XFA

Optical Tunable Filter

User Guide

About This Manual

Subject	This manual explains how to install operate the XFA optical tunable filter in local and remote modes. It also explains how to perform basic maintenance operations.
Application	Information in this document applies to the firmware version 2.1.x.
Intended Readers	Users of this manual must be familiar with:

- Fiber optic technology
- The use of the USB, Ethernet, RS-232 C and/or IEEE-488.2 interfaces used to control the XFA in remote mode

Date	24 October 2018
Manual Reference	XFA_UG_2.1v2.3

Typographical Conventions

bold	Identifies graphical interface objects such as menu names, labels, buttons and icons.
italic	Identifies references to other sections or other guides.
`monospace`	Identifies portions of program codes, command lines, or messages displayed in command windows.

Symbols

Important
Identifies important information to which you must pay particular attention.

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 component damage. Do not proceed unless you understand and meet the required conditions.

Abbreviations Used

Abbreviation	Meaning
FWHM	Full width at Half Maximum
GPIB	General Purpose Interface Bus
SELV	Safety Extra-Low Voltage

Command Syntax Notation Conventions	Notation	Meaning
	<...>	The content between angled brackets indicates the type of information that you must enter as parameter (command) or that is received (response).
	|	Indicates an alternative. Equivalent to "or".

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Product Warranty and Limitation of Warranty

For detailed information about the sales terms and conditions, visit the EXFO web site at www.exfo.com/how-to-buy/sales-terms-conditions

Contact Information

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers.

Technical Support Group

400 Godin Avenue	Tel. USA and Canada:	1 866 683-0155
Quebec (Quebec) G1M 2K2	Fax:	1 418 683-9224
CANADA	E-mail:	support@exfo.com

For detailed information about technical support and for a list of other worldwide locations, visit the EXFO web site at
www.EXFO.com/support

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.

Table of Contents

Safety Information

Before you start working with your device, you need to first read the important safety information provided in this section. This section provides information that may supplement or add safety information to the user guides of your product. Keep this information close at hand.

You can obtain a copy of the complete user guide for your product at the following link: www.EXFO.com
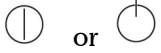
Important

- If you see the ⚠ symbol on your unit, make sure that you refer to the instructions provided in this safety notice. Ensure that you understand and meet the required conditions before using your product.

- 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.

Product Safety

Safety Symbols on Your Product

One or more of the following symbols may appears on your product.

Symbol	Meaning
⎓	Direct current
∼	Alternating current
⏚	The product is equipped with an earth (ground) terminal.
⏚	The product is equipped with a protective conductor terminal.
⏚	The product is equipped with a frame or chassis terminal.
│	On (Power)
○	Off (Power)
⏻ or ⏻	On/Off (Power)
⊏⊐	Fuse

Product Safety Instructions

Warning

- The use of voltages higher than those indicated on the label affixed to your unit may damage the unit.
- 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.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, see its technical specifications or contact EXFO.
- Where applicable, use only the listed and certified AC adapter provided by EXFO with your unit. It provides reinforced insulation between primary and secondary, and is suitably rated for the country where the unit is sold.
- 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 fire risk.
- Your unit is equipped with an internal replaceable clock battery to keep time and date accurate. Only authorized personnel can replace this battery. Attempting to replace it yourself could seriously compromise your safety.
- Unless otherwise specified, all interfaces are intended for connection to Safety Extra Low Voltage (SELV) circuits only.
- To avoid electrical shock, do not operate the unit if any part of the outer surface (covers, panels, etc.) is damaged.
- Operation of any electrical instrument around flammable gases or fumes constitutes a major safety hazard.
- 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 are connected.
- Use only the listed and certified AC adapter/charger provided by EXFO with your unit. It provides reinforced insulation between primary and secondary, and is suitably rated for the country where the unit is sold.

Caution

- Where applicable, the operation and storage temperatures, as well as the altitude and relative humidity values of some modules may differ from those specified for your platform. In this case, always ensure that you comply with the most restrictive conditions (either module or platform).
- When using the unit while connected to the AC/DC adapter/charger, make sure you do not position the equipment so that it is difficult to disconnect the adapter/charger from the AC mains.
- Position the unit so that the air can circulate freely around it.

1. Product Presentation

The XFA is a flat-top tunable filter for fiber-optic component and system testing. It is designed for closely-spaced channel selection and extraction in DWDM applications.

When an optical signal is detected at the XFA input port, the input wave is directed towards the output port after passing through the XFA monochromator, which is tuned at the center wavelength via the XFA software. The FWHM (in nm) is fixed, at the wavelength selected at order time.

Each XFA provides on-board touchscreen controls and user interface to drive both system common controls and parameters. All system operations are software-controlled from the XFA user interface.

The XFA system may also be remote-operated via an external screen or standard USB, Ethernet, RS-232 and IEEE-488 (with an external controller) interfaces.

1.1   Technical Specifications

The following table lists the technical specifications of the XFA.

Optical Characteristics

Wavelength range		1450−1650 nm
Wavelength resolution		1 pm
Wavelength accuracy[1]		±30 pm
Insertion loss[2][3]		5 dB (4.5 dB typical)
Polarization dependent loss[3][4]		±0.2 dB
Wavelength tuning speed		1 s
Optical Bandwidth (FWHM) (selected at order time)	Minimum bandwidth	50 pm
	Maximum bandwidth	800 pm
FWHM accuracy		±10 pm
Maximum optical input power		30 dBm
Out-of-band suppression (crosstalk)[5]		40 dB (60 dB typical)
Flatness[6]		0.2 dB
Filter edge roll-off[7]		500 dB/nm typical

 All specifications are given at 21°± 3°C after 30 minutes warm-up.

*1: With "Backlash Suppression" setting enabled.
*2: From 1500 to 1600 nm & FWHM >60 pm.
*3: At lowest FWHM the insertion loss is 7 dB typical.
*4: At 1500, 1550 and 1600 nm, FWHM > 100 pm.
*5: Measured 1 nm away from the -3 dB points.
*6: Centered width of FWHM - 150 pm. For 150 pm < FWHM < 650 pm.
*7: Between -3 and -40 dB for FWHM <800 pm.

**Interfaces &
Electrical
Specifications**

Optical Interfaces		
Optical Connector		FC/PC or FC/APC
Optical Fiber Type		SMF or PMF
Remote Interfaces		
Ethernet RJ45 (x2)		1 Gb/s max
IEEE 488.2 (GPIB)		Accessory (only available with a GPIB/RS-232 converter)
USB-B		115 kb/s max.
Serial ports (x2)		COM1: unused COM2 (RS-232C): 9.6 kb/s
External Devices		
External Display		DVI-I (Digital) port (x1): res. 1920x1200 max
Mouse, keyboard		USB-A (x4), PS/2 (x2)
Electrical Specifications		
Unit	Input Power	XFA turned on: 12 V ⎓, 2.8 A XFA turned off (power switch set to **I**): 12 V ⎓, 0.16 A
	Fuse Type	4 A Fast-acting, Low-breaking, 250 V, Ø5x20 mm
	Internal clock battery	3V CR2032 (replacement by service personnel only)
AC/DC Adapter	Input Power	100−240 V ∼, 50−60 Hz, 2.0 A rms
	Output power	12 V ⎓, 100 W

All specifications are given at 21°± 3°C after 30 minutes warm-up.

Environmental & Physical Specifications

Environmental Specifications	
Equipment Type	Test and Measurement
Equipment Location	Indoor use only
Safety Class	Basic insulation, as defined in IEC-61010-1. Grounded product.
Overvoltage Category	Category II Local-level mains (wall sockets). Equipment at this level includes appliances, portable tools, and similar products. Equipment is usually cord-connected.
Pollution Degree	Degree 2 Normally only dry, non-conductive pollution occurs. Occasional and temporary conductivity caused by condensation may occur. This location is a typical office/home environment. Temporary condensation occurs only when the product is left unused.
Operating Conditions	
Safe Operating Temperature Range	15 to 35 °C
Performance Guaranteed Temperature Range	21°± 3°C after 30 minutes warm-up
Storage Temperature Range	-20°C to 60°C
Maximum Relative Humidity	80 % for temperatures up to 31°C decreasing linearly to 50 % relative humidity at 40°C
Altitude (maximum operating)	2000 m
Physical Specifications	
Display	7 inch resistive touch-screen (res. 800x480) color TFT-LCD
Dimensions (W x D x H)	254 x 385 x 154 mm (10 in x 15 $^{1/8}$ in x 6 in)
Weight	7.0 kg (15.4 lb)

1.2   Product Overview

The XFA is delivered with the following accessories:

- A power supply cord
- An RS-232 cross-connect cable with two female adapters (for remote control)
- The calibration certificate and the test report
- A USB key containing the available drivers and user documentation

Cables for fiber-optic input/output are not provided.

1.2.1   Front Panel Description
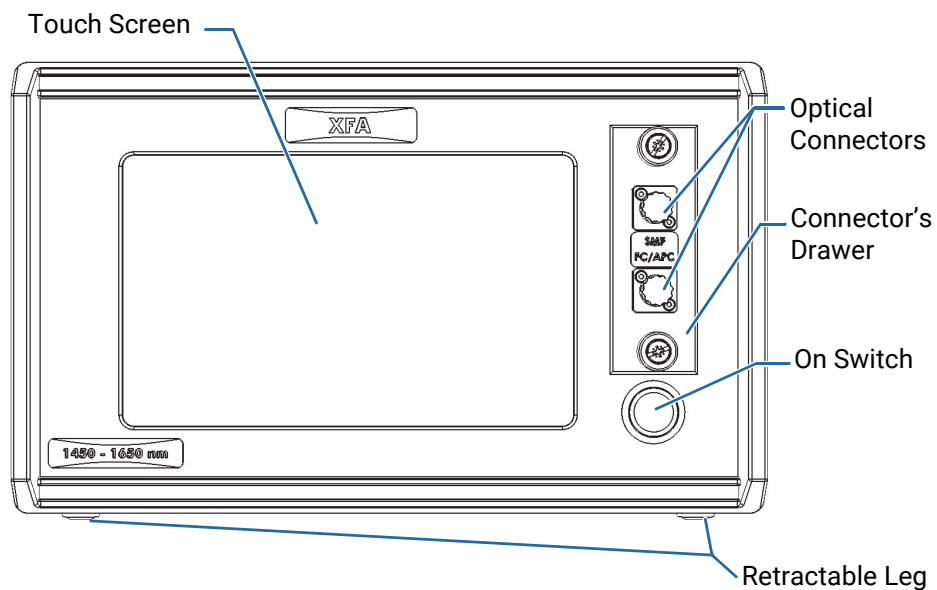
Figure 1: Front Panel

Touch Screen

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

To select a parameter, command or function on the screen, touch the corresponding command with the tip of your finger or a touch screen stylus device.

If you apply simultaneous pressure with two or more fingers, the touchscreen will not function properly.

Optical Connectors

The two following optical connectors, protected by a dust cap, are located on the front panel:

•   **IN**: channel filter input port.

•   **OUT**: channel filter output port.

