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# OF-500 OptiFiber<sup>®</sup>

## Certifying OTDR

### Users Manual

PN 1779484

September 2002 Rev. 6 7/09

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4/04

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# OF-500 OptiFiber Certifying OTDR

## Note

*While this manual describes specific operating procedures for the OptiFiber tester, the fiber test methods described are provided only as guidelines. Your test methods may vary.*

## Overview of Features

The OF-500 OptiFiber® Certifying OTDR (hereafter referred to as the tester) is a hand-held Optical Time Domain Reflectometer (OTDR) that locates and characterizes reflective and loss events in multimode and singlemode fibers. The tester is optimized for use on the shorter fiber runs typically installed in premises (building and campus) networks. Typical test ranges are up to 7 km at 1300 nm for multimode fiber and up to 60 km for singlemode fiber.

The tester offers the following features:

- Automated OTDR trace and event analysis help you identify and locate faults on multimode (850 nm and 1300 nm; 50 µm and 62.5 µm) and singlemode (1310 nm and 1550 nm; 9 µm) fiber.
- Displays OTDR results in summary format, as a table of events, or as an interpretive OTDR trace. PASS/FAIL results are based on factory-installed limits or limits you specify.
- ChannelMap™ function provides an intuitive diagram of the connectors and segment lengths in a channel.
- FaultMap™ function provides an intuitive diagram of connections that might be bad.
- Optional FiberInspector™ Video Probe lets you inspect fiber endfaces and save the images.

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- Optional modules add visual fault locator (OFTM-57xx only), power meter, and loss/length test set functions to the standard OTDR.
- Interchangeable connector adapters on the input ports of the loss/length modules allow ISO-compliant reference and test connections with a variety of connector types.
- Saves hundreds of test results on a removable memory card or in internal memory.
- Context-sensitive online help gives you quick access to operating instructions and fiber troubleshooting information.
- LinkWare™ software lets you upload test results to a PC and create professional-quality test reports. The LinkWare Stats option generates browsable, graphical reports of cable test statistics.

## Accessing the Technical Reference Handbook

The OF-500 OptiFiber Technical Reference Handbook provides additional information on the tester. The handbook is available on the OptiFiber Product CD included with your tester and on the OptiFiber product page on the Fluke Networks website.

## 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



**205 Westwood Ave**  
**Long Branch, NJ 07740**  
**1-877-742-TEST (8378)**  
**Fax: (732) 222-7088**  
**salesteam@Tequipment.NET**

## Contacting Fluke Networks

### Note

*If you contact Fluke Networks about your tester, have the tester's software and hardware version numbers available if possible.*



[www.flukenetworks.com](http://www.flukenetworks.com)



[support@flukenetworks.com](mailto:support@flukenetworks.com)



+1-425-446-4519

- Australia: 61 (2) 8850-3333 or 61 (3) 9329 0244
- Beijing: 86 (10) 6512-3435
- Brazil: 11 3759-7600
- Canada: 1-800-363-5853
- Europe: +44-(0)1923 281 300
- Hong Kong: 852 2721-3228
- Japan: 03-3434-0510
- Korea: 82 2 539-6311
- Singapore: 65-6799-5566
- Taiwan: (886) 2-227-83199
- USA: 1-800-283-5853

Visit our website for a complete list of phone numbers.

# OF-500 OptiFiber Certifying OTDR

## Users Manual

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### Unpacking

The OF-500 OptiFiber packages come with the accessories listed below. If something is damaged or missing, contact the place of purchase immediately.

Model numbers followed by a "/50M" include 50/125  $\mu\text{m}$  accessories instead of 62.5/125  $\mu\text{m}$  accessories

#### Model OF-500-01

- OF-500 OptiFiber tester with battery pack
- OFTM-5610B multimode OTDR module
- 62.5/125  $\mu\text{m}$  multimode launch fiber (gray zipper), 100 m, SC/SC
- Protective carrying case for tester
- Carrying strap
- Memory card
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

#### Model OF-500-02

- OF-500 OptiFiber tester with battery pack
- OFTM-5611B multimode OTDR module with power meter option
- 62.5/125  $\mu\text{m}$  multimode launch fiber (gray zipper), 100 m, SC/SC
- Two 62.5/125  $\mu\text{m}$  multimode duplex reference test cords, 2 m, SC/SC
- Two gray mandrels for 62.5/125  $\mu\text{m}$  fiber with 3 mm jackets
- Protective carrying case for tester
- Carrying strap
- Memory card
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

**Model OF-500-03**

- OF-500 OptiFiber tester with battery pack
- OFTM-5730 singlemode OTDR module
- 9/125  $\mu\text{m}$  singlemode launch fiber (yellow zipper), 130 m, SC/SC
- Protective carrying case for tester
- Carrying strap
- Memory card
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

**Model OF-500-10**

- OF-500 OptiFiber tester with battery pack
- OFTM-5612B multimode OTDR module with power meter and loss/length options
- OFTM-5352 FiberInspector Video Probe (250X/400X) with adapter tip kit
- 62.5/125  $\mu\text{m}$  multimode launch fiber (gray zipper), 100 m, SC/SC
- Two 62.5/125  $\mu\text{m}$  multimode duplex reference test cords, 2 m, SC/SC
- Two gray mandrels for 62.5/125  $\mu\text{m}$  fiber with 3 mm jackets
- Protective carrying case for tester
- Carrying strap
- Soft carrying case for accessories
- Memory card
- USB memory card reader
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

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### Model OF-500-13

- OF-500 OptiFiber tester with battery pack
- OFTM-5732 singlemode OTDR module with power meter and loss/length options
- DTX Smart Remote with DTX-SFM2 singlemode fiber module and interchangeable SC adapter
- OFTM-5352 FiberInspector Video Probe (250X/400X) with adapter tip kit
- 9/125  $\mu\text{m}$  singlemode launch fiber (yellow zipper), 130 m, SC/SC
- Two 9/125  $\mu\text{m}$  singlemode duplex reference test cords, 2 m, SC/SC
- Carrying strap
- Hard carrying case for tester
- Soft carrying case for accessories
- Memory card
- USB memory card reader
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

### Model OF-500-15

- OF-500 OptiFiber tester with battery pack
- OFTM-5612B multimode OTDR module with power meter and loss/length options
- DTX Smart Remote with DTX-MFM2 multimode fiber module and interchangeable SC adapter
- OFTM-5352 FiberInspector Video Probe (250X/400X) with adapter tip kit
- 62.5/125  $\mu\text{m}$  multimode launch fiber (gray zipper), 100 m, SC/SC
- Two 62.5/125  $\mu\text{m}$  multimode duplex reference test cords, 2 m, SC/SC
- Two gray mandrels for 62.5/125  $\mu\text{m}$  fiber with 3 mm jackets
- OptiFiber carrying strap
- Smart Remote carrying strap
- Soft carrying case for accessories
- Hard carrying case for tester
- Memory card
- USB memory card reader
- USB cable for PC communications
- Mini-B USB cable for OptiFiber Smart Remote

- Two AC adapters
- OptiFiber Users Manual
- OptiFiber Product Manuals CD
- Smart Remote Users Manual
- Smart Remote Product CD
- LinkWare Software CD

**Model OF-500-35**

- OF-500 OptiFiber tester with battery pack
- OFTM-5612B multimode OTDR module with power meter and loss/length options
- OFTM-5732 singlemode OTDR module with power meter and loss/length options
- OFTM-5352 FiberInspector Video Probe (250X/400X) with adapter tip kit
- 62.5/125 µm multimode launch fiber (gray zipper), 100 m, SC/SC
- 9/125 µm singlemode launch fiber (yellow zipper), 130 m, SC/SC
- Two 62.5/125 µm multimode duplex reference test cords, 2 m, SC/SC
- Two gray mandrels for 62.5/125 µm fiber with 3 mm jackets

- Two 9/125 µm singlemode duplex reference test cords, 2 m, SC/SC
- Carrying strap
- Soft carrying case for accessories
- Hard carrying case for tester
- Memory card
- USB memory card reader
- USB cable for PC communications
- AC adapter
- Users Manual
- Product Manuals CD
- LinkWare Software CD

# OF-500 OptiFiber Certifying OTDR

## Users Manual

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### Model OF-500-45






- OF-500 OptiFiber tester with battery pack
- OFTM-5612B multimode OTDR module with power meter and loss/length options
- OFTM-5732 singlemode OTDR module with power meter and loss/length options
- DTX Smart Remote with DTX-MFM2 multimode fiber module and interchangeable SC adapter
- DTX-SFM2 singlemode fiber module and interchangeable SC adapter
- OFTM-5352 FiberInspector Video Probe (250X/400X) with adapter tip kit
- 62.5/125  $\mu\text{m}$  multimode launch fiber (gray zipper), 100 m, SC/SC
- 50/125  $\mu\text{m}$  multimode launch fiber (aqua zipper), 100 m, SC/SC
- 9/125  $\mu\text{m}$  singlemode launch fiber (yellow zipper), 130 m, SC/SC
- Two 62.5/125  $\mu\text{m}$  multimode duplex reference test cords, 2 m, SC/SC
- Two 50/125  $\mu\text{m}$  multimode duplex reference test cords, 2 m, SC/SC
- Two red mandrels for 62.5/125  $\mu\text{m}$  fiber with 3 mm jackets
- Two gray mandrels for 62.5/125  $\mu\text{m}$  fiber with 3 mm jackets
- Two 9/125  $\mu\text{m}$  singlemode duplex reference test cords, 2 m, SC/SC
- Carrying strap
- Protective carrying case for accessories
- Hard carrying case for tester
- Protective carrying case for tester
- Memory card reader
- Memory card
- USB cable for PC communications
- Two AC adapters
- Users Manual
- Product Manuals CD
- LinkWare Software CD



## Safety Information

Table 1 shows the international electrical symbols used on the tester 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.
	Warning: Class 1 (OUTPUT port) and Class 2 (VFL port) lasers. Risk of eye damage from hazardous radiation.
	Do not put products containing circuit boards into the garbage. Dispose of circuit boards in accordance with local regulations.
	THIS PRODUCT CONTAINS MERCURY. DISPOSE OF THIS PRODUCT IN ACCORDANCE WITH LOCAL REGULATIONS.

### **Warning: Class 1 and Class 2 Laser Products**

To avoid possible eye damage caused by hazardous radiation and to avoid possible fire, electric shock, or personal injury:

- Never look directly into optical connectors. Some sources produce invisible radiation that can permanently damage your eyes.
- Never run any tests that activate the tester's outputs unless a fiber is attached to the output.
- Do not open the case; no user-serviceable parts are inside.
- Do not modify the tester.
- 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.
- Use only the ac adapter provided to charge the battery or power the tester.
- Do not use the tester if it is damaged. Inspect the tester before use.

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### Users Manual

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

#### Caution


To avoid damaging the tester or cables under test and to avoid data loss:

- Always turn the tester off before removing or installing a module.
- Never connect the OTDR port to an optical source. Doing so can damage the OTDR receiver.
- Never connect the tester to an active network, except when using the power meter. Doing so causes unreliable test results and can disrupt network operations.
- If the tester shows an error because the power reading is too high, immediately disconnect the source from the tester. The tester is not designed for measuring higher power levels, such as produced by CATV, optical amplifiers, and cellular systems.
- Avoid touching reflective surfaces (such as metal) to the end of a fiber cable plugged into the OTDR when the OTDR is operating. An open fiber connector end face has about a 4% reflection. Holding a reflective surface near the connector end face may cause much greater than a 4% reflection, which may damage the photodetector in the OTDR.
- 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 OTDR and loss/length option's OUTPUT connectors for scratches and other damage.

- **Read the instructions for splice machines before using the OTDR to monitor splicing procedures. The OTDR can interfere with the light injection detection techniques used by some splicers.**
- **To avoid unreliable test results, connect the ac adapter or replace the battery as soon as the low battery indication appears.**
- **You may use a PC to move or copy test record (.tst) files from a memory card, but do not rename the .tst files. Doing so may result in loss of data.**
- **Never remove the memory card while the memory card's LED is on. Doing so can corrupt the data on the card.**
- **Memory cards may be lost, damaged, or accidentally formatted, resulting in data loss. Therefore, Fluke Networks recommends saving no more than one day's worth of test results on a memory card.**

## Powering the Tester

You can power the tester with the ac adapter included or with the removable lithium ion battery pack.

Press  to turn the tester on.

## Charging the Battery

Before you rely on battery power for the first time, charge the battery for about 2 hours with the tester turned off.

You can also charge the battery when it is detached from the tester, as shown in Figure 1.


A fully-charged battery lasts about 8 hours during typical use. The battery typically takes about 4 hours to fully charge when the tester is turned off.



### Notes

*You do not need to fully discharge the battery before recharging it.*

*The battery will not charge if its temperature is outside the range of 32 °F to 113 °F (0 °C to 45 °C).*

## Checking the Battery Status

Many of the tester's screens show a battery status icon () near the lower-right corner.

To see more information about the battery status, press ; then select **Battery Status**. Press  for detailed information about the battery status screen.

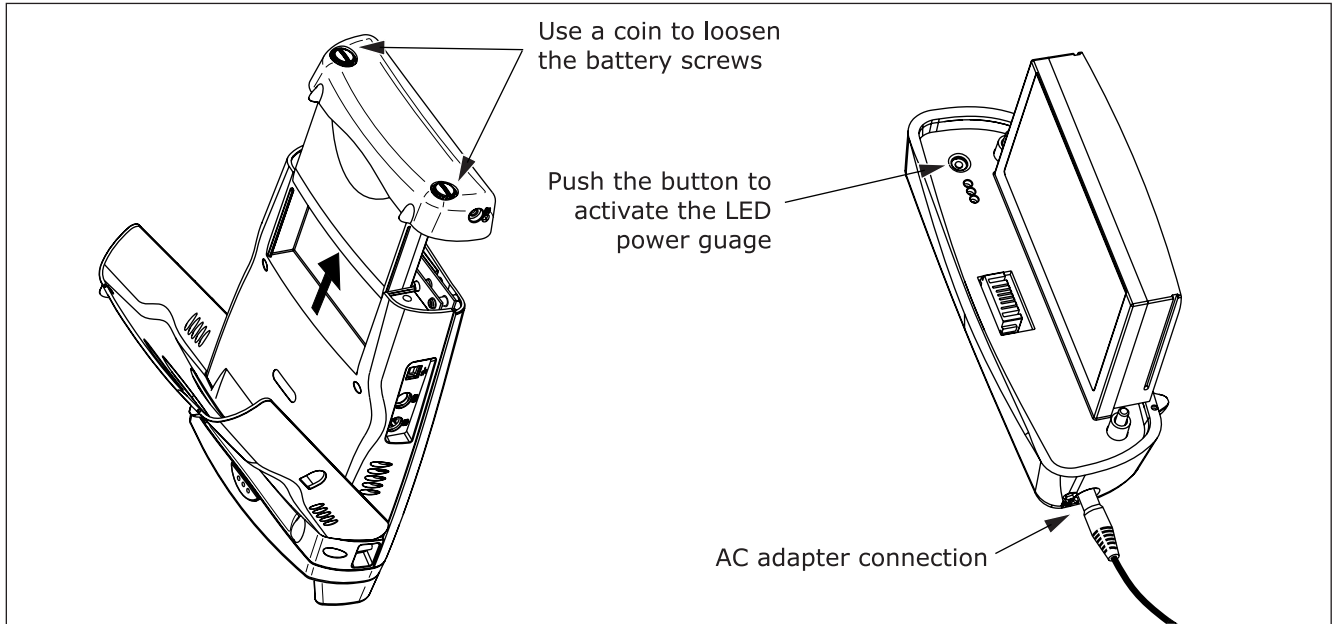









Figure 1. Battery Pack Features

ajt20f.eps

## Changing the Language

To change the tester's language, do the following:

- 1 Press .
- 2 Press  once to select the **System** tab.
- 3 Press  to select **LANGUAGE**; then press .
- 4 Use   to select the desired language; then press .
- 5 Restart the tester to apply the new language.

Additional languages for the tester may be available with software updates available on the Fluke Networks website. Use LinkWare software to install or remove languages. See "Updating the Tester's Software" on page 92 for details.

## Removing and Installing the Module

The tester's capabilities depend on which test module is installed. Figure 2 shows how to remove the module.

### Caution

**To avoid corrupting the tester's software, always turn the tester off before removing or installing a module.**

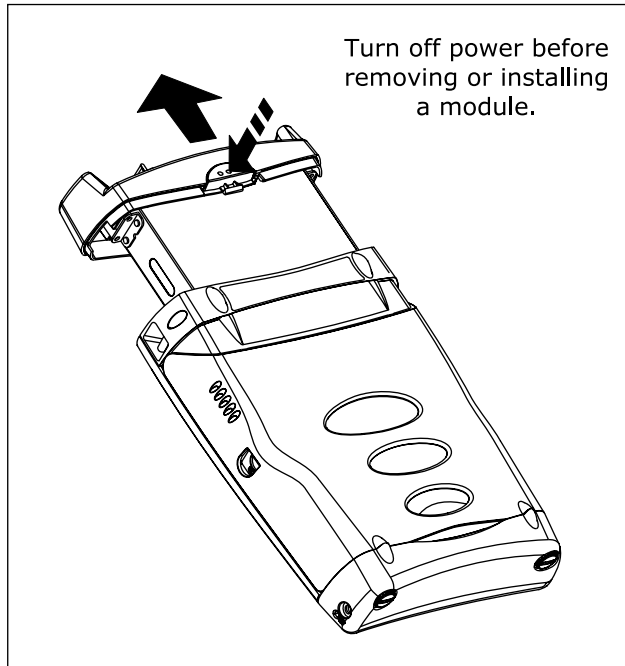


Figure 2. Removing the Module

ajt56f.eps

## Verifying Operation

The tester performs a basic self-test when you turn it on. If the tester reports an error or does not turn on, refer to “If Something Seems Wrong” on page 97.

