



OFSR-X

OptiFiber Smart Remote Options

Users Manual

PN 2140377

May 2004

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OFSR-X OptiFiber Smart Remote Options

Overview of Features

The OFSR-X OptiFiber™ Smart Remote options are used with the OptiFiber Certifying OTDR to measure loss and length on fiber optic cabling. The smart remote offers the following features:

- Functions as the remote unit for loss/length tests in Smart Remote mode with OptiFiber OFTM-5612 and OFTM-5632 modules.
- Can also be manually controlled to transmit 850 nm and 1300 nm wavelengths.
- Visual fault locator helps you locate breaks, bad splices, and bends, and check fiber continuity and polarity.
- Runs for at least 12 hours on the rechargeable lithium ion battery pack.

Registration

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services.

To register, fill out the online registration form on the Fluke Networks website at www.flukenetworks.com/registration.

Contacting Fluke Networks

Note

If you contact Fluke Networks about your smart remote, have the smart remote's software and hardware version numbers available if possible. See page 22.



www.flukenetworks.com



support@flukenetworks.com



+1-425-446-4519

- Australia: 61 (2) 8850-3333 or 61 (3) 9329 0244
- Beijing: 86 (10) 6512-3435
- Brazil: 11 3044 1277
- Canada: 1-800-363-5853
- Europe: +44 1923 281 300
- Hong Kong: 852 2721-3228
- Japan: +81-3-3434-0181
- Korea: 82 2 539-6311
- Singapore: +65-6738-5655
- Taiwan: (886) 2-227-83199
- USA: 1-800-283-5853

Visit our website for a complete list of phone numbers.

Additional Resources for Cable Testing Information

The Fluke Networks Knowledge Base answers common questions about Fluke Networks products and provides articles on cable testing techniques and technology.

To access the Knowledge Base, log on to www.flukenetworks.com, then click **knowledge base** at the top of the page.

The website **cabletesting.com** answers common questions about cable testing and provides articles on testing, documentation, standards, and other reference information.

Unpacking

Three OFSR-X options with their accessories are listed below. If something is damaged or missing, contact the place of purchase immediately.

OF SR-MMREM Smart Remote with Multimode Module

- One DTX-1200 smart remote
- One DTX-MFM multimode fiber module
- Two 62.5/125 μm multimode patch cords, 2 m, SC/SC
- One 62.5/125 μm multimode patch cord, 0.3 m, SC/SC
- One SC/SC adapter
- Carrying strap
- USB cable with mini-B connector
- AC adapter
- Users manual
- Product manuals CD

OF SR-SFM Singlemode Module

- One DTX-SFM singlemode fiber module
- Two 9/125 μm singlemode patch cords, 2 m, SC/SC
- One 9/125 μm singlemode patch cord, 0.3 m, SC/SC
- One SC/SC adapter





OF SR-MFM Multimode Module

- One DTX-MFM multimode fiber module
- Two 62.5/125 μm multimode patch cords, 2 m, SC/SC
- One 62.5/125 μm multimode patch cord, 0.3 m, SC/SC
- One SC/SC adapter

Safety Information

Table 1 shows the international electrical symbols used on the smart remote or in this manual.

Table 1. International Electrical Symbols

	Warning: Risk of fire, electric shock, or personal injury.
	Warning or Caution: Risk of damage or destruction to equipment or software. See explanations in the manuals.
	Do not connect this equipment to public communications networks, such as telephone systems.
	Warning: Class 1 laser (OUTPUT port). Risk of eye damage from hazardous radiation. Class 2 laser (VFL port). Do not stare into beam.

Warning

To avoid possible fire, electric shock, or personal injury

- Do not open the case; no user-serviceable parts are inside.
- Do not modify the smart remote.
- Use only ac adapters approved by Fluke Networks for use with the smart remote to charge the battery or power the smart remote.
- When servicing the smart remote, use only specified replacement parts.
- Do not use the smart remote if it is damaged. Inspect the smart remote before use.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Read the safety information given in the *OptiFiber Certifying OTDR Users Manual*.

Warning: Class 1 and Class 2 Laser Products

To avoid possible eye damage caused by hazardous radiation:

- Never look directly into optical connectors. Some sources produce invisible radiation that can permanently damage your eyes.
- Keep the fiber module's OUTPUT port covered with a dust plug or keep a patch cord attached. The OUTPUT port may be active even when a test is not in progress. Covering the port reduces the risk of accidental exposure to hazardous radiation.
- Never start a test or activate the OUTPUT port or VFL port without first connecting a fiber to the port you will use.

