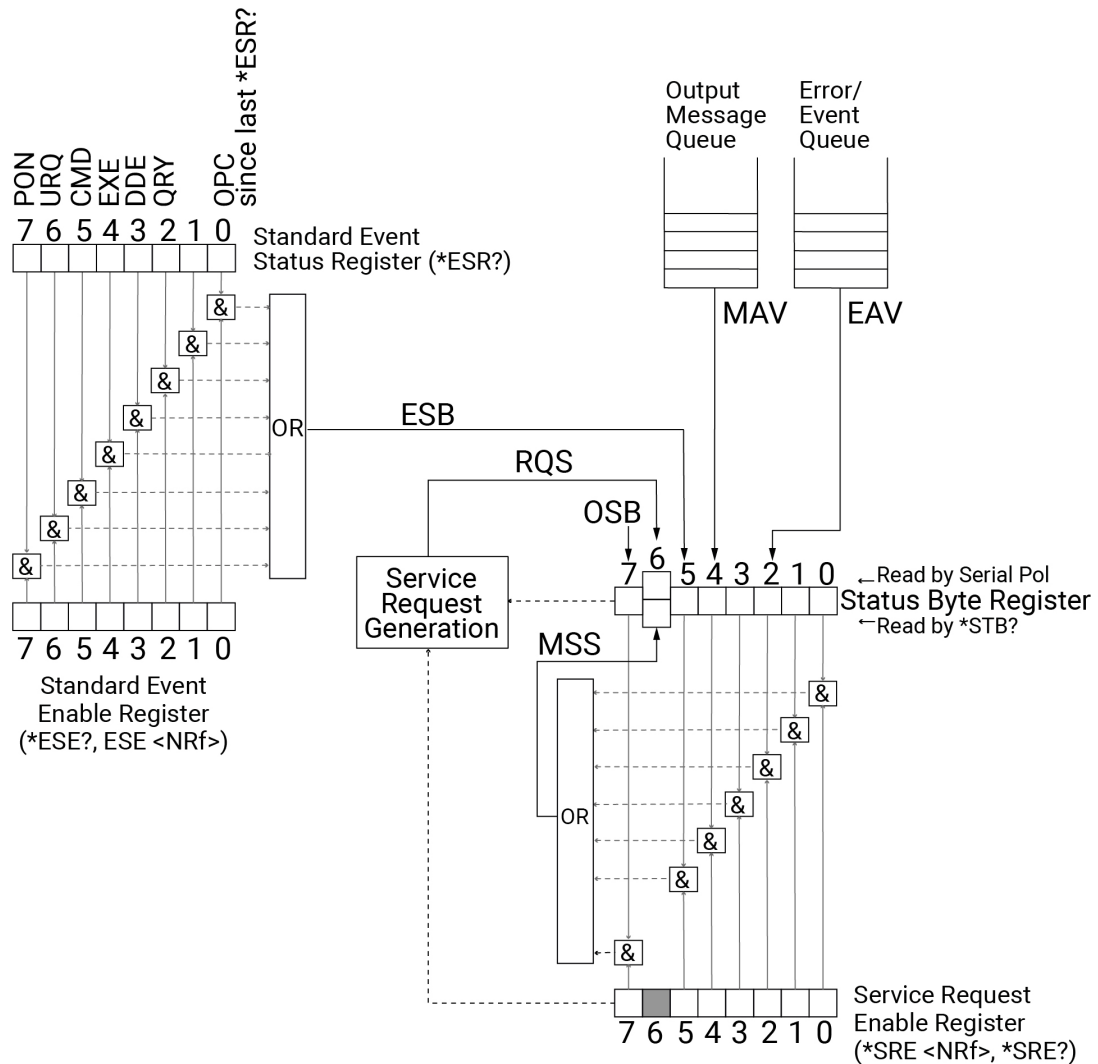
- Standard Event Status Register (ESR)
- Standard Event Status Enable Register (ESE)
- Status Byte Register (STB)
- Service Request Enable Register (SRE)

The following diagram is a useful aid in understanding the general commands and how a service request (SRQ) is generated.

Using a service request, a device notifies the controller that an event requiring special attention occurred. The controller will then find which device generated a SRQ (its RQS bit is set) and the causes of it.

## Remotely Controlling the T200S

### Communication Principle



### Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)

The following table shows the content of the Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR):

Bit	Weight	Meaning
7 - PON	128	Power ON Enable
6 - URQ	64	User ReQuest Enable
5 - CMD	32	CoMmanD Error Enable
4 - EXE	16	Execution Error Enable
3 - DDE	8	Device Dependent Error Enable
2 - QRY	4	QueRy Error Enable
1 - N.U.	2	Not used
0 - OPC	1	Operation Complete Enable

**Service Request Enable Register (SRE)**

The following table shows the content of the Service Request Enable Register (SRE):

Bit	Weight	Meaning
7 - N.U.	128	Not used
6 - N.U.	64	Not used
5 - ESB	32	Event Summary Bit Enable
4 - MAV	16	Message AVailable Enable
3 - N.U.	8	Not used
2 - EAV	4	Error/event AVailable Enable
1 - N.U.	2	Not used
0 - N.U.	1	Not used

**Status Byte Register (STB)**

The following table shows the content of the Status Byte Register (STB):

Bit	Weight	Meaning
7 - OSB	128	Not used
6 - RQS/MSS	64	ReQuest Service (read by serial polling)/ MaSter Summary bit (read by *STB?).
5 - ESB	32	Event Status Byte Enable
4 - MAV	16	Message AVailable Enable
3 - N.U.	8	Not used
2 - EAV	4	Error/event AVailable Enable
1 - N.U.	2	Not used
0 - N.U.	1	Not used

## Operational / Questionable Status Reporting

### **Operational Status Condition Register**

The following table shows the content of the Operational Status Condition Register:

<b>Bit</b>	<b>Weight</b>	<b>Meaning</b>
15	32768	Always zero.
14	16384	PROGram running: a user-defined programming is currently in the run state.
13	8192	INSTRument Summary Bit: One of n multiple logical instruments is reporting OPERational status. (NOT USED)
12	4096	Shutting Down: The instrument is performing a shutdown.
11	2048	Warming Up: the instrument is warming up.
10	1024	Always zero.
9	512	INITializing: the instrument is currently performing initialization.
8	256	REFerencing: the instrument is currently performing a reference.
7	128	CORRecting: the instrument is currently performing a correction.
6	64	Waiting for ARM: the instrument is in a “wait for arm” state of the trigger model.
5	32	Waiting for TRIG: the instrument is in a “wait for trigger” state of the trigger model.
4	16	MEASuring: the instrument is actively measuring.
3	8	SWEEping: a sweep is in progress.
2	4	RANGing: the instrument is currently changing its range.
1	2	SETTling: the instrument is waiting for signals it controls to stabilize enough to begin measurements.
0 (LSB)	1	CALibrating: the instrument is currently performing a calibration.

**Questionable Status Condition Register**

The following table shows the content of the Questionable Status Condition Register:

Bit	Weight	Meaning
15	32768	Always zero.
14	16384	Command warning: a non-fatal warning related to the interpretation of a command or query.
13	8192	INSTRUMENT Summary Bit: one of n multiple logical instruments is reporting QUESTIONABLE status. (NOT USED)
12	4096	Always zero.
11	2048	Always zero.
10	1024	Operational: The instrument is not operational.
9	512	Always zero.
8	256	CALIBRATION: the calibration accuracy of the signal is of questionable quality.
7	128	MODULATION: the modulation accuracy of the signal is of questionable quality.
6	64	PHASE: the phase accuracy of the signal is of questionable quality.
5	32	FREQUENCY: the frequency accuracy of the signal is of questionable quality.
4	16	TEMPERATURE: the temperature accuracy of the signal is of questionable quality.
3	8	POWER: the power accuracy of the signal is of questionable quality.
2	4	TIME: the time accuracy of the signal is of questionable quality.
1	2	CURRENT: the current accuracy of the signal is of questionable quality.
0 (LSB)	1	VOLTAGE: the voltage accuracy of the signal is of questionable quality.

## SCPI Command Structure and Syntax

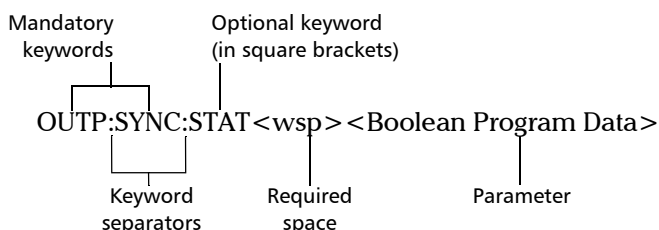
The information presented in this section provides an overview of SCPI programming. If you need detailed information, refer to:

- The International Institute of Electrical and Electronics Engineers. IEEE Standard 488.2-1992, IEEE Standard Codes, Formats, Protocols and Common Commands For Use with ANSI/IEEE Std. 488.1-1987. New York, 1992.
- Standard Commands for Programmable Instruments (SCPI). Volume 1: Syntax and Style. Vers. 1999.0 May, U.S.A, 1999.

### Syntax of Messages

The provided commands follow the guidelines determined by the Standard Commands for Programmable Instruments (SCPI) consortium. A program message consists of one or more commands (and/or queries) with their appropriate parameters.

For example, a program message could contain a command used to activate or deactivate the output synchro signal (Trig out). The corresponding command syntax would be:



When sending a message containing the previous command, you would actually type:  
 OUTP:SYNC:STAT ON.

The following table shows elements that are commonly used in the commands or queries syntax.

Item	Meaning
[ ]	Enclose optional keywords or parameters. <i>Do not include square brackets in your program message.</i>
<wsp>	Indicates that a space is required ("wsp" stands for "white space"). Corresponds to ASCII character codes (0 to 9 and 11 to 32, in decimal). <i>Do not include "&lt;wsp&gt;" in your program message; simply type a space.</i>
< >	Text appearing between angled brackets specifies the command parameter to be sent or the response you will receive from an instrument. <i>Do not include angled brackets in your program message.</i>
	Indicates that one, and only one, value must be selected from the available choices. Example: If the list is 0 1, you can only select 0 or 1. <i>Do not include the pipe character in your program message.</i>
{ }	Indicates that the enclosed parameters can appear 0 to n times when the command is used. <i>Do not include braces in your program message.</i>
:	Mandatory to separate keywords. Can be omitted at the beginning of a program message. For example, you can use either :SYST:ERR or SYST:ERR.



Item	Meaning
;	<ul style="list-style-type: none"> <li>➤ Mandatory to separate the different commands of a program message when more than one command is sent at a time. If an error occurs in a command of a program message, the program does not stop: all the commands of the program message are still executed.</li> <li>➤ Also used to separate responses when multiple queries were sent in a single program message.</li> </ul>
,	<ul style="list-style-type: none"> <li>➤ Mandatory to separate parameters in a command or a query.</li> <li>➤ Also used to separate the various responses from a query.</li> </ul>

There are also several conventions regarding command syntax:

- Spelling errors cancel the command or query.
- The unit of received numerical values is always the base unit.
- Numerical values are entered in decimal format.  
Result format for float is +1.12345678E-123.
- If a transmitted value has a higher precision than expected, the value is rounded off to the nearest accepted value.
- Commands and queries are not case-sensitive. You can type your program messages using either lower-case or upper-case letters.
- The command or query can be written using only the three- or four-letter shortcuts, only full words, or a combination of both.

The example below shows the long and the short forms of a same query.

```

:SYSTem:ERRor? _____ Long form
:SYST:ERR? ] _____ Short form (small words
:syst:err? ] _____ represented by the capital letters
                    of the long form)
    
```

- A message must end with the following characters: CR LF (\r\n)
- The T200S uses the ISO-8859-1:1998 (Latin-1, West Europe) character set. Make sure to configure your remote client with the same character set and to use supported characters while giving names to files or to other items.

**Command Types**

The T200S uses the following types of commands and queries:

- Sequential: these commands are executed one after the other, in sequential order. A sequential command always finishes before the next command is implemented.
- Overlapped: these commands allow execution of overlapping commands while execution of the overlapped commands is still in progress.
- Overlapping: these commands can be executed during execution of an overlapped command.

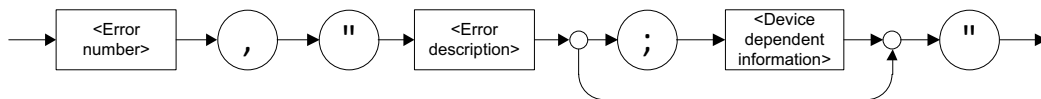
## Unit Multipliers

The following table illustrates the possible unit multipliers:

Name	Value	Mnemonic
Exa	1E18	EX
Peta	1E15	PE
Tera	1E12	T
Giga	1E9	G
Mega	1E6	MA
Kilo	1E3	K
Milli	1E-3	M
Micro	1E-6	U
Nano	1E-9	N
Pico	1E-12	P
Femto	1E-15	F
Atto	1E-18	A

## Error Messages

System and device-specific errors are managed by your unit. The generic format for error messages is illustrated in the following figure.



As shown in the above figure, the message contains three parts:

- error number
- error description
- device-dependent information

Error messages ending in a negative number are SCPI-based errors.



### IMPORTANT

If an error occurs in a command of a program message (several commands separated by ";"), the program does not stop: all the commands of the program message are executed. As a consequence, several errors may be present in the error queue. You need to check the error bit to make sure that the error queue is empty.

## 8 Maintenance

To help ensure long, trouble-free operation:

- Always keep the unit and its surroundings clean, free of dust and dirt, even if you are not using it.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store the unit at room temperature in a clean and dry area, free of dust and out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately, disconnect from any external power source and let the unit dry completely.



### WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

## Cleaning the T200S

### Cleaning the Cover of the T200S

If the external cover of the T200S becomes dirty or dusty, clean it by following the instructions below.



### CAUTION

Do not use chemically active or abrasive materials to clean the T200S.

Material needed:

- Cleaning cloth
- Isopropyl alcohol

#### **To clean the external cover of the T200S:**

1. Turn the T200S off (see *Turning off the T200S* on page 18) and unplug the power supply cable from the wall socket.
2. Slightly damp the cloth with an isopropyl alcohol liquid and gently swipe dirt and dust on the external cover of the T200S, without applying excessive force onto it.

## **Cleaning the Fan Grid**

To ensure proper cooling of the T200S from the fan, the cooling fan grid located on the rear panel (see *Rear panel* on page 3) must not be dusty, you must clean it regularly.



### **CAUTION**

Do not use a vacuum cleaner to clean the fan as this may apply excessive force to it and cause damage to the fan.