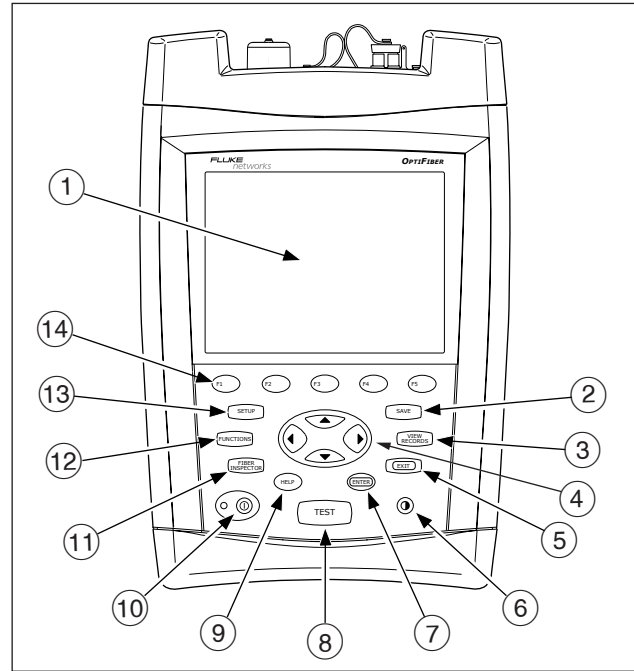
The tester shows the model number of the installed module in the upper-right corner of the screen. If the screen shows **No Module Installed**, **Problem with Module**, or **The module needs a software update** refer to “If Something Seems Wrong” on page 97.

## Basic Features

The following sections describe the tester's basic features and introduce the tester's menu system.

### Front Panel Features



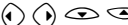












Figure 3 describes the tester's front panel features.



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Figure 3. Front Panel Features



- ① LCD display with backlight and adjustable brightness.
- ② : Saves test results on the removable memory card or in internal memory.
- ③ : Shows the test records saved on the memory card or in internal memory.
- ④ : Navigation keys let you move the cursor or highlighted area on the screen and increment or decrement alphanumeric values.
- ⑤ : Exits the current screen.
- ⑥ : Lets you adjust the display brightness.
- ⑦ : Selects the highlighted item on the screen.
- ⑧ : Starts the currently selected fiber test. The test that will run is shown in the upper-left corner of the display. To change the test, press  **Change Test** from the **HOME** screen or select a test from the **FUNCTIONS** menu.
- ⑨ : Shows a help topic related to the current screen. To see the help index, press  again.
- ⑩ : On/off key.
- ⑪ : Activates the optional FiberInspector video probe, which lets you inspect fiber endfaces and save the images with test results.
- ⑫ : Shows a list of additional test, configuration, and status functions.
- ⑬ : Shows the menus you use to configure the tester.
- ⑭ : The five softkeys provide functions related to the current screen. The current functions are shown on the screen above the keys.

### Side and Top Panel Features

Figure 4 describes the tester's connectors and other features on the side and top panels.

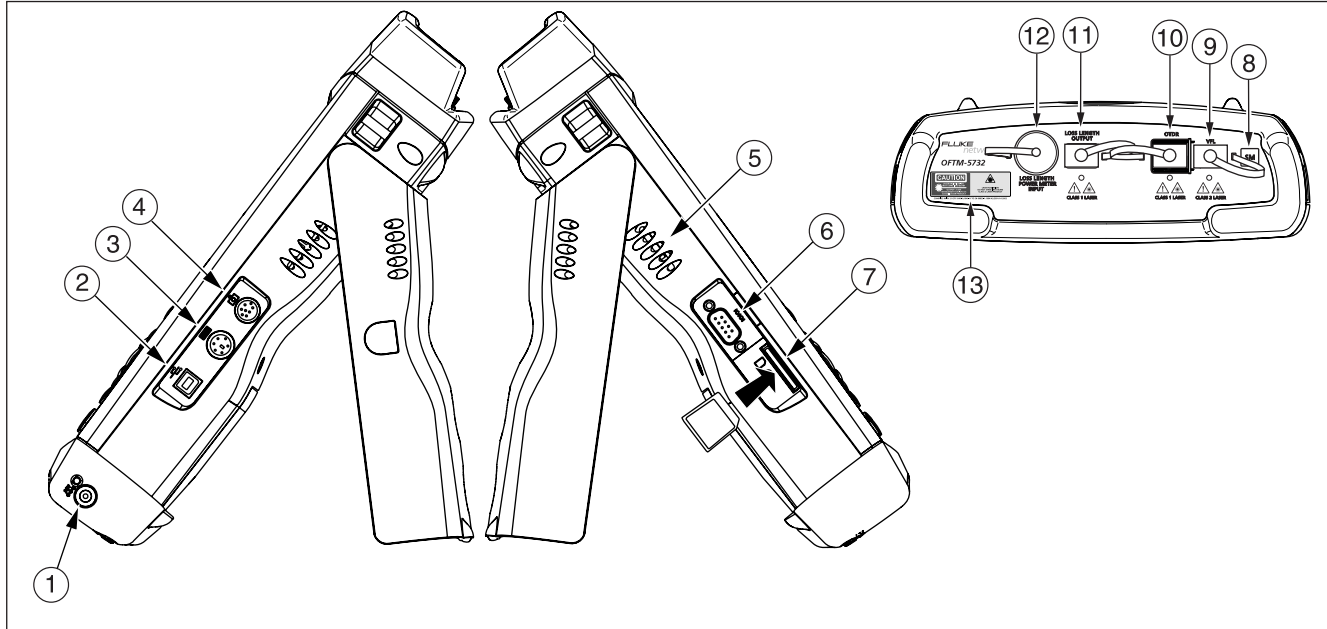


Figure 4. Side and Top Panel Features

ajt14f.eps

- ① Connector for the ac adapter. The LED turns on when the adapter is connected to ac power.
- ② USB port for uploading test reports to a PC and downloading software updates from a PC to the tester. See the LinkWare documentation for details on using the USB port.
- ③ Six-pin mini DIN connector for an optional external PS2 keyboard.
- ④ Eight-pin mini DIN connector for the optional FiberInspector video probe.
- ⑤ Fan vents.
- ⑥ RS-232C serial port for uploading test reports to a PC and downloading software updates from a PC to the tester. See the LinkWare documentation for details on using the serial port.
- ⑦ Slot for the removable memory card. The LED lights when the tester is writing to or reading from the memory card.
- ⑧ Multimode (MM) or singlemode (SM) label for the module.
- ⑨ OFTM-57xx: Connector for the visual fault locator.
- ⑩ OTDR connector adapter (SC is standard). The LED lights when the laser is active.
- ⑪ OFTM-5612B/5732: Loss/length output port (SC). Transmits optical signals for loss/length tests.
- ⑫ OFTM-5731/5732/5611B/5612B: Loss/length input port with interchangeable connector adapter (SC is standard). Receives optical signals for power measurements and loss/length tests.
- ⑬ Laser safety label (shown below).



**Never look directly into optical connectors.  
Some sources produce invisible radiation that  
can permanently damage your eyes.**



COMPLIES WITH 21 CFR 1040.10, 1040.11 TO EN 60825-1:1994/A2:2001/A1:2002

ajt72f.eps

## The HOME Screen

The **HOME** screen shows important test and job settings you might need to change to configure the tester for your needs.

Figure 5 describes a typical home screen.

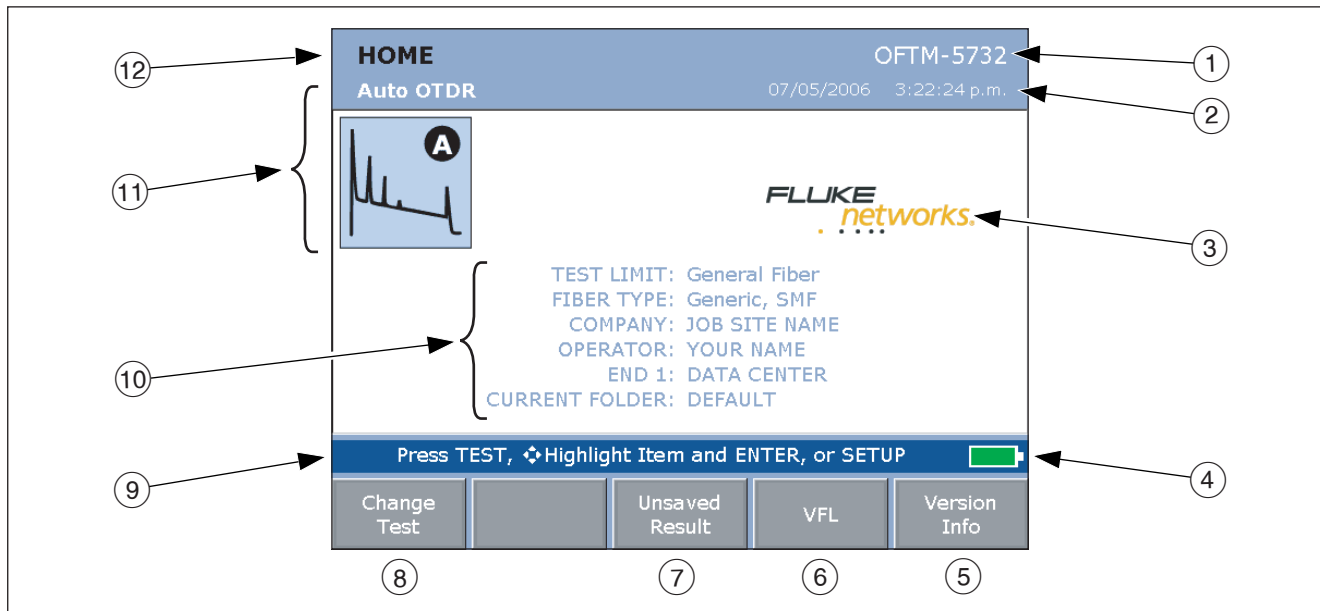


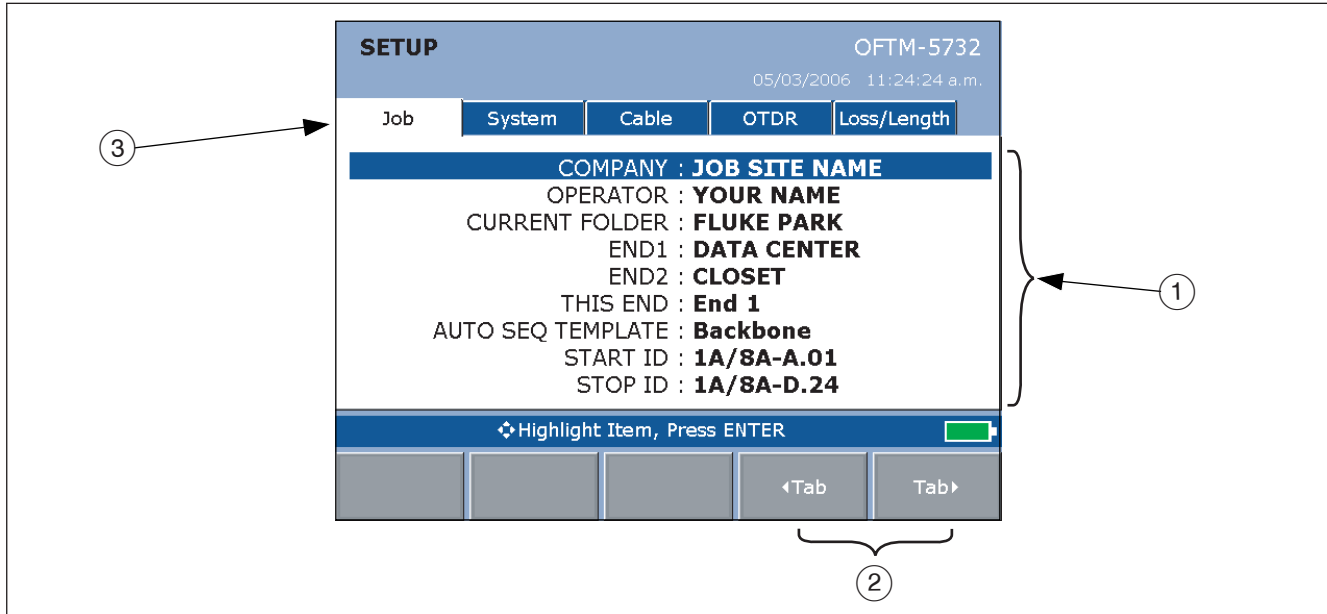
Figure 5. Home Screen for OTDR with Loss/Length Option

ajt13f.eps

- ① Model number of the installed module.
- ② The current date and time.
- ③ Owner's logo. See the OptiFiber Technical Reference Handbook (on the Product Manuals CD) or the LinkWare online help for information on changing the logo.
- ④ Battery status icon. For more information about the battery, press **FUNCTIONS**; then select **Battery Status**.
- ⑤ Press **F5** to see the hardware and software versions and calibration dates for the tester and the installed module.
- ⑥ Press **F4** **VFL** to activate the visual fault locator.
- ⑦ If the last test run was not saved, you can press **F3** **Unsaved Result** to see the test's results.
- ⑧ Press **F1** **Change Test** to switch test modes. See ⑪.
- ⑨ Action prompts. For most screens, this area prompts you on what keys to press.
- ⑩ Important test and job settings. To change these settings, use **←** **→** **↶** **↷** to highlight a setting; then press **ENTER**. Selecting **TEST LIMIT** or **FIBER TYPE** lets you change the item. Selecting the limit's or type's name lets you see that item's settings. You may also access the tester's settings by pressing **SETUP**.
- ⑪ The test mode, which determines what type of test will run when you press **TEST**. The available modes depend on which module is installed. To change the test mode, press **F1** **Change Test**.
- ⑫ The name of the current screen.

### Using the Setup Menus

To access the tester's settings, press **SETUP**. Figure 6 introduces the **SETUP** menus.




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Figure 6. The SETUP Screen

- ① The settings available on the current tab.

*Note*

*To see details about a setting, highlight the setting; then press .*

- ② Use  **Tab** and  **Tab** to move among tabs on the **SETUP** screen.

- ③ Tabs for the setup menus:

- **Job** settings apply to the fiber installation you are testing and are stored with saved test results. Use these settings to identify the job site, set up cable ID lists, and identify which end of the cabling you are testing.
- **System** settings let you localize the tester and set other user preferences, such as the power down timeout and camera type.

- The **Cable** tab lets you select the type of fiber cable you will test and define some cable characteristics for loss/length tests. You can also change the index of refraction if you do not want to use the default values.

*Note*

*Select a fiber type before selecting a test limit. The fiber type determines which test limits are available.*

- The **OTDR** tab lets you select a test limit and wavelength for OTDR tests and enable launch fiber compensation. You can also change settings for Manual OTDR mode.
- The **Loss/Length** tab appears if the installed module includes the loss/length or power meter option (you can run loss tests in Far End Source mode with the power meter option). Use this tab to configure the loss/length test. See “Using the Loss/Length Option” on page 57 for details.

Different or additional tabs may be available depending on the installed module.

### Using the Online Help

When you press **HELP**, the tester shows a help topic that relates to the current screen. Blue, underlined words are links to other topics.

#### Note

*The help files are stored in the mainframe (rather than the module) and may describe features not present in the installed module*

To go to a linked topic (blue, underlined words), use the left or right arrow keys to highlight the words; then press **ENTER**.

To see an index of all help topics, press **HELP** any time you are in the help system.

### Fiber ID Options

You can create or select fiber IDs as follows:

- You can create an ID after you press **SAVE**. You can also highlight a used or unused ID in a list; then press **ENTER** to edit it into a new ID. The next time you press **SAVE**, the tester increments the last character of the ID you created (the auto increment feature).
- You can create a list of sequential fiber IDs by configuring a template on the **Job** tab in Setup. Select the IDs from the **AUTO SEQ IDs** list after you press **SAVE**.
- You can create ID lists in LinkWare software; then download them to the tester. Select the IDs from the **DOWNLOAD IDs** list after you press **SAVE**.
- After you press **SAVE**, you can use an ID already assigned to a record stored in the current folder. This lets you overwrite existing results or add new results to an existing record. Select the ID from the **IDs IN CURRENT FOLDER** list after you press **SAVE**.



## Checking the Tester's Status

The following steps help you verify that the tester is ready for use.

Checking the Tester's Status	
<ul style="list-style-type: none"><li>❑ <b>Check the battery status</b> Look at the battery icon in the lower-left corner of the screen or press <b>FUNCTIONS</b>; then select <b>Battery Status</b>.  A fully-charged battery lasts about 8 hours during typical use.</li><li>❑ <b>Check the space available on the memory card</b> Insert the memory card you will use, press <b>FUNCTIONS</b>; then select <b>Memory Status</b>.  To see the status of the internal memory, press <b>F1</b> from the <b>MEMORY STATUS</b> screen.</li></ul>	<p>To view or delete stored records, press <b>VIEW RECORDS</b>.</p> <p>To format the memory card press <b>FUNCTIONS</b>; then select <b>Format Memory Card</b>.</p> <ul style="list-style-type: none"><li>❑ <b>Verify that the installed module can run the tests you need</b> The module's model number is shown in the upper-right corner of the screen.  To review module capabilities, press <b>HELP</b> twice; then select "modules" in the OptiFiber online help index.</li></ul>

## Preparing to Save Tests

The following steps summarize how to configure settings that apply to saved test results.

### Preparing to Save Tests

#### ❑ Set up a job folder

- 1 Insert a memory card into the tester.
- 2 Press **SETUP**; then select **CURRENT FOLDER** on the **Job** tab.
- 3 Select an existing folder on the memory card, or press **F1** **New Folder** to create a new folder.

#### ❑ Enable or disable the **SAVE WARNING**

Press **SETUP**; then select **SAVE WARNING** on the **System** tab to enable or disable the warning about an unsaved test.

#### ❑ Enter **COMPANY** and **OPERATOR** names on the **Job** tab

**COMPANY** is the customer name, job site, job work order, or other job identifier.

**OPERATOR** is the name of the OptiFiber user.

#### ❑ Create a list of sequential fiber IDs (See “Fiber ID Options” on page 24 for other ID options.)

- 1 Select **AUTO SEQ TEMPLATE** on the **Job** tab.
- 2 Press **F1** **Change Template** to select an ID template.
- 3 Press **F2** **Edit Start** or **F3** **Edit Stop** to create the start and stop IDs; then press **F5** **Sample List** to see what the list will look like.
- 4 Press **SAVE** when you are finished.