The two optical connectors are mounted on a drawer, which enables you to access the internal optical connectors for cleaning (see section *Cleaning Optical Connectors, p. 58*).

On Switch

The ⏻ label identifies the on button that enables you to turn on the XFA (see section *Turning on/off the XFA, p. 19*).

Retractable Legs

The retractable legs enable you to tilt the XFA upward for convenient purpose, so that it stands on both front legs and the rear feet (see section *Unpacking and Installing the XFA, p. 15*).

1.2.2　　Rear Panel Description
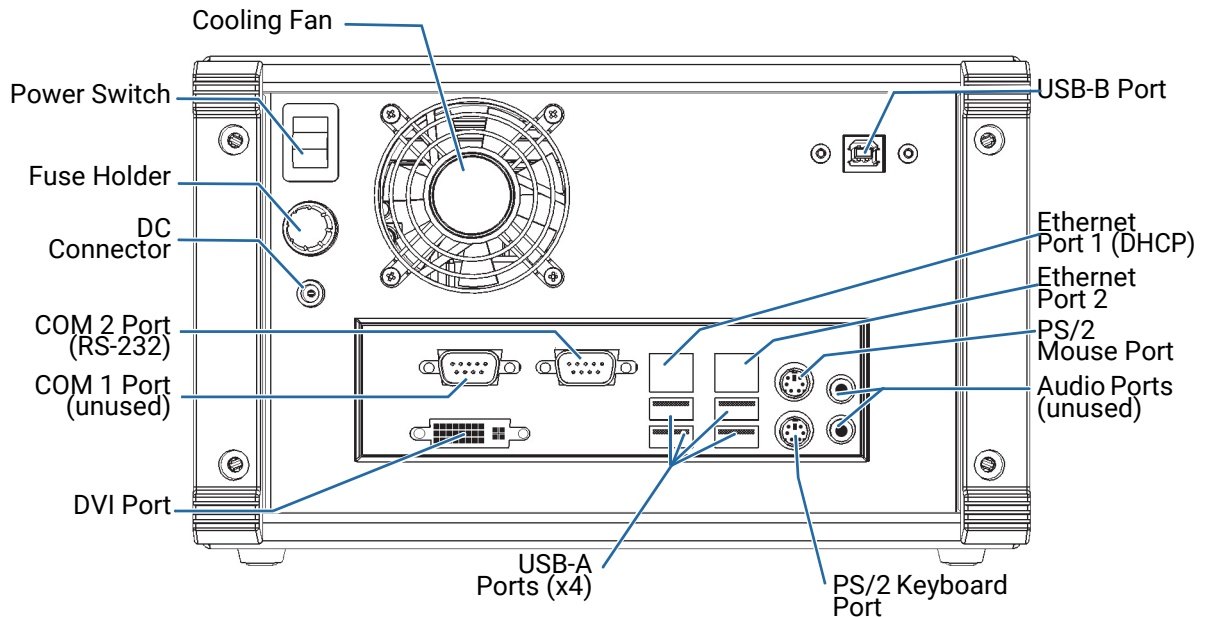
Figure 2: Rear Panel

Cooling Fan

The cooling fan extracts warm air from inside. Ventilation holes for air input are located on the top and bottom sides of the XFA.

DC Connector and Power Adapter

The power adapter is provided with the product and must be plugged to the DC connector.

Caution
To ensure the smooth functioning of the XFA, you must only use the power adapter provided by EXFO.

Fuse Holder

The fuse holder contains a fuse (see section *Technical Specifications, p. 9* for fuse type) to protect the XFA from overcurrent.
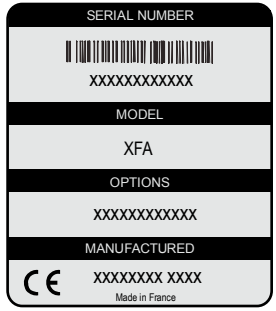
Connectors

All ports and interfaces are SELV classified and must only be connected to interfaces of the same type.

- **RS-232 (COM 2)** enables you to connect a computer for remote control.
  The RS-232 COM 1 port is not active.
  For more details, see section *Remotely Controlling the XFA via RS-232, p. 41*.

- **USB-A** ports enable you to connect a USB keyboard and a USB mouse. Do not connect a computer to this port.

- **USB-B** port enables you to connect a computer for remote control via USB.
  for more details, see section *Remotely Controlling the XFA via USB-B, p. 35*.

- **Ethernet RJ45** ports enables you to connect a computer/network for Ethernet remote control.
  - **Ethernet port LAN1:**
    This port is associated with a DHCP server. It can be used to connect directly a computer that will be assigned automatically an IP address.

  - **Ethernet port LAN2:**
    You can configure this port manually or automatically through a remote DHCP server.
    For more information, see section *Remotely Controlling the XFA via Ethernet, p. 38*.

- **DVI** port enables you to connect an external screen. For more details, see section *Controlling the XFA Graphical Interface from an External Screen, p. 43*.

- **PS/2** ports enable you to connect a USB keyboard and a USB mouse.

Labels

Label	Description
SERIAL NUMBER XXXXXXXXXXX MODEL XFA OPTIONS XXXXXXXXXXXX MANUFACTURED CE XXXXXXXX XXXX Made in France	**Identification of the Product** Indicates serial number, model, options (if any), CE marking (see section *Certification and Compliance, p. 65*) and date of manufacture.
Manufactured by: **EXFO** 4, rue Louis de Broglie www.EXFO.com 22300 LANNION Tel: +33 2 96 48 37 15 France Fax: +33 2 96 48 73 04	**Manufacturer Identification** Contact information of the manufacturer.
125318 CSA C22.2 No. 61010-1 UL 61010-1	**Power and Compliance** • ⚠: indicates an injury hazard. It appears on a location that requires special instructions for proper use: see section *Safety Information, p. 7*. • ▭: the fuse type is described in section *Technical Specifications, p. 9*. • Compliances: see section *Certification and Compliance, p. 65*.
Windows® Embedded Standard XXX-XXX-XXX-XXX Microsoft	**Windows License Label** The XFA uses Windows Embedded Standard 7.
⚠ Warranty void if seal broken.	**Warranty Seal** The XFA cover must not be open, otherwise the warranty is not valid anymore.

2. Installing and Connecting the XFA

2.1 Unpacking and Installing the XFA

Subject

The XFA is a bench-top instrument designed for indoor use only, and is not dedicated to wet locations. It is designed for use either in the horizontal or tilted position.

Before Starting

Caution
- To ensure proper environment conditions:
  - Do not expose the XFA to rain or excessive moisture.
  - Do not install the XFA near flammable gases or fumes.
- To ensure proper ventilation and cooling, make sure there is sufficient clearance below, and at the back of the XFA in the place where it will be installed.

Procedure

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 XFA needs to be returned to EXFO.

2. Pull out the XFA vertically from its packaging.

3. Set the XFA on a flat stable surface free of excessive vibration and make sure you can easily reach the rear of the instrument to remove the power supply cord if necessary.

4. Allow the flow of air to circulate freely around the XFA and remove any equipment or paper that could block the air flow. Ventilation holes are located on the bottom side of the XFA.
   Do not place anything under or at the rear of the XFA, as illustrated in the following figure.
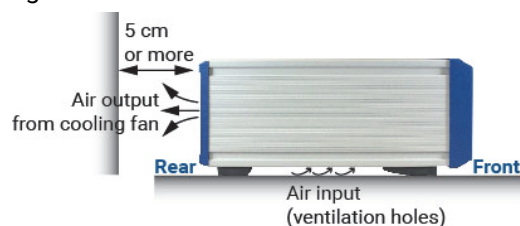
Figure 3: Air Flow

5. On the rear panel (see *Figure 2, p. 13*), make sure the power switch is set to **O**.

6. Place the XFA in the wanted operating position as illustrated in *Figure 4, p. 15*.
   To tilt the XFA upward, deploy the two retractable legs located below it.

Figure 4: Possible Operating Positions

2.2   Connecting the XFA to a Power Source

Subject

The XFA is dedicated to be connected to a SELV circuit.

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

You must use the power adapter provided with the XFA. For voltage specifications, see section *Technical Specifications, p. 9*.

Before Starting

Warning
- Make sure the wall socket on which the XFA will be plugged is protected by a 16 A max circuit breaker.
- Make sure the XFA 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 cord will be plugged is equipped with a protective ground contact, and that the electrical installation fulfills the local safety requirements.
- The XFA system is intended to operate from an external power adapter 12V/8A. Use the one provided by EXFO at instrument delivery or contact EXFO for replacement unit.

Procedure

1. Make sure the power adapter is not plugged to the wall socket.

2. On the rear panel (see *Figure 2, p. 13*), make sure the power switch is set to **O**.

3. On the rear panel, connect the power cord of the adapter to the 12 V connector.

4. Connect one end of the provided power supply cord to the power adapter located on the rear panel and plug the other end to the proper voltage wall socket outlet (to know the voltage requirement, see section *Technical Specifications, p. 9*).

5. On the rear panel, set the power switch to **I**.

2.3   Connecting an Optical Source to the XFA

Subject

Caution
- Make sure you use the appropriate connector type, corresponding to the one mounted on your XFA (see section *Technical Specifications, p. 9* for available models).
- Make sure optical connectors are perfectly clean. It is essential to achieve optimum system performance (see section *Cleaning Optical Connectors, p. 58*).
- To prevent premature failure of the XFA optical connectors due to frequent connections, always keep a fiber-optic jumper cable connected to the XFA optical port while you use the jumper's free end to connect to other devices.

Procedure
- Remove the protective cap from the **IN** and **OUT** connectors and connect the appropriate jumper corresponding to the connector type mounted on your product, as indicated next to the connectors (see *Figure 2, p. 13*).

Important
Keep protective caps on optical connectors when not in use.

3.1 Turning On the XFA and Accessing the Operating Modes

Subject   The **Operating Mode** window enables you to access all XFA functions.

Before Starting   Make sure the XFA is properly installed: see section *Installing and Connecting the XFA, p. 15*.

Procedure
- If the XFA is turned off: on the front panel, press the (⏻) button.
  The button lights up and the initialization procedure starts.

  Caution
  Do not turn the XFA off during the system initialization.

  Once started, the **About** window is displayed for a few seconds before the **Operating Mode** window appears.

- If the XFA is turned on and you have entered an operating mode or a configuration window, touch the BACK button to get back to the **Operating Mode** window.