#### **To clean the fan grid:**

1. Turn the T200S off (see *Turning off the T200S* on page 18) and unplug the power supply cable from the wall socket.
2. Using a duster or a slightly moist cloth, gently clean the external grid of the fan without pressing it.

## **Cleaning the Optical Connector**

To ensure measurement accuracy and prevent loss of optical power, you must regularly verify that the optical connector of the T200S is clean.

Handle optical fiber with appropriate care and preserve the integrity of optical connectors by keeping them free of contamination.



### **IMPORTANT**

To reduce the need for cleaning, immediately replace protective caps on the optical connectors when not in use.

#### **To clean the connectors:**

1. Disable the laser output.
2. Make sure you have the following material:

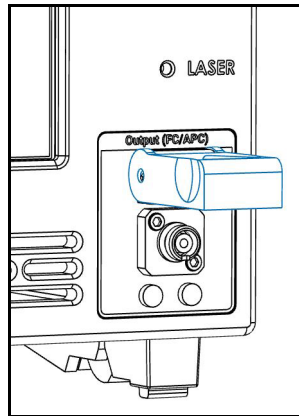


### **IMPORTANT**

Use only high quality cleaning supplies that are non-abrasive and leave no residue.

- Clean compressed air
- Optical grade cleaning swabs
- Connector cleaner pen
- Fiberscope or similar if available

- 3.** On the front panel, lift the protective cap. Do not disassemble the bulkhead adapter.




- 4.** Gently clean the connector end, with the following instructions:
  - 4a.** Hold the can of compressed air upright and spray the can into the air to purge any propellant.
  - 4b.** Spray the clean compressed air on the connector to remove any loose particles or moisture.
- 5.** Clean the fiber end using your cleaning tool.
- 6.** Spray the clean compressed air on the connector again to remove any loose particles or isopropyl alcohol.
- 7.** Check that the connector is clean with a fiberscope (or similar).

## Updating the T200S System Version

The T200S embedded software package is a .pkg file available on the EXFO website.

Updating the T200S system version takes less than 10 minutes.

**To update the T200S system version:**

1. From the EXFO website ([www.EXFO.com/en/exfo-apps](http://www.EXFO.com/en/exfo-apps)), download the last T200S update package (compressed into a \*.zip file).
2. Unzip the package to a USB storage device, so that the necessary \*.pkg file is located at the USB device root.
3. Connect the USB storage device to one of the available USB ports.
4. Turn off the T200S (see *Turning off the T200S* on page 18).
5. On the front panel, press the  button to turn on the T200S.

The T200S automatically detects the \*.pkg file on the USB device and starts the update wizard (if several \*.pkg files are detected, the last copied on the USB device or on the internal drive is taken into account).



### CAUTION

To avoid serious system problems:

- Do not turn the T200S off during the update.
- Do not remove the USB device before the end of the upgrade process.

6. Follow the instructions displayed on screen to update the system version.


Once the update is finished, the T200S may start normally or shutdown, depending on the update. In this case, you need to restart it as explained in *Turning on the T200S and Accessing the GUI* on page 16.

## Updating the Operating System Version

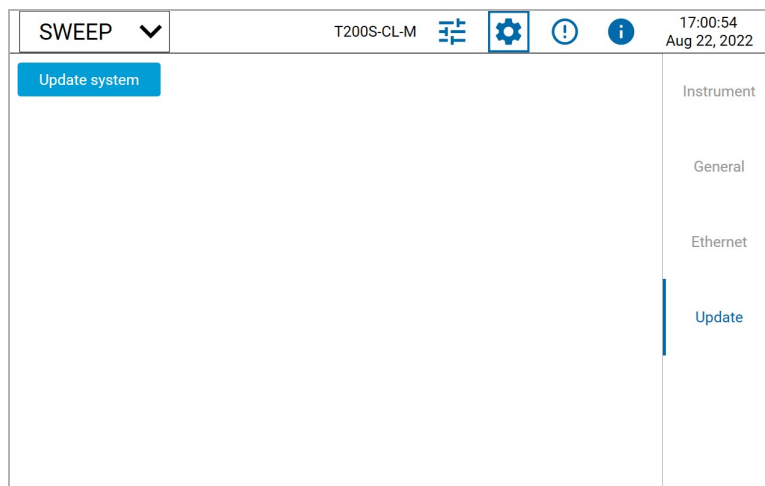
For security reasons, you should check for updates regularly to keep the T200S operating system version up to date.

Updating the operating system may take a significant amount of time.

### To update the operating system version:

1. Make sure that your T200S is connected to the Internet.
2. Turn on the T200S as explained in *Turning on the T200S and Accessing the GUI* on page 16.
3. In the T200S task bar, touch the  button to display the **Settings** window and select the **Update** tab.

The **System Update** button enables you to update the operating system.



4. Touch the **Update system** button.
 

The T200S verifies if your system is up to date. This operation might take time.

  - If after 15 minutes, the T200S is still checking for updates, a problem may have occurred during the update checking. In this case, touch **Cancel** and restart the T200S before running a new operating system update.
  - If updates are available, a message gives the list of available updates and prompts you to install them.
  - If no update has been found, an information message is displayed.
5. Touch the **Download, install and restart** button to install the update(s).
 

The T200S downloads and installs the updates, and then restarts automatically.
6. Once the T200S has restarted: in the **Settings** window, touch the **Check for updates** button again to make sure that all updates have been installed.
 

If all updates have not been installed, perform steps 1 to 5 again to install all the available updates.

## Replacing Fuses

You must verify the power fuses in case you cannot turn on the T200S Tunable Laser Source.



### WARNING

To avoid fire hazard, only use the correct fuse type, voltage and current ratings.

The unit contains two fuses (see *Technical Specifications* on page 3 for details). The fuse holder is located at the back of the unit, just above the power inlet.

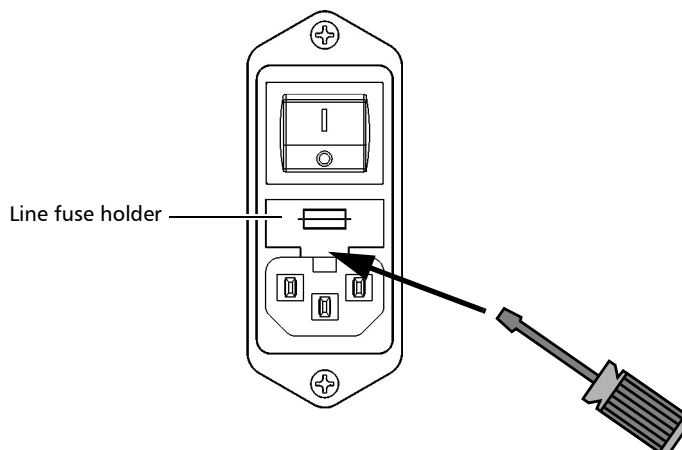
#### **Before starting:**

Make sure you have the following equipment:

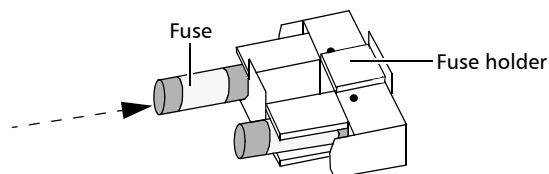
- 1 small flat-head screwdriver.
- 1 or 2 replacement fuses (for fuse type, see *Technical Specifications* on page 3).

#### **To replace a fuse:**

1. Turn off the unit and unplug the power cord.
2. Using a flat-head screwdriver as a lever, pull the fuse holder out of the unit.



3. Check and replace the fuses if necessary.
4. Insert the new fuse into the fuse holder.



5. Make sure the fuses are placed firmly in the holder prior to reinsertion.
6. Firmly push the fuse holder into place.



## Recalibrating the T200S

The validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration interval of this particular EXFO unit.

Under normal use, the recommended interval for your T200S is: 1 year.

## Recycling and Disposal



This symbol on the product means that you should recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

For complete recycling/disposal information, visit the EXFO Web site at [www.exfo.com/recycle](http://www.exfo.com/recycle).



## 9 Troubleshooting

This section explains how to handle common problems that can occur with your instrument, and how to ask for support.

### Solving Common Problems

The following table lists problems that can occur and their possible solution.

Trouble	Possible cause	Possible resolution
<b>Operating system update:</b> After 15 minutes, the T200S is still checking for updates.	A problem occurred during the update checking.	In the update checking window, touch <b>Cancel</b> and restart the T200S before running a new operating system update.

### Forcing the T200S to Shutdown & Restart

In case of system crash and frozen screen, you can abruptly turn the T200S off as explained in the following procedure.



#### CAUTION

Do not stop the T200S with this procedure if you can turn it off normally as explained in *Turning on the T200S and Accessing the GUI* on page 16.

#### To force the T200S to shutdown and restart:

1. If the touchscreen is frozen: try to shutdown the T200S as explained in *Turning off the T200S* on page 18.

If this does not work, follow the rest of these instructions.

2. Press the On/Off button during 4 seconds.  
The system abruptly stops.
3. On the rear panel, set the power switch to **O**.
4. Wait 10 seconds and set the power switch back to **I**.
5. Restart the T200S as explained in *Turning on the T200S and Accessing the GUI* on page 16.

### Abruptly Turning off the T200S (Emergency Shutdown)

In case of emergency (presence of smoke flame or any immediate hazard), you can abruptly turn the T200S off as explained in the following procedure.



#### CAUTION

Do not stop the T200S with this procedure if you can turn it off normally as explained in *Turning off the T200S* on page 18.

#### To abruptly turn off the T200S:

Unplug the T200S by pulling the power cable off the T200S power cable connector on the rear panel (see *Rear panel* on page 3).

## Restoring Your Unit to Normal Operation

If you encounter major problems with your unit (for example, the unit does not behave the way it used to), you can revert it to its initial state (as it was at time of purchase).



### CAUTION

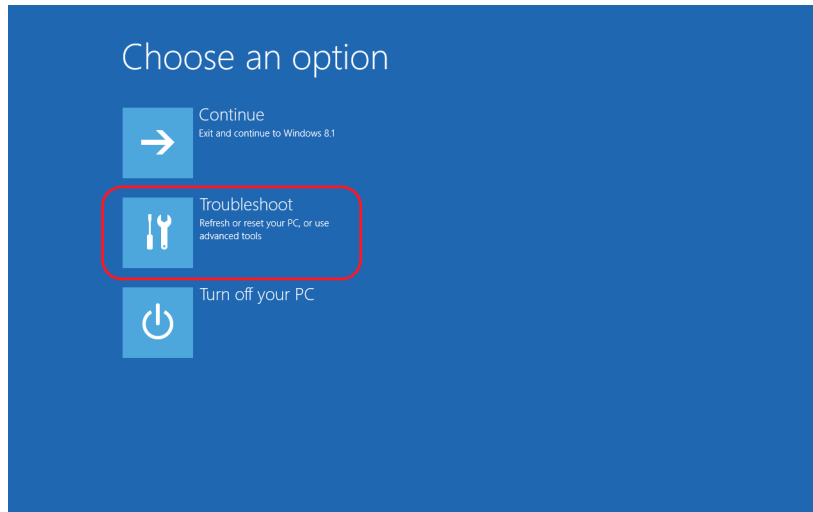
**DO NOT TURN OFF** your unit while the recovery operation is underway. Doing so may severely damage your unit.

#### **To reset your unit to its factory settings:**

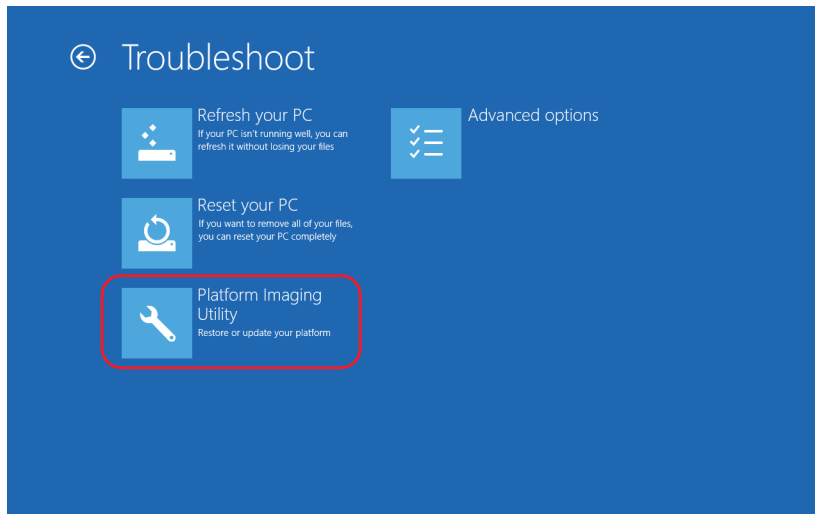
- 1.** Repeatedly turn your device off and then on as explained in the following steps:
  - 1a.** Press the On/Off button during 10 seconds to turn off the T200S.
  - 1b.** Press the On/Off button to turn on the T200S.
  - 1c.** On the first sign that the T200S has started, hold down the On/Off button for 10 seconds to turn off the T200S.
  - 1d.** Press the On/Off button to turn on the T200S.
  - 1e.** When the T200S restarts, hold down the On/Off button for 10 seconds to turn it off.
  - 1f.** Press the On/Off button to turn on the T200S.

The WinRe (Windows Recovery Environment) appears.

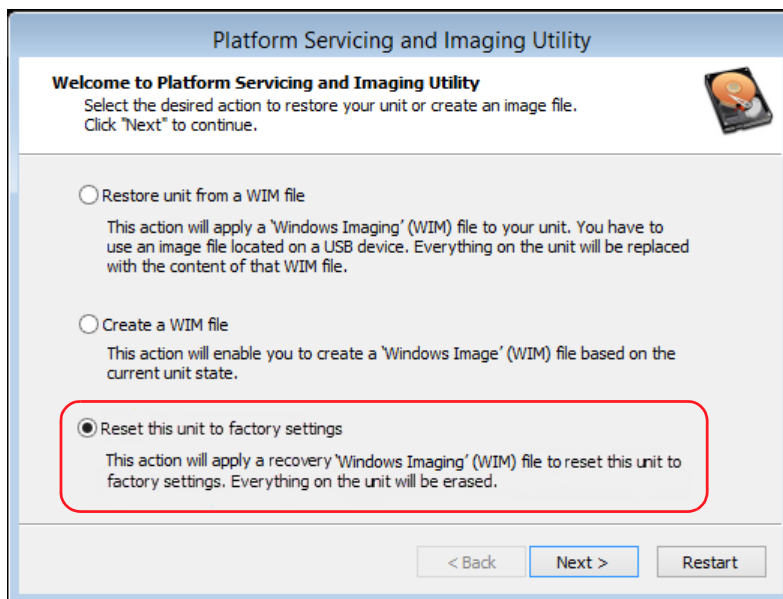
- 2.** In WinRe (Windows Recovery Environment), touch **See advanced repair options**.
- 3.** Under **Choose an option**, touch **Troubleshoot**.