#### ❑ Identify the ends of the cabling

- 1 Enter names for **END 1** and **END 2** on the **Job** tab. For example, one end could be **TELECOM ROOM** and the other could be **WORK AREA**.
- 2 Set **THIS END** to the end you will test from first.

### Cleaning and Inspecting Fiber Connectors and Adapters

Always clean and inspect fiber connectors before making connections. Use fiber optic solvent and optical-grade wipes or swabs to clean connectors as follows:



See pages 39 and 60 for instructions on cleaning the tester's OTDR and loss/length connectors.

#### Cleaning Bulkhead Connectors

- 1 Touch the tip of a fiber optic solvent pen or swab soaked in solvent to a lint-free dry wipe or fiber cleaning card.
- 2 Touch a new, dry swab to the solvent spot on the wipe or card.
- 3 Push the swab into the connector, twist it around 3 to 5 times against the end-face, then remove and dispose of the swab.
- 4 Dry the connector with a dry swab by twisting it around in the connector 3 to 5 times.

- 5 Inspect connectors with a fiber microscope, such as the Fluke Networks FiberInspector™ Video Microscope before making connections.

#### Cleaning Fiber Adapters

Periodically clean fiber adapters with a swab and fiber optic solvent. Dry with a dry swab before use.

#### Cleaning Connector Ends

- 1 Touch the tip of a fiber optic solvent pen or swab soaked in solvent to a lint-free dry wipe or fiber cleaning card.
- 2 Wipe the connector end-face across the solvent spot, then back and forth once across the dry area of the wipe or card.

#### Note

*Some connector styles, such as VF-45, may require a different cleaning method.*

Always cover unused connectors with protective caps. Clean caps periodically with a swab or wipe and fiber optic solvent.

## Testing Your Reference Test Cords and Launch Fiber

You should test your reference test cords and launch fiber before each job. Use another set of known-good cords to set a reference and run an Autotest on each cord and launch fiber. Use Smart Remote mode to test two cords at a time, or Loopback mode to test one cord.

You should also use a fiber microscope, such as the FiberInspector video probe, to inspect the reference test cord and launch fiber connectors for damage at least once a day.

## Using the OTDR

The OTDR helps you identify and locate faults on fiber cabling. It also measures length, event loss, and overall loss of the cabling and provides PASS/FAIL results based on a selected test limit.

### About Launch and Receive Fibers

Launch and receive fibers let the tester measure the loss and reflectance of the first and last connectors in the cabling, and include those connectors in ORL (optical return loss) measurements. Without launch and receive fibers, no backscatter is available before the first connector and after the last, so the tester cannot measure the connectors' characteristics.

If the first or last connection in the cabling is bad, and you do not use launch and receive fibers, the OTDR test may pass because it does include measurements from the bad connection.

**OVERALL LOSS** and **FIBER LENGTH** include the loss and length of the launch and receive fibers, unless you use the launch/receive fiber compensation function. See the online help or the Technical Reference Handbook for details on launch fiber compensation.

Fluke Networks recommends that you use launch and receive fibers. You should also use launch/receive fiber compensation to remove the effects of these fibers from the OTDR measurements.

### Caution

**For testing cabling with angled physical contact (APC) connectors, use only launch/receive fibers with APC connectors at the end connected to the cabling. Other connector types will cause large reflections that may invalidate your test results.**


#### Note

*Avoid using hybrid patch cords to connect to the cabling under test. Connect the launch and receive fibers directly to the cabling under test, using a launch fiber with the appropriate connectors. This provides the best measurement of the connectors at the ends of the cabling. Hybrid launch fibers with various connector styles are available from Fluke Networks.*

## Selecting Auto or Manual OTDR Mode

### Note

*You should use Auto OTDR mode when certifying cabling with the OTDR.*

From the **HOME** screen, press  **Change Test**. Select **Auto OTDR** or **Manual OTDR** from the popup menu.

In **Auto OTDR** mode, the tester automatically selects settings based on the length and overall loss of the cabling. This mode is the easiest to use, provides the most comprehensive view of the events on the cabling, and is the best choice for most applications.

**Manual OTDR** mode lets you change settings to optimize the OTDR for displaying specific events. See the online help or the Technical Reference Handbook for details.

### OTDR Connection Quality

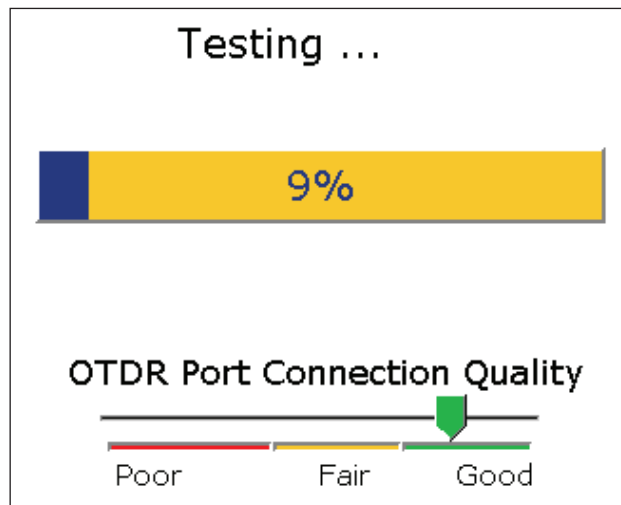
When you run an OTDR test, the tester determines the quality of OTDR port connection (Figure 7).

If the gauge is in the **Poor** range, you should clean the OTDR port and the fiber connector. Use a video microscope, such as the FiberInspector video probe, to inspect the port and fiber connector for scratches and other damage. If a connector on the tester is damaged, contact Fluke Networks for service information.

A poor OTDR connection increases the connector's deadzone, as shown in Figure 40 on page 100. The deadzone can hide faults near the OTDR connector.

A poor connection also decreases the light available for testing the fiber. The weakened test signal causes a noisier trace, poor event detection, and decreased dynamic range.

The port connection quality rating is saved with OTDR result details.

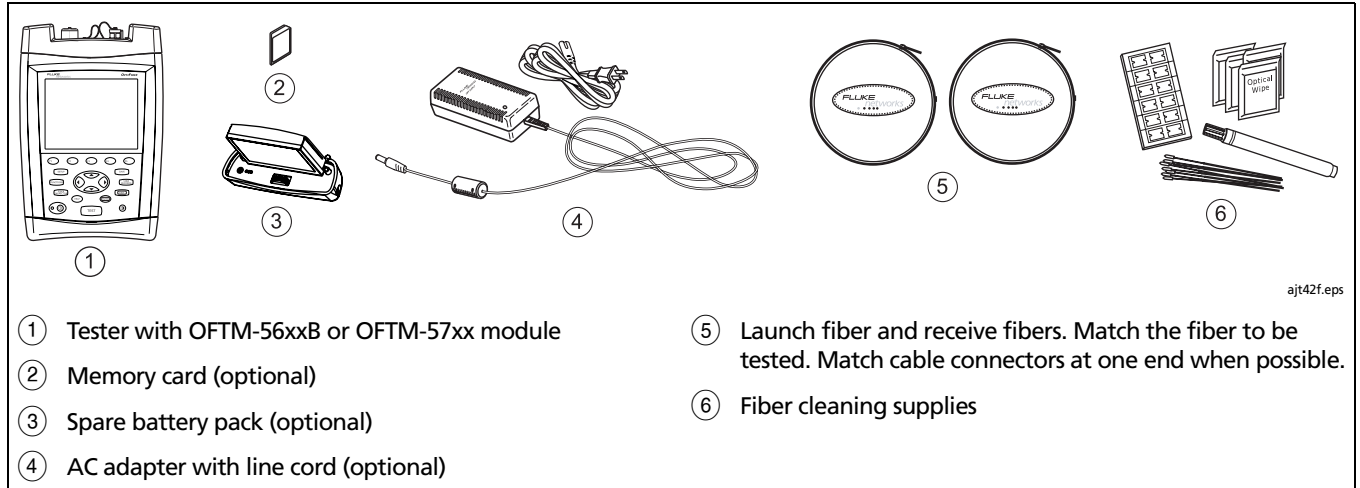


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Figure 7. OTDR Port Connection Quality Gauge

## Running the OTDR Test

Figure 8 shows the equipment needed for using the OTDR.



**Figure 8. Equipment for OTDR Testing**

### Using the OTDR

- 1 Select Auto OTDR mode: On the **HOME** screen, press **F1** **Change Test**; then select **Auto OTDR**.
  - 2 Compensate for the launch/receive fibers, if desired: Press **FUNCTIONS**; then select **Set Launch Fiber Compensation**. Press **HELP** for details on the compensation screens.
  - 3 Choose settings for the fiber to be tested. Set the following on the **Cable** tab:
    - **FIBER TYPE**: Select the fiber type to be tested.
    - **MANUAL CABLE SETTINGS** (index of refraction and backscatter coefficient): Disable to use the values defined in the selected fiber type, which are suitable for most applications.
  - 4 Configure the OTDR test. Press **SETUP**; then select the following on the **OTDR** tab:
    - **TEST LIMIT**: Select an appropriate limit.
    - **WAVELENGTH**: Select one or both wavelengths.
    - **LAUNCH COMPENSATION**: Enable if you want to use the launch fiber compensation settings.
    - **OTDR PLOT GRID**: Enable to see a measurement grid on the OTDR plot.
  - 5 Clean all connectors that will be used.
  - 6 Connect the tester's OTDR port to the cabling, as shown in Figure 9, 10, or 11.
  - 7 Press **TEST** to start the OTDR test. Figure 12 describes the OTDR trace screen.
  - 8 To save the results, press **SAVE**, select or create a fiber ID; then press **SAVE** again.
- For bi-directional testing, do the following:
- 1 Set **THIS END** to **END 1** on the **Job** tab in Setup.
  - 2 Test all the cabling from **END 1**.
  - 3 Change **THIS END** to **END 2**; then test all the cabling from the other end. Save the results with the same fiber IDs as results from the first test direction. The ID will be in the **IDs IN CURRENT FOLDER** list.



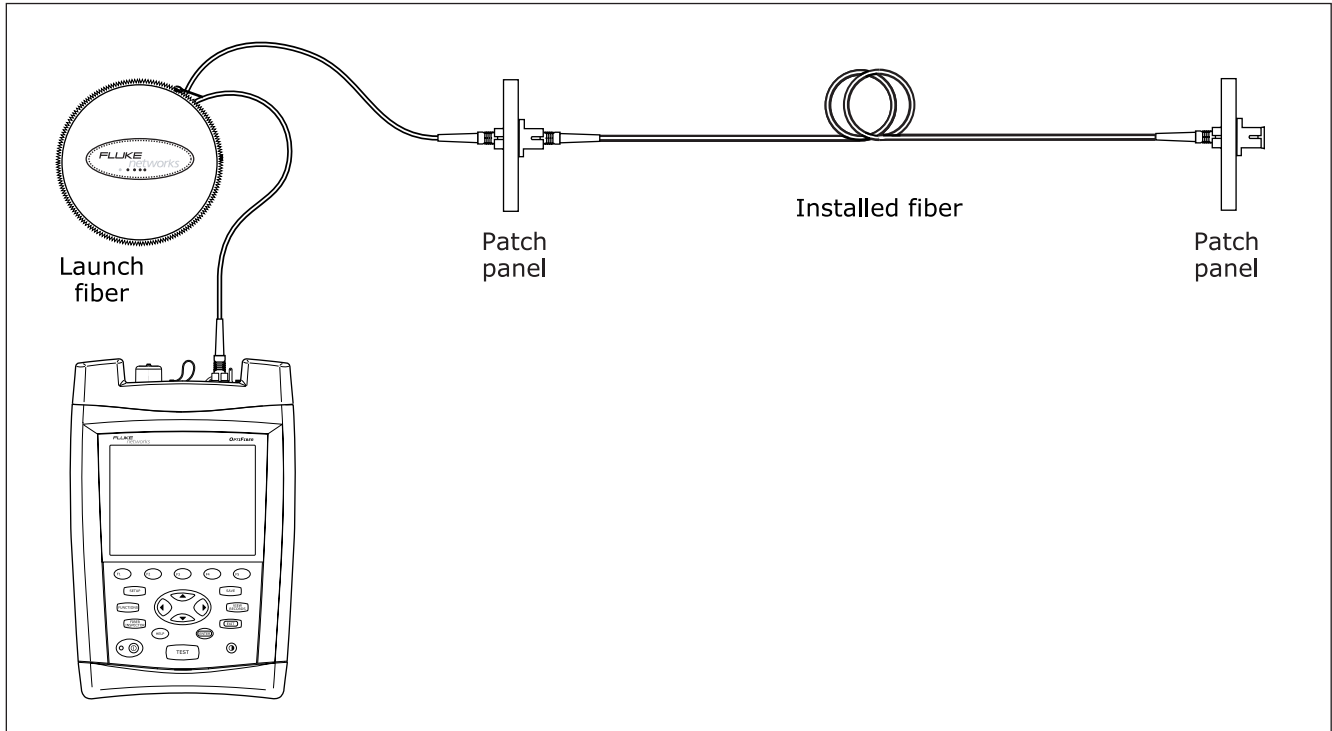
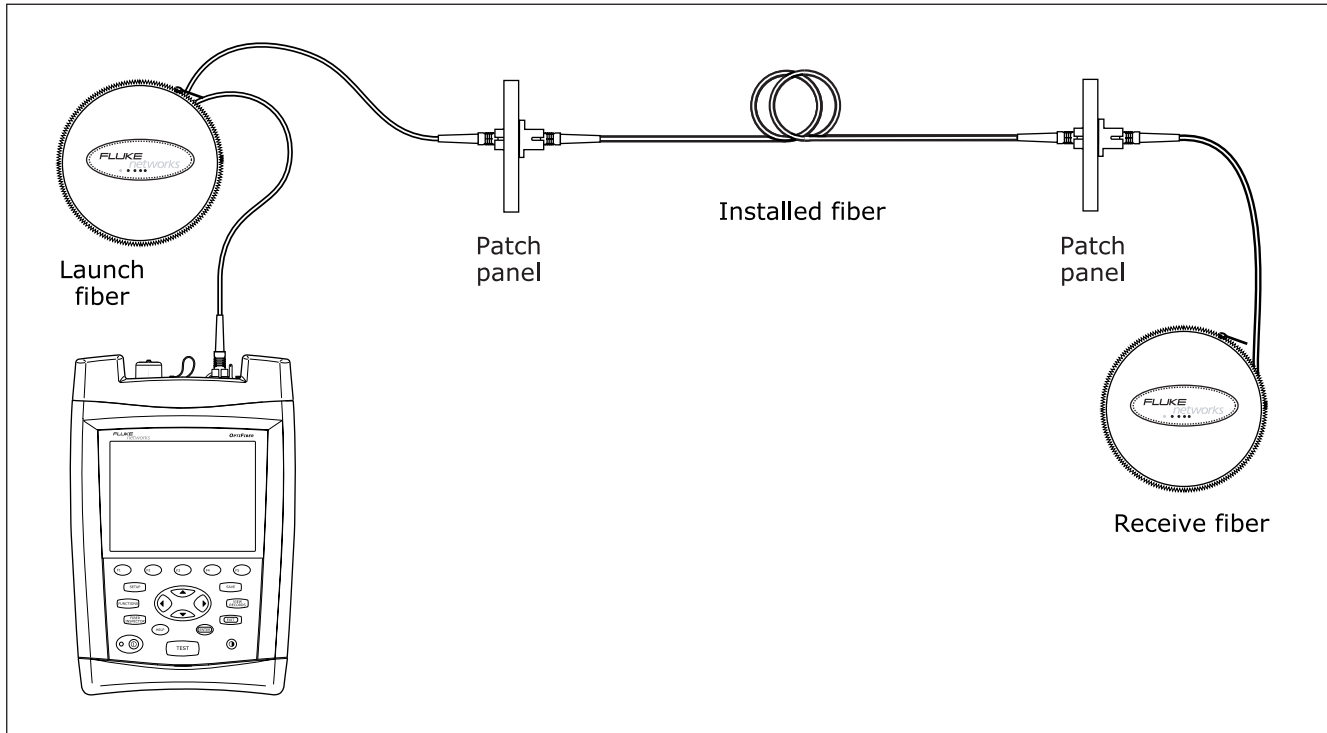