Operating Mode Window Description
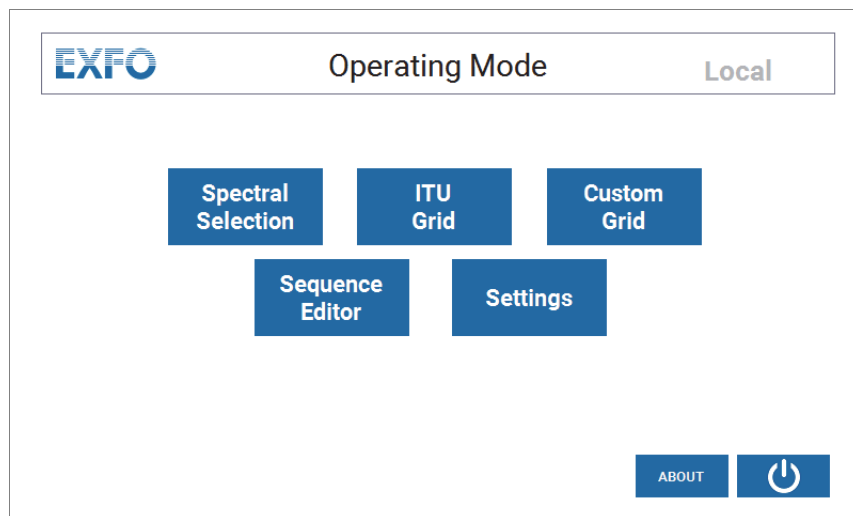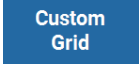
Figure 5: Operating Mode Window

The **Operating Mode** window enables you to access the following functions:

Button	Description	Corresponding Section
Spectral Selection	Enables you to manually set the wavelength/frequency.	section *Manually Entering the Wavelength/Frequency Value, p. 23*

Button	Description	Corresponding Section
ITU Grid	Enables you to select and use an ITU grid to rapidly select a channel (not available in the XFA O-band model).	section *Using a Predefined Grid to Select a Channel, p. 24*
Custom Grid	Enables you to create and use a custom grid.	section *Using a Custom Grid to Select a Channel, p. 25*
Sequence Editor	Enables you to create and use sequences.	section *Defining and Running a Sequence of Wavelength/Frequency, p. 27*
Settings	Enables you to configure ports for remote control and screen brightness	• section *Setting the XFA Ethernet Ports, p. 38* • section *Setting the GPIB Address, p. 44* • section *Setting the XFA RS-232C Port, p. 41* • section *Setting the Screen Brightness, p. 21*
ABOUT	Provides information about the XFA model and version.	section *Checking the Firmware Version, p. 20*
⏻	Turns the XFA off.	section *Turning off the XFA, p. 21*

3.2   Checking the Firmware Version

Subject   The **About** window provides information on your XFA. It is displayed for a few seconds at system startup. You can also display it on demand as explain in the following procedure.

Procedure
1. Access the **Operating Mode** window (see section section *Turning On the XFA and Accessing the Operating Modes, p. 19*).

2. In the **Operating Mode** window, touch the **ABOUT** button.
   The **About** window appears and displays information on your XFA.

3. To go back to the **Operating Mode** window, touch the **BACK** button.

3.3 Setting the Screen Brightness

Subject   You can control the screen brightness from the Settings window, as explained in the following procedure.

If you have connected an external screen to the XFA (see section *Controlling the XFA Graphical Interface from an External Screen, p. 43*), this function is not applicable.

Procedure   1. In the **Operating Mode** window, touch the **Settings** button.

The **Settings** window appears.
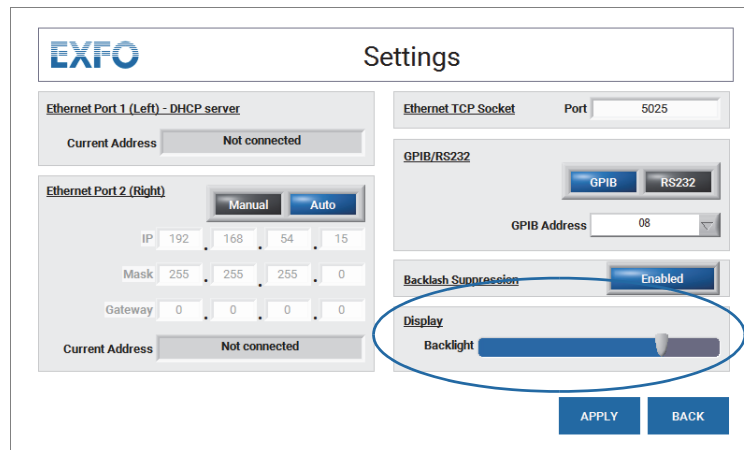
Figure 6: Settings Window – Display Setting

2. In the **Display** area, slide the **Backlight** cursor to increase or decrease the screen brightness.

3. Touch the **Apply** button.

3.4 Turning off the XFA

Subject   The following procedure explains how to correctly turn the XFA off.

Important
Do not turn the XFA off by using the **On** switch located on the front panel.

Procedure   1. Access the **Operating Mode** window (see section *Turning On the XFA and Accessing the Operating Modes, p. 19*).

2. In the **Operating Mode** window, touch the 🔘 button.

Caution
Do not unplug any power cord during the shutdown process.

A confirmation message appears.

3. Touch the **Continue** button.
The XFA stops

4. On the rear panel, set the power switch to **O**.

4. Setting the Wavelength/Frequency Value

4.1   Manually Entering the Wavelength/Frequency Value

Subject   The **Spectral Selection** function enables you to manually set the wavelength or frequency value.

Procedure   1. In the **Operating Mode** window, touch the **Spectral Selection** button.

The **Spectral Selection** window appears.
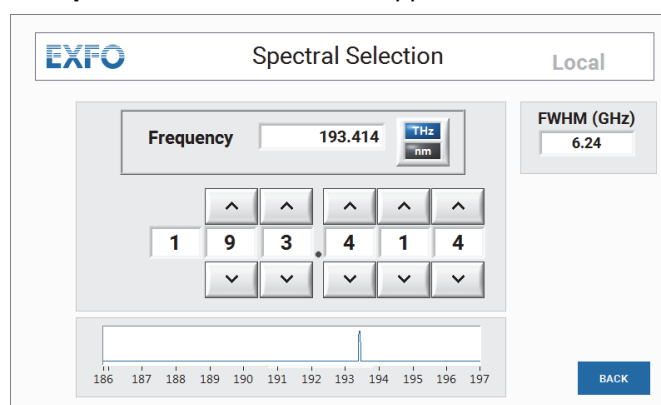
Figure 7: Spectral Selection Window

2. Specify the wanted spectral unit by touching the [THz/nm] button.
    - In wavelength mode:
        - FWHM unit is pm (picometer). FWHM is for information only; you cannot change it.
        - Wavelength unit is nm (nanometer).

    - In frequency mode:
        - FWHM unit is GHz (gigahertz). FWHM is for information only; you cannot change it.
        - Frequency unit is THz (terahertz).

3. Specify the wanted wavelength or frequency value by doing one of the following:

    - Touch the **Wavelength** or **Frequency** field and using the virtual keypad appearing on screen, enter the wavelength/frequency value.

    - Touch the [∧] and [∨] buttons to increment/decrement the displayed digits of the wavelength/frequency value.

    - Touch one wavelength/frequency digit and using the virtual keypad appearing on screen, enter the wanted value for the digit.

    The graph display the selected wavelength/frequency value.
    The available wavelength values are detailed in section *Technical Specifications, p. 9*.

4.2   Selecting a Channel by Using an ITU Grid

4.2.1   Using a Predefined Grid to Select a Channel

Subject   The **ITU Grid** function enables you to use a predefined ITU grid to quickly select a channel.
This function is not available for O-band models of the XFA.

Procedure   1.   In the **Operating Mode** window, touch the **ITU Grid** button.

The **ITU Grid Selection** window appears.
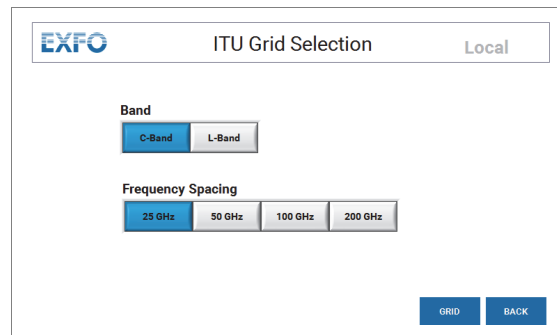
Figure 8: ITU Grid Selection Window

2.   Set the predefined grid you want to use:

•   **Band**: touch the button corresponding to the band you want to use.

•   **Frequency Spacing**: touch the button corresponding to the wanted spacing between two channels of the grid.

3.   Touch the **Grid** button to display the selected ITU grid.

The grid window appears: channels are organized in tables. Each tab corresponds to a table and the name of the tab is the first value of its table.

Figure 9: ITU Grid Window

4.   Specify the wanted spectral unit by touching the 🔲 button.
•   In wavelength mode:
•   FWHM unit is pm (picometer). FWHM is for information only; you cannot change it.
•   Wavelength unit is nm (nanometer).
•   In frequency mode:

- FWHM unit is GHz (gigahertz). FWHM is for information only; you cannot change it.
- Frequency unit is THz (terahertz).

5. Select the wanted channel:

    a. Touch the tab to display the corresponding table.

    b. In the table, select the value corresponding to the wanted channel.

4.2.2   Using a Custom Grid to Select a Channel

Subject

The **Custom Grid** function enables you to create and use a custom grid to select a channel.

Procedure

1. In the **Operating Mode** window, touch the **Custom Grid** button.
The **Custom Grid Selection** window appears.

Figure 10: Custom Grid Selection Window

1. Create your custom grid:

    a. Specify the wanted spectral unit by touching the ⬚ button.

    b. Specify the starting wavelength/frequency to use for the grid:

- Touch the **Start** field and using the virtual keypad appearing on screen, enter the wavelength/frequency value.
- In the **Start value** field, touch the ⬚ and ⬚ buttons to increment/decrement the displayed digits of the wavelength/frequency value.
- Touch one wavelength/frequency digit and using the virtual keypad appearing on screen, enter the wanted value for the digit.

    c. Touch the **Spacing** field to specify the spacing value between two channels of the grid using the virtual keypad appearing on screen.

       The maximum available wavelength corresponding to your configuration appears in the **Max** field and the number of channels appears in the **Number of elements** field.

2. Touch the **Grid** button to display the created grid.
The grid window appears: channels are organized in tables. Each tab corresponds to a table and the name of the tab is the first value of its table.
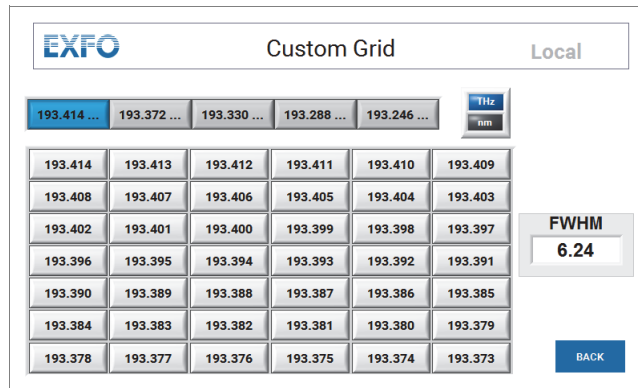
Figure 11: Custom Grid Window

3. Specify the wanted spectral unit by touching the ⬛ button.
- In wavelength mode:
    - FWHM unit is pm (picometer). FWHM is for information only; you cannot change it.
    - Wavelength unit is nm (nanometer).

- In frequency mode:
    - FWHM unit is GHz (gigahertz). FWHM is for information only; you cannot change it.
    - Frequency unit is THz (terahertz).

