

OPTICAL POLARIZED SOURCE

FLS-110

NETWORK TESTING

USER GUIDE



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Units of Measurement

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

Version number: 1.0.0

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Certification Information

F.C.C. Information to User

This unit has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This unit 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. However, there is no guarantee that interference will not occur in a particular installation. If this unit does cause harmful interference to radio or television reception, which can be determined by turning the unit off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



WARNING

Changes or modifications not expressly approved by EXFO Electro-Optical Engineering Inc. could void the user's authority to operate the equipment.

Independent Laboratory Testing

This unit has undergone extensive **CE** certification testing both internally, at EXFO, and externally, at an independent, qualified laboratory. All pre-qualification tests were performed at EXFO while all final tests were performed at UltraTech Engineering Labs Inc., a renowned test laboratory from Mississauga, Canada. This guarantees the unerring objectivity and authoritative compliance of all test results.

CE Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device.

DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive
Manufacturer's Name:	EXFO ELECTRO-OPTICAL ENG.
Manufacturer's Address:	400 Godin Avenue Quebec, Quebec Canada G1M 2K2 (418) 683-0211
Equipment Type/Environment:	Industrial Scientific Equipment
Trade Name/Model No.:	FLS-110 Optical Light Source
Year of Conformity Assessment:	1997

Standard(s) to which Conformity is Declared:

EN 61010-1:1990 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements
EN 60825-1:1994 Safety of LED products - Part 1: Equipment classifications, requirements, and user's guide
EN 55011: 1993 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific, and medical equipment
EN 50082-2: 1995 Electromagnetic Compatibility Generic immunity standard - Part 2: Industrial Environment

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer

Signature:



Full Name: Stephen Bull, E. Eng
Position: Vice-President Research and Development
Address: 400 Godin Avenue
Quebec, Quebec, Canada G1M 2K2
Date: February 20, 2007

1 Introduction

Unpacking and Inspection

The FLS-110 Optical Polarized Source package contains the following standard items:

- FLS-110 Optical Polarized Source
- Two 9 V alkaline batteries (one installed and one spare)
- AC adapter/charger
- Holster with shoulder strap
- Instruction manual
- Warranty validation card
- Certificate of Quality
- Declaration of Conformity
- Carrying case

Your FLS-110 has been thoroughly inspected before shipment. If any damage has occurred during transport, or if any item is missing, please notify EXFO immediately.

Conventions

Before using the product described in this manual, 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.



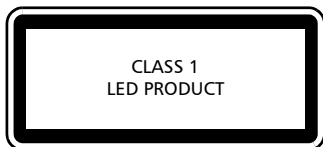
IMPORTANT

Refers to information about this product you should not overlook.

Safety Information

Your instrument is a Class 1 LED product in compliance with standard IEC 60825-1 Amendment 2: 2001. Laser radiation may be encountered at the output port.

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

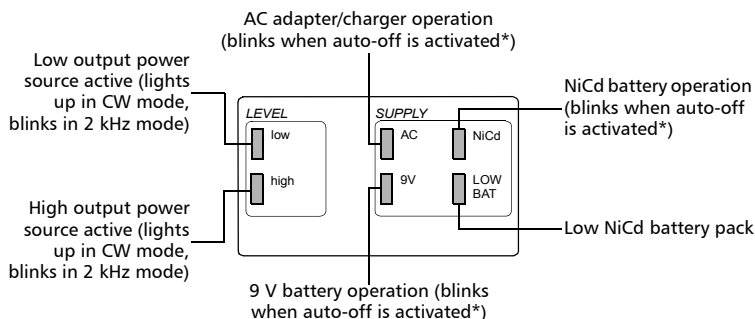


Note: *Label shown for information purposes only. It is not affixed to your product.*

2 Description

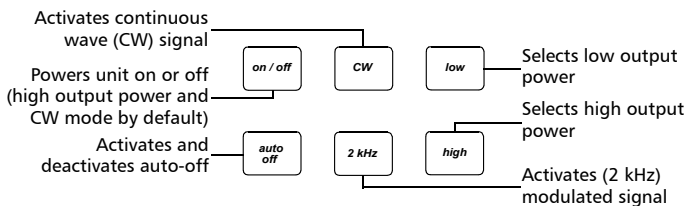
The FLS-110 Optical Polarized Source is a fiber-optic source used with a power meter to measure power and loss in singlemode fibers, and with a PMD analyzer such as the FTB-5500 and FTB-5500B for PMD measurements. The unit includes a LED optical source and a 2 kHz signal generation for fiber identification. The FLS-110 is powered by either the built-in rechargeable NiCd battery pack, the 9 V alkaline battery, or the AC adapter/charger.

LED Status Indicators

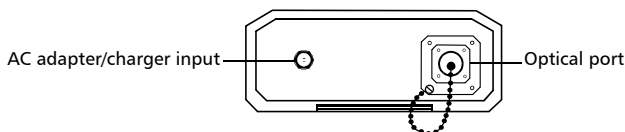


* Unit powers off after 10 minutes of inactivity

Keypad



Connector Panel



3 Maintenance

To help ensure long, trouble-free operation:

- Always clean fiber-optic connectors before using them.
- Keep the unit free of dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately and let the unit dry completely.



WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

The FLS-110 contains no user-serviceable parts. However, the unit contains sensitive electronic and optical components, and should be handled carefully and stored in its carrying case when not in use.

Cleaning the Optical Port

To prevent dust and dirt from entering the connector, always replace the protective cap on the optical port when not in use. Clean the optical port using a lint-free swab dipped in isopropyl alcohol (98% pure or more) and blow-dry with compressed air. In case the unit is equipped with a universal interface (option), rotate the connector adapter counter-clockwise and remove it. You now have access to the ferrule inside the connector interface. Clean and blow-dry as explained above. Then replace the connector adapter and rotate it clockwise until it clicks into place.