- Under **Troubleshoot**, touch **Platform Imaging Utility** to display the corresponding application.



- From the **Platform Servicing and Imaging Utility** wizard, select **Reset this unit to factory settings** and touch **Next**.



- Read the warning and click **Start** to restore the unit to its initial state.

When the operation is complete the application prompts you.

- Touch **OK**.

The unit restarts.

If an error is display at startup, it means that the software package must be updated: in this case, download the last T200S update package from the EXFO website and install it as described in *Updating the T200S System Version* on page 56.

- Accept the license agreements as you did when you first received you unit.

# Using Assistance Tools


The T200S provides tools for remote or self assistance, as explained in the following sections:

- *Saving Debug Data* on page 64
- *Displaying the List of Errors and Warnings* on page 64

## Saving Debug Data

Saving debug data and sending it to the EXFO customer support service can be useful for remote assistance (see *Contacting the Technical Support Group* on page 65).

### **To save debug data:**

1. In the T200S task bar, touch the  button.
2. Touch the **View event log** button.

The list of event log is displayed.


3. Connect a USB storage device to one of the available USB ports.
4. Touch the **Save event log** button.

The event log is saved at the root of the USB storage device in .xml format.

## Displaying the List of Errors and Warnings


The following procedure explains how to display the last main warnings that occurred on the T200S.

### **To display the last error/warning messages:**

In the T200S task bar, touch the  button.

The last 100 errors or warnings that occurred are displayed in order of appearance, with their corresponding date and time.



### **To clear the list of error/warning messages:**

1. In the T200S task bar, touch the  button.
2. At the bottom of the list, touch the **Clear error list** button.

## Viewing System Information

You can see information about your product, such as the serial number, options, version numbers, license agreement and contact information at all times.

### **To view product information:**

1. In the task bar, touch the  button.
2. Do one of the following:
  - To display contact information, touch the **Technical support** tab
  - To display product information, touch the **System information** tab
3. To see the license agreements, touch the **View license agreement** button.
4. Touch the  button to exit the **Settings** window.

## Displaying the User Documentation

The user guide is available in PDF format on the USB key delivered with the instrument and from the EXFO website: [www.EXFO.com/en/resources/](http://www.EXFO.com/en/resources/)

## Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

### **Technical Support Group**

400 Godin Avenue	1 866 683-0155 (USA and Canada)
Quebec (Quebec) G1M 2K2	Tel.: 1 418 683-5498
CANADA	Fax: 1 418 683-9224
	<a href="mailto:support@exfo.com">support@exfo.com</a>

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at [www.exfo.com](http://www.exfo.com).

If you have comments or suggestions about this user documentation, you can send them to [customer.feedback.manual@exfo.com](mailto:customer.feedback.manual@exfo.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.

## 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 unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shocks and vibrations.
- To avoid damaging the optical core, imperatively turn off the unit as described in *Turning off the T200S* on page 18.

For instructions on returning the T200S, please contact EXFO (see *Contacting the Technical Support Group* on page 65).



# 10 Warranty

## General Information

EXFO Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of 1 year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO 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, EXFO will charge standard calibration fees.



### IMPORTANT

The warranty can become null and void if:

- unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.
- warranty sticker has been removed.
- case screws, other than those specified in this guide, have been removed.
- case has been opened, other than as explained in this guide.
- unit serial number has been altered, erased, or removed.
- 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 EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

## Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

A product is sold by an unauthorized intermediary.

A product is designed and destined for a particular market and sold on a second market.

A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

## Warranty

### Liability

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For complete information, refer to EXFO's policy regarding gray market products at [www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/](http://www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/)

## Liability

EXFO 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.

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

## Exclusions

EXFO 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 EXFO 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 EXFO.



### IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

## Certification

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

## Service and Repairs

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

**To send any equipment for service or repair:**

- 1.** Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 70). Support personnel will determine if the equipment requires service, repair, or calibration.
- 2.** If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
- 3.** If possible, back up your data before sending the unit for repair.
- 4.** Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
- 5.** Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

**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. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 70).

## Warranty

EXFO Service Centers Worldwide

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### EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

#### EXFO Headquarters Service Center

400 Godin Avenue

Quebec (Quebec) G1M 2K2

CANADA

1 866 683-0155 (USA and Canada)

Tel.: 1 418 683-5498

Fax: 1 418 683-9224

support@exfo.com

#### EXFO Europe Service Center

Winchester House, School Lane

Chandlers Ford, Hampshire S053 4DG

ENGLAND

Tel.: +44 2380 246800

Fax: +44 2380 246801

support.europe@exfo.com

#### EXFO Telecom Equipment (Shenzhen) Ltd.

3rd Floor, Building C,

FuNing Hi-Tech Industrial Park, No. 71-3,

Xintian Avenue,

Fuhai, Bao'An District,

Shenzhen, China, 518103

Tel: +86 (755) 2955 3100

Fax: +86 (755) 2955 3101

support.asia@exfo.com

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:

<http://www.exfo.com/support/services/instrument-services/exfo-service-centers>.

# A **SCPI Command Reference**

This section presents detailed information about the command and queries supplied with your T200S. For more details on T200S remote control parameters and procedures, see *Remotely Controlling the T200S* on page 43.

- *General Commands* on page 71
- *T200S Specific Commands* on page 80

## **General Commands**

### **Quick Reference**

The T200S recognizes the required commands identified in IEEE 488.2. The table below summarizes these commands. These commands are fully explained on the following pages.

<b>Command</b>	<b>Function</b>	<b>Section</b>
*CLS	Clear status command	*CLS on page 72
*ESE	Standard event status enable command	*ESE on page 72
*ESE?	Standard event status enable query	*ESE? on page 73
*ESR?	Standard event status register query	*ESR? on page 74
*IDN?	Identification query	*IDN? on page 74
*OPC	Operation complete command	*OPC on page 75
*OPC?	Operation complete query	*OPC? on page 75
*OPT?	Option query	*OPT? on page 76
*RST	Reset command	*RST on page 76
*SRE	Service request enable command	*SRE on page 77
*SRE?	Service request enable query	*SRE? on page 77
*STB?	Read status byte query	*STB? on page 78
*TRG	Trigger event command	*TRG on page 78
*WAI	Wait for pending operations to be completed	*WAI on page 79

## General Commands

<b>*CLS</b>	
<b>Description</b>	The *CLS command clears the Standard Event Status Register and the Error/Event Queue.
<b>Type</b>	Overlapping, no query.
<b>Syntax</b>	*CLS
<b>Parameter(s)</b>	None.
<b>See Also</b>	*ESR? on page 74

<b>*ESE</b>	
<b>Description</b>	<p>The *ESE command sets the Standard Event Status Enable Register bits, as defined in <i>Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)</i> on page 46.</p> <p>This register contains a mask value for the bits to be enabled in the Standard Event Status Register.</p>
<b>Type</b>	Overlapping.
<b>Syntax</b>	*ESE<wsp> <register value>
<b>Parameter(s)</b>	<p><i>register value:</i></p> <p>The &lt;register value&gt; represents the bit values of the Standard Event Status Enable Register, in the range of 0 through 255.</p> <p>See the content of this register in <i>Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)</i> on page 46.</p> <p>A value of 1 in the Enable Register enables the corresponding bit in the Status Register, a value of 0 disables the bit.</p>
<b>Example(s)</b>	<p>*ESE 25 where 25 sets the EXE, DDE and OPC bits)</p> <p>*ESE 0 clears the content of the Standard Event Status Enable register</p>
<b>See Also</b>	<p>*ESE? on page 73</p> <p>*ESR? on page 74</p>

**\*ESE?**

<b>Description</b>	The *ESE? query returns the current contents of the Standard Event Status Enable Register, as defined in <i>Standard Event Status Enable Register (ESE)</i> and <i>Standard Event Status Register (ESR)</i> on page 46.
<b>Type</b>	Overlapping.
<b>Syntax</b>	*ESE?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<register value>
<b>Response(s)</b>	<i>register value:</i> The <register value> value represents the bit values of the Standard Event Status Enable register. The <register value> ranges from 0 through 255. See the content of this register in <i>Standard Event Status Enable Register (ESE)</i> and <i>Standard Event Status Register (ESR)</i> on page 46.
<b>Example(s)</b>	*ESE? returns 133 (the PON, QRY and OPC bits are set)
<b>See Also</b>	*ESE? on page 73 *ESR? on page 74

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<b>*ESR?</b>	
<b>Description</b>	The *ESR? query returns the current contents of the Standard Event Status Register, as defined in <i>Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)</i> on page 46 Reading the Standard Event Status Register clears it.
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	*ESR?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<register value>
<b>Response(s)</b>	<i>register value:</i> The <register value> value represents the bit values of the Standard Event Status register. The <register value> ranges from 0 through 255. See the content of this register in <i>Standard Event Status Enable Register (ESE) and Standard Event Status Register (ESR)</i> on page 46.
<b>Example(s)</b>	*ESR? returns 33 (the CME and OPC bits are set)
<b>See Also</b>	*ESE? on page 73 *ESR? on page 74

<b>*IDN?</b>	
<b>Description</b>	The *IDN? query returns the unique identification of the device.
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	*IDN?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<Identification>
<b>Response(s)</b>	<i>Identification:</i> The response is organized into four fields separated by commas. The field definitions are as follows: Field 1 (Manufacturer): EXFO Inc. Field 2 (Model): instrument model Field 3 (Serial number): instrument serial number Field 4 (Firmware level): instrument firmware version
<b>Example(s)</b>	*IDN? returns EXFO Inc., T200S,12345678,1.0.0.0
<b>Notes</b>	The overall length of the *IDN? response is less than or equal to 72 characters.
<b>See Also</b>	*OPT? on page 76



**\*OPC**

<b>Description</b>	<p>This command makes synchronization between the instrument and an external controller possible. The *OPC command causes the instrument to set bit 0 (Operation Complete) in the Standard Event Status Register to the TRUE (logic 1) state when the instrument completes all pending operations.</p> <p>Detection of the Operation Complete message can be accomplished by continuous polling of the Standard Event Status Register using the *ESR? common query command. However, using a service request eliminates the need to poll the Standard Event Status Register thereby freeing the controller to do other useful work.</p>
<b>Type</b>	Overlapping.
<b>Syntax</b>	*OPC
<b>Parameter(s)</b>	None.
<b>See Also</b>	<p>*OPC? on page 75</p> <p>*WAI on page 79</p>

**\*OPC?**

<b>Description</b>	<p>The *OPC? query makes possible the synchronization between the instrument and an external controller by reading the Output Queue or by waiting for a service request on the Message Available (MAV) bit in the Status Byte Register.</p> <p>The *OPC? query causes the instrument to place an ASCII character, 1, into its Output Queue when the device completes all pending operations. A consequence of this action is that the MAV bit in the Status Byte Register is set to state 1.</p>
<b>Type</b>	Overlapping.
<b>Syntax</b>	*OPC?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<Acknowledge>
<b>Response(s)</b>	<p><i>Acknowledge:</i></p> <p>The &lt;Acknowledge&gt; response is a single ASCII-encoded byte corresponding to 1.</p> <p>The receipt of an &lt;Acknowledge&gt; response indicates that all pending selected device operations have been completed.</p>
<b>Example(s)</b>	*OPC? returns 1
<b>See Also</b>	<p>*OPC on page 75</p> <p>*WAI on page 79</p>

**\*OPT?**

<b>Description</b>	The *OPT? query returns the list of device options.
<b>Type</b>	Overlapping.
<b>Syntax</b>	*OPT?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<Option>
<b>Response(s)</b>	<i>Option:</i> The <Option> response is a list of comma separated fields. If there is no option, the response is a null string (""). The overall length of the *OPT? response is less than or equal to 255 characters.
<b>Example(s)</b>	*OPT? returns "200" (for 200 nm/s)
<b>See Also</b>	*IDN? on page 74

**\*RST**

<b>Description</b>	<p>The *RST command performs a reset of the instrument. It is the third reset level in a three-level reset strategy. The *RST command does the following:</p> <ul style="list-style-type: none"><li>➤ Sets the device-specific functions to a known state that is independent of the past-use history of the device.</li><li>➤ Forces the device into OCIS state (Operation complete Command Idle State).</li><li>➤ Forces the device into OQIS state (Operation complete Query Idle State).</li></ul> <p>The *RST command explicitly DOES NOT affect the following:</p> <ul style="list-style-type: none"><li>➤ The state of the Communication interface.</li><li>➤ The Output Queue.</li><li>➤ Any Event Enable Register setting, including the Standard Event Status Enable Register setting.</li><li>➤ Any Event Register setting, including the Standard Event Status Register settings.</li><li>➤ Calibration data that affects device specifications.</li><li>➤ The Service Request Enable Register setting.</li></ul>
<b>Type</b>	Overlapping.
<b>Syntax</b>	*RST
<b>Parameter(s)</b>	None.