- Never look directly into the visual fault locator output. Momentary exposure to the locator's output will not damage your eyes; however, direct, long-term exposure is potentially hazardous.
- Do not use magnification to view the optical outputs without proper filtering.
- Use of controls, adjustments, or procedures not stated herein might result in hazardous radiation exposure.

Caution

To avoid damaging the smart remote or cables under test, to avoid data loss, and to ensure maximum accuracy of test results:

- Turn off the smart remote before attaching or removing modules.
- Keep the fiber module installed. The module protects the module connector from contamination and static electricity.
- Use proper cleaning procedures to clean all fiber connectors before every use. Neglecting this step or using improper procedures can cause unreliable test results and may permanently damage the connectors.

- Use a Fluke Networks FiberInspector Video Microscope to periodically inspect the fiber module's OUTPUT connector for scratches and other damage.
- Do not use a video microscope to inspect the fiber module's INPUT connector. This connector has different dimensions than the OUTPUT connector, and may be damaged by a fiber inspection probe.
- Do not use the smart remote if it operates abnormally. Protection may be impaired.
- To avoid disrupting network operation, never connect the smart remote to an active network. Doing so may disrupt network operation.

Getting Acquainted

The following sections introduce the smart remote's basic features.

Physical Features

Figure 1 describes the smart remote's features and shows how to remove and install the fiber module. Figure 2 describes the fiber module's features.

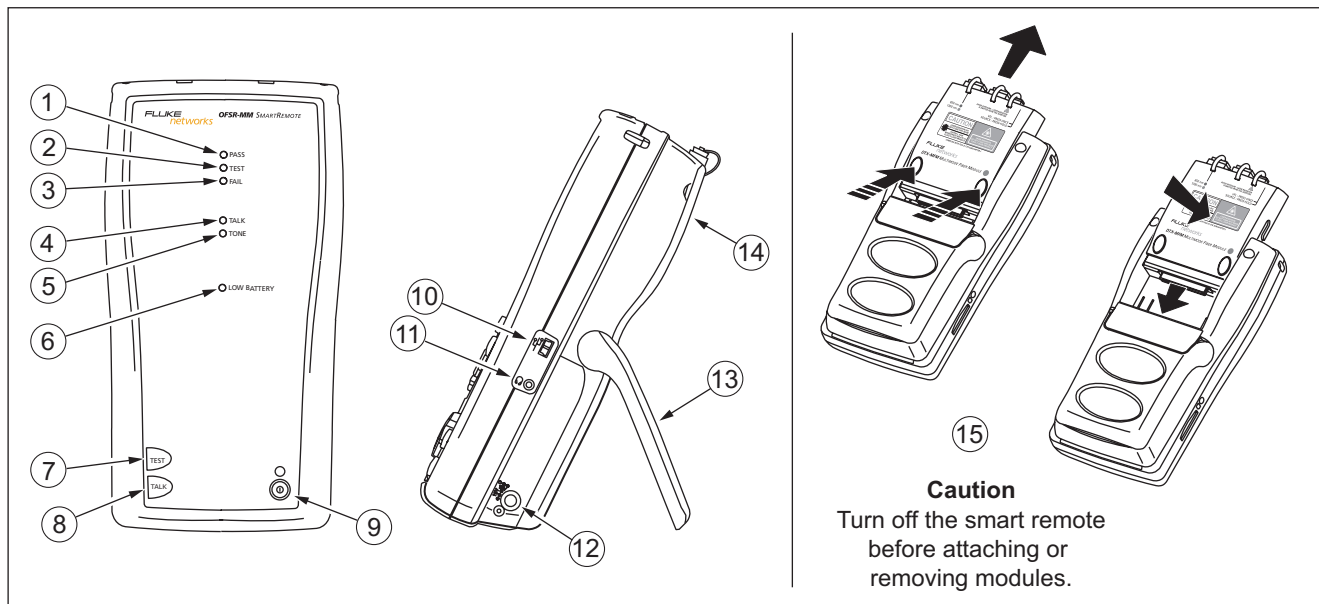


Figure 1. Smart Remote Features

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Note

The LEDs also act as a battery gauge. See Figure 3 on page 13.