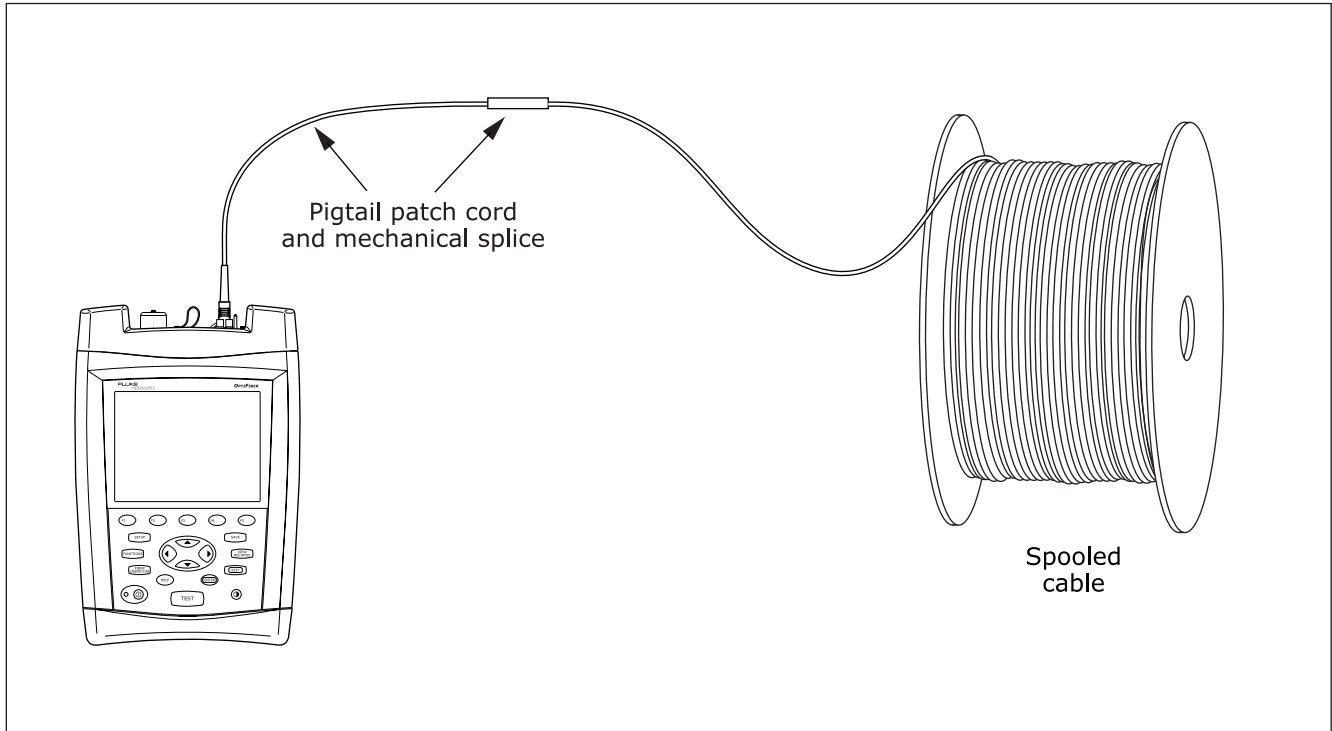
Figure 9. Connecting the OTDR to Installed Fiber (no receive fiber)

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**Figure 10. Connecting the OTDR to Installed Fiber (with receive fiber)**

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ajt33f.eps

**Figure 11. Connecting the OTDR to Spooled Cable**

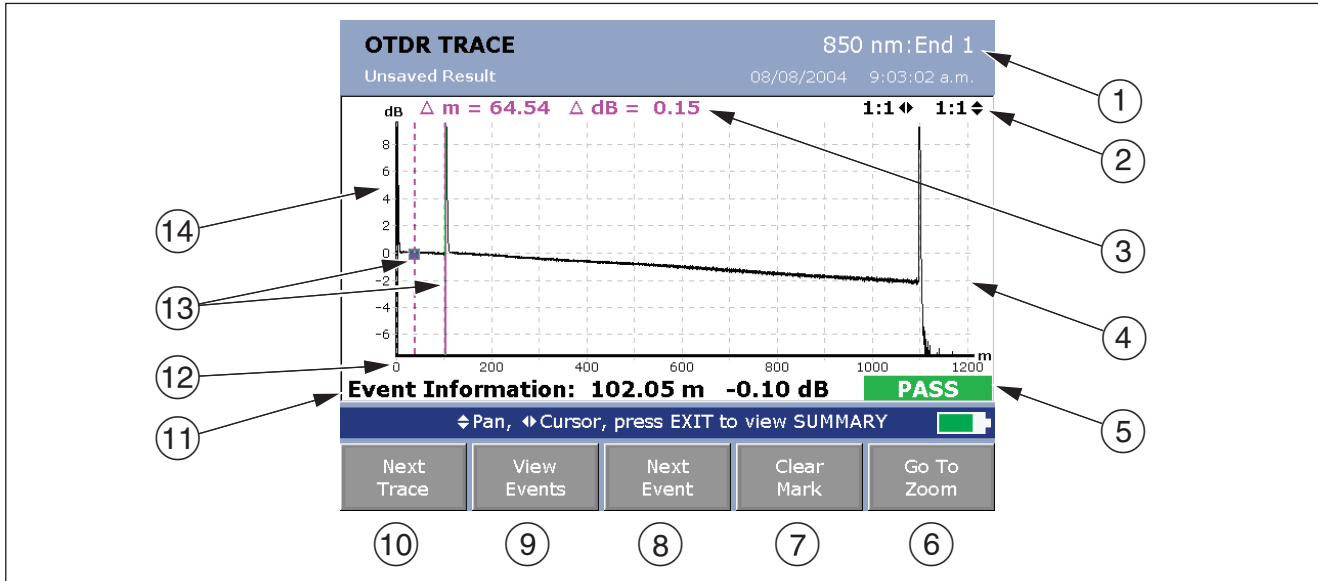


Figure 12. OTDR Trace Screen

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- ① Wavelength for the trace and the **End** setting on the **Job** tab in **SETUP**. If the test ran at two wavelengths, press **F1** to switch wavelengths. You can set the wavelengths on the **OTDR** tab in **Setup**.
- ② Magnification factors for the trace. See the online help for details on zooming.
- ③ The distance (**m** or **ft**) and the power loss (**dB**) between the cursor and the measurement marker (⑬).
- ④ OTDR plot grid. You can enable or disable the grid on the **OTDR** tab in **SETUP**.
- ⑤ **PASS/FAIL** status appears if the cursor is on an event. The status may refer to the event or the fiber segment before the event. If the event looks ok, press **F3** **View Details** from the **EVENT TABLE** screen or the **SUMMARY** screen to see results for the segment.
- ⑥ Press **F5** to change the arrow keys' function from moving the cursor to zooming to moving the trace if trace overlay is active (page 38). The navigational cue above the softkey labels describes the arrow keys' current function.
- ⑦ Key for setting and clearing the measurement cursor.
- ⑧ Moves the cursor to the next event on the trace. If you use **↵** to move the cursor, **F3** changes to **Previous Event** and moves the cursor to the previous event.
- ⑨ Displays the event table.
- ⑩ For dual-wavelength tests, press **F1** to switch wavelengths.
- ⑪ Event information appears if the cursor is on an event. Otherwise, the distance to the cursor is shown.
- ⑫ Scale for the distance along the cabling under test.  
**Tip:** The distance scale represents the distance along the fiber, which may be different from the distance along the cable jacket. To adjust the length measurements to represent cable jacket length, change the index of refraction until the measured length matches the jacket length.
- ⑬ Measurement marker and cursor.
- ⑭ Decibel scale for the OTDR backscatter.

### Comparing OTDR Traces

The trace overlay function lets you see two OTDR traces at the same time. This lets you do the following:

- Compare a link's current trace with a past trace to see if the link has changed.
- Compare traces from links in the same run to check for differences.


To compare two traces, do the following:

- 1 Run an OTDR test; then press  **View Trace**.

or

View an OTDR trace from a saved record.


This trace is the **Comparison Trace**.

- 2 Press . This brings up the **OTDR FUNCTIONS** menu.

- 3 Select **New Reference Trace**.

- 4 On the **VIEW RECORDS** screen, select a record. Only records with OTDR traces are shown.

The test's trace becomes the **Reference Trace** on the **OTDR FUNCTIONS** menu.

- 5 Press .

The reference trace stays on the plot until you turn off the trace overlay function.

### Cleaning the OTDR Connector

Use a dry, optical-grade wipe to clean the OTDR connector. Figure 13 shows how to remove the OTDR adapter to access the connector ferrule.

The OTDR port connection quality screen helps you determine when the OTDR connector needs cleaning. See page 30.

If the connector is very dirty, wipe the end of the ferrule with an optical-grade wipe lightly moistened with fiber optic solvent. Dry with a dry wipe.

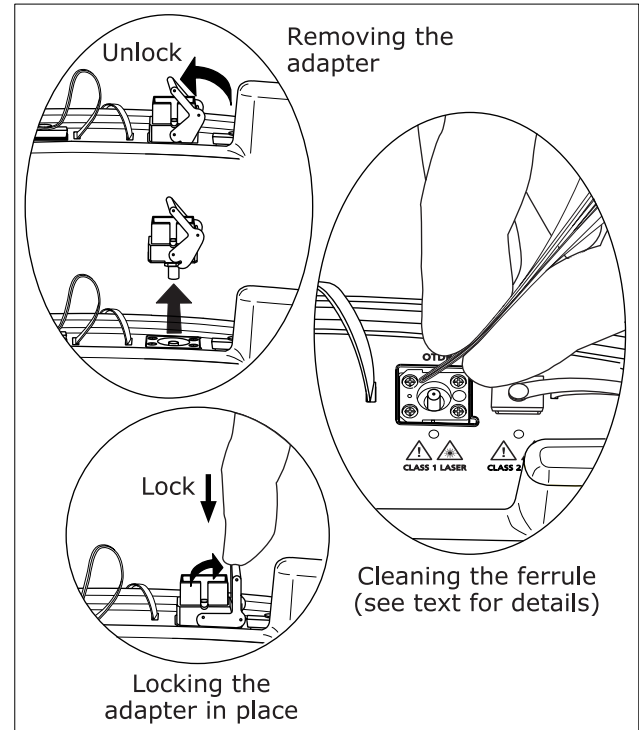


Figure 13. Cleaning the OTDR Connector

## Using the ChannelMap Function

The ChannelMap™ function creates a map of the cabling under test. The map shows the fiber links and connections in the cabling. This function is optimized for resolving connections as close as 1 m apart on multimode fiber and 2 m apart on singlemode fiber.

Reflective events that do not appear to be connectors are not shown on the map. Loss events are also not shown.

### Note

*Since the ChannelMap function identifies only reflections, it is not appropriate for finding fusion splices or angled physical contact (APC) connectors.*

Figure 14 shows the equipment needed for ChannelMap tests.



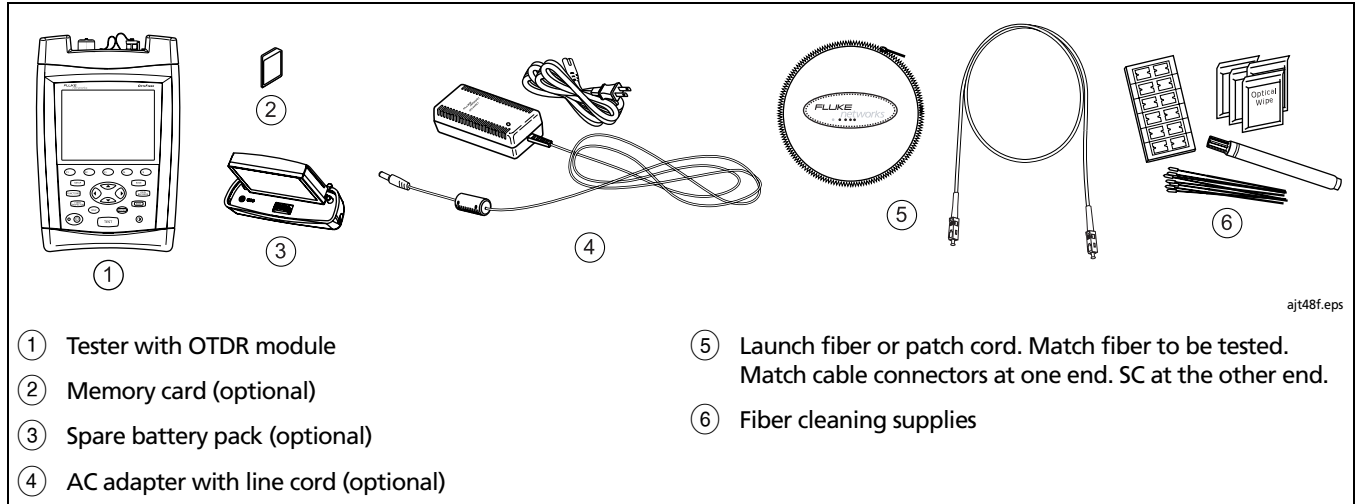


Figure 14. Equipment for ChannelMap Testing

### Using the ChannelMap Function

- 1 Select ChannelMap mode: On the **HOME** screen, press **F1** **Change Test**; then select **ChannelMap**.
- 2 Select a fiber type on the **Cable** tab in Setup. You do not need to select a test limit for ChannelMap tests.
- 3 Clean the connectors on the launch fiber or patch cord and the channel to be tested.
- 4 Connect the launch fiber to the OTDR port and the channel to be mapped. Refer to Figure 15.
- 5 Press **TEST**. Figure 16 describes the features of the ChannelMap diagram.
- 6 To save the results, press **SAVE**, select or create a fiber ID; then press **SAVE** again.

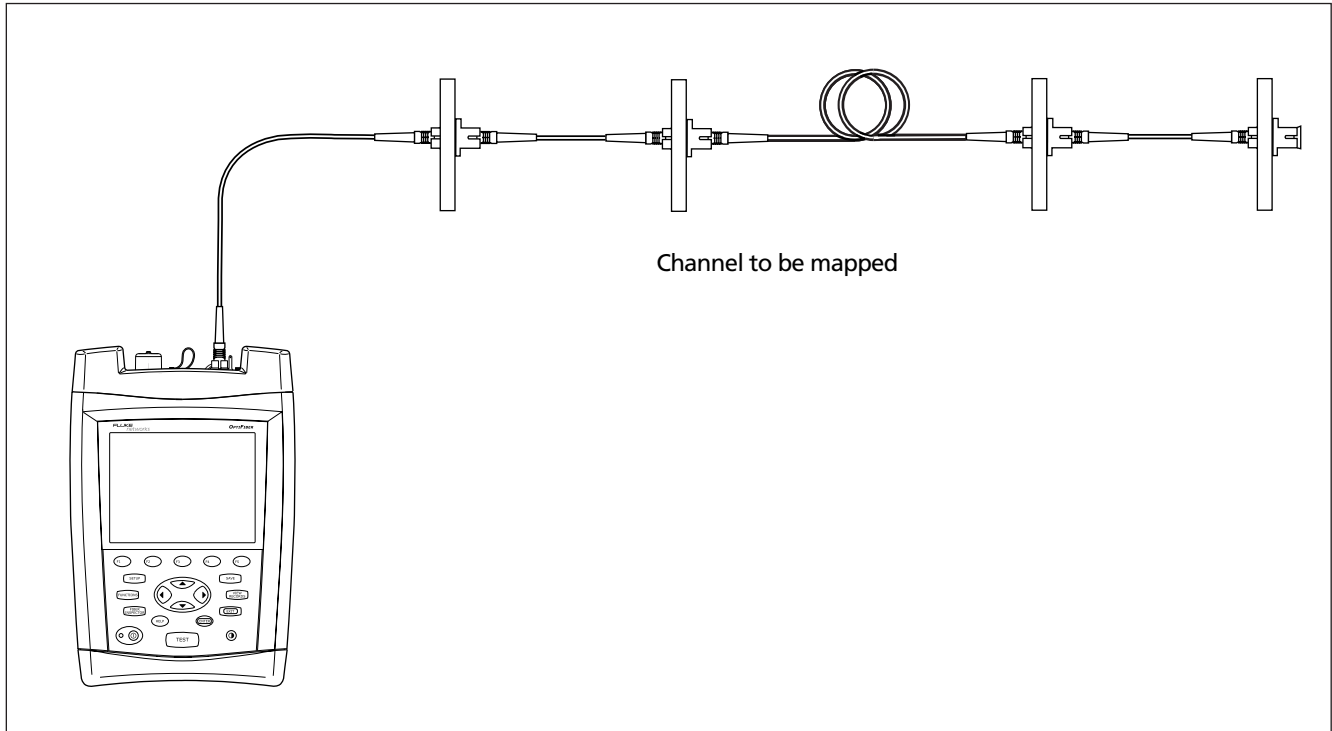
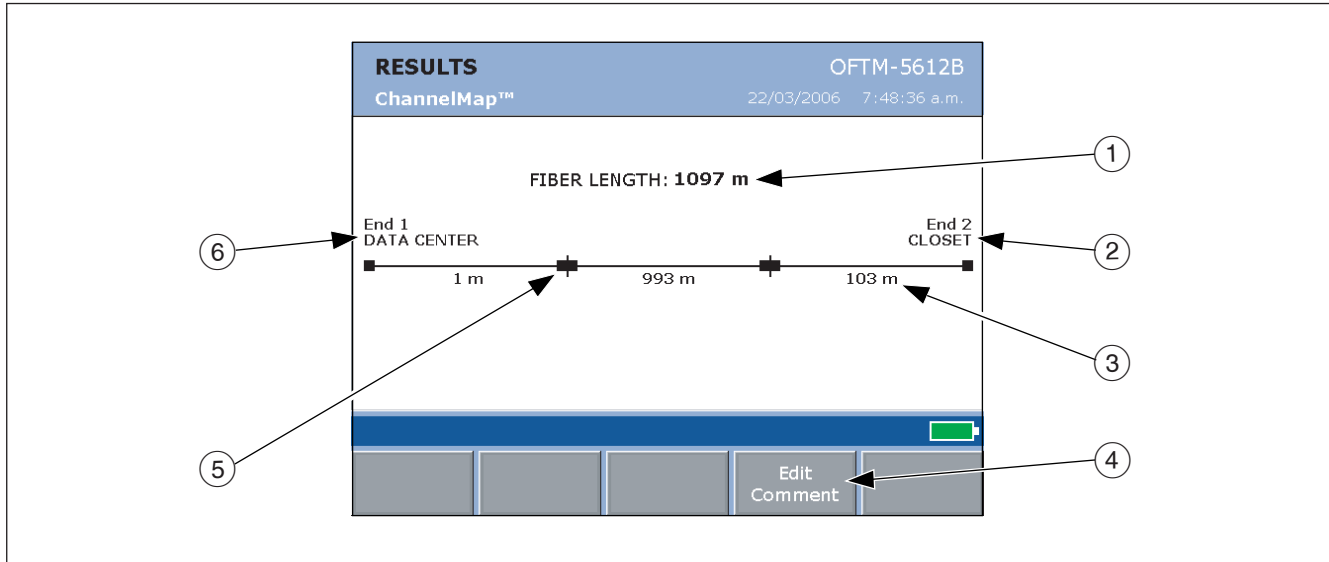


Figure 15. ChannelMap Test Connections

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Figure 16. ChannelMap Diagram Features

- ① The length of the channel, including the launch fiber.

*Note*

*The **FIBER LENGTH** shown is the actual length of the channel rounded to the nearest meter or foot (not the sum of the displayed segment lengths).*

- ② The far end of the channel. The name is set by the **END 1** or **END 2** setting on the **Job** tab in Setup.