**\*SRE**

<b>Description</b>	The *SRE command sets the Service Request Enable Register bit value, as defined in <i>Service Request Enable Register (SRE)</i> on page 47.
<b>Type</b>	Overlapping.
<b>Syntax</b>	*SRE<wsp> <register value>
<b>Parameter(s)</b>	<p><i>register value:</i></p> <p>The &lt;register value&gt;, represents the bit values of the Service Request Enable Register.</p> <p>The &lt;register value&gt; value ranges from 0 through 255.</p> <p>See the content of this register in <i>Service Request Enable Register (SRE)</i> on page 47.</p>
<b>Example(s)</b>	*SRE 52 where 52 sets the ESB, MAV and EAV bits
<b>See Also</b>	*SRE? on page 77 *STB? on page 78

**\*SRE?**

<b>Description</b>	<p>The *SRE? query returns the current content of the Service Request Enable Register.</p> <p>See the content of this register in <i>Service Request Enable Register (SRE)</i> on page 47.</p>
<b>Type</b>	Overlapping.
<b>Syntax</b>	*SRE?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<register value>
<b>Response(s)</b>	<p><i>register value:</i></p> <p>The &lt;register value&gt; represents the current bit values of the Service Request Enable Register.</p> <p>The &lt;register value&gt; ranges from 0 through 255.</p> <p>See the content of this register in <i>Service Request Enable Register (SRE)</i> on page 47.</p>
<b>Example(s)</b>	*SRE returns 32 (the ESB bit is set)
<b>See Also</b>	*SRE? on page 77 *STB? on page 78

<b>*STB?</b>	
<b>Description</b>	The *STB? query returns the contents of the Status Byte register, as defined in <i>Status Byte Register (STB)</i> on page 47.
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	*STB?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<register value>
<b>Response(s)</b>	<i>register value:</i> The <register value> value represents the bit values of the Status Byte Register. The <register value> ranges from 0 through 255. See the content of this register in <i>Status Byte Register (STB)</i> on page 47.
<b>Example(s)</b>	*STB? returns 68 (the MSS and EAV bits are set)
<b>See Also</b>	*SRE? on page 77

<b>*TRG</b>	
<b>Description</b>	This command causes the immediate exit from the event detector of a trigger sequence if the system is waiting for the BUS event source. Otherwise, the command is ignored.  This command generates a trigger event that starts the sweep or the sweep sequence (depending on the parameters), if the system is waiting for the BUS event source.
<b>Applicability</b>	This command only applies if the command <i>TRIGger[:SEquence]:SOURce</i> on page 133 or <i>ARM[:SEquence][:LAYer]:SOURce</i> on page 81 is set to BUS.
<b>Syntax</b>	*TRG
<b>Parameter(s)</b>	None.
<b>Example(s)</b>	*TRG
<b>See Also</b>	<i>ARM[:SEquence][:LAYer]:SOURce</i> on page 81 <i>INITiate[:IMMediate][:ALL]</i> on page 89 <i>TRIGger[:SEquence]:SOURce</i> on page 133

**\*WAI**

<b>Description</b>	The *WAI command prevents the device from executing any further commands or queries until the no-operation-pending flag becomes TRUE.
<b>Type</b>	Overlapping, no query.
<b>Syntax</b>	*WAI
<b>Parameter(s)</b>	None.
<b>Example(s)</b>	*WAI
<b>See Also</b>	*OPC on page 75

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## T200S Specific Commands

### Quick Reference

The table below contains a summary of the T200S specific commands. These commands are fully explained on the following pages.

Command/Query category	Corresponding section
:ABORt	<i>ABORt</i> on page 80
:ARM	<i>ARM Commands and Queries</i> on page 81
:CALibration	<i>CALibration Commands and Queries</i> on page 83
:FORMat	<i>FORMat Commands and Queries</i> on page 87
:INITiate	<i>INITiate Commands and Queries</i> on page 89
:MEASure	<i>MEASURE Commands and Queries</i> on page 90
:OUTPut	<i>OUTPut Commands and Queries</i> on page 92
[[:SOURCE]]	<i>SOURce Commands and Queries</i> on page 96
:STATus	<i>STATus Commands and Queries</i> on page 126
:SYSTem	<i>SYSTem Commands and Queries</i> on page 128
:TRIGger	<i>TRIGger Commands and Queries</i> on page 133
:UNIT	<i>UNIT Commands and Queries</i> on page 135

<b>ABORt</b>	
<b>Description</b>	<p>This command resets the trigger system and places all trigger sequences in the idle state. The command is not completed until the trigger sequence is in the idle state.</p> <p>This command aborts any sweep in progress.</p> <p>This command is an event and has no associated *RST condition or query form.</p>
<b>Syntax</b>	:ABORt
<b>Parameter(s)</b>	None.
<b>Example(s)</b>	ABOR
<b>See Also</b>	<p><i>INITiate[:IMMediate][:ALL]</i> on page 89</p> <p><i>:STATus:OPERation:CONDition?</i> on page 126</p>

## ARM Commands and Queries

### Quick Reference

Command Overview				Parameter(s)	Section
ARM	[:SEquence]	[:LAYer]	SOURce	<source>	see p. 81
	[:SEquence]	[:LAYer]	SOURce?		see p. 82

### ARM[:SEquence][:LAYer]:SOURce

<b>Description</b>	This command selects the source of the arm event for the sweep sequence. At *RST, this value is set to IMMEDIATE.
<b>Syntax</b>	ARM[:SEquence][:LAYer]:SOURce<wsp><source>
<b>Parameter(s)</b>	<i>source</i> : Valid arm event source. The allowed values are: <ul style="list-style-type: none"> <li>➤ <i>BUS</i>: the sweep sequence is started by the *TRG command. Once initiated with the <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89, the instrument waits for the *TRG command to start the sequence.</li> <li>➤ <i>IMMEDIATE</i>: no waiting for an event to occur. The sweep sequence starts as soon as the initiate command is received (see <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89).</li> </ul>
<b>Example(s)</b>	ARM:SOUR IMM ARM:SOUR? returns IMMEDIATE
<b>See Also</b>	*TRG on page 78 <i>ARM[:SEquence][:LAYer]:SOURce?</i> on page 82 <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89 <i>TRIGger[:SEquence]:SOURce</i> on page 133

**ARM[:SEQuence][:LAYer]:SOURce?**

<b>Description</b>	This query returns the source of the arm event for the sweep sequence. At *RST, this value is set to IMMEDIATE.
<b>Syntax</b>	ARM[:SEQuence][:LAYer]:SOURce?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<source>
<b>Response(s)</b>	<p><i>source:</i></p> <p>Selected arm event source:</p> <ul style="list-style-type: none"> <li>➤ <i>BUS</i>: the sweep sequence is started by the *TRG command (see *TRG on page 78). Once initiated with the <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89, the instrument waits for the *TRG command to start the sequence.</li> <li>➤ <i>IMMEDIATE</i>: no waiting for an event to occur. The sequence starts as soon as the initiate command is received (see <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89).</li> </ul>
<b>Example(s)</b>	<p>ARM:SOUR IMM</p> <p>ARM:SOUR? returns IMMEDIATE</p>
<b>See Also</b>	<p><i>ARM[:SEQuence][:LAYer]:SOURce</i> on page 81</p> <p><i>INITiate[:IMMEDIATE][:ALL]</i> on page 89</p> <p><i>TRIGger[:SEQuence]:SOURce?</i> on page 134</p>

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## CALibration Commands and Queries

### Quick Reference

Command Overview		Parameter(s)	Section
CALibration	[ALL]		see p. 83
	DATA	TEMPerature?	see p. 84
	DATA	DATE?	see p. 85
	DATA	TIME?	see p. 86
	WARMup	ABORt	see p. 86

### Commands and Queries

CALibration[:ALL]	
<b>Description</b>	<p>This command starts a full wavelength referencing of the instrument.</p> <p>During the execution of this command, bit #0 (CALibrating) is set in the Operation Status Condition register (see <i>Operational / Questionable Status Reporting</i> on page 48).</p>
<b>Syntax</b>	:CALibration[:ALL]
<b>Parameter(s)</b>	None.
<b>Example(s)</b>	:CAL:ALL
<b>See Also</b>	<p><i>CALibration:DATA:TEMPerature?</i> on page 84</p> <p><i>:STATus:OPERation:CONDition?</i> on page 126</p>

## CALibration:DATA:TEMPerature?

<b>Description</b>	This query returns the ambient temperature measured inside the instrument during the last successful wavelength referencing operation.
<b>Syntax</b>	:CALibration:DATA:TEMPerature?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<temperature>
<b>Response(s)</b>	<p><i>temperature:</i></p> <p>Floating point number corresponding to the temperature value measured during wavelength referencing.</p> <p>The unit of the returned value depends on the unit set with <i>UNIT:TEMPerature</i> on page 136.</p>
<b>Example(s)</b>	<p>UNIT:TEMP CEL</p> <p>CAL:DATA:TEMP? returns 2.850000E+001</p>
<b>See Also</b>	<p><i>CALibration[:ALL]</i> on page 83</p> <p><i>CALibration:DATA:DATE?</i> on page 85</p> <p><i>CALibration:DATA:TIME?</i> on page 86</p> <p><i>MEASure[:SCALar]:TEMPerature[:DC]?</i> on page 91</p> <p><i>UNIT:TEMPerature</i> on page 136</p>

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**CALibration:DATA:DATE?**

<b>Description</b>	This query returns the date of the last successful wavelength referencing operation.
<b>Syntax</b>	:CALibration:DATA:DATE?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<year>,<month><day>
<b>Response(s)</b>	<i>year:</i> Four-digit integer corresponding to the year of the current calibration. <i>month:</i> Integer corresponding to the month of the current calibration, in the range 01 to 12. 01 corresponds to January, 02 to February and so on. <i>day:</i> Integer corresponding to the day of the current calibration. It ranges from 1 to the number of days in the month from the previous field.
<b>Example(s)</b>	CAL:DATA:DATE? returns 2019,08,22
<b>See Also</b>	<i>CALibration[:ALL]</i> on page 83 <i>CALibration:DATA:TEMPerature?</i> on page 84 <i>CALibration:DATA:TIME?</i> on page 86

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### CALibration:DATA:TIME?

<b>Description</b>	This query returns the time of the last successful wavelength referencing operation.
<b>Syntax</b>	:CALibration:DATA:TIME?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<hour>, <minute>, <second>
<b>Response(s)</b>	<p><i>hour:</i></p> <p>Integer corresponding to the hour of the current calibration in 24 hour format, in the range 0 to 23.</p> <p><i>minute:</i></p> <p>Integer corresponding to the number of minutes in the range 0 to 59.</p> <p><i>second:</i></p> <p>Integer corresponding to the number of seconds, in the range 0 to 59.</p>
<b>Example(s)</b>	CAL:DATA:TIME? returns 14,57,09
<b>See Also</b>	<p><i>CALibration[:ALL]</i> on page 83</p> <p><i>CALibration:DATA:DATE?</i> on page 85</p> <p><i>CALibration:DATA:TEMPerature?</i> on page 84</p>

### CALibration:WARMup:ABORT

<b>Description</b>	<p>This command stop the warmup of the instrument.</p> <p>This command is an event and has no associated *RST condition or query form.</p>
<b>Applicability</b>	This command is only valid if bit #11 (WarmingUp) of the Operation Status Condition register is set (see <i>Operational / Questionable Status Reporting</i> on page 48).
<b>Syntax</b>	:CALibration:WARMup:ABORT
<b>Parameter(s)</b>	None
<b>Example(s)</b>	CAL:WARM:ABOR
<b>See Also</b>	:STATus:OPERation:CONDition? on page 126

## FORMat Commands and Queries

### Quick Reference

Command Overview		Parameter(s)	Section
FORMat	[DATA]	<type> [, <length> ]	see p. 87
	[DATA]?		see p. 88

### Commands and Queries

## FORMat[:DATA]

<b>Description</b>	This command selects the format and length of data readings. At *RST, ASCii is selected as the default data format and the length is set to 0.
<b>Syntax</b>	:FORMat[:DATA] <wsp> <type> [, <length> ]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>type</i>: Format of data readings. Possibles values are: <ul style="list-style-type: none"> <li>➤ ASCii: numeric data is formatted as ASCII bytes such as &lt;NR1 NUMERIC RESPONSE DATA&gt;, &lt;NR2 NUMERIC RESPONSE DATA&gt; or &lt;NR3 NUMERIC RESPONSE DATA&gt; representation, as appropriate.</li> <li>➤ PACKed: data is formatted as a series of 8-bit binary data bytes.</li> </ul> </li> <li>➤ <i>length</i>: If the ASCii format is selected, this parameters specifies the number of significant digits to be returned. A &lt;length&gt; value of zero indicates that the device selects the number of significant digits to be returned. If the PACKed data format is selected, the optional parameter &lt;length&gt; is not used.</li> </ul>
<b>Example(s)</b>	FORM:DATA ASC,6
<b>See Also</b>	FORMat[:DATA]? on page 88

**FORMat[:DATA]?**

<b>Description</b>	This query returns the format and length of data readings.
<b>Syntax</b>	:FORMat[:DATA]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<type>[,<length>]
<b>Response(s)</b>	<ul style="list-style-type: none"><li>➤ <i>type</i>: Format of data readings.<ul style="list-style-type: none"><li>➤ <b>ASCIi</b>: numeric data is formatted as ASCII bytes such as &lt;NR1 NUMERIC RESPONSE DATA&gt;, &lt;NR2 NUMERIC RESPONSE DATA&gt; or &lt;NR3 NUMERIC RESPONSE DATA&gt; representation, as appropriate.</li><li>➤ <b>PACKed</b>: data is formatted as a series of 8-bit binary data bytes.</li></ul></li><li>➤ <i>length</i>: If the data is returned in ASCII format, the &lt;length&gt; is the number of significant digits to be returned. A &lt;length&gt; value of zero indicates that the device selects the number of significant digits to be returned.  If the data is returned in PACKed format, the &lt;length&gt; is not used and always returns 0.</li></ul>
<b>Example(s)</b>	FORM:DATA PACK FORM:DATA? returns PACKed, 0
<b>See Also</b>	<i>FORMat[:DATA]</i> on page 87

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## INITiate Commands and Queries

### Quick reference

Command Overview			Parameter(s)	Section
INITiate	[IMMEDIATE]	[ALL]		see p. 89

### Commands and Queries

## INITiate[:IMMEDIATE][:ALL]

<b>Description</b>	<p>This command completes one full trigger system cycle and returns to IDLE on completion.</p> <p>This command initiates a sweep sequence.</p> <p>This command is an event and has no associated *RST condition or query form.</p>
<b>Syntax</b>	:INITiate[:IMMEDIATE][:ALL]
<b>Parameter(s)</b>	None.
<b>Example(s)</b>	:INIT:IMM:ALL
<b>See Also</b>	<p><i>ABORt</i> on page 80</p> <p><i>[SOURce]:SWEep:CYCLE:CONTInuous</i> on page 108</p> <p><i>:STATus:OPERation:CONDition?</i> on page 126</p>

## MEASURE Commands and Queries

### Quick reference

Command Overview				Parameter(s)	Section
MEASure	[SCALar]	POWer	[DC]?		see p. 90
		TEMPerature	[DC]?		see p. 91

### Commands and Queries

<b>MEASure[:SCALar]:POWER[:DC]?</b>	
<b>Description</b>	This query returns the power read at the source output. This query has no associated *RST condition.
<b>Syntax</b>	MEASure[:SCALar]:POWER[:DC]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<power>
<b>Response(s)</b>	<i>power:</i> Floating point number corresponding to the power measured at the laser output. The unit of the returned value depends on the unit set with <i>UNIT:POWER</i> on page 135.
<b>Example(s)</b>	UNIT:POW DBM MEAS:SCAL:POW:DC?returns 5.246000E+000
<b>See Also</b>	<i>OUTPut[:STATe]?</i> on page 93 <i>UNIT:POWER</i> on page 135