- | | |
|--|--|
| <ul style="list-style-type: none"> ① Pass LED lights when a test passes. ② Test LED lights during tests. ③ Fail LED lights when a test fails. ④ Talk LED. Not used with an OptiFiber tester. ⑤ Tone LED. Not used with an OptiFiber tester. ⑥ Low battery LED lights when the battery is low. ⑦ : Not used with an OptiFiber tester. | <ul style="list-style-type: none"> ⑧ : Not used with an OptiFiber tester. If you unintentionally press , hold down  for one second to exit talk mode ⑨ : On/off key. ⑩ USB port for updating the smart remote's software. ⑪ Headset jack. Not used with an OptiFiber tester. ⑫ Connector for the ac adapter. The LED lights when the ac adapter is connected. See page 12. ⑬ Bail. ⑭ Multimode or singlemode fiber module. ⑮ Removing and installing the fiber module. |
|--|--|

Figure 1. Smart Remote Features (cont.)

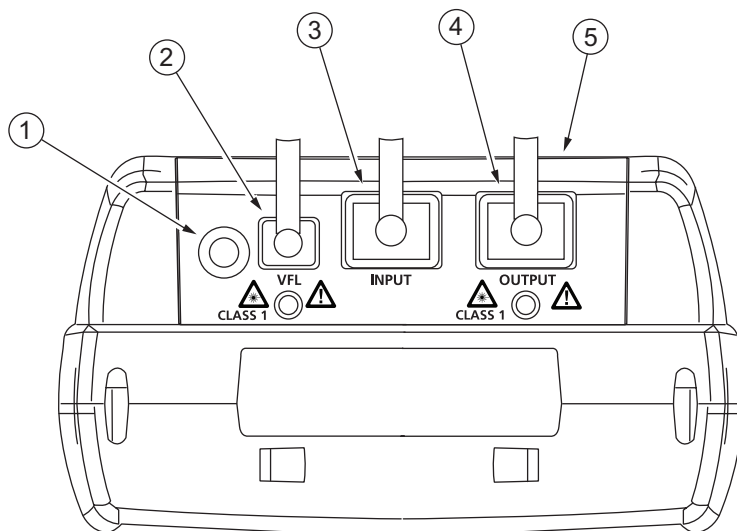


Figure 2. Fiber Module Features

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- ① Button for activating the visual fault locator (②) and output port (④). See "Using the Visual Fault Locator" on page 15 and "Using the Smart Remote as an Optical Source" on page 18.
- ② Universal fiber connector (with dust cap) for the visual fault locator output. The connector accepts 2.5 mm ferrules. The LED below the connector indicates the locator's mode (continuous or blinking).
- ③ SC input connector with dust cap. Receives optical signals for loss, length, and power measurements.

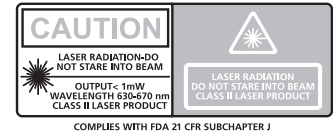
- ④ SC output connector with dust cap. Transmits optical signals for loss and length measurements.

The LED below the connector is red when the output is active at 850 nm (DTX-MFM) or 1310 nm (DTX-SFM) and green for 1300 nm (DTX-MFM) or 1550 nm (DTX-SFM).

Warning

Never look directly into optical output connectors (② and ④). Some sources produce invisible radiation that can permanently damage your eyes.

- ⑤ Laser safety label.



COMPLIES WITH FDA 21 CFR SUBCHAPTER J

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Figure 2. Fiber Module Features (cont.)

Powering the Smart Remote

To charge the battery, connect the ac adapter provided, as shown in Figure 3. You may charge the battery when it is attached or detached from the smart remote.

The ac adapters for the OptiFiber tester and the smart remote are interchangeable.

The battery charges fully in about 4 hours with the smart remote off. A fully-charged battery lasts for at least 12 hours of typical use.

Note

The battery will not charge at temperatures outside of 32 °F to 113 °F (0 °C to 45 °C). The battery charges at a reduced rate between 104 °F and 113 °F (40 °C and 45 °C).

The LED near the ac adapter connection indicates the following:

- Red: battery is charging.
- Green: battery is charged.
- Flashing red: The battery did not reach full charge within 6 hours. Verify that the battery was within the temperature range given above during charging and that the correct ac adapter was used. Disconnect then reconnect ac power and try charging the battery again. If the battery does not charge the second time, it should be replaced.

To determine the smart remote's battery status, watch its LEDs at the end of the power-up cycle. Refer to Figure 3.

The accuracy of the smart remote's battery gauge may drift over time. If the battery status information seems incorrect, reset the battery gauge as described on page 21.