4. Select the wanted channel:

a. Touch the tab to display the corresponding table.
b. In the table, select the value corresponding to the wanted channel.

4.3 Defining and Running a Sequence of Wavelength/Frequency

The **Sequence Editor** function enables you to create a list of wavelength values that the XFA will be able to execute without supervision.

An instruction is composed of:

* a wavelength/frequency value
* FWHM (fixed)
* duration of the instruction execution.

Each instruction can be triggered by a specific time. You can save, load and run sequences you have created, as explained in this section.

4.3.1 Creating a Sequence

Procedure

1. In the **Operating Mode** window, touch the **Sequence Editor** button.

   The **Sequence Editor** window appears.
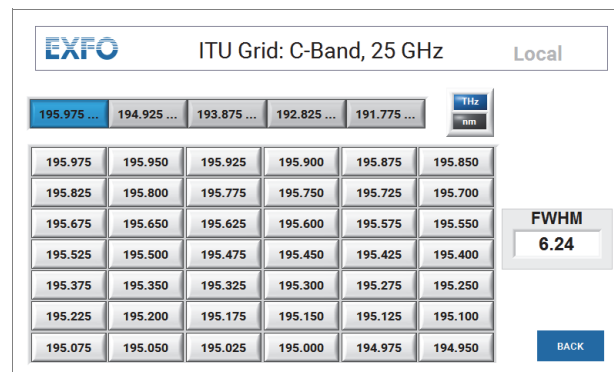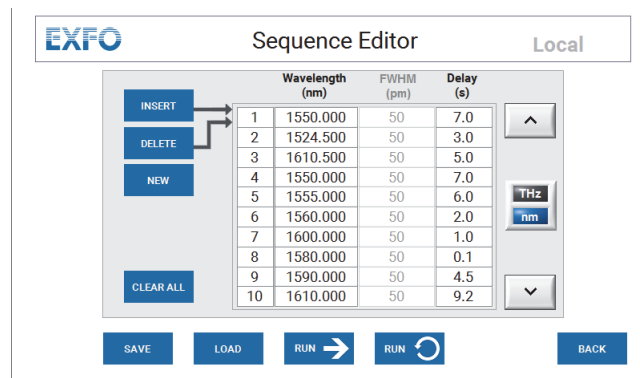

   Figure 12: Sequence Editor Window

2. Specify the wanted spectral unit by touching the [THz/nm] button.
   * In wavelength mode:
     * FWHM unit is pm (picometer). FWHM is for information only; you cannot change it.
     * Wavelength unit is nm (nanometer).

   * In frequency mode:
     * FWHM unit is GHz (gigahertz). FWHM is for information only; you cannot change it.
     * Frequency unit is THz (terahertz).

3. Add instructions to the list by touching the following buttons.
   Maximum instruction number is 200.

Button	Description
INSERT	Adds an instruction before the first instruction displayed in the list
NEW	Adds an instruction at the end of the list.
DELETE	Deletes the first instruction of the list.
∧ ∨	Enables you to navigate through the list.

4. For each instruction, specify the wanted values by touching the corresponding fields:

    -   **Wavelength/Frequency**
    -   **Delay**: period of time between instruction execution (in seconds).
        Possible value: 0.1 to 100 seconds.

4.3.2   Running a Sequence

Subject   The XFA provides two ways to execute a sequence:

-   Executing a single run of the listed instructions
-   Executing the listed instructions continuously.

Before Starting   In the **Sequence Editor** window, display the list of instructions you want to execute by creating (see section *Creating a Sequence, p. 27*) or loading (see section *Loading a Sequence, p. 30*) a sequence.

Procedure   **Executing a Single Run**

1. In the **Sequence Editor** window, touch the [RUN →] button.

    The **Running Single Sequence** window appears.
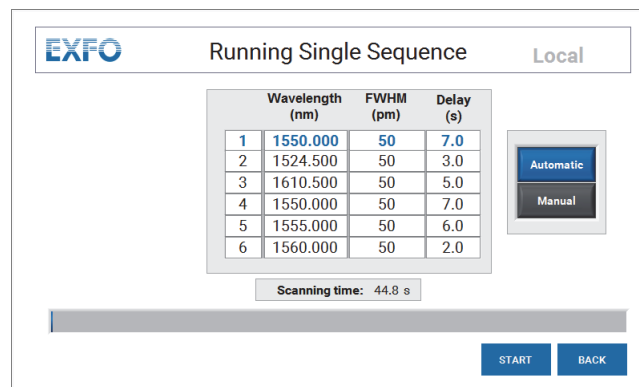
Figure 13: Sequence - Single Run

2. Select the sequence execution mode by touching one of the following buttons:

    -   **Automatic**: the entire sequence is automatically executed.

    -   **Manual**: this mode enables you to execute the sequence step by step. The first instruction is executed and the sequence execution stops until you touch the **Next** button.

3. Touch the **Start** button to begin the sequence execution.

    -   To stop the sequence execution touch the [BACK] button.

    -   In Manual execution mode, the first instruction is executed. Touch the **Next** button to execute the following instruction.

4. To go back to the **Sequence Editor** page, touch the [BACK] button.

Executing the Sequence Continuously

1. In the **Sequence Editor** window, touch the [RUN ↻] button.

   The **Running Loop Sequence** window appears and the sequence is automatically started.
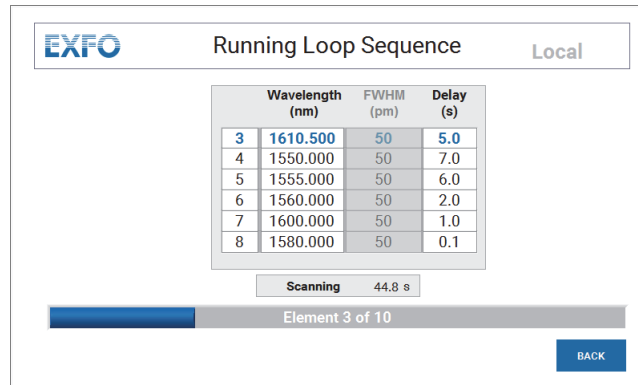
Figure 14: Sequence - Loop

2. To stop the sequence execution touch the [BACK] button.

3. To go back to the **Sequence Editor** page, touch the [BACK] button again.

4.3.3 Saving a Sequence

Subject

You can save the sequence you have just created to the XFA internal disk, as explained in the following procedure.
You cannot save sequences to an external device.

Procedure

1. In the **Sequence Editor** window, touch the [SAVE] button.

   The **Save Sequence** window appears, displaying the previously saved sequences.

   The default sequence name is YY.MM.DD_HH.MM
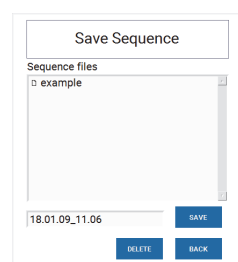
2. To modify the sequence name, touch the name field and using the virtual keyboard appearing on screen, enter the wanted sequence name and touch **OK**.

3. To delete a previously saved sequence, select the sequence name in the **Sequence files** list and touch the [DELETE] button.

4. Save the new sequence to the XFA internal disk by touching the [SAVE] button.

4.3.4   Loading a Sequence

Subject   You can load a previously saved sequence, as explained in the following procedure.
You cannot load a sequence from an external device.

Procedure   1. In the **Sequence Editor** window, touch the [LOAD] button.

The **Load Sequence** window appears, displaying the previously saved sequences.

The default sequence name is YY.MM.DD_HH.MM
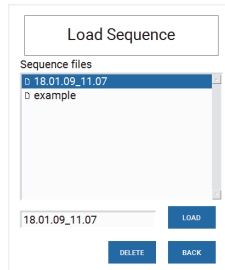
2. To delete a previously saved sequence, select the sequence name in the **Sequence files** list and touch the [DELETE] button.

3. Load the selected sequence by touching the [LOAD] button.

4.4   Enabling/Disabling the Backlash Suppression Mechanism

Subject

When you change the wavelength/frequency value, the XFA automatically operates the backlash suppression mechanism to eliminate the effect of mechanical backlash on the tuning wavelength actuator: it moves 5 nm lower than the wanted wavelength/frequency before going to the requested wavelength/frequency.

This mechanism is enabled after each startup of the XFA.

You may want to disable the backlash suppression mechanism for specific applications, as explained in the following procedure.

> **Important**
> If you disable the backlash suppression, the wavelength/frequency accuracy specification is no longer guaranteed.

Procedure

1. In the **Operating Mode** window, touch the **Settings** button.

    The **Settings** window appears.
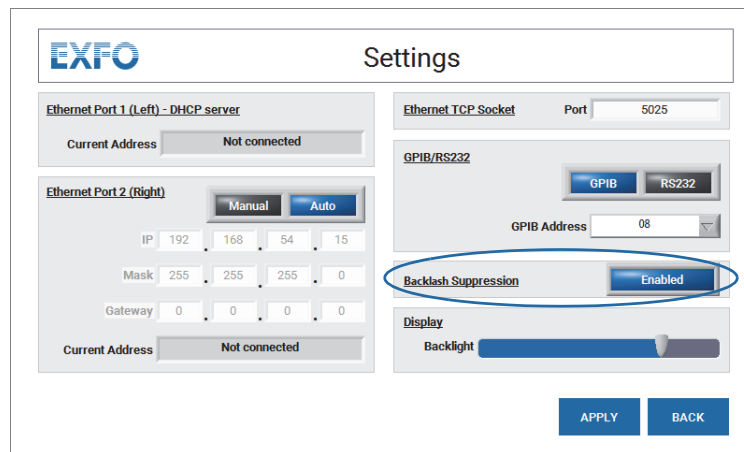
Figure 15: Settings Window – Backlash Suppression

2. In the **Backlash Suppression** area,

    •   To disable the backlash suppression mechanism, touch the **Enabled** button.

    •   To enable the backlash suppression mechanism, touch the **Disabled** button

3. Touch the **Apply** button.

5. Using the XFA in Remote Mode

The XFA features the following interfaces for remote control (see *Figure 2, p. 13*):

- **USB-B** (see section *Remotely Controlling the XFA via USB-B, p. 35*)
- **Ethernet** (see section *Remotely Controlling the XFA via Ethernet, p. 38*)
- **RS-232** for remote control (see section *Remotely Controlling the XFA via RS-232, p. 41*)

  With an external RS-232/GPIB converter, you can also use the RS-232 interface for **GPIB** remote control (see section *Remotely Controlling the XFA via IEEE-488 with an External Controller, p. 44*)
- **DVI** for remote display (section *Controlling the XFA Graphical Interface from an External Screen, p. 43*)

5.1   Switching Between Remote and Local Mode

Procedures   **Entering the Remote Mode**

The remote mode can only be used after initialization of the XFA and after validation of the presentation page appearing at device start-up.

The XFA switches to remote mode in the following cases:

- An RS-232, USB or GPIB command is received.
- An Ethernet session is open.