**MEASure[:SCALar]:TEMPerature[:DC]?**

<b>Description</b>	This query returns the actual temperature for calibration monitoring.  This query has no associated *RST condition.
<b>Syntax</b>	MEASure[:SCALar]:TEMPerature[:DC]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<temperature>
<b>Response(s)</b>	<i>temperature:</i>  Floating point number corresponding to the temperature measured in the instrument.  The unit of the returned value depends on the unit set with <i>UNIT:TEMPerature</i> on page 136.
<b>Example(s)</b>	UNIT:TEMP CEL MEAS:SCAL:TEMP:DC? returns 2.40000E+001
<b>See Also</b>	<i>CALibration[:ALL]</i> on page 83 <i>CALibration:DATA:TEMPerature?</i> on page 84 <i>UNIT:TEMPerature</i> on page 136

## OUTPut Commands and Queries

### Quick reference

Command Overview			Parameter(s)	Section
OUTPut	[STATe]		<state>	see p. 92
	[STATe]?			see p. 93
	MONitor<n>	[STATe]	<state>	see p. 93
		[STATe]?		see p. 94
	SYNChronization	[STATe]	<state>	see p. 95
		[STATe]?		see p. 95

### Commands and Queries

<b>OUTPut[:STATe]</b>	
<b>Description</b>	<p>This command enables/disables the laser output.</p> <p>At *RST, this value is set to ON.</p> <p>During the execution of this command, bit #1 (SETTLing) is set in the Operation Status Condition register (see <i>Operational / Questionable Status Reporting</i> on page 48).</p>
<b>Syntax</b>	:OUTPut[:STATe] <wsp> <state>
<b>Parameter(s)</b>	<p><i>state</i>:</p> <p>State of the laser output. The allowed values are:</p> <ul style="list-style-type: none"> <li>➤ OFF 0 : disables the laser output, which means that the source emission is disabled.</li> <li>➤ ON 1 (default): enables the laser output.</li> </ul>
<b>Example(s)</b>	OUTP:STAT OFF
<b>See Also</b>	<p>OUTPut[:STATe]? on page 93</p> <p>:STATus:OPERation:CONDition? on page 126</p> <p>:STATus:QUEStionable:CONDition? on page 127</p>

**OUTPut[:STATe]?**

<b>Description</b>	This query returns the state of the laser output. At *RST, this value is set to ON.
<b>Syntax</b>	:OUTPut[:STATe]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<i>state</i> : State of the laser output: <ul style="list-style-type: none"> <li>➤ 0 : the laser output is disabled, which means that the source emission is disabled.</li> <li>➤ 1 (default): the laser output is enabled.</li> </ul>
<b>Example(s)</b>	OUTP ON OUTP? returns 1 (open)
<b>See Also</b>	<i>OUTPut[:STATe]</i> on page 92

**OUTPut:MONitor1 | 2[:STATe]**

<b>Description</b>	This command controls the activation of the output signal generation on the specified monitoring BNC connector located on the rear panel: <ul style="list-style-type: none"> <li>➤ MONitor1 is the <math>\lambda</math> <b>out</b> BNC connector (for spectrum monitoring).</li> <li>➤ MONitor2 is the <b>Power out</b> BNC connector (for power monitoring).</li> </ul> <p>During the execution of this command, bit #1 (SETTling) is set in the Operation Status Condition register (see <i>Operational / Questionable Status Reporting</i> on page 48).</p> <p>At *RST, this value is set to OFF.</p>
<b>Syntax</b>	:OUTPut:MONitor1   2[:STATe]<wsp><state>
<b>Parameter(s)</b>	<i>state</i> : State of the specified monitoring output. The allowed values are: <ul style="list-style-type: none"> <li>➤ OFF 0 (default): the output is closed, which means that no signal is output from the BNC port.</li> <li>➤ ON 1: the output is open.</li> </ul>
<b>Example(s)</b>	OUTP:MON:STAT OFF OUTP:MON:STAT? returns 0 (closed)
<b>See Also</b>	<i>OUTPut:MONitor1   2[:STATe]?</i> on page 94 <i>OUTPut:SYNChronization[:STATe]</i> on page 95

**OUTPut:MONitor1 | 2[:STATe]?**

<b>Description</b>	<p>This query indicates if the output signal generation is active for the specified monitoring BNC connector located on the rear panel:</p> <ul style="list-style-type: none"> <li>➤ MONitor1 is the <math>\lambda</math> <b>out</b> BNC connector (for spectrum monitoring).</li> <li>➤ MONitor2 is the <b>Power out</b> BNC connector (for power monitoring).</li> </ul> <p>At *RST, this value is set to OFF.</p>
<b>Syntax</b>	:OUTPut:MONitor1   2[:STATe]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<p><i>state</i>:</p> <p>State of the specified monitoring output:</p> <ul style="list-style-type: none"> <li>➤ 0 (default): the output is closed, which means that no signal is output from the BNC port.</li> <li>➤ 1: the output is open.</li> </ul>
<b>Example(s)</b>	<p>OUTP:MON2:STAT ON</p> <p>OUTP:MON2:STAT? returns 1 (open)</p>
<b>See Also</b>	<p><i>OUTPut:MONitor1   2[:STATe]</i> on page 93</p> <p><i>OUTPut:SYNChronization[:STATe]?</i> on page 95</p>

**OUTPut:SYNChronization[:STATe]**

<b>Description</b>	This command controls the activation of the output signal generation on the <b>Trig out</b> BNC connector located on the rear panel. At *RST, this value is set to OFF.
<b>Syntax</b>	:OUTPut:SYNChronization[:STATe]<wsp><state>
<b>Parameter(s)</b>	<i>state</i> : State of the Trig out output. The allowed values are: <ul style="list-style-type: none"> <li>➤ OFF 0 (default): the output is closed, which means that no signal is output from the BNC port.</li> <li>➤ ON 1: the output is open.</li> </ul>
<b>Example(s)</b>	OUTP:SYNC:STAT OFF (closed)
<b>See Also</b>	<i>OUTPut:MONitor1  2[:STATe]</i> on page 93 <i>OUTPut:SYNChronization[:STATe]?</i> on page 95

**OUTPut:SYNChronization[:STATe]?**

<b>Description</b>	This query indicates if the output signal generation is active for the <b>Trig out</b> BNC connector located on the rear panel. At *RST, this value is set to OFF.
<b>Syntax</b>	:OUTPut:SYNChronization[:STATe]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<i>state</i> : State of the Trig out output: <ul style="list-style-type: none"> <li>➤ 0 (default): the output is closed, which means that no signal is output from the BNC port.</li> <li>➤ 1: the output is open.</li> </ul>
<b>Example(s)</b>	OUTP:SYNC ON OUTP:SYNC? returns 1 (open)
<b>See Also</b>	<i>OUTPut:MONitor1  2[:STATe]?</i> on page 94 <i>OUTPut:SYNChronization[:STATe]</i> on page 95

## SOURCE Commands and Queries

### Quick reference

Command Overview					Parameter(s)	Section
[SOURCE]	FREQUENCY	[CW FIXed]			<frequency>[<unit>]  MAXimum MINimum DEFAULT  UP DOWN	see p. 98
		[CW FIXed]?			[MAXimum MINimum DEFAULT]	see p. 99
			STEP	[WIDTH]	<step>[<unit>] MAXimum  MINimum DEFAULT UP  DOWN	see p. 100
				[WIDTH]?	[MAXimum MINimum DEFAULT]	see p. 101
		SWEep	START		<start>[<unit>]  MAXimum MINimum DEFAULT	see p. 102
			START?		[MAXimum MINimum DEFAULT]	see p. 103
			STOP		<stop>[<unit>] MAXimum  MINimum DEFAULT	see p. 104
			STOP?		[MAXimum MINimum DEFAULT]	see p. 105
	OPTimization	BCOMPensation	[STATE]		<state>	see p. 106
			[STATE]?			see p. 106
		OLINewidth	[STATE]		<state>	see p. 107
			[STATE]?			see p. 107
	SWEep	CYCLE	CONTinuous		<state>	see p. 108
			CONTinuous?			see p. 108
			COUNT		<count> MAXimum  MINimum DEFAULT	see p. 109
			COUNT?		[MAXimum MINimum  DEFAULT]	see p. 110
		HOLDoff			<pause>[<unit>]  MAXimum MINimum DEFAULT	see p. 111
		HOLDoff?			[MAXimum MINimum DEFAULT]	see p. 112
		REST			<position>	see p. 113
		REST?				see p. 114
	WAVelength	[CW FIXed]			<wavelength>[<unit>] MAXi mum MINimum DEFAULT UP  DOWN	see p. 115
		[CW FIXed]?			[MAXimum MINimum DEFAULT]	see p. 116
			STEP	[WIDTH]	<step>[<unit>] MAXimum  MINimum DEFAULT UP DOWN	see p. 117
				[WIDTH]?	[MAXimum MINimum DEFAULT]	see p. 118
		SWEep	SPEed		<speed>[<unit>] MAXimum  MINimum DEFAULT	see p. 119
			SPEed?		[MAXimum MINimum DEFAULT]	see p. 120

Command Overview				Parameter(s)	Section	
			SPEed	LIST?	see p. 121	
			STARt		<start> [ <unit> ]   MAXimum   MINimum   DEFault	see p. 122
			STARt?		[MAXimum   MINimum   DEFault]	see p. 123
			STOP		<stop> [ <unit> ]   MAXimum   MINimum   DEFault	see p. 124
			STOP?		[MAXimum   MINimum   DEFault]	see p. 125

**Commands and Queries**

**[SOURce]:FREQUency[:CW|FIXed]**

<b>Description</b>	<p>This command sets the absolute or relative frequency of a non-swept signal.</p> <p>During the tuning of the emission frequency, bit #1 (SETTling) is set in the Operation Status Condition register (see <i>Operational / Questionable Status Reporting</i> on page 48).</p> <p>At *RST, this value is set to DEFault.</p>
<b>Syntax</b>	<p>[[:SOURce]:FREQUency[:CW FIXed]&lt;wsp&gt; &lt;frequency&gt;[ &lt;unit&gt; ]   MAXimum   MINimum   DEFault   UP   DOWN</p>
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>frequency</i>: Value corresponding to the emission frequency in Hertz (if no unit is specified). To know the valid frequency range, use the query <i>[SOURce]:FREQUency[:CW FIXed]?</i> on page 99 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the emission frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i>: Sets the emission frequency to the maximum possible frequency value, depending on the laser model.</li> <li>➤ <i>MINimum</i>: Sets the emission frequency to the minimum possible frequency value, depending on the laser model.</li> <li>➤ <i>DEFault</i>: Sets the emission frequency to the default frequency value, depending on the laser model. To know the default frequency, use the query <i>[SOURce]:FREQUency[:CW FIXed]?</i> on page 99 (DEF parameter).</li> <li>➤ <i>UP</i>: This parameter enables you to perform relative frequency tuning: it sets the emission frequency one step up from the actual frequency value. You can specify the step size with the command <i>[SOURce]:FREQUency[:CW FIXed]:STEP[:WIDTH]</i> on page 100.</li> <li>➤ <i>DOWN</i>: This parameter enables you to perform relative frequency tuning: it sets the emission frequency one step down from the actual frequency value. You can specify the step size with the command <i>[SOURce]:FREQUency[:CW FIXed]:STEP[:WIDTH]</i> on page 100.</li> </ul>
<b>Example(s)</b>	<p>SOUR:FREQ:CW 197.5 THZ</p> <p>SOUR:FREQ:CW? returns 1.975000E+014</p>
<b>See Also</b>	<p><i>[SOURce]:FREQUency[:CW FIXed]?</i> on page 99</p> <p><i>[SOURce]:FREQUency[:CW FIXed]:STEP[:WIDTH]</i> on page 100</p> <p><i>[SOURce]:OPTimization:OLINewidth[:STATE]</i> on page 107</p> <p><i>[SOURce]:WAVelength[:CW FIXed]</i> on page 115</p>



**[SOURce]:FREQuency[:CW|FIXed]?**

<b>Description</b>	This query returns a value indicating either the current absolute frequency or the minimum/maximum/default absolute frequency of a non-swept signal. At *RST, this value is set to DEFault.
<b>Syntax</b>	[[:SOURce]:FREQuency[:CW FIXed]?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible frequency value for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible frequency value for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default frequency value for the laser model.</li> </ul>
<b>Response Syntax</b>	<frequency>
<b>Response(s)</b>	<i>frequency:</i> Floating point number in Hz corresponding to the current frequency or the minimum/maximum/default frequency, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:FREQ:FIX 197.5 THZ SOUR:FREQ:FIX? returns 1.975000E+014
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?</i> on page 101 <i>[SOURce]:OPTimization:OLINewwidth[:STATe]?</i> on page 107 <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116

**[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]**

<b>Description</b>	<p>This command specifies the size of steps used to perform relative frequency of a non-swept signal.</p> <p>You can perform relative frequency tuning through the command <i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 with the UP/DOWN keywords.</p> <p>At *RST, this value is set to DEFault.</p>
<b>Syntax</b>	<p>[[:SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh] &lt;wsp&gt; &lt;step&gt; [ &lt;unit&gt; ]   MAXimum   MINimum   DEFault   UP   DOWN</p>
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>step</i>: Value corresponding to the step in Hertz (if no unit is specified). To know the valid frequency range, use the query <i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?</i> on page 101 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the frequency step: HZ preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i>: Sets the frequency step to the maximum possible step value.</li> <li>➤ <i>MINimum</i>: Sets the frequency step to the minimum possible step value.</li> <li>➤ <i>DEFault</i>: Sets the frequency step to the default step value. To know the default step, use the query <i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?</i> on page 101 (DEF parameter).</li> </ul>
<b>Example(s)</b>	<p>SOUR:FREQ:CW 197.5 THZ SOUR:FREQ:CW? returns 1.975000E+014 SOUR:FREQ:CW:STEP 0.5 THZ SOUR:FREQ:CW UP SOUR:FREQ:CW? returns 1.980000E+014</p>
<b>See Also</b>	<p><i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?</i> on page 101 <i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]</i> on page 117</p>

**[SOURce]:FREQuency[:CW|FIXed]:STEP[:WIDTh]?**

<b>Description</b>	This query returns a value indicating either the current frequency step size or the minimum/maximum/default frequency step size for relative tuning of a non-swept signal.  At *RST, this value is set to DEFault.
<b>Syntax</b>	[[:SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible frequency value for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible frequency value for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default frequency value for the laser model.</li> </ul>
<b>Response Syntax</b>	<step>
<b>Response(s)</b>	<i>step</i> :  Floating point number in Hz corresponding to the current frequency step or the minimum/maximum/default frequency step, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:FREQ:CW:STEP 0.1 THZ  SOUR:FREQ:CW:STEP? returns 1.000000E+011
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]?</i> on page 99 <i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]</i> on page 100 <i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?</i> on page 118