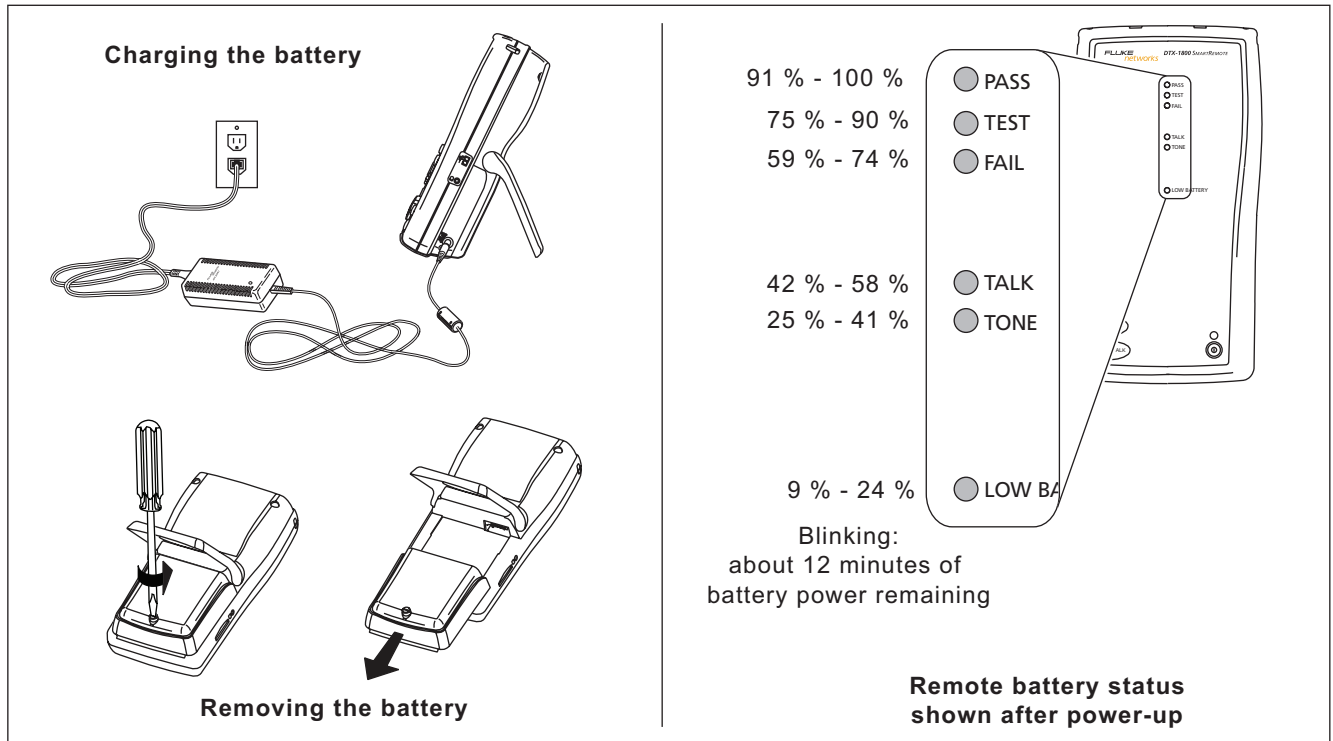
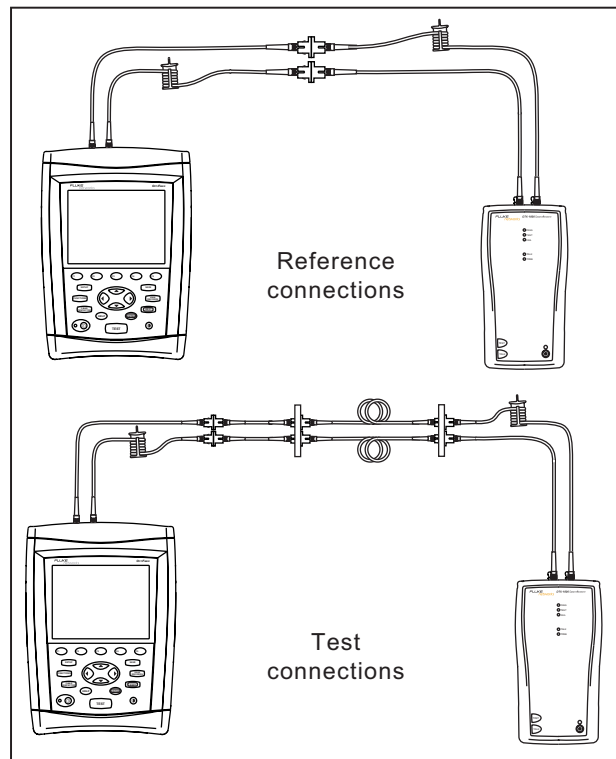