Recharging the NiCd Battery Pack

The **LOW BAT** indication is displayed when the instrument switches from the NiCd battery pack to the 9-V alkaline battery. To recharge the NiCd battery pack, plug in the AC adapter/charger. A full recharge takes approximately 14 hours. For maximum efficiency, recharge the battery at room temperature. To extend NiCd battery life, deplete the battery's charge completely before activating the AC adapter/charger.

Replacing the 9 V Alkaline Battery

To replace the alkaline battery:

1. Power off the unit and remove it from the holster.
2. Open the battery compartment door located at the back of the unit.
3. Replace the battery (respecting polarity).
4. Close the battery compartment door and replace the holster.

Periodic Source Verification

EXFO recommends that the FLS-110 be sent back to the factory every year for verification and adjustment.

Recycling and Disposal (Applies to European Union Only)



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.

This equipment was sold after August 13, 2005 (as identified by the black rectangle).

- ▶ Unless otherwise noted in a separate agreement between EXFO and a customer, distributor or commercial partner, EXFO will cover costs related to the collection, treatment, recovery and disposal of end-of-lifecycle waste generated by electronic equipment introduced after August 13, 2005 to an European Union member state with legislation regarding Directive 2002/96/EC.
- ▶ Except for reasons of safety or environmental benefit, equipment manufactured by EXFO, under its brand name, is generally designed to facilitate dismantling and reclamation.

For complete recycling/disposal procedures and contact information, visit the EXFO Web site at www.exfo.com/recycle.

4 Troubleshooting

Problem	Possible Cause	Solution
Output power is too low (single-wavelength units only).	<ul style="list-style-type: none">▶ Insufficient output power▶ Dirty optical port	<ul style="list-style-type: none">▶ Select high output power.▶ Clean optical port.
Unit does not power on.	Batteries may be drained.	<ul style="list-style-type: none">▶ Use line voltage to operate the unit or recharge the NiCd battery pack.▶ Verify the 9 V battery polarity.▶ Replace the 9 V battery.

Finding Information on the EXFO Web Site

The EXFO Web site provides answers to frequently asked questions (FAQs) regarding the use of your FLS-110 Optical Polarized Source.

To access FAQs:

1. Type <http://www.exfo.com> in your Internet browser.
2. Click on the **Support** tab.
3. Click on **FAQs** and follow the on-screen instructions. You will be given a list of questions pertaining to your subject.

The EXFO Web site also provides the product's most recent technical specifications.

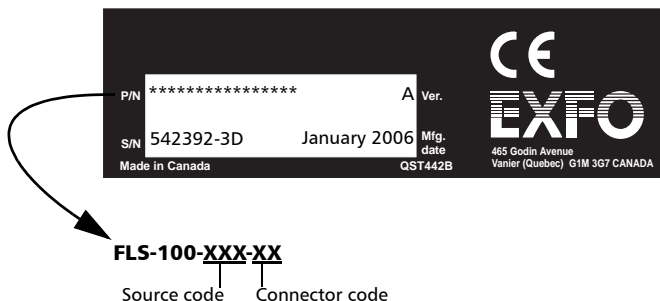
Contacting the Technical Support Group

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, 7:30 a.m. to 8:00 p.m. (Eastern Time in North America).

Technical Support Group
 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

To accelerate the process, please have information such as the name and the serial number (see the product identification label—an example is shown below), 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 shock and vibration.

5 Warranty

General Information

EXFO Electro-Optical Engineering Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one 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.

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 EXFO's control.



IMPORTANT

EXFO will charge a fee for replacing optical 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 11). 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 11).

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
quebec.service@exfo.com

EXFO Europe Service Center

Omega Enterprise Park, Electron Way
Chandlers Ford, Hampshire S053 4SE
ENGLAND

Tel.: +44 2380 246810
Fax: +44 2380 246801
europe.service@exfo.com

EXFO China Service Center/ Beijing OSIC

Beijing New Century Hotel
Office Tower, Room 1754-1755
No. 6 Southern Capital Gym Road
Beijing 100044
P. R. CHINA

Tel.: +86 (10) 6849 2738
Fax: +86 (10) 6849 2662
beijing.service@exfo.com

A Technical Specifications



IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at www.exfo.com.

POLARIZED SOURCE SPECIFICATIONS ^a

Model	-02P	-03P
Nominal Wavelength (nm)	1310	1550
Spectral width (nm)	≥ 35	≥ 65
Emitter type	LED	LED
Typical output power (dBm) 9/125 μm	-16	-20

NOTE

^a. At 23 °C ± 2 °C.



P/N: 1049824

www.EXFO.com · info@exfo.com

CORPORATE HEADQUARTERS	400 Godin Avenue	Quebec (Quebec) G1M 2K2 CANADA Tel.: 1 418 683-0211 · Fax: 1 418 683-2170
EXFO AMERICA	3701 Plano Parkway, Suite 160	Plano TX, 75075 USA Tel.: 1 972 907-1505 · Fax: 1 972 836-0164
EXFO EUROPE	Omega Enterprise Park, Electron Way	Chandlers Ford, Hampshire S053 4SE ENGLAND Tel.: +44 2380 246810 · Fax: +44 2380 246801
EXFO ASIA-PACIFIC	151 Chin Swee Road #03-29, Manhattan House	SINGAPORE 169876 Tel.: +65 6333 8241 · Fax: +65 6333 8242
TOLL-FREE	(USA and Canada)	1 800 663-3936