- ③ The length of a segment or patch cord rounded to the nearest meter or foot.

- ④ Press **F4** to add a comment to the ChannelMap results.

- ⑤ A reflective event, usually a connector. Could also be a mechanical splice or a reflective fault such as a sharp bend or a crack in the fiber.

- ⑥ The near end of the channel. The name is set by the **END 1** or **END 2** setting on the **Job** tab in Setup.

## Using the FaultMap Function

The FaultMap™ function is a troubleshooting tool that shows you connections that might have problems. This function uses event reflectance as the criteria for identifying connections that might be bad. It is optimized for resolving connections as close as 1 m apart on multimode fiber and 2 m apart on singlemode fiber.

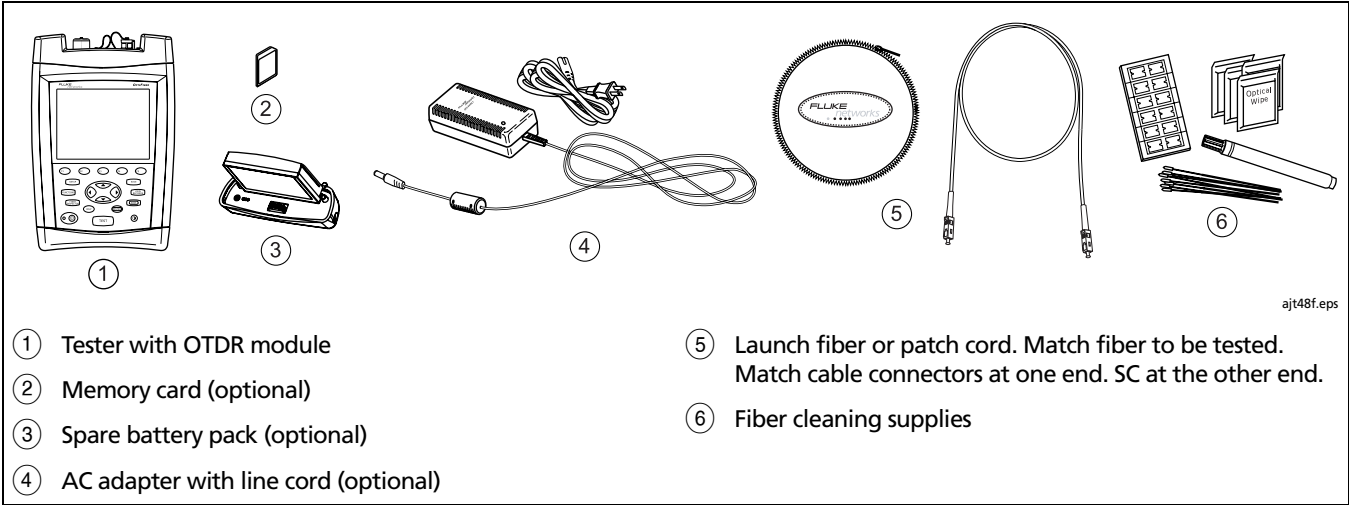
Reflective events that do not appear to be connectors are not shown on the map. Loss events are also not shown.

### Notes

*The FaultMap function uses a reflectance threshold of approximately -35 dB for identifying connections that might have problems. (More negative values mean less reflectance and a better connection. For example, a connector with a reflectance of -40 dB is better than one with -35 dB.)*

*Since the FaultMap function identifies only reflections, it is not appropriate for finding bad fusion splices or bad angled physical contact (APC) connectors.*



Figure 17 shows the equipment needed for FaultMap tests.



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Figure 17. Equipment for FaultMap Testing

### Using the FaultMap Function

- 1 Select FaultMap mode: On the **HOME** screen, press  **Change Test**; then select **FaultMap**.
- 2 Select a fiber type on the **Cable** tab in Setup. You do not need to select a test limit for FaultMap tests.
- 3 Clean the connectors on the launch fiber or patch cord and the channel to be tested.
- 4 Connect the launch fiber to the OTDR port and the channel to be tested. Refer to Figure 18.  
  
Optional: To evaluate the far-end connector, connect a launch fiber or patch cord to the far end of the link.
- 5 Press . Figure 19 describes the features of the FaultMap diagram.

*Note*

*You cannot save FaultMap tests.*



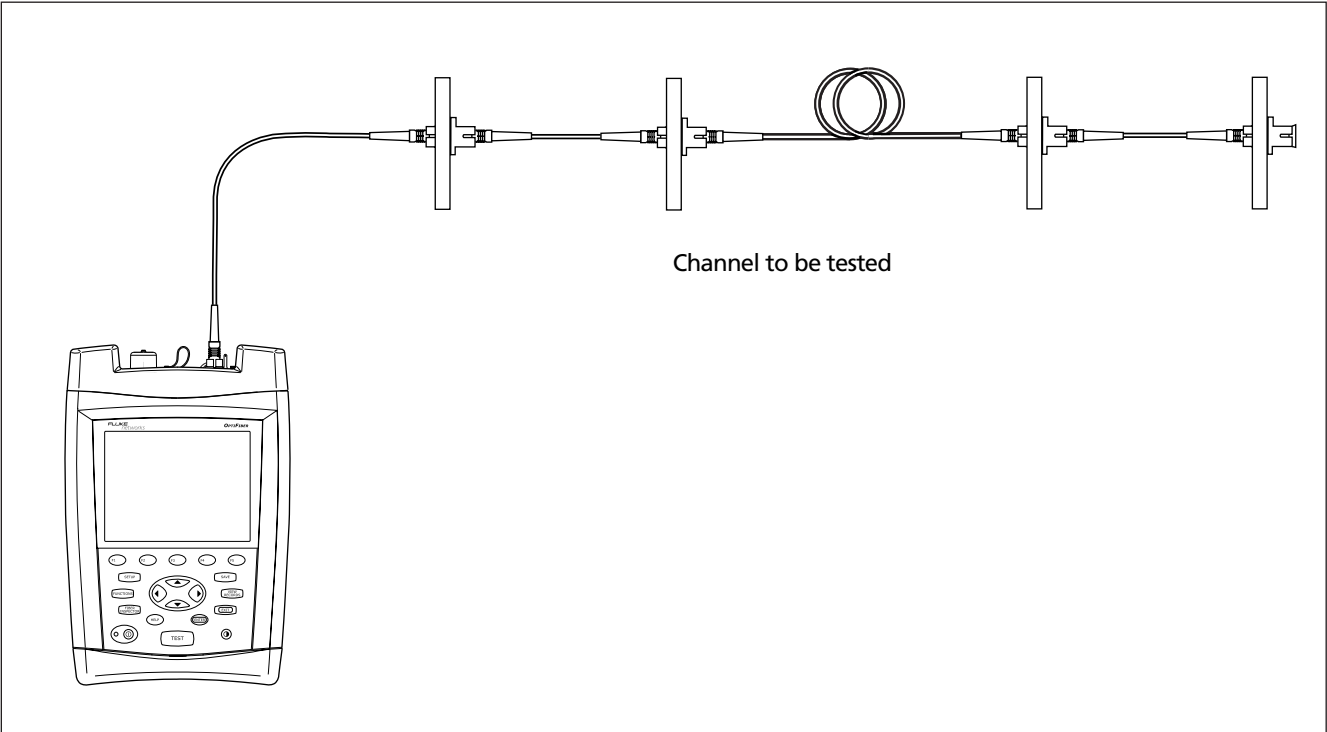


Figure 18. FaultMap Test Connections

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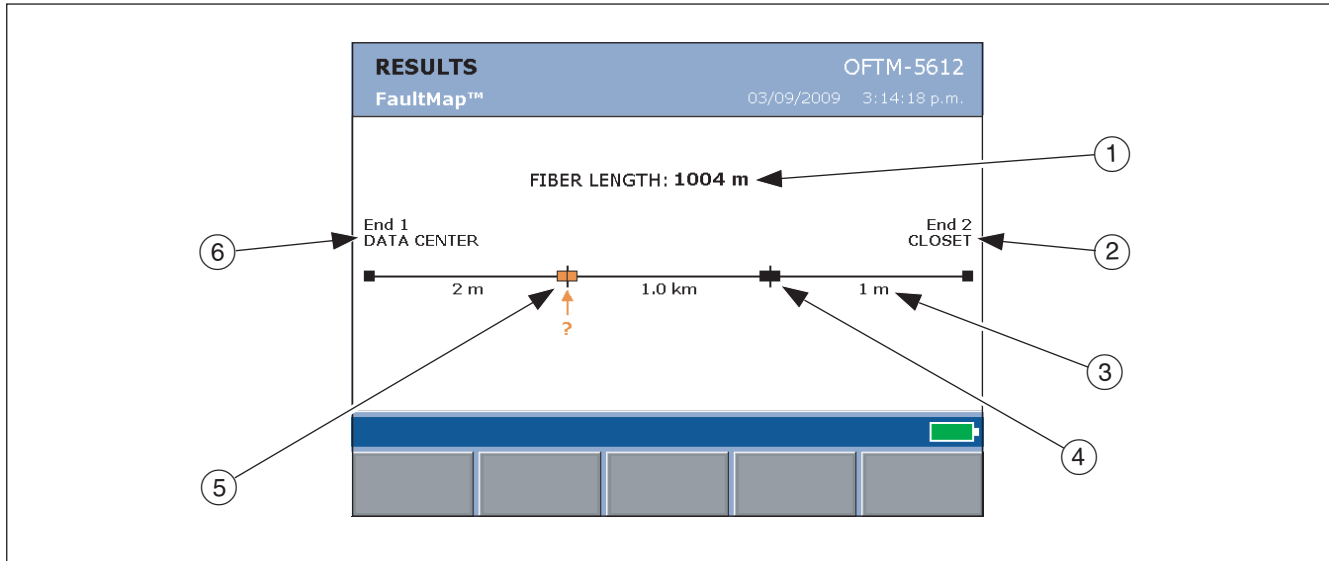


Figure 19. FaultMap Diagram Features

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- ① The length of the channel, including the launch fiber.

*Note*

*The **FIBER LENGTH** shown is the actual length of the channel rounded to the nearest meter or foot (not the sum of the displayed segment lengths).*

- ② The far end of the channel. The name is set by the **END 1** or **END 2** setting on the **Job** tab in Setup.

- ③ The length of a segment or patch cord rounded to the nearest meter or foot.

- ④ A reflective event, usually a connector. Could also be a mechanical splice or a reflective fault such as a sharp bend or a crack in the fiber.

- ⑤ A connection that might have a problem. The connector might be dirty, poorly polished, scratched, cracked, misaligned, unseated, worn, or the wrong type.

- ⑥ The near end of the channel. The name is set by the **END 1** or **END 2** setting on the **Job** tab in Setup.

## Using the FiberInspector Option

The OFTM-5352 FiberInspector™ Video Probe connects to an OptiFiber fiber tester to let you inspect the ends of fiber optic connectors. The probe's 250X and 400X magnifications reveal dirt, scratches, and other defects that can cause poor performance or failures in fiber optic networks.

The 250X magnification shows dirt and other defects on the fiber endface and surrounding ferrule. The 400X magnification allows a more detailed inspection of the cladding and core.

Figure 20 shows the equipment needed for using the FiberInspector probe.

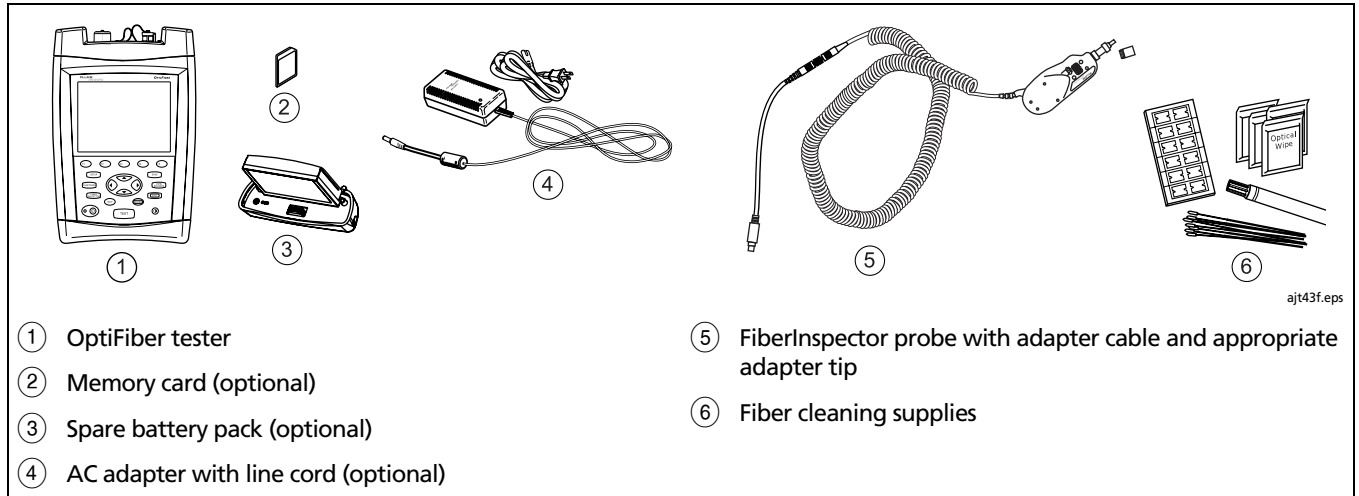


Figure 20. Equipment for FiberInspector Tests

#### Using the FiberInspector Probe





- 1 On the **System** tab in Setup, set **CAMERA TYPE** to match the magnification you will use. This selects the correct size for the core size scale.
- 2 Use the adapter cable provided to connect the probe to the video input jack on the side of the tester.
- 3 Screw an adapter tip that matches the connector type being inspected onto the fiber probe.
- 4 Clean the connector to be inspected.
- 5 Press . If the message “**Camera Image Unavailable**” appears check the connections between the probe and the tester.
- 6 Place the probe on the fiber connector. Turn the larger ring on the probe to focus the image. Turn the smaller ring to change magnification. Refer to Figure 21.  
  
The tester’s softkeys provide additional functions. Press  **More** to see other softkey functions.
- 7 To save the image, press , select or create a fiber ID; then press  again.

Figure 22 shows some typical FiberInspector images.

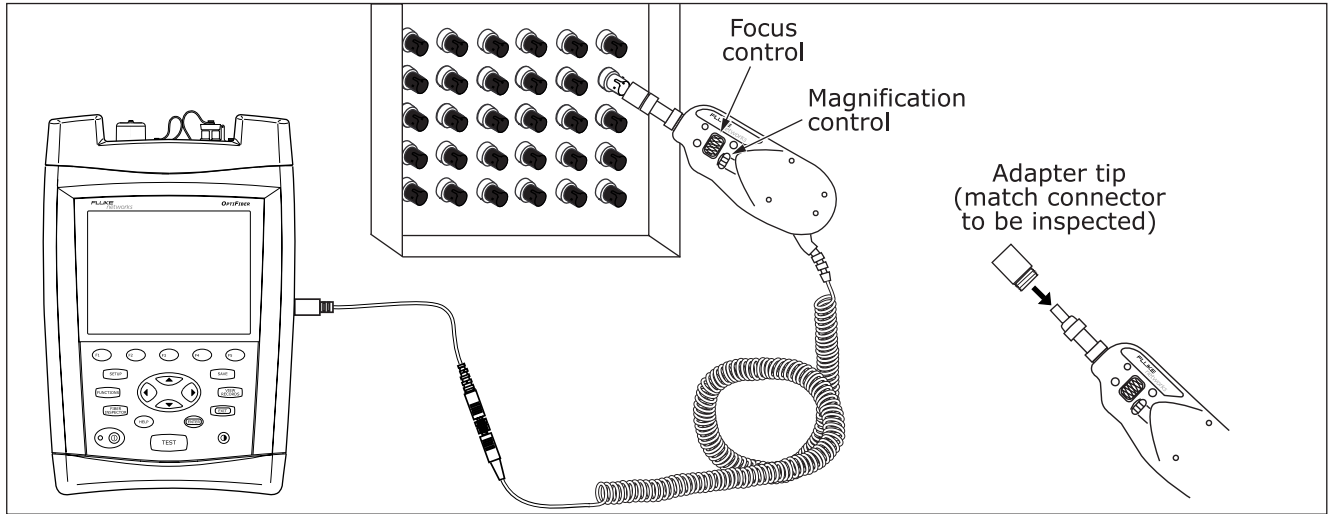


Figure 21. Using the FiberInspector Probe

ajt57f.eps

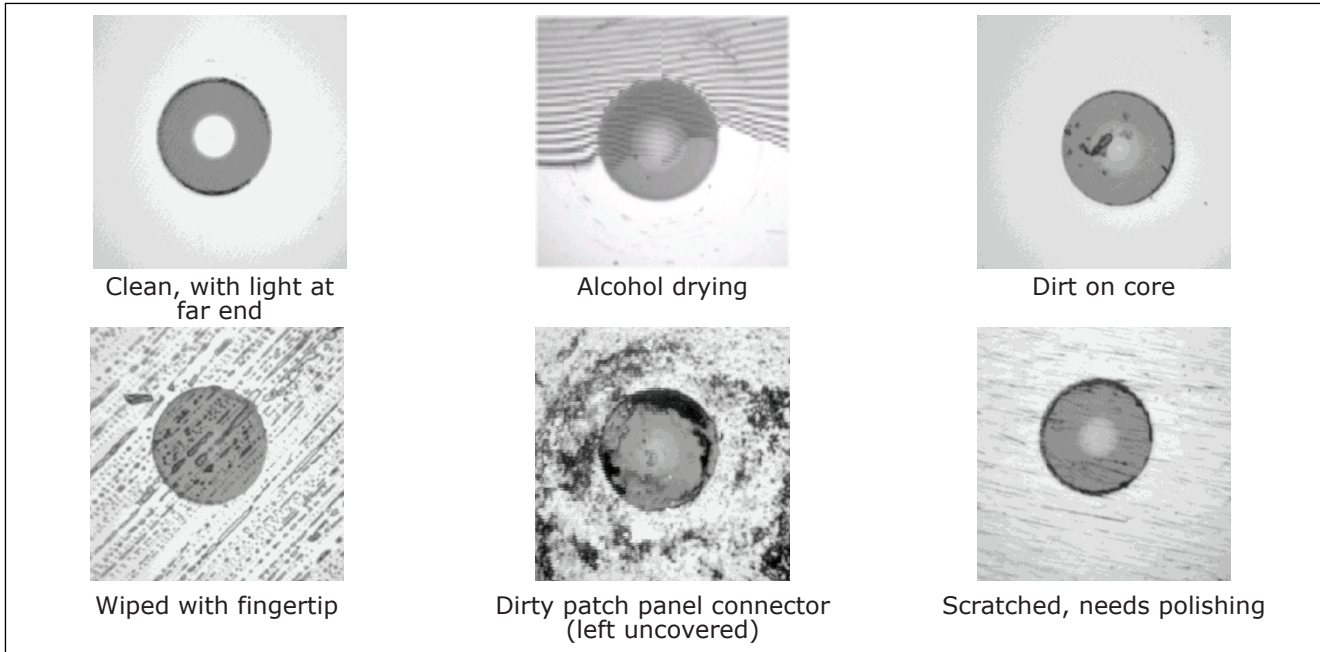


Figure 22. FiberInspector Image Examples

ajt23f.eps



## Using the Loss/Length Option

The loss/length measurement option provides the following features, in addition to the OTDR module features described earlier:

- Measures optical power loss, length, and propagation delay on dual-fiber cabling. Provides PASS/FAIL results based on limits you enter or on factory-installed limits.
- FindFiber™ feature helps you identify and verify optical connections.