Figure 3. Battery Charging, Removal, and Status

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Using the Smart Remote with OptiFiber

Use the smart remote in place of a second OptiFiber tester for loss/length testing in Smart Remote mode. Figure 4 shows examples of reference and test connections. See the *OptiFiber Certifying OTDR Users Manual* or *Technical Reference Handbook* for details on reference and test connections.



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Figure 4. Using an OFSR-X in Smart Remote Mode

Using the Visual Fault Locator

The smart remote includes a visual fault locator that helps you quickly check fiber continuity, trace fibers, and locate faults along fibers and in connectors.

The visual fault locator port accepts connectors with 2.5 mm ferrules (SC, ST, or FC). To connect to other ferrule sizes, use a patch cord with the appropriate connector at one end and a SC, ST, or FC connector at the smart remote end.

Figure 5 shows the equipment needed for using the visual fault locator.

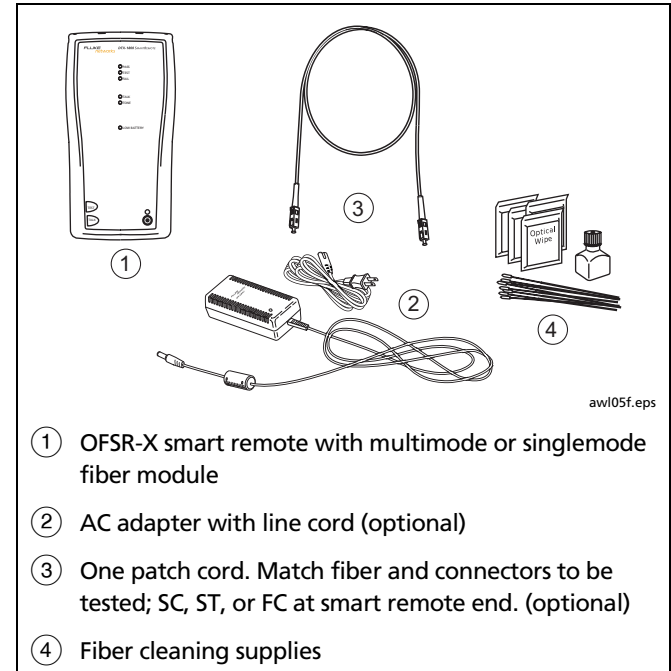


Figure 5. Equipment for Using the Visual Fault Locator

Using the Visual Fault Locator

- 1** Clean the connectors on the patch cord, if used, and the fiber to be tested.
- 2** Connect the fiber directly to the smart remote's VFL port or connect using the patch cord.
- 3** Turn on the visual fault locator by pressing the button near the VFL connector, as shown in Figure 6. Press again to switch to blinking mode. Press again to turn off the locator.
- 4** Look for the red light at the end of a fiber or at faults (Figure 6).

To check continuity or trace fiber connections, look for the red light at the end of the fiber.

To locate faults, move along the fiber from either end, looking for a red glow coming from the fiber jacket or a connector housing.

Tips: View the VFL's light indirectly by holding a white card or paper in front of the VFL connector or the fiber connector emitting the light.

The VFL's light may not be visible through thick or dark-colored cable sheaths or connector dust caps.