When the XFA enters the remote mode, the touch screen comes back to the main menu and all controls are disabled.
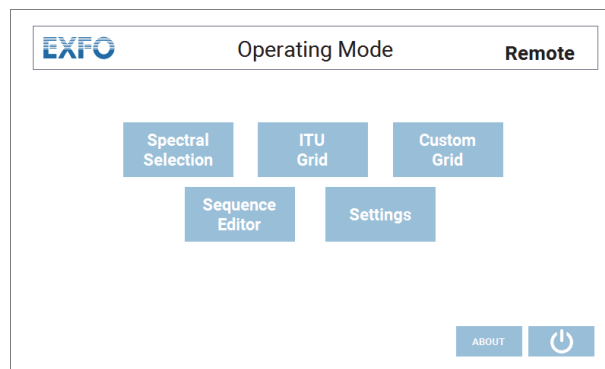
Figure 16: Remote Mode Window

If a sequence is running, wavelength, frequency remote assignment are disabled.

Switching back to Local Mode

In remote mode, the **Remote** label (at the top right corner) is available in the **Operating mode** window. To go back to the local mode, do one of the following:

- Click on the **Remote** label.

- Use the `LOCAL` remote command (see section *Available Remote Commands, p. 48*).

- If using the Ethernet interface, close the Ethernet session using the remote application software.

The XFA switches back to remote mode as soon as it receives a command.

5.2 Installing/Updating and Starting the XFA Remote Program

Subject

If LabVIEW is not installed on your computer or if you want to check the connection using a dedicated interface, you can install the XFA Remote Client program, which enables you to remotely access the XFA.

If the XFA Remote program is already installed on your computer and you want to update it, you do not need to uninstall it, just follow the installation procedure below.

Procedure

1. From the XFA USB key or the EXFO website, copy the **Remote Client vx.xx** folder to a local directory on your computer.

2. Double-click the **setup.exe** file located in the **Remote Client vx.xx** folder.

   The installation wizard appears.

3. Follow the instructions displayed in the wizard window to install the program.

4. Restart your computer.

5. To start the **Remote Client** software, click the ⌨ XTA-50 Remote icon located in **Start\All Programs\EXFO** (default location).

6. If you want to remotely control the XFA via USB-B, you must install the USB driver on your computer as explained in section *Installing the USB Driver, p. 35* before using the **XTA-50 Remote** program.

5.3 Remotely Controlling the XFA via USB-B

The USB-B port enables you to connect the XFA to a computer to control it with remote commands. The XFA can receive RS-232C commands at the USB-B port from a computer on which the appropriate USB driver is installed.

5.3.1 Installing the USB Driver

Subject
The XFA USB Driver is available on the USB key provided with the product, or can be downloaded from the EXFO website.

You must install the XFA USB Driver on your computer in order to make the XFA USB-B port appear as an additional COM port available to the computer.

Application software can then access the USB port in the same way as it would access a standard COM port. Therefore, you can send RS-232C commands to the XFA using a serial-communication terminal.

Before Starting
- Make sure your computer runs one of the following operating systems: Windows 7, Windows 8 or Windows 10.
  If not, the XFA USB driver is not supported by your computer.

- Make sure you have a USB-B/USB-A cable to link the XFA to your computer.

USB-B   USB-A

- Make sure you have the appropriate XFA USB driver. It is provided on the USB key delivered with the XFA, or you can download it from the EXFO website (www.exfo.com/software/exfo-apps).

- If a previous version of the XFA USB driver is already installed on your computer, uninstall it.

Procedure
1. Do one of the following:

   - Connect the XFA USB key to the USB-A port of your computer.

   - From the EXFO website (http://www.exfo.com/software/exfo-apps), download the XFA USB driver and unzip it to a temporary folder on your computer.

2. In the **USB Driver** folder, double-click one of the following files, depending on you Windows platform (if you select the wrong file, a message appears, prompting you to select the other file):

   - 32-bit system: XTA-50 USB Driver_x86.exe
   - 64-bit system: XTA-50 USB Driver_x64.exe

   The USB Driver installation wizard appears.

3. Follow the instructions displayed in the wizard window.

   The XFA USB Driver is now installed on your computer.

4. Connect the USB B port of the XFA (see *Figure 2, p. 13*) to the USB-A port of your computer using a USB-B/USB-A cable.

> **Important**
> Do not connect your computer to the XFA USB-A port. The USB remote mode is only available through the XFA USB-B port.

The XFA USB-B port is recognized as a COM port by the computer.

5. To know the COM port number your computer use for the XFA, open the **Windows Device Manager** (**Control Panel**>**System and Security**>**System**) and browse the **Ports (COM & LPT)** folder.

5.3.2   Controlling the XFA via USB-B

Before Starting
- Make sure you the XFA USB Driver is installed on you computer (see section *Installing the USB Driver, p. 35*).

- Connect the USB B port of the XFA (see *Figure 2, p. 13*) to your computer with a USB-A to USB-B cable.

Procedures   **Controlling the XFA Using LabVIEW**

1. If LabVIEW is already installed on your computer, use the following files:

    - **<XTA-50 USB key>\LabVIEW vx.xx\XTA-50 Remote.lvproj**: this file contains the LabVIEW sample project.

    - **<XTA-50 USB key>\LabVIEW vx.xx\src\Ethernet USB GPIB RS232 clients.vi**: this file contains a sample LabVIEW program for either an Ethernet, USB or GPIB RS232 interface.

    - **<XTA-50 USB key>\LabVIEW vx.xx\src\CP1202 UART USB**: this directory contains all the .vi files for USB control.

    The following identifiers are required by the LabVIEW driver.
    - PID (Product IDentifier): 0x8606
    - Baud rate: 115200
    - Parity: None
    - Stop bits: 1 stop bit
    - DSR: Status input
    - DTR: Held inactive
    - DCD: Status input
    - CTS: Status input
    - RTS: Held inactive
    - xonxoff: false/OFF

2. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Controlling the XFA Using the XFA Remote Client

If LabVIEW is not installed on your computer, do the following:

1. Install and start the **XTA-50 Remote Client** program on your computer as explained in section *Installing/Updating and Starting the XFA Remote Program, p. 34*.

    If you don't intend to program with LabVIEW, you can use this software to check the connection between your computer and the XFA via this interface.
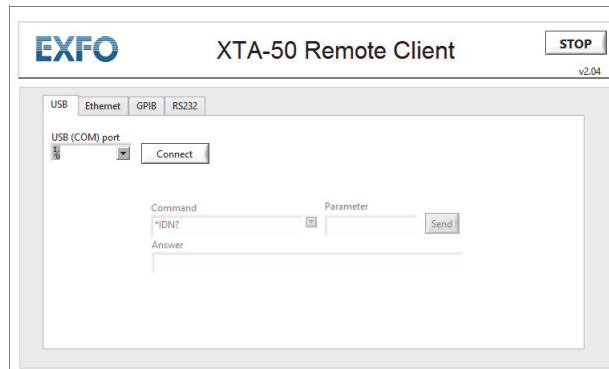
Figure 17: XTA-50 Remote Client - USB Communication

2. In the **XTA-50 Remote Client** program, select the **USB** tab.

3. In the **COM Port** field, select the computer COM port used for the XFA.
    To know the COM port number your computer use for the XFA, open the Windows Device Manager (Control Panel>System and Security>System) and browse the Ports (COM & LPT) folder.

4. Click the **Connect** button.

5. Use the **Command** and **Parameter** fields to send commands to the XFA.

6. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

5.4   Remotely Controlling the XFA via Ethernet

The Ethernet port enables you to connect the XFA to a computer or to a network to control it with remote commands.

5.4.1   Setting the XFA Ethernet Ports

Subject

To connect the XFA to a computer or network via the Ethernet port, use the **Settings** window to configure the IP address.

Before Starting

Make sure you have an Ethernet RJ45 cable to link the XFA to your computer.

Procedure

1.   In the **Operating Mode** window, touch the **Settings** button.

     The **Settings** window appears.

Figure 18: Settings Window – Ethernet Setting

2.   In the **Ethernet TCP Socket** area, specify the TCP socket **Port** as described in the following *Ethernet Parameter Description* section, *p 39*.

3.   Connect the RJ45 cable to the wanted port:

     •   Use port LAN 1 (left) to directly connect a computer to the XFA. This ports provides an automatic IP address configuration.

     •   Use port LAN 2 (right) to remotely control the XFA from a computer through your company network, or to directly connect a computer to the XFA and manually configure the connection parameters.

4.   Set the corresponding parameters as described in the following *Ethernet Parameter Description* section, *p 39*.

     If the XFA is connected to a network and/or if you don't know which configuration to use, contact your network administrator.

5.   Touch the **Apply** button.

     The new IP configuration can take a few minutes to be operational.

Ethernet Parameter Description

Ethernet Port 1 (Left) - DHCP server

Displays the address automatically assigned to the XFA.
Default XFA IP address: 192.168.54.1

Ethernet Port 2 (Right)

Specify the wanted IP configuration mode by touching the [Manual Auto] button.

- **Auto**: the XFA connection parameters (IP address, subnet mask and default gateway) are automatically retrieved from the connected network, and the connection is automatically established. You cannot modify the values.

- **Manual**: enables you to manually set the connection parameters. Touch a field to modify its value by using the virtual keypad appearing on screen:
    - **IP**: IP address used by your company network.
      Default value: 192.168.0.5
    - **Mask**: subnet mask used by your company network.
      Default value: 255.255.255.0
    - **Gateway**: default gateway used by your company network.
      Default value: 192.168.0.1

Ethernet TCP Socket

TCP destination port to be used by the socket to allow data transmission between the XFA and the external controller.
Default value: 5025 (SCPI-RAW)

Important
Make sure the firewall of your computer allows communication on this port.

5.4.2   Controlling the XFA via Ethernet

Subject

The Ethernet port enables you to remotely control the XFA via a direct connection to a computer or through a network.

Before Starting

- Connect the LAN 1 or LAN 2 port of the XFA (see *Figure 2, p. 13*) to a computer or network with an RJ45 cable.
- Make sure the IP address is configured correctly (see section *Setting the XFA Ethernet Ports, p. 38*).

Procedures

Controlling the XFA Using LabVIEW

1. If LabVIEW is already installed on your computer, use the following files:
    - **<XTA-50 USB key>\LabVIEW vx.xx\XTA-50 Remote.lvproj**: this file contains the LabVIEW sample project.
    - **<XTA-50 USB key>\LabVIEW vx.xx\src\Ethernet USB GPIB RS232 clients.vi**: this file contains a sample LabVIEW program for either an Ethernet, USB or GPIB RS232 interface.
    - **<XTA-50 USB key>\LabVIEW vx.xx\src\Ethernet**: this directory contains all the .vi files related to Ethernet control.

2. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Controlling the XFA Using the XFA Remote Client

If LabVIEW is not installed on your computer, do the following:

1. Install and start the **XTA-50 Remote Client** program on your computer as explained in section *Installing/Updating and Starting the XFA Remote Program, p. 34*.

If you don't intend to program with LabVIEW, you can use this software to check the connection between your computer and the XFA via this interface.