The loss/length option is available with OFTM-56x2B and OFTM-5732 modules.

## About Smart Remotes

You can use the following as the remote for loss/length testing and FindFiber tests in Smart Remote mode:

- A second OptiFiber tester with the loss/length option
- A Fluke Networks DTX Series CableAnalyzer™ smart remote with a multimode or singlemode fiber module. The DTX remote can also be used as a manually-controlled source for testing in Far End Source mode. You can buy a DTX smart remote separately for this purpose. See the Fluke Networks website or contact Fluke Networks for details.

### Note

*The OptiFiber tester must have software version 2.0 or later to work with a DTX-xFM2 smart remote. OptiFiber software updates are available on the Fluke Networks website.*

## Changing the Connector Adapter

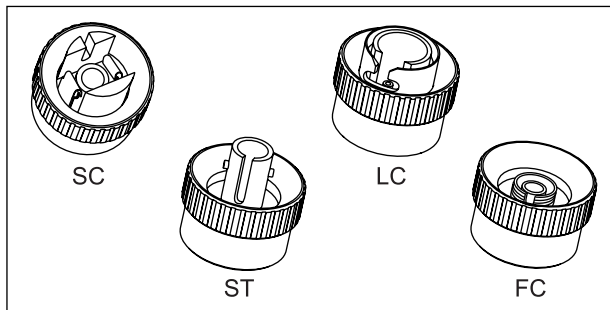
You can change the module's input connector adapter (Figure 23) to connect to SC, ST, LC, and FC fiber connectors. Additional adapter styles may be available. Check the Fluke Networks web site for updates.

### Caution

- Cover all connectors with protective caps when not in use.
- Store extra connector adapters in the canisters provided.
- Do not touch the photodiode lens (see Figure 24).
- Do not overtighten the adapter or use tools to tighten the adapter.

To install a connector adapter, refer to Figure 24 and do the following:

- 1 Locate the slot in the module connector and the key on the adapter ring.
- 2 Holding the adapter so it does not turn in the nut, align the adapter's key with the module connector's slot and slide the adapter onto the connector.
- 3 Screw the nut onto the module connector.



amd37f.eps

Figure 23. SC, ST, LC, and FC Connector Adapters

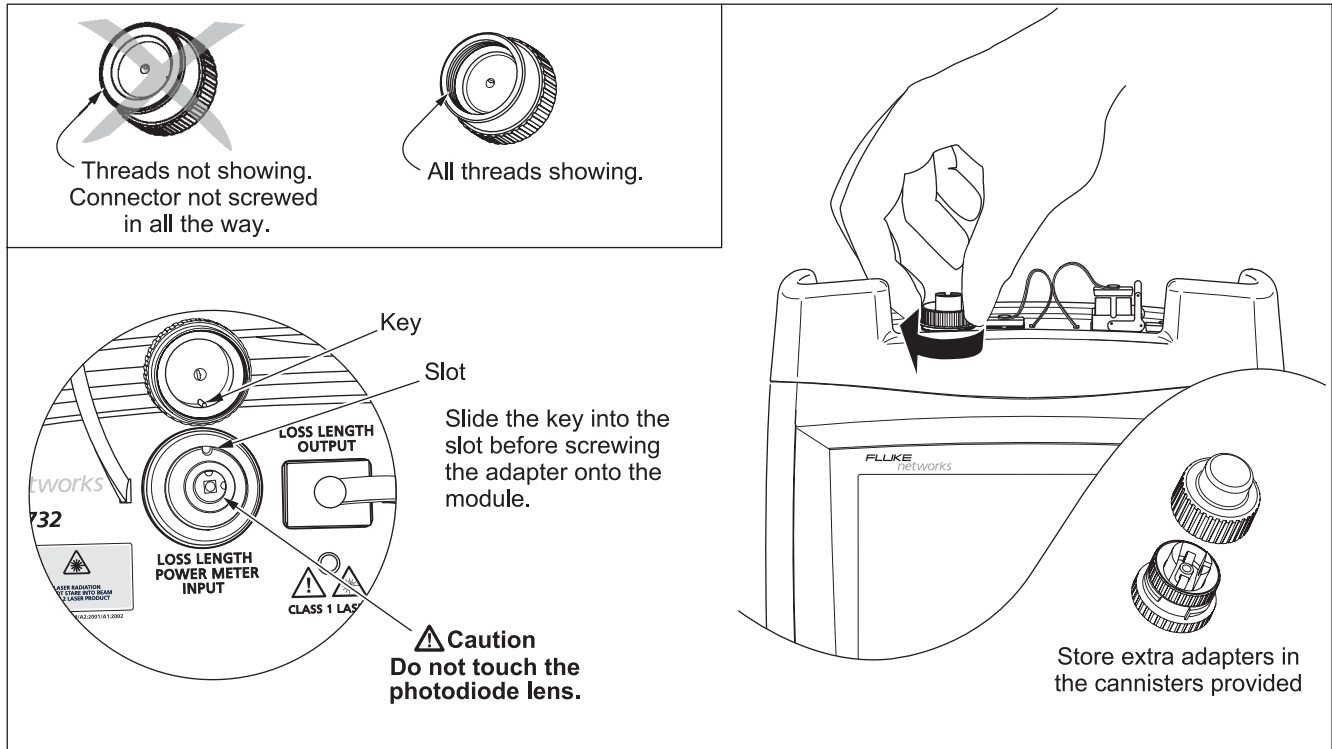


Figure 24. Changing the Connector Adapter

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### **Cleaning the Loss/Length Connectors**

Always clean and inspect fiber connectors before making connections. Use fiber optic solvent and optical-grade wipes or swabs to clean connectors as follows:

#### ***Cleaning the Loss/Length OUTPUT Connector***

- 1** Touch the tip of a fiber optic solvent pen or swab soaked in solvent to a lint-free dry wipe or fiber cleaning card.
- 2** Touch a new, dry swab to the solvent spot on the wipe or card.
- 3** Push the swab into the connector, twist it around 3 to 5 times against the end-face, then remove and dispose of the swab.
- 4** Dry the connector with a dry swab by twisting it around in the connector 3 to 5 times.
- 5** Inspect the connector regularly with a fiber microscope, such as the Fluke Networks FiberInspector Video Microscope.

#### ***Cleaning the Loss/Length and Power Meter INPUT Connector***

- 1** Remove the connector adapter to expose the photodiode lens (see Figure 24).
- 2** Use the method described in steps 1 and 2 under “Cleaning the Loss/Length OUTPUT Connector” to dampen a swab with fiber optic solvent.
- 3** Twist the damp swab around against the lens 3 to 5 times; then twist a dry swab around against the lens 3 to 5 times.

## About Setting the Reference

Setting a reference lets the tester automatically subtract out the losses due to reference test cords and the main and remote tester.

### Note

*Always let your test equipment warm up for 5 minutes before setting a reference.*


For the most accurate test results, you should set the reference at these times:

- At the beginning of each day using the remote end setup (Figures 28 through 35) you will use that day. The tester reminds you to set the reference if the reference is more than 12 hours old.
- Anytime you reconnect a reference test cord to the tester or other source.
- Anytime the tester warns you that the reference is out of date.

The tester requires you to set the reference at these times:

- Anytime you change the loss/length module in the main or remote tester.
- Anytime you start using a different remote tester.
- Thirty days after the reference was previously set.

The tester warns you if the reference value is outside of an acceptable range.


To see the reference information for the current remote end setup, select **Set Loss/Length Reference** from the Functions menu; then press  **View Settings**.

See the sections “Testing in Smart Remote Mode”, “Testing in Loopback Mode”, and “Testing in Far End Source Mode” for details on setting the reference for each mode.

### Setting the Number of Adapters and Splices

The **NUMBER OF ADAPTERS** and **NUMBER OF SPLICES** settings are on the **Loss/Length** tab in Setup. These settings do not apply to all test limits.

Test limits that include maximum values for the loss per km, loss per connector, and loss per splice use a calculated limit for loss. Only limits with all three values use a calculated loss limit. The **OVERALL LOSS** value should be **N/A** in these limits. If a loss value is entered, it is ignored.

To see the limit's values, select **TEST LIMIT** on the **Loss/Length** tab; then press  **View Limit**.

If the selected limit uses a calculated loss limit, enter the number of adapters and splices that will be added to the fiber path after the reference is set.

Figure 25 shows an example of how to determine the **NUMBER OF ADAPTERS** setting.



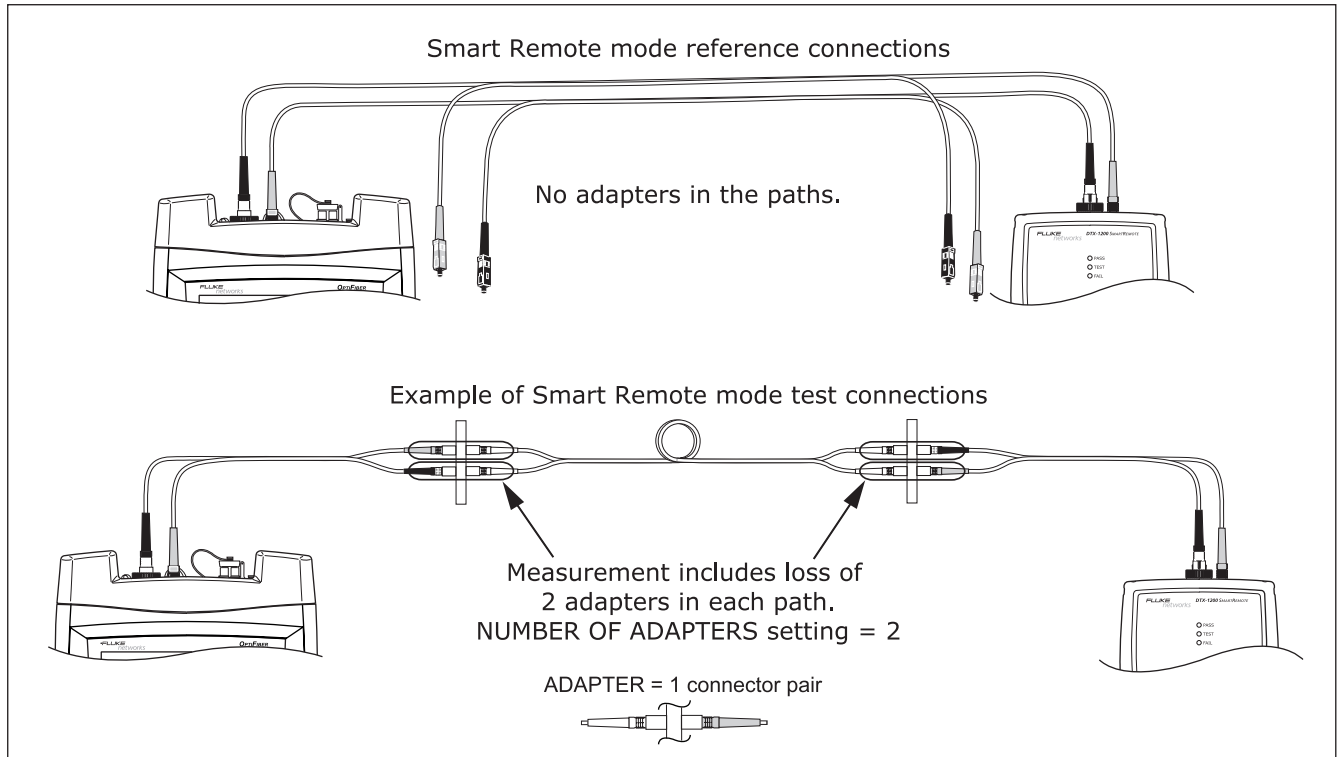


Figure 25. Example of How to Determine the NUMBER OF ADAPTERS Setting

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#### Using Mandrels for Testing Multimode Fiber

You should use mandrels when testing multimode fiber. Mandrels can improve measurement repeatability and consistency. They also allow the use of LED light sources to certify 50  $\mu\text{m}$  and 62.5  $\mu\text{m}$  fiber links for current and planned high bit-rate applications, such as Gigabit Ethernet and 10 Gigabit Ethernet.

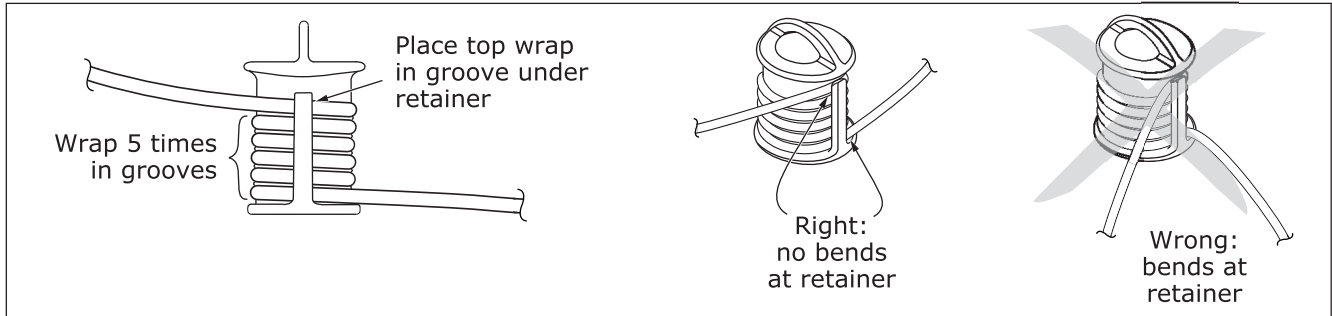
The gray mandrels included with some OptiFiber models are compliant with TIA-568-C for 62.5  $\mu\text{m}$  fiber with a 3 mm jacket.

Mandrels for 50  $\mu\text{m}$  fiber are available from Fluke Networks. Refer to the appropriate standard for mandrel requirements if you follow other standards. The OF-500 Technical Reference Handbook provides a partial list of mandrel requirements for TIA standards.

Figure 26 shows how to wrap the fiber around a mandrel. Place mandrels on the tester's output fibers, as shown in Figures 28 through 35.

In the reference and test connection diagrams shown on the tester, mandrels are indicated by a loop in the fiber.





ajt02f.eps

**Figure 26. Wrapping a Reference test cord Around a Mandrel**

### Testing in Smart Remote Mode

Use Smart Remote mode to test and certify dual-fiber cabling. In this mode, the tester measures loss, length, and propagation delay on two fibers at two wavelengths in one or both directions.

Figure 27 shows the equipment needed for testing in Smart Remote mode.