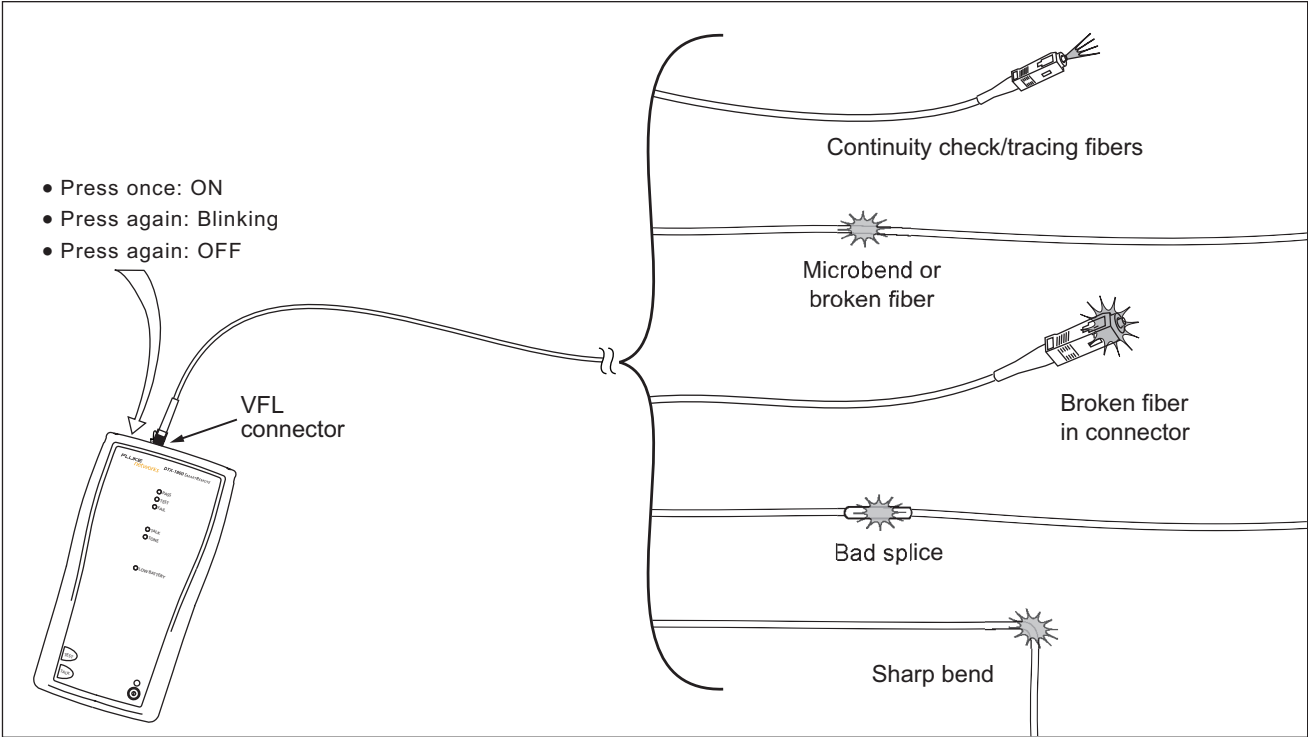


Figure 6. Using the Visual Fault Locator

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Using the Smart Remote as a Manually-Controlled Optical Source

You can manually-control the smart remote as a source for loss and power measurements with an OptiFiber tester or any optical power meter.

To turn on the source, use the button on the fiber module as described in Figure 7.

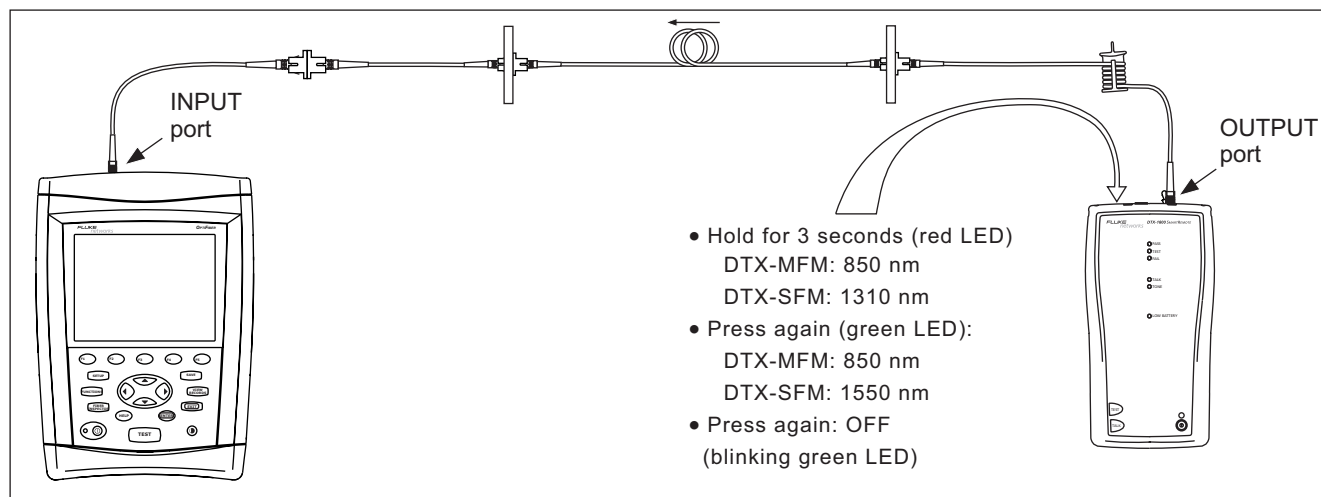


Figure 7. Using the Smart Remote as an Optical Source

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Options and Accessories

Table 2 shows options and accessories available for the OFSR-X smart remote. For a complete list of options and accessories visit the Fluke Networks website at www.flukenetworks.com.