Figure 19: XTA-50 Remote Client - Ethernet Communication

2. In the **XTA-50 Remote Client** program, select the **Ethernet** tab.

3. Fill-in the **IP** and **Port** fields according to the Ethernet configuration you set (see section *Setting the XFA Ethernet Ports, p. 38*):

- **IP**: type the IP address displayed in the **Settings** screen of the XFA, in the **Current Address** field corresponding to the connected port.

- **Port**: type the TCP socket displayed in the **Settings** screen of the XFA, in the **Ethernet TCP Socket** field.

4. Click the **Connect** button.

5. Use the **Command** and **Parameter** fields to send commands to the XFA.

6. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Caution
Before disconnecting the XFA from the computer or closing the LabVIEW driver, do one of the following otherwise an error message will appear.
- Send the `LOCAL` command.
- On the XFA screen, touch the **Remote** label on the top right corner.

5.5 Remotely Controlling the XFA via RS-232

The RS-232 port enables you to connect the XFA to a computer to control it with remote commands.

5.5.1 Setting the XFA RS-232C Port

Subject

If you want to use the RS-232 port of the XFA, use the **Settings** window to set the port, as explained in the following procedure.

Procedure

1. In the **Operating Mode** window, touch the **Settings** button.

   The **Settings** window appears.
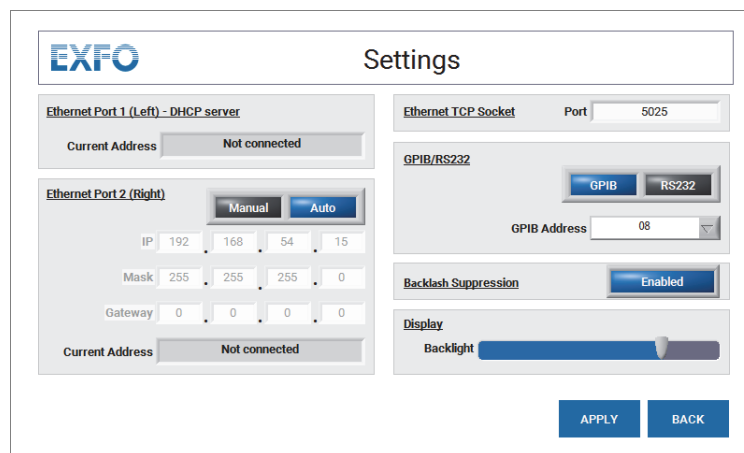
Figure 20: Settings Window – RS-232 Setting

2. In the **GPIB/RS232** area, touch the **RS232** button.

3. Touch the **Apply** button.

   The RS-232 Port is ready to receive remote commands.

5.5.2 Controlling the XFA via RS-232

Before Starting

Link the COM2 port of the XFA (see *Figure 2, p. 13*) to your computer with the RS-232 cable delivered with the product (cross-connect cable (in Rx/Tx) with two female adapters).
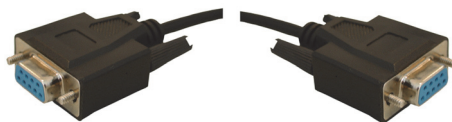
Procedures

Controlling the XFA Using LabVIEW

1. If LabVIEW is already installed on your computer, use the following files:

   • **<XTA-50 USB key>\LabVIEW vx.xx\XTA-50 Remote.lvproj**: this file contains the LabVIEW sample project.

- **<XTA-50 USB key>\LabVIEW vx.xx\src\Ethernet USB GPIB RS232 clients.vi**: this file contains a sample LabVIEW program for either an Ethernet, USB or GPIB RS232 interface.

- **<XTA-50 USB key>\LabVIEW vx.xx\src\RS232**: this directory contains all the .vi files related to RS-232 control.

The following identifiers are required by the LabVIEW driver.
- Baud rate: 9600
- Data bits: 8
- Parity: None
- Stop bits: 1 stop bit
- Char Term: LF (Line Feed)
- Flow Control: None

2. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Controlling the XFA Using the XFA Remote Client

If LabVIEW is not installed on your computer, do the following:

1. Install and start the **XTA-50 Remote Client** program on your computer as explained in section *Installing/Updating and Starting the XFA Remote Program, p. 34*.

   If you don't intend to program with LabVIEW, you can use this software to check the connection between your computer and the XFA via this interface.
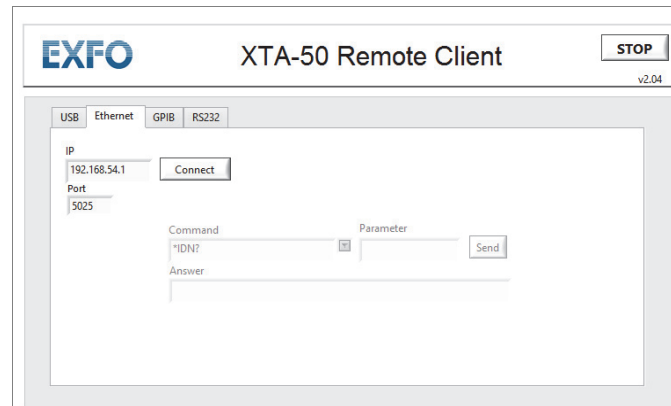

Figure 21: XTA-50 Remote Client - RS-232 Communication

2. In the **XTA-50 Remote Client** program, select the **RS232** tab.

3. In the **COM Port** field, select the computer COM port used for the XFA.

4. Click the **Connect** button.

5. Use the **Command** and **Parameter** fields to send commands to the XFA.

6. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

5.6   Controlling the XFA Graphical Interface from an External Screen

Subject

You can connect an external screen to the XFA to display and control the graphical interface.

Before Starting

• Make sure you have a DVI cable to link the XFA to your external screen.

• If the screen you want to connect is not a touch screen, make sure you have a mouse to be able to control the XFA graphical interface.

Procedure

1. Connect your external screen to the DVI port located on the rear panel of the XFA (see *Figure 2, p. 13*).

   The XFA graphical interface immediately appears on the external screen, and is no longer displayed on the XFA screen.

2. Do one of the following, depending on the type of screen you have connected:

   • If you have connected a touchscreen, you can control the graphical interface by using touch screen gestures.

   • If your screen is not a touch screen, connect a mouse to one of the USB-A or PS/2 port located on the XFA rear panel (see *Figure 2, p. 13*) to control the graphical interface.

3. To stop the remote display, disconnect the DVI cable from the XFA.

5.7 Remotely Controlling the XFA via IEEE-488 with an External Controller

Important

Controlling the XFA via GPIB is only available using an external NI RS-232/GPIB converter.

5.7.1 Setting the GPIB Address

Subject

If you want to use the IEEE-488 interface (accessory) of the XFA, use the **Settings** window to configure the GPIB address.

Procedure

1. In the **Operating Mode** window, touch the **Settings** button.

   The **Settings** window appears.
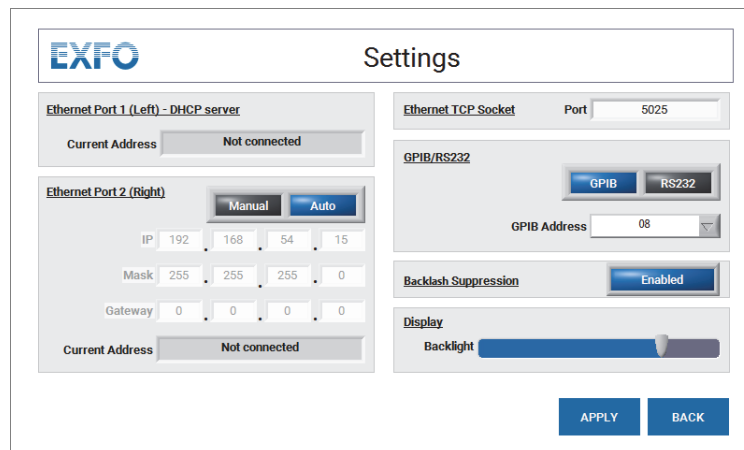
Figure 22: Settings Window – GPIB Setting

2. In the **GPIB/RS232** area, touch the **GPIB** button to make available the GPIB address setting.

3. In the **GPIB Address** list, select the appropriate GPIB address from the list.

4. Touch the **Apply** button.

5.7.2 Controlling the XFA via an IEEE-488 Interface

Subject

The IEEE-488 interface is optional. This option can be ordered with the instrument to enable software setting.

Before Starting

- Make sure you have the following material:
  - An external RS-232/GPIB converter, to provide the GPIB (IEEE-488) interface.
  - The RS-232 cable delivered with the XFA (cross-connect cable with two female adapters) to link the XFA to the converter.
  - A GPIB cable, to link the converter to your application.

- Link the COM2 port of the XFA (see *Figure 2, p. 13*) to the RS-232 converter via the RS-232 cable delivered with the product and use a GPIB cable to link the GPIB converter to your application.

Procedures

Controlling the XFA Using LabVIEW

1. If LabVIEW is already installed on your computer, use the following files:

   - **<XTA-50 USB key>\LabVIEW vx.xx\XTA-50 Remote.lvproj**: this file contains the LabVIEW sample project.

   - **<XTA-50 USB key>\LabVIEW vx.xx\src\Ethernet USB GPIB RS232 clients.vi**: this file contains a sample LabVIEW program for either an Ethernet, USB or GPIB RS232 interface.

   - **<XTA-50 USB key>\LabVIEW vx.xx\src\NI GPIB-RS232**: this directory contains all the .vi files related to RS-232 control.

2. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Controlling the XFA Using the XFA Remote Client

If LabVIEW is not installed on your computer, do the following:

1. Install and start the **XTA-50 Remote Client** program on your computer as explained in section *Installing/Updating and Starting the XFA Remote Program, p. 34*.

   If you don't intend to program with LabVIEW, you can use this software to check the connection between your computer and the XFA via this interface.
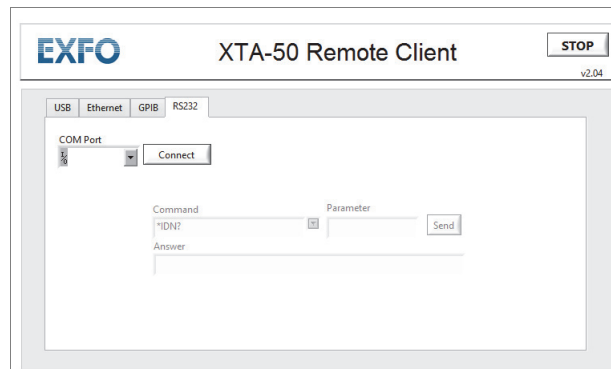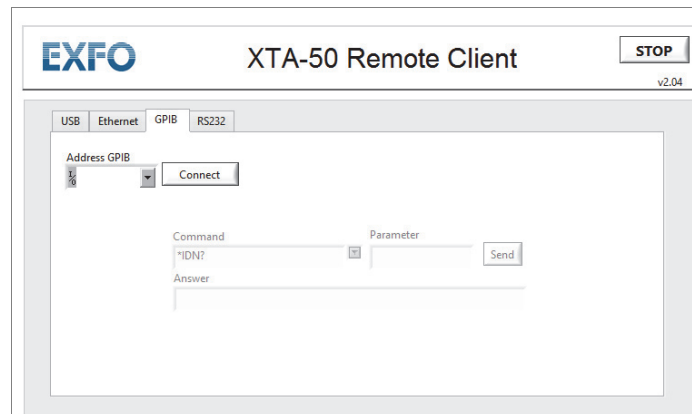

Figure 23: XTA-50 Remote Client - GPIB Communication

2. In the **XTA-50 Remote Client** program, select the **GPIB** tab.

3. In the **Address GPIB** field, type the GPIB address specified in section *Setting the GPIB Address, p. 44*.

4. Click the **Connect** button.

5. Use the **Command** and **Parameter** fields to send commands to the XFA.

6. Use the authorized remote commands detailed in section *Available Remote Commands, p. 48* to remotely control the XFA.