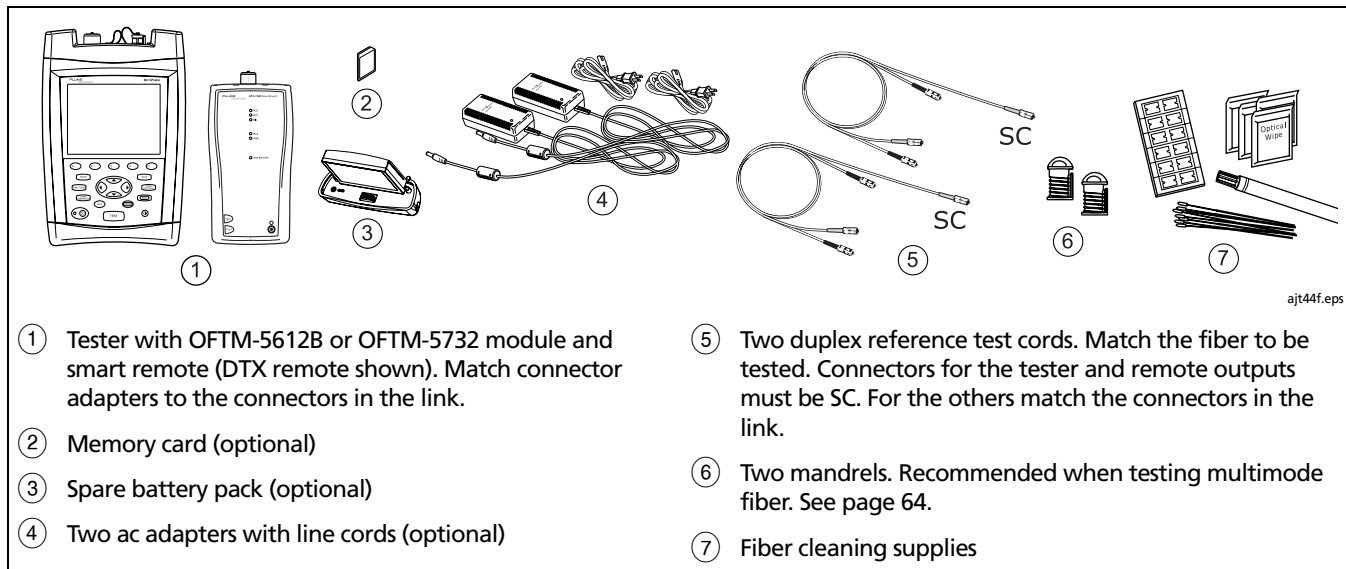


Figure 27. Equipment for Loss/Length Testing in Smart Remote Mode

### Loss/Length Testing in Smart Remote Mode

- 1 Turn on all test equipment and let it warm up for 5 minutes.
- 2 **On the main tester:** On the **HOME** screen, press **F1** **Change Test**; then select **Loss/Length**.
- 3 **On the main tester:** press **SETUP**; then set the following on the **Cable** tab:
  - **FIBER TYPE:** Select the fiber type to be tested.
  - **MANUAL CABLE SETTINGS** (index of refraction and backscatter coefficient):  
Disable to use the values defined in the selected fiber type, which are suitable for most applications.
- 4 **On the main tester:** set the following on the **Loss/Length** tab in Setup:
  - **TEST LIMIT:** Select an appropriate limit.
  - **REMOTE END SETUP:** Set to **Smart Remote**.
  - **THIS UNIT:** Set to **Main**.
  - **BI-DIRECTIONAL:** Enable this if you want to save bi-directional results.
- 5 **For an OptiFiber Smart Remote:** set the following on the **Loss/Length** tab in Setup
  - **TEST METHOD:** Refers to the number of adapters that are represented in the loss results. Select Method B (multimode) or A.1 (singlemode) if you use the reference and test connections shown in this manual. See the online help or the Technical Reference Handbook for details.
  - **CONNECTOR TYPE:** Select connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
  - **NUMBER OF ADAPTERS** and **NUMBER OF SPLICES:** Enter the number of adapters and splices that will be added to each direction of the fiber path after the reference is set. See "Setting the Number of Adapters and Splices" on page 62 for details.
  - **REMOTE END SETUP:** Set to **Smart Remote**.
  - **THIS UNIT:** Set to **Remote**.

-continued-

### Loss/Length Testing in Smart Remote Mode (cont.)

- 6 Clean the tester's and source's OUTPUT connectors and the reference test cord connectors.
- 7 **On the main tester:** press **FUNCTIONS**; then select **Set Loss/Length Reference**.
- 8 Connect the reference test cords as shown on the screen and in Figure 28; then press **ENTER**.
- 9 **Optional:** From the **TEST SETUP** screen, you can enter reference test cord lengths to meet TSB-140 reporting requirements:  
  
Use **←** to highlight a reference test cord number, press **ENTER**; then enter a length. Press **SAVE** when you are done.
- 10 Press **F3** **OK** to leave the **TEST SETUP** screen.

#### **Caution**

**If you disconnect the reference test cords from the tester's or remote's output, you must set the reference again to ensure valid measurements.**

-continued-

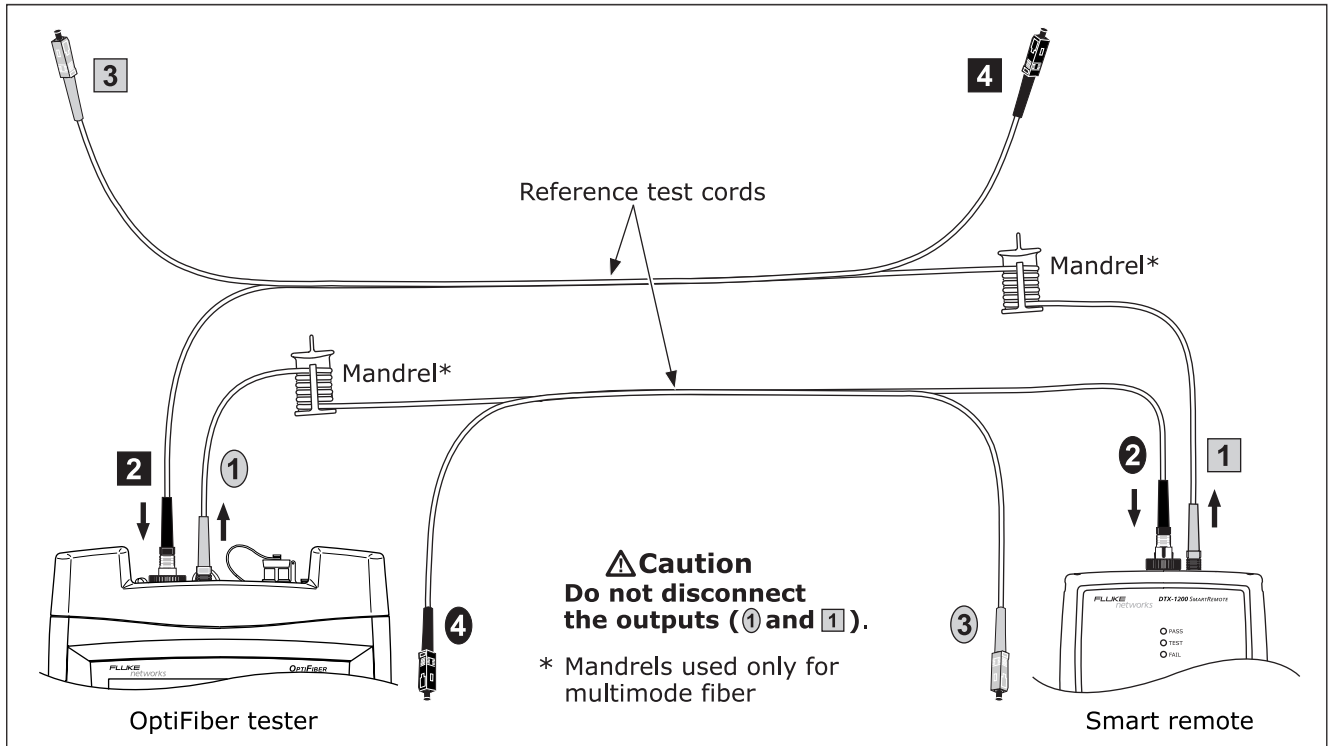


Figure 28. Smart Remote Mode Reference Connections

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#### Loss/Length Testing in Smart Remote Mode (cont.)

- 11 Clean the connectors on the cabling to be tested; then connect the reference test cords and the short patch cords to the cabling, as shown in Figure 29.
  - Verify that the remote tester is still active. For an OptiFiber smart remote you may need to press **F1** **Start** on the remote tester to reactivate the tester.
- 12 Press **TEST** to start the loss/length test.

If **Open** or **Unknown** appears as the status, try the following:

  - Verify that all connections are good.
  - For an OptiFiber smart remote verify that the remote tester is set to **Remote** on its **Loss/Length** tab in Setup.
  - Try different connections to the cabling until the test continues. See “Using FindFiber in Smart Remote Mode” in the online help or Technical Reference Handbook for details on FindFiber messages.
  - Use a visible light source to verify fiber continuity.
- 13 To save the results, press **SAVE**, select or create a fiber ID for the INPUT fiber; then press **SAVE**.
- 14 Select or create a fiber ID for the OUTPUT fiber; then press **SAVE**.

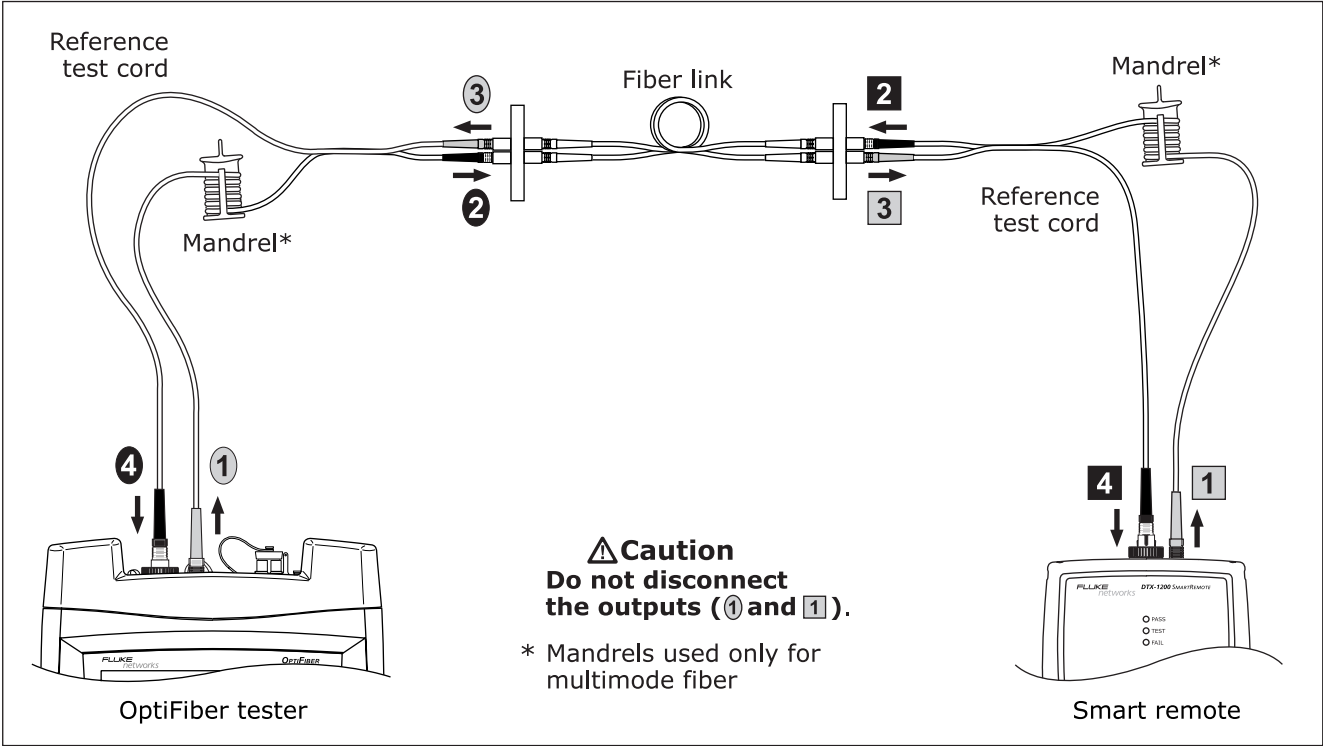


Figure 29. Smart Remote Mode Test Connections

ajt08f.eps

### **Testing in Loopback Mode**

Use Loopback mode to test spools of cable, segments of uninstalled cable, patch cords, reference test cords, and launch fibers.

In this mode, the tester measures loss, length, and propagation delay at two wavelengths in one or both directions.

Figure 30 shows the equipment needed for testing in Loopback mode.



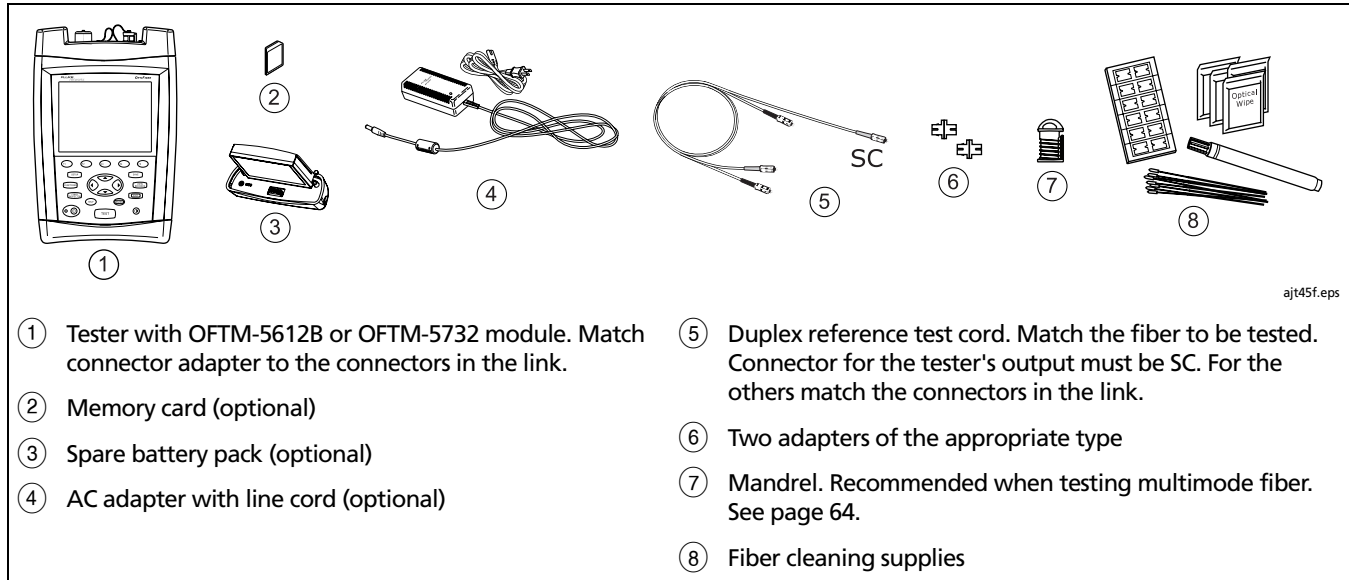


Figure 30. Equipment for Loss/Length Testing in Loopback Mode

### Loss/Length Testing in Loopback Mode

- 1 Turn on the tester and let it warm up for 5 minutes.
- 2 On the **HOME** screen, press **F1** **Change Test**; then select **Loss/Length**.
- 3 Choose settings for the fiber to be tested. Press **SETUP**; then set the following on the tester's **Cable** tab:
  - **FIBER TYPE:** Select the fiber type to be tested.
  - **MANUAL CABLE SETTINGS** (index of refraction and backscatter coefficient):  
Disable to use the values defined in the selected fiber type, which are suitable for most applications.
- 4 Set the following on the tester's **Loss/Length** tab in Setup:
  - **TEST LIMIT:** Select an appropriate limit.
  - **REMOTE END SETUP:** Set to **Loopback** mode.
  - **THIS UNIT:** Set to **Main**.
  - **BI-DIRECTIONAL:** Enable this setting if you want to save bi-directional results.
- **TEST METHOD:** Refers to the number of adapters that are represented in the loss results. Select Method B (multimode) or A.1 (singlemode) if you use the reference and test connections shown in this manual. See the online help or the Technical Reference Handbook for details.
- **CONNECTOR TYPE:** Select connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
- **NUMBER OF ADAPTERS** and **NUMBER OF SPLICES:** Enter the number of adapters and splices that will be added to the fiber path after the reference is set. See "Setting the Number of Adapters and Splices" on page 62 for details.
- 5 Clean the tester's **OUTPUT** connector and the reference test cord connectors.
- 6 Press **FUNCTIONS**; then select **Set Loss/Length Reference**. Connect the reference test cords as shown on the screen and in Figure 31; then press **ENTER**.

-continued-

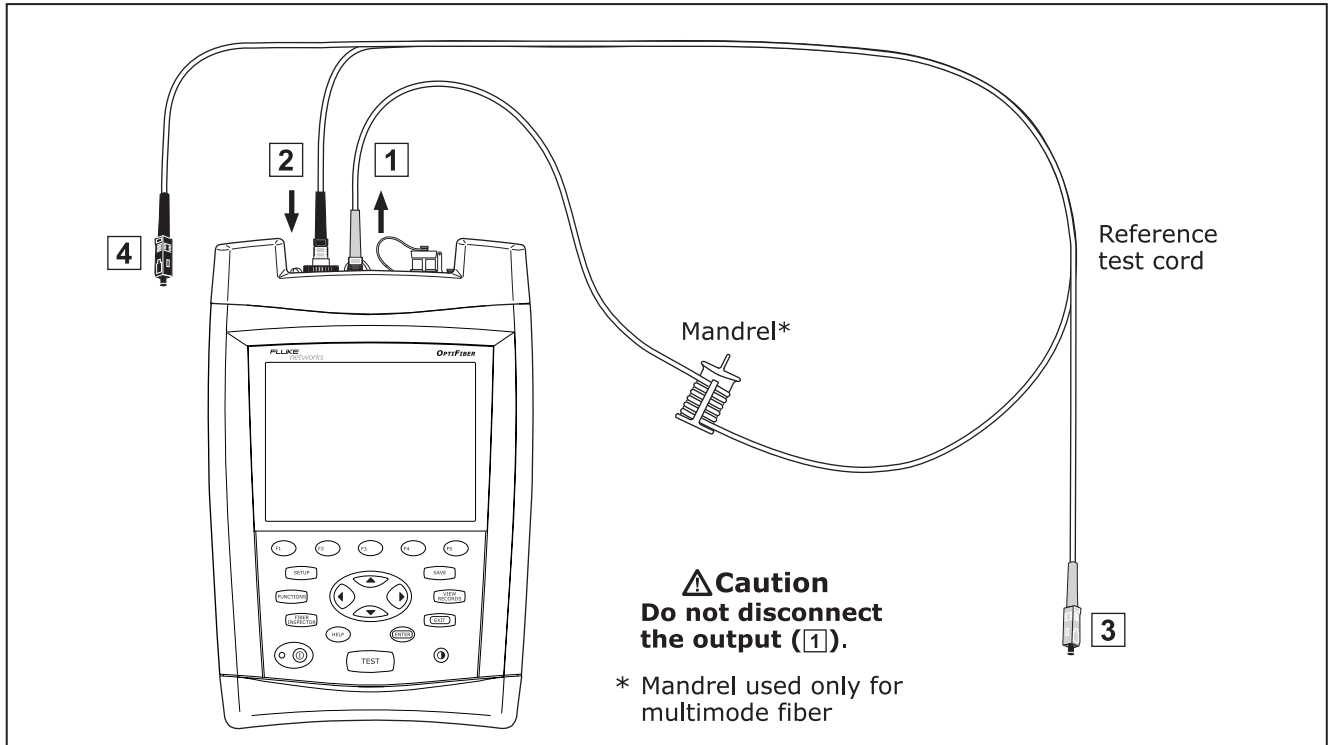





Figure 31. Loopback Mode Reference Connections

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### Loss/Length Testing in Loopback Mode (cont.)