To order options or accessories, contact Fluke Networks as described on page 2.

Table 2. Options and Accessories

Option or Accessory	Fluke Networks Model Number
Lithium ion battery pack	DTX-LION
USB interface cable (with mini-B connector)	DTX-USB
Carrying strap	DTX-STRP

Maintenance

Warning

To avoid possible fire, electric shock, personal injury, or damage to the smart remote:

- Do not open the case. No user-serviceable parts are inside.
- Replacing electrical parts yourself will void the smart remote's warranty and might compromise its safety features.
- Use only specified replacement parts for user-replaceable items.
- Use only Fluke Networks authorized service centers.

Caution

Replacing electrical parts yourself might void the smart remote's calibration and compromise its accuracy. If the calibration is void, cable manufacturers might not extend their warranty to the cabling you install.

Cleaning

Clean the case with a soft cloth dampened with water or water and a mild soap.

Caution

To avoid damaging the case, do not use solvents or abrasive cleansers.

Factory Calibration

The smart remote and fiber modules require calibration at a service center once a year to ensure that they meet or exceed the published accuracy specifications. Contact an authorized Fluke Networks Service Center for information on getting your smart remote calibrated.

Resetting the Battery Gauge

The accuracy of the battery gauge may drift over time if the battery is frequently recharged before being fully discharged.

To reset the battery gauge:

- 1 Completely discharge the battery until the smart remote no longer operates.
- 2 Charge the battery for at least 4 hours with the smart remote turned off.
- 3 Repeat steps 1 and 2.

Replacing the Battery

Replace the lithium ion battery pack when its life becomes noticeably shorter or when it fails to reach full charge. The battery is normally good for up to 400 charge/discharge cycles.



Dispose of the lithium ion battery pack in accordance with local regulations.

Updating the Smart Remote's Software

Keeping your smart remote's software current gives you access to new features and the latest test limits.

Software updates for the smart remote are posted on the DTX CableAnalyzer™ webpage on the Fluke Networks website.

To see the software version installed in your smart remote:

- 1 Install the latest version of LinkWare software on your PC.
- 2 Make the connections shown in Figure 8. Turn on the smart remote.
- 3 Select **Utilities > DTX Utilities > Software Version** from the LinkWare menu.

To update the smart remote's software:

Caution

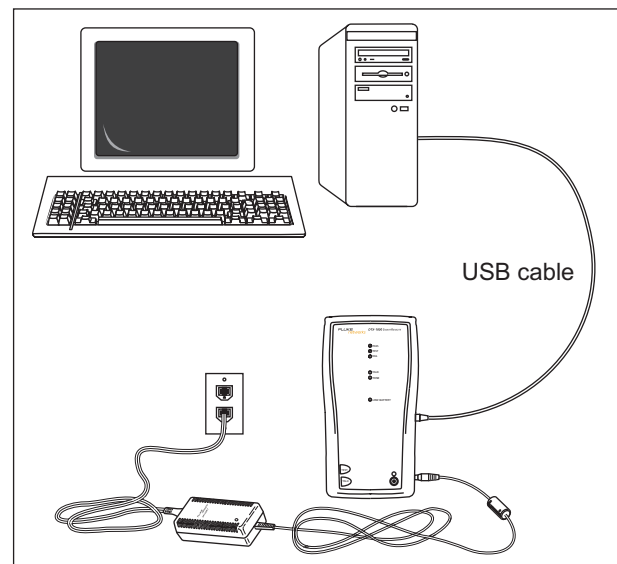
To avoid unexpected loss of power, connect the ac adapter to the smart remote when updating the software.

Note

Changes to the update procedure may be posted on the DTX CableAnalyzer software page on the Fluke Networks website.

- 1 Install the latest version of LinkWare software on your PC.
- 2 Download the smart remote update file from the Fluke Networks website, or contact Fluke Networks to get the update by other means. You can access the software page at **www.flukenetworks.com/support**. Save the file to your hard drive.
- 3 Make the connections shown in Figure 8. Turn on the smart remote.