**[SOURce]:FREQuency:SWEep:STARt**

<b>Description</b>	This command sets the start frequency of a swept signal. At *RST, this value will be set to MINimum.
<b>Syntax</b>	[[:SOURce]:FREQuency:SWEep:STARt<wsp><start>[<unit>]] MAXimum MINimum DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>start</i>: Value corresponding to the start frequency in Hz (if no unit is specified). To know the valid frequency range, you can use the query <i>[SOURce]:FREQuency:SWEep:STARt?</i> on page 103 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the start frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the start frequency to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the start frequency to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the start frequency to the default value. To know the valid frequency range, you can use the query <i>[SOURce]:FREQuency:SWEep:STARt?</i> on page 103 (DEF parameter)</li> </ul>
<b>Example(s)</b>	SOUR:FREQ:SWE:STAR 197.5 THZ SOUR:FREQ:SWE:STAR? returns 1.975000E+014
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:FREQuency:SWEep:STARt?</i> on page 103 <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122

**[SOURce]:FREQuency:SWEep:STARt?**

<b>Description</b>	This query indicates either the current or the minimum/maximum/default start frequency of a swept signal. At *RST, this value is set to MINimum.
<b>Syntax</b>	[[:SOURce]:FREQuency:SWEep:STARt? <wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible start frequency for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible start frequency for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default start frequency for the laser model.</li> </ul>
<b>Response Syntax</b>	<start>
<b>Response(s)</b>	<i>start:</i> Floating point number in Hz corresponding to the current start frequency or the minimum/maximum/default start frequency, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:FREQ:SWE:STAR 197.5 THZ SOUR:FREQ:SWE:STAR? returns 1.975000E+014
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]?</i> on page 99 <i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 <i>[SOURce]:FREQuency:SWEep:STOP?</i> on page 105 <i>[SOURce]:WAVelength:SWEep:STARt?</i> on page 123

**[SOURce]:FREQuency:SWEEp:STOP**

<b>Description</b>	This command sets the stop frequency of a swept signal. At *RST, this value will be set to MAXimum.
<b>Syntax</b>	[[:SOURce]:FREQuency:SWEEp:STOP<wsp><stop>[<unit>]] MAXimum MINimum DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>stop</i>: Value corresponding to the stop frequency in Hz (if no unit is specified). To know the valid frequency range, you can use the query <i>[SOURce]:FREQuency:SWEEp:STOP?</i> on page 105 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the stop frequency: HZ preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the stop frequency to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the stop frequency to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the stop frequency to the default value. To know the default value, you can use the query <i>[SOURce]:FREQuency:SWEEp:STOP?</i> on page 105 (DEF parameter).</li> </ul>
<b>Example(s)</b>	SOUR:FREQ:SWE:STOP 197.5 THZ SOUR:FREQ:SWE:STOP? returns 1.975000E+014
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:FREQuency:SWEEp:STARt</i> on page 102 <i>[SOURce]:FREQuency:SWEEp:STOP?</i> on page 105 <i>[SOURce]:WAVelength:SWEEp:STOP</i> on page 124

**[SOURce]:FREQuency:SWEep:STOP?**

<b>Description</b>	This query indicates either the current or the minimum/maximum/default stop frequency of a swept signal. At *RST, this value is set to MAXimum.
<b>Syntax</b>	[[:SOURce]:FREQuency:SWEep:STOP?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible stop frequency for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible stop frequency for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default stop frequency for the laser model.</li> </ul>
<b>Response Syntax</b>	<stop>
<b>Response(s)</b>	<i>stop:</i> Floating point number in Hz corresponding to the current stop frequency or the minimum/maximum/default stop frequency, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:FREQ:SWE:STOP 197.5 THZ SOUR:FREQ:SWE:STOP? returns 1.975000E+014
<b>See Also</b>	<i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:FREQuency:SWEep:START?</i> on page 103 <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 <i>[SOURce]:WAVelength:SWEep:STOP?</i> on page 125

**[SOURce]:OPTimization:BCOMpensation[:STATe]**

<b>Description</b>	This command enables/disables the backlash compensation optimization during a sweep. At *RST, this value is set to ON.
<b>Syntax</b>	[[:SOURce]:OPTimization:BCOMpensation[:STATe]<wsp><state>
<b>Parameter(s)</b>	<i>state</i> : State of the backlash compensation optimization. The allowed values are: <ul style="list-style-type: none"> <li>➤ OFF 0: disables the backlash compensation.</li> <li>➤ ON 1: enables the backlash compensation.</li> </ul>
<b>Example(s)</b>	SOUR:OPT:BCOM:STAT ON SOUR:OPT:BCOM:STAT? returns 1 (compensation enabled)
<b>See Also</b>	<i>[SOURce]:OPTimization:BCOMpensation[:STATe]? on page 106</i> <i>[SOURce]:OPTimization:OLINewwidth[:STATe] on page 107</i>

**[SOURce]:OPTimization:BCOMpensation[:STATe]?**

<b>Description</b>	This query returns the state of the backlash compensation optimization of the sweep. At *RST, this value is set to ON.
<b>Syntax</b>	[[:SOURce]:OPTimization:BCOMpensation[:STATe]?]
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<i>state</i> : Activation state of the backlash compensation: <ul style="list-style-type: none"> <li>➤ OFF 0: backlash compensation is disabled.</li> <li>➤ ON 1: backlash compensation is enabled.</li> </ul>
<b>Example(s)</b>	SOUR:OPT:BCOM:STAT ON SOUR:OPT:BCOM:STAT? returns 1 (compensation enabled)
<b>See Also</b>	<i>[SOURce]:OPTimization:BCOMpensation[:STATe] on page 106</i> <i>[SOURce]:OPTimization:OLINewwidth[:STATe]? on page 107</i>



**[SOURce]:OPTimization:OLINewwidth[:STATE]**

<b>Description</b>	This command enables/disables the optimized linewidth optimization while tuning the laser. At *RST, this value is set to OFF.
<b>Syntax</b>	[[:SOURce]:OPTimization:OLINewwidth[:STATE] <wsp> <state>
<b>Parameter(s)</b>	<i>state:</i> State of the optimized linewidth optimization. The allowed values are: <ul style="list-style-type: none"> <li>➤ OFF   0: disables optimized linewidth.</li> <li>➤ ON   1: enables optimized linewidth.</li> </ul>
<b>Example(s)</b>	SOUR:OPT:OLIN:STAT ON SOUR:OPT:OLIN:STAT? returns 1 (optimized linewidth active)
<b>See Also</b>	<i>[SOURce]:FREQUENCY[:CW FIXed]</i> on page 98 <i>[SOURce]:OPTimization:BCOMPensation[:STATE]</i> on page 106 <i>[SOURce]:OPTimization:OLINewwidth[:STATE]?</i> on page 107 <i>[SOURce]:WAVelength[:CW FIXed]</i> on page 115

**[SOURce]:OPTimization:OLINewwidth[:STATE]?**

<b>Description</b>	This query returns the state of the optimized linewidth optimization. At *RST, this value is set to OFF.
<b>Syntax</b>	[[:SOURce]:OPTimization:OLINewwidth[:STATE]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<i>state:</i> Activation state of the optimized linewidth optimization: <ul style="list-style-type: none"> <li>➤ OFF   0: optimized linewidth is disabled.</li> <li>➤ ON   1: optimized linewidth is enabled.</li> </ul>
<b>Example(s)</b>	SOUR:OPT:OLIN:STAT ON SOUR:OPT:OLIN:STAT? returns 1 (optimized linewidth active)
<b>See Also</b>	<i>[SOURce]:OPTimization:BCOMPensation[:STATE]?</i> on page 106 <i>[SOURce]:OPTimization:OLINewwidth[:STATE]</i> on page 107

**[SOURce]:SWEep:CYCLE:CONTInuous**

<b>Description</b>	This command enables/disables the continuous sweep mode. At *RST, this value is set to OFF.
<b>Syntax</b>	[[:SOURce]:SWEep:CYCLE:CONTInuous<wsp> <state>
<b>Parameter(s)</b>	<i>state</i> : State of the sweep. The allowed values are: <ul style="list-style-type: none"> <li>➤ OFF 0: disables continuous sweep cycle mode. The sweep cycles are not continuously repeated.</li> <li>➤ ON 1: enables continuous sweep cycle mode. The sweep cycles are continuously repeated.</li> </ul>
<b>Example(s)</b>	SOUR:SWE:CYCL:CONT ON SOUR:SWE:CYCL:CONT? returns 1 (continuous cycle enabled)
<b>See Also</b>	<i>[SOURce]:SWEep:CYCLE:CONTInuous?</i> on page 108 <i>[SOURce]:SWEep:CYCLE:COUNt</i> on page 109

**[SOURce]:SWEep:CYCLE:CONTInuous?**

<b>Description</b>	This query returns the state of the continuous sweep mode. At *RST, this value is set to 1.
<b>Syntax</b>	[[:SOURce]:SWEep:CYCLE:CONTInuous?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<state>
<b>Response(s)</b>	<i>state</i> : Activation state of the continuous sweep mode: <ul style="list-style-type: none"> <li>➤ OFF 0: the continuous sweep mode is disabled.</li> <li>➤ ON 1: the continuous sweep mode is enabled.</li> </ul>
<b>Example(s)</b>	SOUR:SWE:CYCL:CONT ON SOUR:SWE:CYCL:CONT? returns 1 (continuous cycle enabled)
<b>See Also</b>	<i>[SOURce]:SWEep:CYCLE:CONTInuous</i> on page 108 <i>[SOURce]:SWEep:CYCLE:COUNt?</i> on page 110

**[SOURce]:SWEep:CYCLE:COUNT**

<b>Description</b>	This command sets the number of sweep cycles you want the instrument to perform. At *RST, this value is set to 1.
<b>Applicability</b>	This command applies if the continuous repeat is disabled ( <i>[SOURce]:SWEep:CYCLE:CONTinuous</i> on page 108 set to OFF).
<b>Syntax</b>	<i>[SOURce]:SWEep:CYCLE:COUNT</i> <wsp> <count>   MAXimum   MINimum   DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>count</i>: Number of sweep cycles you want the instrument to perform. To know the valid count range, use the query <i>[SOURce]:SWEep:CYCLE:COUNT?</i> on page 110 (MIN and MAX parameters).</li> <li>➤ <i>MAXimum</i> Sets the number of sweep cycle to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the number of sweep cycle to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the number of sweep cycle to the default value. To know the default count, use the query <i>[SOURce]:SWEep:CYCLE:COUNT?</i> on page 110 (DEF parameter).</li> </ul>
<b>Example(s)</b>	<p>SOUR:SWE:CYCL:CONT OFF</p> <p>SOUR:SWE:CYCL:COUN 4</p> <p>SOUR:SWE:CYCL:COUN? returns 4</p>
<b>See Also</b>	<p><i>[SOURce]:SWEep:CYCLE:CONTinuous</i> on page 108</p> <p><i>[SOURce]:SWEep:CYCLE:COUNT?</i> on page 110</p>

<b>[SOURce]:SWEep:CYCLE:COUNT?</b>	
<b>Description</b>	This query indicates either the number of sweep cycles set or the minimum/maximum/default number of sweep cycles. At *RST, this value is set to 1.
<b>Syntax</b>	[[:SOURce]:SWEep:CYCLE:COUNT?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible number of sweep cycles.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible number of sweep cycles.</li> <li>➤ <i>DEFault</i> The query returns the default number of sweep cycles.</li> </ul>
<b>Response Syntax</b>	<count>
<b>Response(s)</b>	<i>count:</i> Integer corresponding to the current number of sweep cycles or the minimum/maximum/default possible number of sweep cycles, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:SWE:CYCL:COUN 4 SOUR:SWE:CYCL:COUN? returns 4
<b>See Also</b>	<i>[SOURce]:SWEep:CYCLE:CONTInuous?</i> on page 108 <i>[SOURce]:SWEep:CYCLE:COUNT</i> on page 109

**[SOURce]:SWEep:HOLDoff**

<b>Description</b>	This command sets the time duration of the pause to perform after sweep completion. At *RST, this value is set to 0.0 second.
<b>Syntax</b>	[[:SOURce]:SWEep:HOLDoff<wsp><pause>[<unit>]] MAXimum MINimum DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>pause</i>: Numeric value corresponding to the pause in second. To know the valid time range, use the query <i>[SOURce]:SWEep:HOLDoff?</i> on page 112 (MIN and MAX parameters).</li> <li>➤ <i>unit</i> Unit of the pause value: S preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the pause to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the pause to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the pause to the default value. To know the default time, use the query <i>[SOURce]:SWEep:HOLDoff?</i> on page 112 (DEF parameter).</li> </ul>
<b>Example(s)</b>	SOUR:SWE:HOLD 200 MS SOUR:SWE:HOLD? returns 2.000000E-001
<b>See Also</b>	<i>[SOURce]:SWEep:HOLDoff?</i> on page 112

**[SOURce]:SWEep:HOLDoff?**

<b>Description</b>	This query returns a value indicating either the current pause duration after sweep completion, or the minimum/maximum/default possible pause duration. At *RST, this value is set to 0.0 second.
<b>Syntax</b>	[[:SOURce]:SWEep:HOLDoff?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible pause duration in second.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible pause duration in second.</li> <li>➤ <i>DEFault</i> The query returns the default pause duration in second.</li> </ul>
<b>Response Syntax</b>	<pause>
<b>Response(s)</b>	<p><i>pause:</i></p> <p>Floating point number corresponding to the current pause duration in seconds or the minimum/maximum/default pause duration, depending on the specified query parameters.</p>
<b>Example(s)</b>	<p>SOUR:SWE:HOLD 200 MS</p> <p>SOUR:SWE:HOLD? returns 2.000000E-001</p>
<b>See Also</b>	<i>[SOURce]:SWEep:HOLDoff</i> on page 111

**[SOURce]:SWEep:REST**

<b>Description</b>	This command sets the spectrum position when the source return to idle after completion of a sweep sequence. At *RST, this value is set to START.
<b>Syntax</b>	[[:SOURce]:SWEep:REST <wsp> <position>
<b>Parameter(s)</b>	<i>position:</i> Position of the laser after sweep sequence completion. Possible values are: <ul style="list-style-type: none"> <li>➤ START: on sweep sequence completion, the source goes back to the sweep start position as specified by the commands <i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 and <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122.</li> <li>➤ STOP: on sweep sequence completion, the source stays at the sweep stop position. If the sweep sequence is completed normally then the position is specified by the commands <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 and <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124. If the sequence is canceled then the position will be anywhere within the sweep range.</li> </ul>
<b>Example(s)</b>	SOUR:SWE:REST STOP SOUR:SWE:REST? returns STOP
<b>See Also</b>	<i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 <i>[SOURce]:SWEep:REST?</i> on page 114 <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122 <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124