Configuring the National Instrument Measurement & Automation Explorer (MAX)

To directly send commands using the National Instrument Measurement & Automation Explorer (MAX), proceed to the configuration illustrated in *Figure 24, p. 46*:
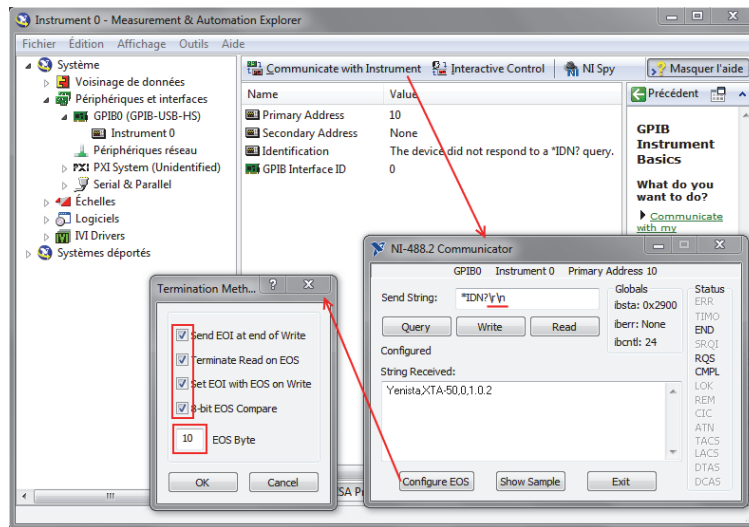
Figure 24: National Instrument - MAX Configuration

5.8   Remote Control Commands

The XFA specific commands and syntax are identical in USB, Ethernet, RS-232 and GPIB remote control modes.

5.8.1   Command/Answer Syntax

Rules

In remote mode the XFA is a slave. It replies to the computer but will never instigate a communication.

- A command is a string.
- The decimal separator is the dot.
- Spaces are treated as nothing: "L A M B DA ? " is the same as "LAMBDA?"
- Commands are not case sensitive. All answers are in uppercase.
- Each command ends with the two following characters:
  - CR: carriage return (0x0D)
  - LF: line feed (0x0A).

Command Types

Setting Commands

Setting commands enable you to assign a new value to an internal parameter of the XFA. Name and value of parameters are returned.

- Command:
  - Syntax: `<parameter name>=<value><CR><LF>`
  - Example: `LAMBDA=1550.0000000<CR><LF>`
- Answer:
  - Syntax: `<parameter name>=<value><CR><LF>`
  - Example: `LAMBDA=1550.000<CR><LF>`

Query Commands

Query commands enable you to get the value of an internal parameter.
Name and value of parameters are returned.

- Command:
  - Syntax: `<parameter name>?<CR><LF>`
  - Example: `LAMBDA?<CR><LF>`
- Answer:
  - Syntax: `<parameter name>=<value><CR><LF>`
  - Example: `LAMBDA=1550.000<CR><LF>`

Action Commands

Action commands enable you to ask the XFA to perform an action. Answer is the command.

- Command/Answer:
  - Syntax: `<action identifier><CR><LF>`
  - Example: `LOCAL<CR><LF>`

Command Error   If the XFA is not able to understand a command, it resends it (in uppercase and without space) preceded by the character "?":

```
?<Command><CR><LF>
```

Error can come from a wrong parameter name, a wrong action identifier, a wrong value.

For one command all operators are not always available. A command sent with an unavailable operator will not be understood by the XFA.

> **Important**
> Do not omit the two ending parameters <CR><LF>. Without them the XFA will never understand a command.

5.8.2   Available Remote Commands

The following table gives an overview of the available commands and queries.

	Command/Query	Corresponding Section
General System Control	`*IDN?`	**IDN?, p. 49*
	`SERIAL_NUMBER?`	*SERIAL_NUMBER?, p. 49*
Wavelength/Frequency and FWHM Control	`LAMBDA=`	*LAMBDA=, p. 50*
	`LAMBDA?`	*LAMBDA?, p. 50*
	`LAMBDA_MIN?`	*LAMBDA_MIN?, p. 50*
	`LAMBDA_MAX?`	*LAMBDA_MAX?, p. 50*
	`FREQ=`	*FREQ=, p. 51*
	`FREQ?`	*FREQ?, p. 51*
	`FWHM?`	*FWHM?, p. 52*
	`FWHM_MIN?`	*FWHM_MIN?, p. 52*
	`FWHM_MAX?`	*FWHM_MAX?, p. 53*
	`SEQUENCE_RUNNING?`	*SEQUENCE_ RUNNING?, p. 53*
	`B_SUPPR=`	*B_SUPPR=, p. 53*
	`B_SUPPR?`	*B_SUPPR?, p. 53*
Remote Mode Control	`LOCAL`	*LOCAL, p. 54*
	`ETH_IP=`	*ETH_IP=, p. 54*
	`ETH_IP?`	*ETH_IP?, p. 54*
	`ETH_MASK=`	*ETH_MASK=, p. 54*
	`ETH_MASK?`	*ETH_MASK?, p. 55*
	`ETH_GATEWAY=`	*ETH_GATEWAY=, p. 55*
	`ETH_GATEWAY?`	*ETH_GATEWAY?, p. 55*
	`ETH_AUTO`	*ETH_AUTO, p. 55*
	`ETH_AUTO?`	*ETH_AUTO?, p. 56*
	`ETH_MANUAL`	*ETH_MANUAL, p. 56*
	`ETH_MANUAL?`	*ETH_MANUAL?, p. 56*

5.8.2.1   General System Control

*IDN?

Syntax

`*IDN?`

Description

Queries the XFA identification string.

Query Response

`EXFO,XFA,0,x.x.x`
where `x.x.x` is the firmware version.

SERIAL_NUMBER?

Syntax

`SERIAL_NUMBER?`

Description

Queries the XFA serial number.

Query Response

`YOxxxxxxxxx`

5.8.2.2   Wavelength/Frequency Control

LAMBDA=

Syntax

```
LAMBDA=<value>
```

Description

Sets a new wavelength value in nm.

If a sequence is running, the wavelength cannot be remotely assigned. In this case the XFA answer is: `SEQUENCE_RUNNING=TRUE`

- <value>: string of a natural number, according to the wavelength limits and the FWHM value. Available wavelength values are detailed in section *Technical Specifications, p. 9*.
  FWHM can constrain wavelength/frequency value. The value really taken into account is returned in the answer

Example

```
LAMBDA=1550.003
```

LAMBDA?

Syntax

```
LAMBDA?
```

Description

Queries the current wavelength value in nm.

Example

```
LAMBDA?  → 1550.003
```

LAMBDA_MIN?

Syntax

```
LAMBDA_MIN?
```

Description

Queries the XFA minimal wavelength value in nm.

Query Response

String of a natural number

LAMBDA_MAX?

Syntax

```
LAMBDA_MAX?
```

Description

Queries the XFA maximal wavelength value in nm.

Query Response

String of a natural number

FREQ=

Syntax

```
FREQ=<value>
```

Description

Sets the frequency value in THz.

If a sequence is running, the wavelength cannot be remotely assigned. In this case the XFA answer is: `SEQUENCE_RUNNING=TRUE`

- <value>: string of a natural number, according to the frequency limits and the FWHM value. Available wavelength values are detailed in section *Technical Specifications, p. 9*.
  FWHM can constrain wavelength/frequency value. The value really taken into account is returned in the answer

Query Response

String of a natural number corresponding to the current frequency value in THz.

Example

```
FREQ=193.415
```

FREQ?

Syntax

```
FREQ?
```

Description

Queries the current frequency value in THz.

Example

```
FREQ? → 193.415
```

FWHM?

Syntax

```
FWHM?
```

Description

Queries the current FWHM value in nm.

Example

```
FWHM?  → 0.065
```

FWHM_F?

Syntax

```
FWHM_F?
```

Description

Queries the current FWHM value in GHz.

Example

```
FWHM?  → 8.11
```

FWHM_MIN?

Syntax

```
FWHM_MIN?
```

Description

Queries the XFA minimal FWHM value in nm.

Query Response

String of a natural number.

FWHM_MAX?

Syntax

```
FWHM_MAX?
```

Description

Queries the XFA maximal FWHM value in nm.

Query Response

String of a natural number.

SEQUENCE_ RUNNING?

Syntax

```
SEQUENCE_RUNNING?
```

Description

Queries if a sequence is currently running. In this case, the wavelength, frequency and FHWM cannot be remotely assigned.

Query Response

- `TRUE`: a sequence is currently running.
- `FALSE`: no sequence is currently running.

B_SUPPR=

Syntax

```
B_SUPPR=DISABLED|ENABLED
```

Description

Sets the state of the backlash suppression mechanism:
- `DISABLED`: the backlash suppression is disabled
- `ENABLED` (default): the backlash suppression is enabled

B_SUPPR?

Syntax

```
B_SUPPR?
```

Description

Queries the state of the backlash suppression mechanism:

Query Response

- `DISABLED`: the backlash suppression is disabled.
- `ENABLED`: the backlash suppression is enabled

5.8.2.3   Remote Mode Control

LOCAL

Syntax

```
LOCAL
```

Description

Ends remote mode, the XFA comes back to local mode.

ETH_IP=

Syntax

```
ETH_IP=<value>.<value>.<value>.<value>
```

Description

Sets a new IP address (for more details, see section *Setting the XFA Ethernet Ports, p. 38*). The new value is only taken into account after calling `ETH_MANUAL`.
We do not recommend to set this value using the Ethernet remote mode.

* `<value>`: integer in the range 0 to 255.

Example

```
ETH_IP=192.168.0.5
```

ETH_IP?

Syntax

```
ETH_IP?
```

Description

Queries the XFA IP address.

Query Response

String of four integers (0 to 255) separated by dots

Example

```
ETH_IP? → 192.168.0.5
```

ETH_MASK=

Syntax

```
ETH_MASK=<value>.<value>.<value>.<value>
```

Description

Set a new mask for Ethernet connection (for more details, see section *Setting the XFA Ethernet Ports, p. 38*). The new value is only taken into account after calling `ETH_MANUAL`.
We do not recommend to set this value using the Ethernet remote mode.

* `<value>`: integer in the range 0 to 255.

Example

```
ETH_MASK=255.255.255.0
```

ETH_MASK?