- 4 Select **Utilities > DTX Utilities > Software Update** from the LinkWare menu, locate and select the update file; then click **Open**.
- 5 To verify the update, select **Utilities > DTX Utilities > Software Version** from the LinkWare menu.





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Figure 8. Updating the Software with a PC

Specifications

Environmental and Regulatory Specifications

Operating temperature	32 °F to 113 °F (0 °C to 45 °C)
Storage temperature	-4 °F to +140 °F (-20 °C to +60 °C)
Operating relative humidity (% RH without condensation)	95 % (50 °F to 95 °F; 10 °C to 35 °C) 75 % (95 °F to 104 °F; 35 °C to 40 °C) uncontrolled < 50 °F (< 10 °C)
Vibration	Random, 2 g, 5 Hz-500 Hz
Shock	1 m drop test with and without module and adapter attached
Safety	CSA C22.2 No. 1010.1: 1992 EN 61010-1 1 st Edition + Amendments 1, 2  Conforms to relevant European Union directives.  Listed by the Canadian Standards Association.
Pollution degree	2
Altitude	Operating: 3000 m; Storage: 12000 m
EMC	EN 61326-1

Optical Specifications (23 °C)

Input/output (meter/source) connectors	SC/SC
Source type and nominal wavelength	DTX-MFM ¹ : 850 nm LED and 1300 nm LED DTX-SFM: 1310 nm FP LD and 1550 nm FP LD
Source wavelengths	DTX-MFM: 850 ± 30 nm, 1300 ± 20 nm DTX-SFM: 1310 ± 20 nm, 1550 ± 30 nm
Source power	DTX-MFM: ≥ -20 dBm at 850/1300 nm DTX-SFM: ≥ -7 dBm at 1310/1550 nm
Source power stability, 8 hour	DTX-MFM: ± 0.1 dB at 23 °C (after 5 minute warm up) DTX-SFM: ± 0.25 dB at 23 °C (after 5 minute warm up)
Length measurement²	DTX-MFM: 0 m to 5,000 m of 62.5 μm or 50 μm fiber DTX-SFM: 0 m to 10,000 m of 9 μm singlemode fiber
Length measurement accuracy	± 1.5 m ± 2 % of length
<ol style="list-style-type: none"> 1. The modal launch conditions from the LED light sources shall be characterized as Category 1 following the procedure specified in TIA/EIA-526-14A Annex A. 2. In Smart Remote mode, length is length between main and smart remote units. 	

-continued-

Optical Specifications (cont.)

Power meter type	InGaAs detector
Power meter calibrated wavelengths	850 nm, 1310 nm, 1550 nm
Power measurement range	0 dBm to -60 dBm (1310 nm and 1550 nm) 0 dBm to -52 dBm (850 nm)
Power measurement uncertainty³ (accuracy)	± 0.25 dB
Measurement linearity (18 °C to 28 °C constant temperature)	± 0.1 dB ³ (1310 nm and 1550 nm) ± 0.2 dB ⁴ (850 nm)
Re-calibration period	1 year
Laser safety	Class I CDRH. Complies to EN 60825-2
3. For 1310 and 1550 nm, ± 0.1 dB from 0 to -55 dBm, ± 0.2 dB <-55 dBm	
4. For 850 nm, ± 0.2 dB from 0 to -45 dBm, ± 0.25 dB <-45 dBm	

Visual Fault Locator Specifications (23 °C)

Output power*	316 μ w (-5 dBm) \leq peak power \geq 1.0 mw (0 dbm)
Operating wavelength	650 nm nominal
Spectral width (RMS)	\pm 3 nm
Output modes	Continuous wave and pulsed mode (2 Hz to 3 Hz blink frequency)
Connector adapter	2.5 mm universal
Laser safety	Class II CDRH
* Into SMF-28 singlemode fiber, continuous wave and pulse modes, SC/UPC connector.	

Power

DC input	15 V dc
AC adapter/charger	Input: 20/240 V ac, 50/60 Hz Output: 15 V dc
Battery	Rechargeable lithium ion
Battery life	12 hours, typical
Recharge time	4 hours, typical

Communications Port

USB, mini B connector

Re-calibration period

1 year

Dimensions and Weight

- 8.5 in x 4.5 in x 2.3 in (21.6 cm x 11.4 cm x 5.8 cm), nominal
- 2.3 lb (1.05 kg), nominal, with module installed