<b>[SOURce]:SWEep:REST?</b>	
<b>Description</b>	This query indicates the spectrum position when the source return to idle after completion of a sweep sequence. At *RST, this value is set to START.
<b>Syntax</b>	[[:SOURce]:SWEep:REST?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<position>
<b>Response(s)</b>	<i>position:</i> Position of the laser after sweep sequence completion: <ul style="list-style-type: none"> <li>➤ START: on sweep sequence completion, the source goes back to the sweep start position as specified by the commands <i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 and <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122.</li> <li>➤ STOP: on sweep sequence completion, the source stays at the sweep stop position. If the sweep sequence is completed normally then the position is specified by the commands <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 and <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124. If the sequence is canceled then the position will be anywhere within the sweep range.</li> </ul>
<b>Example(s)</b>	SOUR:SWE:REST STOP SOUR:SWE:REST? returns STOP
<b>See Also</b>	<i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 <i>[SOURce]:FREQuency:SWEep:STOP</i> on page 104 <i>[SOURce]:SWEep:REST</i> on page 113 <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122 <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124



**[SOURce]:WAVelength[:CW|FIXed]**

<b>Description</b>	<p>This command selects the absolute or relative wavelength of a non-swept signal.</p> <p>During the tuning of the emission wavelength, bit #1 (SETTLing) is set in the Operation Status Condition register (see <i>Operational / Questionable Status Reporting</i> on page 48).</p> <p>At *RST, this value is set to DEFault.</p>
<b>Syntax</b>	<pre>[[:SOURce]:WAVelength[:CW FIXed]&lt;wsp&gt;&lt;wavelength&gt; [&lt;unit&gt;] MAXimum MINimum DEFault UP DOWN</pre>
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>wavelength</i>: <ul style="list-style-type: none"> <li>Value corresponding to the emission wavelength in meters (if no unit is specified).</li> <li>To know the valid wavelength range, use the query <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116 (MIN and MAX parameters).</li> </ul> </li> <li>➤ <i>unit</i>: <ul style="list-style-type: none"> <li>Unit of the emission wavelength: M preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> </ul> </li> <li>➤ <i>MAXimum</i> <ul style="list-style-type: none"> <li>Sets the emission wavelength to the maximum possible wavelength value, depending on the laser model.</li> </ul> </li> <li>➤ <i>MINimum</i> <ul style="list-style-type: none"> <li>Sets the emission wavelength to the minimum possible wavelength value, depending on the laser model.</li> </ul> </li> <li>➤ <i>DEFault</i> <ul style="list-style-type: none"> <li>Sets the emission wavelength to the default wavelength value, depending on the laser model.</li> <li>To know the default wavelength, use the query <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116 (DEF parameter).</li> </ul> </li> <li>➤ <i>UP</i> <ul style="list-style-type: none"> <li>This parameter enables you to perform relative wavelength tuning: it sets the emission wavelength one step up from the actual wavelength value.</li> <li>You can specify the step size with the command <i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]</i> on page 117.</li> </ul> </li> <li>➤ <i>DOWN</i> <ul style="list-style-type: none"> <li>This parameter enables you to perform relative wavelength tuning: it sets the emission wavelength one step down from the actual wavelength value.</li> <li>You can specify the step size with the command <i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]</i> on page 117.</li> </ul> </li> </ul>
<b>Example(s)</b>	<pre>SOUR:WAV:CW 1570 NM SOUR:WAV:CW? returns 1.570000E-006</pre>
<b>See Also</b>	<pre><i>[SOURce]:FREQuency[:CW FIXed]</i> on page 98 <i>[SOURce]:OPTimization:OLINewwidth[:STATe]</i> on page 107 <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116 <i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]</i> on page 117</pre>

**[SOURce]:WAVelength[:CW|FIXed]?**

<b>Description</b>	This query returns a value indicating either the current absolute wavelength or the minimum/maximum/default absolute wavelength of a non-swept signal. At *RST, this value is set to DEFault.
<b>Syntax</b>	[[:SOURce]:WAVelength[:CW FIXed]?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible wavelength value for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible wavelength value for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default wavelength value for the laser model.</li> </ul>
<b>Response Syntax</b>	<wavelength>
<b>Response(s)</b>	<i>wavelength:</i> Value in meter corresponding to the current wavelength or the minimum/maximum/default wavelength, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:WAV:FIX 1570 NM SOUR:WAV:FIX? returns 1.570000E-006
<b>See Also</b>	<p><i>[SOURce]:FREQuency[:CW FIXed]?</i> on page 99</p> <p><i>[SOURce]:OPTimization:OLINewwidth[:STATe]?</i> on page 107</p> <p><i>[SOURce]:WAVelength[:CW FIXed]</i> on page 115</p> <p><i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?</i> on page 118</p>

**[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]**

<b>Description</b>	<p>This command sets the step size used to select the relative wavelength of a non-swept signal.</p> <p>You can perform relative wavelength tuning through the command <code>[SOURce]:WAVelength[:CW FIXed]</code> on page 115 with the UP/DOWN keywords.</p> <p>At *RST, this value is set to DEFault.</p>
<b>Syntax</b>	<code>[[:SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh] &lt;wsp&gt; &lt;step&gt; [ &lt;unit&gt; ]   MAXimum   MINimum   DEFault   UP   DOWN</code>
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>step</i>: Value corresponding to the step in meters (if no unit is specified). To know the valid wavelength range, use the query <code>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?</code> on page 118 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the wavelength step: M preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the wavelength step to the maximum possible step value.</li> <li>➤ <i>MINimum</i> Sets the wavelength step to the minimum possible step value.</li> <li>➤ <i>DEFault</i> Sets the wavelength step to the default step value. To know the default step, use the query <code>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?</code> on page 118 (DEF parameter).</li> </ul>
<b>Example(s)</b>	<p>SOUR:WAV:CW 1570 NM</p> <p>SOUR:WAV:CW? returns 1.570000E-006</p> <p>SOUR:WAV:CW:STEP 10 NM</p> <p>SOUR:WAV:CW DOWN</p> <p>SOUR:WAV:CW? returns 1.560000E-006</p>
<b>See Also</b>	<p><code>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]</code> on page 100</p> <p><code>[SOURce]:WAVelength[:CW FIXed]</code> on page 115</p> <p><code>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?</code> on page 118</p>

**[SOURce]:WAVelength[:CW|FIXed]:STEP[:WIDTh]?**

<b>Description</b>	This query returns a value indicating either the current wavelength step size or the minimum/maximum/default wavelength step size for relative tuning of a non-swept signal. At *RST, this value is set to DEFault.
<b>Syntax</b>	[[:SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible wavelength value for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible wavelength value for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default wavelength value for the laser model.</li> </ul>
<b>Response Syntax</b>	<step>
<b>Response(s)</b>	<p><i>step:</i></p> <p>Floating point number in meter corresponding to the current wavelength step or the minimum/maximum/default wavelength step, depending on the specified query parameters.</p>
<b>Example(s)</b>	<p>SOUR:WAV:FIX:STEP 5 NM</p> <p>SOUR:WAV:FIX:STEP? returns 5.000000E-009</p>
<b>See Also</b>	<p><i>[SOURce]:FREQuency[:CW FIXed]:STEP[:WIDTh]?</i> on page 101</p> <p><i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116</p> <p><i>[SOURce]:WAVelength[:CW FIXed]:STEP[:WIDTh]</i> on page 117</p>

**[SOURce]:WAVelength:SWEEp:SPEEd**

<b>Description</b>	This command sets the speed for a sweep. At *RST, this value is set to MAXimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEEp:SPEEd<wsp> <speed>   MAXimum   MINimum   DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>speed</i>: Numeric value corresponding to the speed in meter per second. To know the valid speed range, use the query <i>[SOURce]:WAVelength:SWEEp:SPEEd?</i> on page 120 (MIN and MAX parameters).</li> <li>➤ <i>MAXimum</i> Sets the speed to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the speed to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the speed to the default value. To know the default speed, use the query <i>[SOURce]:WAVelength:SWEEp:SPEEd?</i> on page 120 (DEF parameter).</li> </ul>
<b>Example(s)</b>	SOUR:WAV:SWE:SPE 100E-009 SOUR:WAV:SWE:SPE? returns 1.000000E-009
<b>See Also</b>	<i>[SOURce]:WAVelength:SWEEp:SPEEd?</i> on page 120 <i>[SOURce]:WAVelength:SWEEp:SPEEd:LIST?</i> on page 121

<b>[SOURce]:WAVelength:SWEEp:SPEEd?</b>	
<b>Description</b>	This query returns a value indicating either the current sweep speed, or the minimum/maximum/default possible sweep speed. At *RST, this value is set to MAXimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEEp:SPEEd?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible speed in meter per second.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible speed in meter per second.</li> <li>➤ <i>DEFault</i> The query returns the default speed in meter per second.</li> </ul>
<b>Response Syntax</b>	<speed>
<b>Response(s)</b>	<p><i>speed:</i></p> <p>Floating point number corresponding to the sweep speed in meter per second or the minimum/maximum/default speed in meter per second, depending on the specified query parameters.</p>
<b>Example(s)</b>	<p>SOUR:WAV:SWE:SPE 100E-009</p> <p>SOUR:WAV:SWE:SPE? returns 1.000000E-009</p>
<b>See Also</b>	<p><i>[SOURce]:WAVelength:SWEEp:SPEEd</i> on page 119</p> <p><i>[SOURce]:WAVelength:SWEEp:SPEEd:LIST?</i> on page 121</p>

**[SOURce]:WAVelength:SWEep:SPEed:LIST?**

<b>Description</b>	This query returns the list of supported speeds for a sweep. This command has no associated *RST condition.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEep:SPEed:LIST?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<speed>
<b>Response(s)</b>	<i>speed:</i> Value corresponding to the vector of speed values in meter per second. You can use the FORMat:DATA PACK command to set list data transfer in compressed binary format (see <i>FORMat[:DATA]</i> on page 87). At *RST, ASCii is selected as the default data format type.
<b>Example(s)</b>	FORMat:DATA ASC SOUR:WAV:SWE:SPE:LIST? returns 1.000000E-008,2.000000E-008,5.000000E-008,...
<b>See Also</b>	<i>FORMat[:DATA]</i> on page 87 <i>[SOURce]:WAVelength:SWEep:SPEed</i> on page 119

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<b>[SOURce]:WAVelength:SWEep:STARt</b>	
<b>Description</b>	This command sets the start wavelength of a swept signal. At *RST, this value will be set to MINimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEep:STARt<wsp><start>[<unit> ]  MAXimum MINimum DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>start</i>: Value corresponding to the start wavelength in meter (if no unit is specified). To know the valid wavelength range, use the query <i>[SOURce]:WAVelength:SWEep:STARt?</i> on page 123 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the start wavelength: M preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the start wavelength to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the start wavelength to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the start wavelength to the default value. To know the default wavelength, use the query <i>[SOURce]:WAVelength:SWEep:STARt?</i> on page 123 (DEF parameter).</li> </ul>
<b>Example(s)</b>	SOUR:WAV:SWE:STAR 1435 NM SOUR:WAV:SWE:STAR? returns 1.435000E-006
<b>See Also</b>	<i>[SOURce]:FREQuency:SWEep:STARt</i> on page 102 <i>[SOURce]:WAVelength[:CW FIXed]</i> on page 115 <i>[SOURce]:WAVelength:SWEep:STARt?</i> on page 123 <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124



**[SOURce]:WAVelength:SWEep:STARt?**

<b>Description</b>	This query indicates either the current or the minimum/maximum/default start wavelength of a swept signal. At *RST, this value is set to MINimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEep:STARt?<wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible start wavelength for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible start wavelength for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default start wavelength for the laser model.</li> </ul>
<b>Response Syntax</b>	<start>
<b>Response(s)</b>	<i>start:</i> Floating point number in meter corresponding to the current start wavelength or the minimum/maximum/default start wavelength, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:WAV:SWE:STAR 1435 NM SOUR:WAV:SWE:STAR? returns 1.435000E-006
<b>See Also</b>	<i>[SOURce]:FREQuency:SWEep:STARt?</i> on page 103 <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116 <i>[SOURce]:WAVelength:SWEep:STARt</i> on page 122 <i>[SOURce]:WAVelength:SWEep:STOP?</i> on page 125

**[SOURce]:WAVelength:SWEep:STOP**

<b>Description</b>	This command sets the stop wavelength of a swept signal. At *RST, this value will be set to MAXimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEep:STOP <wsp> <stop> [ <unit> ]   MAXimum   MINimum   DEFault
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>stop</i>: Value corresponding to the stop wavelength in meters (if no unit is specified). To know the valid wavelength range, use the query [SOURce]:WAVelength:SWEep:STOP? on page 125 (MIN and MAX parameters).</li> <li>➤ <i>unit</i>: Unit of the stop wavelength: M preceded by a possible multiplier. Possible multipliers are listed in <i>Unit Multipliers</i> on page 52.</li> <li>➤ <i>MAXimum</i> Sets the stop wavelength to the maximum possible value.</li> <li>➤ <i>MINimum</i> Sets the stop wavelength to the minimum possible value.</li> <li>➤ <i>DEFault</i> Sets the stop wavelength to the default value. To know the default wavelength, use the query [SOURce]:WAVelength:SWEep:STOP? on page 125 DEF and parameter).</li> </ul>
<b>Example(s)</b>	SOUR:WAV:SWE:STOP 1490 NM SOUR:WAV:SWE:STOP? returns 1.490000E-006
<b>See Also</b>	[SOURce]:FREQuency:SWEep:STOP on page 104 [SOURce]:WAVelength[:CW FIXed] on page 115 [SOURce]:WAVelength:SWEep:STARt on page 122 [SOURce]:WAVelength:SWEep:STOP? on page 125