Syntax

`ETH_MASK?`

Description

Queries the XFA mask.

Query Response

String of four integers (0 to 255) separated by dots.

Example

`ETH_MASK?` → `255.255.255.0`

ETH_GATEWAY=

Syntax

`ETH_GATEWAY=<value>.<value>.<value>.<value>`

Description

Sets a new gateway (for more details, see section *Setting the XFA Ethernet Ports, p. 38*).
The new value is only taken into account after calling `ETH_MANUAL`.
We do not recommend to set this value using the Ethernet remote mode.

Example

`ETH_GATEWAY=192.168.0.1`

ETH_GATEWAY?

Syntax

`ETH_GATEWAY?`

Description

Queries the XFA gateway.

Query Response

String of four integers (0 to 255) separated by dots.

Example

`ETH_GATEWAY?` → `192.168.0.1`

ETH_AUTO

Syntax

`ETH_AUTO`

Description

Sets Ethernet parameters (IP, mask, gateway) automatically.
They are configured by the network DHCP. The new configuration will be operational after few seconds/minutes.

ETH_AUTO?

Syntax

ETH_AUTO?

Description

Queries if the XFA Ethernet parameters are currently in automatic mode.

Query Response

- TRUE: the XFA Ethernet parameters are currently in automatic mode.
- FALSE: the XFA Ethernet parameters are not currently in automatic mode.

ETH_MANUAL

Syntax

ETH_MANUAL

Description

Uses the Ethernet parameters (IP, mask, gateway) set in manual mode.

See ETH_IP (page 54), ETH_MASK (page 54), and ETH_GATEWAY (page 55) commands.

The new configuration will be operational after few seconds/minutes.

ETH_MANUAL?

Syntax

ETH_MANUAL?

Description

Queries if the Ethernet parameters currently used by the XFA are the ones set in manual mode.

Query Response

- TRUE: the XFA uses the Ethernet parameters set manually.
- FALSE: the XFA does not use the Ethernet parameters set manually.

6. Performing Basic Maintenance Operations

User maintenance of the XFA system is limited to basic maintenance tasks that do not require removing the instrument case-cover or accessing any internal component of the instrument.

Warning
To avoid the possibility of injury, never remove the protective cover of the chassis to perform servicing or maintenance operations to the XFA internal parts and optical components.
You must refer to EXFO service representative (see section *Contact Information, p. 4*).

6.1   Updating the Firmware Version

Subject
The firmware version update package is a .pkg file named **XTA_Updater_x.xx.pkg** where x.xx is the firmware version. It is available on the EXFO website, from the EXFO Apps area.

Caution
Do not install a lower version of software than the current version installed on your product. EXFO cannot be held liable or be made responsible for problems caused by a software downgrade.

Before Starting
Make sure you have a USB flash drive.

Procedure
1. From the EXFO website (EXFO Apps), download the last XFA firmware version update (.pkg file) and copy it to a USB device, so that the necessary .pkg file is located at the USB device root.

    Important
    Make sure the downloaded version is a higher version than the one installed on your product.

2. Connect the USB device to one of the available USB ports located on the rear panel (see *Figure 2, p. 13*).

3. Turn off the XFA (see section *Turning off the XFA, p. 21*).

4. On the front panel, press the ⏻ button to turn on the XFA.
    The XFA automatically detects the .pkg file on the USB device and starts the system update wizard.

    Caution
    To avoid serious system problems:
    •   Do not turn the XFA off during the system update.
    •   Do not remove the USB device before the end of the upgrade process.

5. Follow the instructions displayed on screen to update the firmware version.

   Once the update is finished, the XFA starts normally.

6. Remove the USB device.

6.2   Cleaning Optical Connectors

Subject

To optimize the performance of the instrument and prevent loss of optical power, you must verify that optical connectors are clean every time you connect a fiber.

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

The XFA optical connectors are mounted on a drawer to ease the cleaning of internal connectors.

Before Starting

Make sure you have the following material:
- Optical grade cleaning cotton swabs
- Canned air
- Isopropyl alcohol
- Fiberscope or similar if available
- Lint-free tissue or cleaning cartridges

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

Procedure

1. Turn the XFA off (see section *Turning off the XFA, p. 21*) and unplug the power supply cord from the wall socket.

2. On the front panel, make sure the protective caps of the connectors are in place.

3. On the front panel, use your fingers to unscrew the two screws of the connector drawer.

   Once unscrewed from the front panel, the two screws stay attached to the drawer.

4. Gently pull the drawer out of the front panel (no more than 70 mm) so that fiber ends are made visible, as illustrated in the following figure.

Figure 25: Optical Connectors − Cleaning

5. At the rear of the drawer plate, remove one connector end from the plate:

6. Gently clean the connector end, with the following instructions:

a. Hold the can of compressed air upright and spray the can into the air to purge any propellant.

b. Spray the clean compressed air on the connector to remove any loose particles or moisture.

c. Moisten a clean optical swab with isopropyl alcohol and lightly wipe the surfaces of the connector with gentle circular motion.

d. Spray the clean compressed air on the connector again to remove any loose particles or isopropyl alcohol.

e. Check that the connector is clean with a fiberscope (or similar).

7. Replace the connector end at the rear of the drawer plate: make sure the key of the connector is mated with that of the adapter and screw it back.

8. Perform steps 5 to 7 on the second connector.

9. Push the connector drawer back on the front panel and screw the drawer back in its location, making sure no fiber is trapped between the front panel and the drawer plate.

6.3 Cleaning the XFA

6.3.1 Cleaning the Cover of the XFA

Subject
If the external cover of the XFA becomes dirty or dusty, clean it by following the instruction below.

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

Before Starting
Material needed: lint free cleaning cloth

Procedure
1. Turn the XFA off (see section *Turning off the XFA, p. 21*) and unplug the power supply cord from the wall socket.

2. Gently swipe dirt and dust on the external cover of the XFA, without applying excessive force onto it.

6.3.2　Cleaning the Fan Grid

Subject　To ensure proper cooling of the XFA from the fan, the fan grid 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.

Procedure
1. Turn the XFA off (see section *Turning off the XFA, p. 21*) and unplug the power supply cord from the wall socket.
2. Using a duster or a slightly moist cloth, gently clean the external grid of the fan without pressing it.

6.3.3　Cleaning the Touch Screen

Subject　To ensure proper functioning and accuracy of the touch screen, you must clean it regularly.

Before Starting　Material needed:
- Lint-free cleaning cloth
- Isopropyl alcohol

Procedure
1. Turn the XFA off (see section *Turning off the XFA, p. 21*) and unplug the power supply cord from the wall socket.
2. Using an lint-free cloth slightly damped with ethyl alcohol, gently swipe dirt on the screen.
Make sure to avoid drops and prevent alcohol from entering the XFA.

6.4   Replacing the Power Fuse

Subject

You must verify the power fuse in case you cannot turn on the XFA.

Warning
To avoid fire hazard, only use the correct fuse type, voltage and current ratings (see section *Technical Specifications, p. 9*).

Before Starting

Make sure you have the following equipment:

- 1 slot screwdriver (4 to 6 mm).

- 1 replacement fuse (for fuse type, see section *Technical Specifications, p. 9*).

Procedure

1. Turn the XFA off (see section *Turning off the XFA, p. 21*) and unplug the power supply cord from the wall socket.

2. Unplug the cord of the adapter from the 12 V connector.

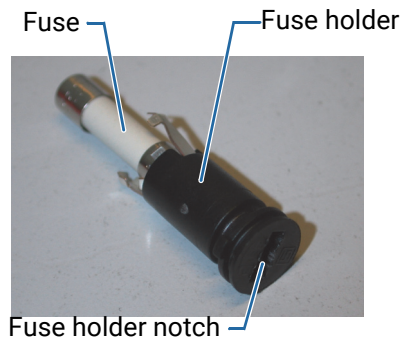3. Insert the screwdriver in the fuse holder notch and unscrew the fuse holder from its housing.

Fuse — ⌐Fuse holder

Fuse holder notch —⌐

Figure 26: Fuse replacement

4. Pull out the defective fuse from the fuse holder and replace it with the new one.

5. Replace the fuse holder in its housing on the rear panel and screw it back.

6. Plug the power cord of the adapter to the 12 V connector.

6.5   Packaging for Shipment

If you need to return the XFA to EXFO for servicing or calibration, use the original packaging.
For instructions on returning the XFA, please contact EXFO (see section *Contact Information, p. 4*).

This section lists all the possible error and warning messages, and how to handle them. Errors are classified by function.

7.1   Motor Errors

Motor Connection error. No driver detected

The motor driver has not been found during the initialization process.

- Restart the XFA.
  If the error appears again, contact the EXFO customer service (see section *Contact Information, p. 4*.

Motors Connection error. At least one motor is missing

At least one motor was not connected to the driver during initialization.

- Restart the XFA.
  If the error appears again, contact the EXFO customer service (see section *Contact Information, p. 4*.

Motors Communication error

Communication with one motor failed.

- Restart the XFA.
  If the error appears again, contact the EXFO customer service (see section *Contact Information, p. 4*.

7.2   Remote Interface Errors

USB interface error

The USB-B interface card has not been found during initialization.

- Restart the XFA.
  If the error appears again, contact the EXFO customer service (see section *Contact Information, p. 4*.

USB/Ethernet/GPIB/RS232 communication error

Communication has been lost during remote mode.
- Close and re-open the remote connection (see section *Switching Between Remote and Local Mode, p. 33*).

- Check cables.

- Check your computer configuration.

- Check IP or GPIB address (see section *Using the XFA in Remote Mode, p. 33*).

- Restart the XFA.

7.3   General Error Messages

Wavelength (and or FWHM) limit switch

One motor has reached one of its limits.

- Restart the XFA.
  If the error appears again, contact the EXFO customer service (see section *Contact Information, p. 4*.

Not a number or number too big! Try again

The number entered with the virtual keyboard is too long, or it is not a number.

- Enter a smaller value.

- Type only digits with one dot maximum.

An error occurred, selected sequence cannot be loaded

The sequence file is corrupted and cannot be loaded.

- Try again.

- Restart the XFA.
  If the error appears again, the sequence file is lost. You must delete it and create a new one.

The sequence has been adjusted within the limits of the XFA

Some parameters of this sequence file are out of their range.
The sequence file has been loaded and parameters have been modified to fit to their range.

Certification and Compliance

Electromagnetic Compatibility

Canada and 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 and from ICES-003 compliance in Canada. 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 guide, 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.

European 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.

European Declaration of Conformity

The European Declaration of Conformity is available at www.EXFO.com/en/resources/legal-documentation

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 procedures and contact information, visit the EXFO website at www.EXFO.com/recycle.

China Table of Toxic and Hazardous Substances

CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS)
中国关于危害物质限制的规定
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-assemblyᵃ 光学组件 ᵃ	X	O	O	O	O	O
Mechanical sub-assemblyᵃ 机械组件 ᵃ	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	⑩
Batteryᵃ 电池 ᵃ	5	⑤

a. If applicable.
  如果适用。

List of Figures