**[SOURce]:WAVelength:SWEep:STOP?**

<b>Description</b>	This query indicates either the current or the minimum/maximum/default stop wavelength of a swept signal. At *RST, this value is set to MAXimum.
<b>Syntax</b>	[[:SOURce]:WAVelength:SWEep:STOP? <wsp> [MAXimum MINimum DEFault]
<b>Parameter(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>MAXimum</i> The query returns the maximum possible stop wavelength for the laser model.</li> <li>➤ <i>MINimum</i> The query returns the minimum possible stop wavelength for the laser model.</li> <li>➤ <i>DEFault</i> The query returns the default stop wavelength for the laser model.</li> </ul>
<b>Response Syntax</b>	<stop>
<b>Response(s)</b>	<i>stop:</i> Floating point number in meter corresponding to the current stop wavelength or the minimum/maximum/default stop wavelength, depending on the specified query parameters.
<b>Example(s)</b>	SOUR:WAV:SWE:STOP 1490 NM SOUR:WAV:SWE:STOP? returns 1.490000E-006
<b>See Also</b>	<i>[SOURce]:FREQuency:SWEep:STOP?</i> on page 105 <i>[SOURce]:WAVelength[:CW FIXed]?</i> on page 116 <i>[SOURce]:WAVelength:SWEep:STARt?</i> on page 123 <i>[SOURce]:WAVelength:SWEep:STOP</i> on page 124

## STATUS Commands and Queries

### Quick Reference

Command Overview			Parameter(s)	Section
STATus	OPERation	CONDition?		see p. 126
	QUESTionable	CONDition?		see p. 127

### Commands and Queries

#### **:STATus:OPERation:CONDition?**

<b>Description</b>	This query returns the content of the condition register associated with the operation status structure. Reading the condition register is nondestructive.
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	:STATus:OPERation:CONDition?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<condition>
<b>Response(s)</b>	<i>condition:</i> Unique integer in the range 0 to 65535, which represents the current operation condition of the instrument. See the content of this register in <i>Operational Status Condition Register</i> on page 48.
<b>Example(s)</b>	STAT:OPER:COND?
<b>See Also</b>	:STATus:QUESTionable:CONDition? on page 127

**:STATus:QUEStionable:CONDition?**

<b>Description</b>	This query returns the content of the condition register associated with the questionable status structure. Reading the condition register is nondestructive.
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	:STATus:QUEStionable:CONDition?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<condition>
<b>Response(s)</b>	<i>condition:</i> Unique integer in the range 0 to 65535, which represents the current questionable condition of the instrument. See the content of this register in <i>Questionable Status Condition Register</i> on page 49.
<b>Example(s)</b>	:STAT:QUES:COND?
<b>See Also</b>	:STATus:OPERation:CONDition? on page 126

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## SYSTEM Commands and Queries

### Quick Reference

Command Overview		Parameter(s)	Section
SYSTem	DATE	<year>,<month>,<day>	see p. 128
	DATE?		see p. 129
SYSTem	ERRor	[:NEXT]?	see p. 130
	TIME	<hour>,<minute>,<second>	see p. 131
	TIME?		see p. 131
	VERSion?		see p. 132

### Commands and Queries

#### SYSTEM:DATE

<b>Description</b>	<p>This command sets the instrument's internal calendar to the current date.</p> <p>This command has no associated *RST condition.</p>
<b>Syntax</b>	:SYSTem:DATE<wsp> <year>,<month>,<day>
<b>Parameter(s)</b>	<p><i>year:</i></p> <p>Four-digit number corresponding to the year in the instrument's date.</p> <p><i>month:</i></p> <p>Number corresponding to the month in the instrument's date, in the range 1 to 12.</p> <p>1 corresponds to January, 2 to February and so on.</p> <p><i>day:</i></p> <p>Number corresponding to the day in the instrument's date. It ranges from 1 to the number of days in the month from the previous field. This command keeps track of the number of days in each month, accounting for leap years through the range of years that it accepts.</p>
<b>Example(s)</b>	SYST:DATE 2019,08,29
<b>See Also</b>	<p><i>SYSTem:DATE?</i> on page 129</p> <p><i>SYSTem:TIME</i> on page 131</p>

**SYSTem:DATE?**

<b>Description</b>	<p>This query returns the current date from the instrument's internal calendar.</p> <p>This query has no associated *RST condition.</p>
<b>Syntax</b>	:SYSTem:DATE?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<year>,<month>,<day>
<b>Response(s)</b>	<p><i>year:</i></p> <p>Integer corresponding to the year in the instrument's date.</p> <p><i>month:</i></p> <p>Integer corresponding to the month in the instrument's date, in the range 1 to 12.</p> <p>1 corresponds to January, 2 to February and so on.</p> <p><i>day:</i></p> <p>Integer corresponding to the day in the instrument's date. It ranges from 1 to the number of days in the month from the previous field. This command keeps track of the number of days in each month, accounting for leap years through the range of years that it accepts.</p>
<b>Example(s)</b>	SYST:DATE? returns 2019,08,22
<b>See Also</b>	<p><i>SYSTem:DATE</i> on page 128</p> <p><i>SYSTem:TIME?</i> on page 131</p>

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**SYSTem:ERRor[:NEXT]?**

<b>Description</b>	<p>This query returns the error/event queue for the next item and removes it from the queue.</p> <p>This query has no associated *RST condition.</p>
<b>Type</b>	Overlapping, query only.
<b>Syntax</b>	:SYSTem:ERRor[:NEXT]?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<code>,<description[,Info]>
<b>Response(s)</b>	<ul style="list-style-type: none"> <li>➤ <i>code:</i> <ul style="list-style-type: none"> <li>Error code as a unique integer in the range -32768 to 32767.</li> <li>All positive numbers are instrument-specific.</li> <li>The zero value indicates that no error or event has occurred.</li> </ul> </li> <li>➤ <i>description:</i> <ul style="list-style-type: none"> <li>Quoted string containing a description followed by an optional information text. Each code has a unique and fixed description associated with it. The date and time are appended to the information text separated by a semi-colon using the following format:</li> <li>&lt;Date&gt; &lt;wsp&gt; &lt;Time&gt; where</li> <li>&lt;Date&gt; = Year/Month/Day</li> <li>&lt;Time&gt; = Hour:Minute:Second (24 hour time)</li> <li>The maximum length of &lt;Description[,Info]&gt; is 255 characters.</li> </ul> </li> </ul>
<b>Example(s)</b>	<p>SYST:ERR:NEXT? returns -222,"Data out of range, instrument T200S, 2019/08/30 10:34:52"</p>
<b>See Also</b>	<p><i>SYSTem:DATE?</i> on page 129</p> <p><i>SYSTem:TIME?</i> on page 131</p>



**SYSTem:TIME**

<b>Description</b>	This command sets the instrument's internal clock to the current time. This command has no associated *RST condition.
<b>Syntax</b>	:SYSTem:TIME<wsp> <hour>,<minute>,<second>
<b>Parameter(s)</b>	<i>hour:</i> Hour information in 24 hour format, in the range 0 to 23. <i>minute:</i> Number of minutes in the range 0 to 59. <i>second:</i> Number of seconds, in the range 0 to 59.
<b>Example(s)</b>	SYST:TIME 16,58,41
<b>See Also</b>	<i>SYSTem:DATE</i> on page 128 <i>SYSTem:TIME?</i> on page 131

**SYSTem:TIME?**

<b>Description</b>	This query returns the current time from the instrument's internal clock. This query has no associated *RST condition.
<b>Syntax</b>	:SYSTem:TIME?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<hour>,<minute>,<second>
<b>Response(s)</b>	<i>hour:</i> Integer corresponding to the hour information in 24 hour format, in the range 0 to 23. <i>minute:</i> Integer corresponding to the number of minutes in the range 0 to 59. <i>second:</i> Integer corresponding to the number of seconds, in the range 0 to 59.
<b>Example(s)</b>	SYST:TIME? returns 15,48,22
<b>See Also</b>	<i>SYSTem:DATE?</i> on page 129 <i>SYSTem:TIME</i> on page 131

## SYSTem:VERsion?

<b>Description</b>	<p>This query returns the SCPI revision to which the instrument complies.</p> <p>This query has no associated *RST condition.</p>
<b>Syntax</b>	:SYSTem:VERsion?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<version>
<b>Response(s)</b>	<p><i>version:</i></p> <p>Fixed point number corresponding to the year followed by the revision number of the SCPI standard to which the instrument complies.</p> <p>The year represents the year-version and the revision represents an approved revision number for that year. If no approved revisions are claimed, then the revision number is 0.</p>
<b>Example(s)</b>	SYST:VERS? returns 1999.0 (no approved revisions are claimed)
<b>See Also</b>	*IDN? on page 74

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## TRIGger Commands and Queries

### Quick Reference

Command Overview		Parameter(s)	Section
TRIGger	[SEquence]	SOURce	see p. 133
	[SEquence]	SOURce?	see p. 134

### Commands and Queries

<b>TRIGger[:SEquence]:SOURce</b>	
<b>Description</b>	This command selects the source of the trigger event for a sweep. At *RST, this value is set to IMMEDIATE.
<b>Syntax</b>	:TRIGger[:SEquence]:SOURce<wsp><source>
<b>Parameter(s)</b>	<p><i>source:</i></p> <p>Valid trigger event source. The allowed values are:</p> <ul style="list-style-type: none"> <li>➤ BUS: the source signal comes from the command *TRG on page 78.</li> <li>➤ EXTERNAL: the source signal comes from the external trigger signal jack (via the Trig In port located on the instrument rear panel).</li> <li>➤ IMMEDIATE: no waiting for an event to occur to start a sweep.</li> </ul>
<b>Example(s)</b>	<p>TRIG:SOUR IMM</p> <p>TRIG:SOUR? returns IMMEDIATE</p>
<b>See Also</b>	<p>*TRG on page 78</p> <p>ARM[:SEquence][:LAYER]:SOURce on page 81</p> <p>INITiate[:IMMEDIATE][:ALL] on page 89</p> <p>[SOURce]:SWEep:CYCLE:COUNT on page 109</p> <p>TRIGger[:SEquence]:SOURce? on page 134</p>

## TRIGger[:SEQuence]:SOURce?

<b>Description</b>	This query returns the selected source of the trigger event detector for a sweep sequence. At *RST, this value is set to IMMEDIATE.
<b>Syntax</b>	:TRIGger[:SEQuence]:SOURce?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<source>
<b>Response(s)</b>	<i>source</i> : Selected trigger event source: BUS: the source signal is generated by the command *TRG on page 78. EXTernal: the source signal comes from the external signal jack (via the Trig In port located on the instrument rear panel). IMMEDIATE: no waiting for an event to occur to start a sweep.
<b>Example(s)</b>	TRIG:SOUR EXT TRIG:SOUR? returns EXTernal
<b>See Also</b>	<i>ARM[:SEQuence][:LAYer]:SOURce?</i> on page 82 <i>INITiate[:IMMEDIATE][:ALL]</i> on page 89 <i>[SOURce]:SWEep:CYCLE:COUNT?</i> on page 110 <i>TRIGger[:SEQuence]:SOURce</i> on page 133

## UNIT Commands and Queries

### Quick Reference

Command Overview		Parameter(s)	Section
UNIT	POWer	<unit>	see p. 135
	POWer?		see p. 136
	TEMPerature	<unit>	see p. 136
	TEMPerature?		see p. 137

### Commands and Queries

<b>UNIT:POWer</b>	
<b>Description</b>	This command selects a default unit for commands that set absolute power. At *RST, this value is set to DBM.
<b>Syntax</b>	:UNIT:POWer<wsp> <unit>
<b>Parameter(s)</b>	<i>unit:</i> Default unit for commands that set absolute power. The allowed values are: DBM: sets the power unit to dBm. W: sets the power unit to watt.
<b>Example(s)</b>	UNIT:POW W
<b>See Also</b>	<i>UNIT:POWer?</i> on page 136 <i>UNIT:TEMPerature</i> on page 136

<b>UNIT:POWer?</b>	
<b>Description</b>	This query returns the selected default unit for commands that set absolute power. At *RST, this value is set to DBM.
<b>Syntax</b>	:UNIT:POWer?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<unit>
<b>Response(s)</b>	<i>unit:</i> Default unit for commands that set absolute power: DBM: the default power unit is set to dBm. W: the default power unit is set to watt.
<b>Example(s)</b>	UNIT:POW DBM UNIT:POW? returns DBM
<b>See Also</b>	<i>UNIT:POWer</i> on page 135 <i>UNIT:TEMPerature?</i> on page 137

<b>UNIT:TEMPerature</b>	
<b>Description</b>	This command selects a default unit for commands that set temperature. At *RST, this value is set to CEL.
<b>Syntax</b>	:UNIT:TEMPerature<wsp> <unit>
<b>Parameter(s)</b>	<i>unit:</i> Default temperature for commands that set temperature. The allowed values are: C CEL: selects Celsius as the temperature unit. F FAR: selects Fahrenheit as the temperature unit. K: selects Kelvin as the temperature unit.
<b>Example(s)</b>	UNIT:TEMP C
<b>See Also</b>	<i>UNIT:POWer</i> on page 135 <i>UNIT:TEMPerature?</i> on page 137

**UNIT:TEMPerature?**

<b>Description</b>	This query returns the selected default unit for commands that set temperature. At *RST, this value is set to CEL.
<b>Syntax</b>	:UNIT:TEMPerature?
<b>Parameter(s)</b>	None.
<b>Response Syntax</b>	<unit>
<b>Response(s)</b>	<i>unit:</i> Default unit for commands that set temperature: C CEL: the temperature unit is set to Celsius. F FAR: the temperature unit is set to Fahrenheit. K: the temperature unit is set to Kelvin.
<b>Example(s)</b>	UNIT:TEMP F UNIT:TEMP? returns FAR
<b>See Also</b>	<i>UNIT:POWer?</i> on page 136 <i>UNIT:TEMPerature</i> on page 136

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Chinese Regulation on Restriction of Hazardous Substances (RoHS)

中国关于有害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT

包含在本 EXFO 产品中的有毒有害物质或元素的名称及含量

Part Name 部件名称	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr(VI))	Polybrominated biphenyls 多溴联苯 (PBB)	Polybrominated diphenyl ethers 多溴二苯醚 (PBDE)
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly <sup>a</sup> 光学组件 <sup>a</sup>	X	O	O	O	O	O
Mechanical sub-assembly <sup>a</sup> 机械组件 <sup>a</sup>	O	O	O	O	O	O

Note:

注:

This table is prepared in accordance with the provisions of SJ/T 11364.

本表依据SJ/T 11364 的规定编制。

O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

O:表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 标准规定的限量要求以下。

X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the "X" mark cannot eliminate hazardous substances.

X:表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。



标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。

a. If applicable.

如果适用。

MARKING REQUIREMENTS

标注要求

Product 产品	Environmental protection uses period (years) 环境保护使用期限 (年)	Logo 标志
This EXFO product 本 EXFO 产品	10	
Battery <sup>a</sup> 电池 <sup>a</sup>	5	

a. If applicable.

如果适用。



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