- 7 **Optional:** From the **TEST SETUP** screen, you can enter reference test cord lengths to meet TSB-140 reporting requirements:

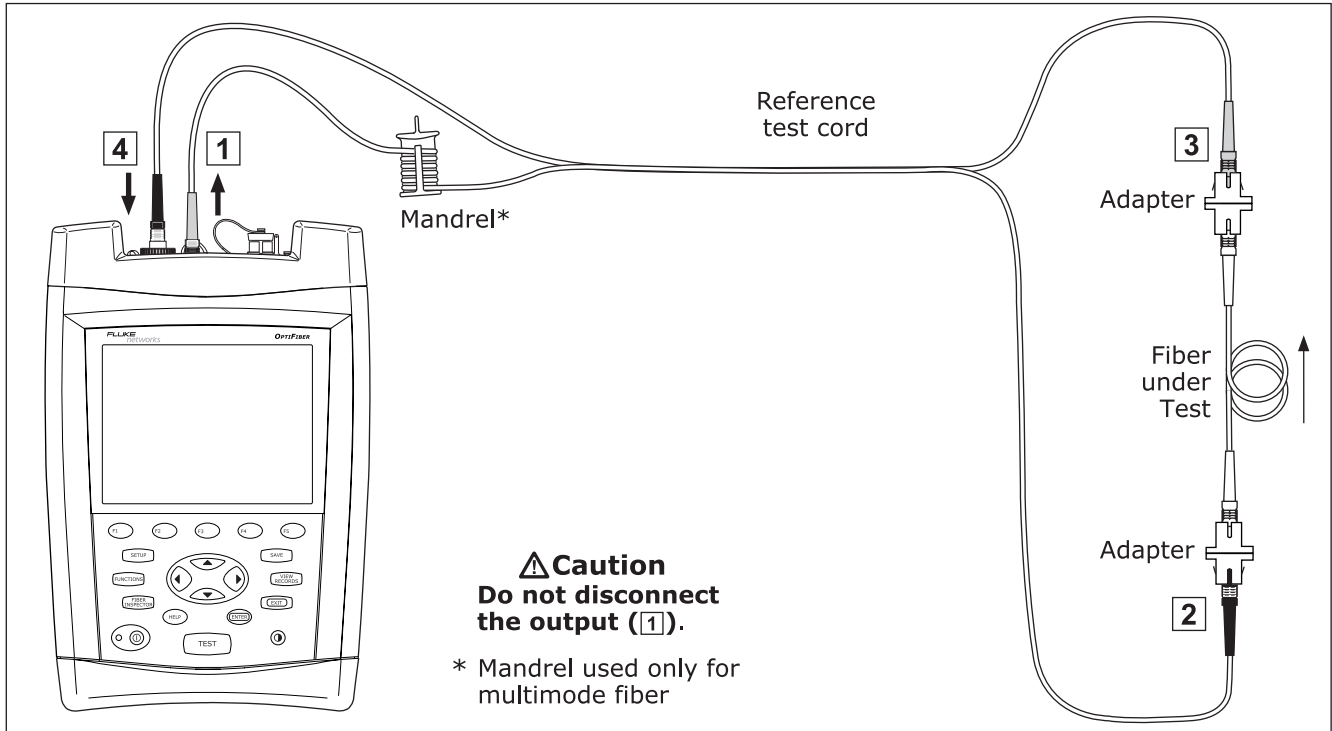
Use  to highlight a reference test cord number, press ; then enter a length. Press  when you are done.

- 8 Press  **OK** to leave the **TEST SETUP** screen.

### **Caution**

**If you disconnect the reference test cord from the tester's output, you must set the reference again to ensure valid measurements.**

- 9 Clean the connectors on the cabling to be tested; then connect the reference test cords and the short patch cord to the cabling, as shown in Figure 32.
- 10 Press  to start the loss/length test.
- 11 To save the results, press , select or create a fiber ID; then press .



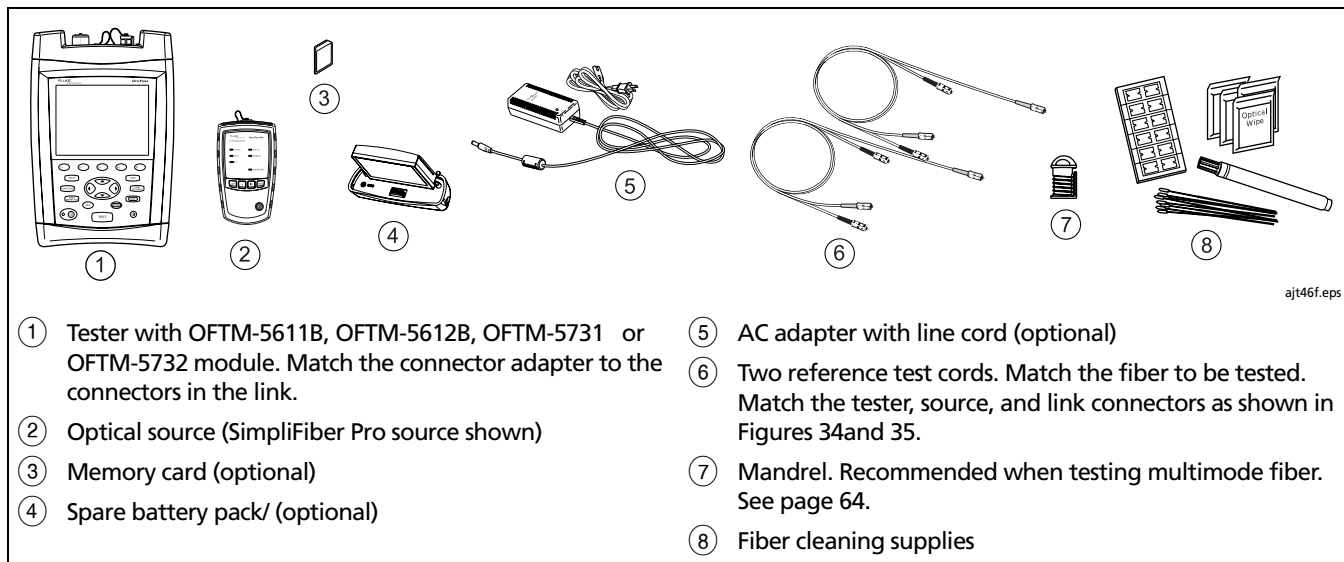
ajt09f.eps

Figure 32. Loopback Mode Test Connections

### Testing in Far End Source Mode

Use Far End Source mode to measure power or power loss at one wavelength on individual fibers. A Far End Source mode record can store dual-wavelength results from both directions.

Far End Source mode requires a stand-alone optical source, such as a Fluke Networks DTX Smart Remote with a fiber module, a SimpliFiber® source, or a LS-1310/1550 Laser Source. Far End Source mode is available on OFTM-5xx1B and OFTM-5xx2 modules. Figure 33 shows the equipment needed for testing in Far End Source mode.



**Figure 33. Equipment for Loss Testing in Far End Source Mode**

### Loss Testing in Far End Source Mode

- 1 Turn on all test equipment and let it warm up for 5 minutes.
  - 2 Verify the source is set to the correct wavelength and to continuous-wave output.
  - 3 On the **HOME** screen, press **(F1)** **Change Test**; then select **Loss/Length**.
  - 4 Choose settings for the fiber to be tested. Press **(SETUP)**; then set the following on the **Cable** tab:
    - **FIBER TYPE:** Select the fiber type to be tested.
    - **MANUAL CABLE SETTINGS** (index of refraction and backscatter coefficient):  
Disable to use the values defined in the selected fiber type, which are suitable for most applications.
  - 5 Set the following on the **Loss/Length** tab in Setup:
    - **TEST LIMIT:** Select an appropriate limit.
    - **REMOTE END SETUP:** Set to **Far End Source** mode.
- **THIS UNIT:** Set to **Main**.
  - **BI-DIRECTIONAL:** Does not apply to Far End Source mode.
  - **TEST METHOD:** Select the method used for making reference and test connections. This setting does not affect test results, but is saved with results. See the online help or the Technical Reference Handbook for details.
  - **CONNECTOR TYPE:** Select the connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
  - **NUMBER OF ADAPTERS** and **NUMBER OF SPLICES:** Enter the number of adapters and splices that will be added to the fiber path after the reference is set. See "Setting the Number of Adapters and Splices" on page 62 for details.

-continued-

### Loss Testing in Far End Source Mode (cont.)

- 6 Clean the connectors on the source and the reference test cords.
- 7 Press **FUNCTIONS**; then select **Set Loss/Length Reference**. Connect the reference test cords as shown on the screen and in Figure 34; then press **ENTER**.
- 8 Highlight a wavelength; then press **ENTER**.
- 9 **Optional:** From the **TEST SETUP** screen, you can enter reference test cord lengths to meet TSB-140 reporting requirements:  
  
Use **←** to highlight a reference test cord number, press **ENTER**; then enter a length. Press **SAVE** when you are done.

### Caution

**If you disconnect the reference test cord from the source's output, you must set the reference again to ensure valid measurements.**

- 10 Clean the connectors on the cabling to be tested; then connect the reference test cords and the short patch cord to the cabling, as shown in Figure 35.
- 11 Press **TEST**.
- 12 Select a wavelength for the test. **Auto** is used with SimpliFiber sources. See the online help or Technical Reference Handbook for details.
- 13 To save the results, press **SAVE**, select or create a fiber ID; then press **SAVE**.



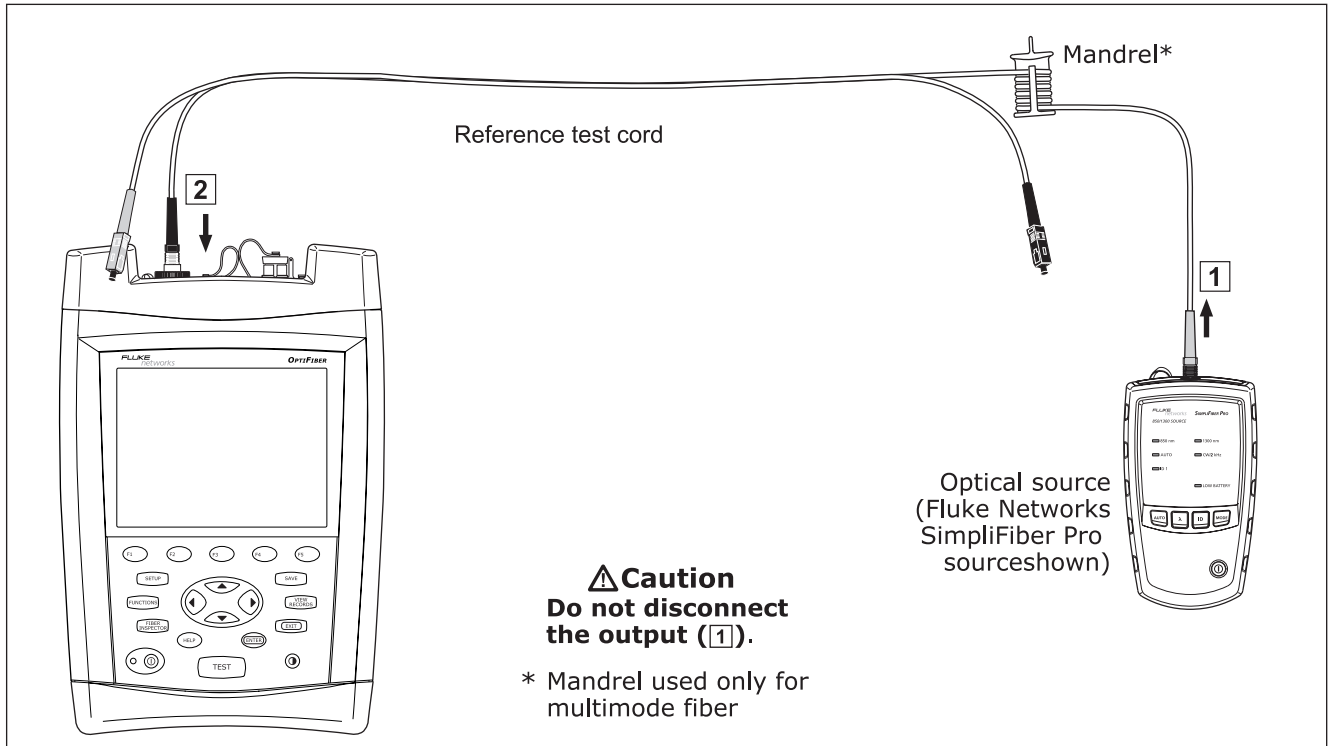
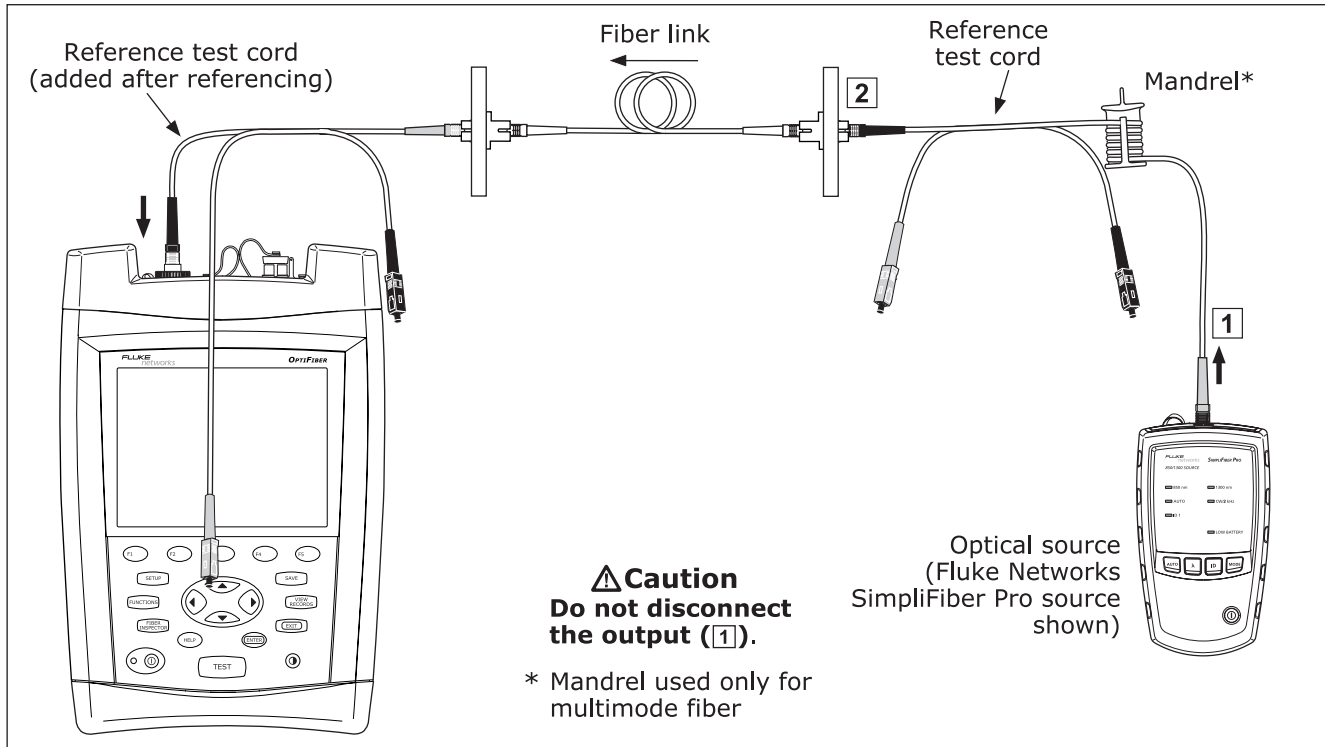


Figure 34. Far End Source Mode Reference Connections

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ajt10f.eps

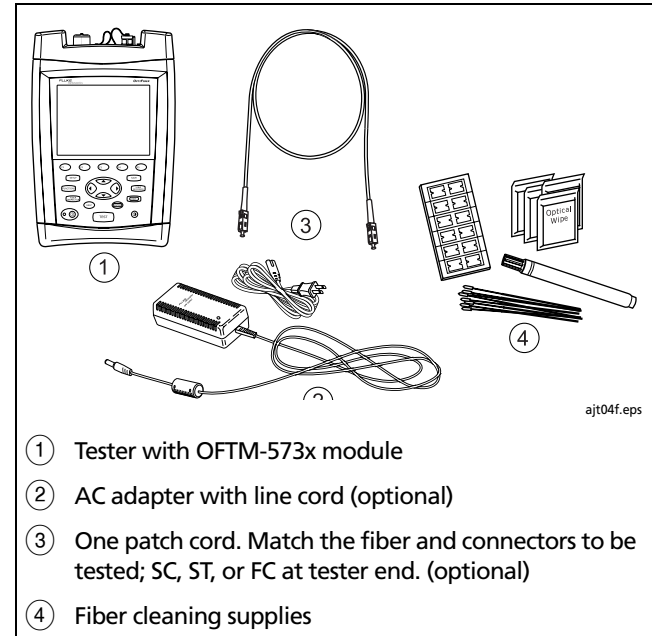
Figure 35. Far End Source Mode Test Connections

## Using the Visual Fault Locator

The visual fault locator (VFL) is available with OFTM-573x modules. The VFL helps you quickly check fiber continuity, trace fibers, and locate faults along fibers and in connectors.

Figure 36 shows the equipment required for using the VFL.

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 tester end.



**Figure 36. 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 tester's VFL port or connect using the patch cord.
- 3 Turn on the VFL as follows:
  - Press **F4** **VFL** from the **HOME** screen.
  - or
  - Press **FUNCTIONS**; then select **Visual Fault Locator**.
- 4 To toggle between continuous wave and pulse modes, press **F2**.
- 5 To turn the VFL off and on, press **F4**.
- 6 Look for the red light to locate fibers or faults, as shown in Figure 37.

**Tip:** To more quickly locate the VFL's light at a patch panel, view the light indirectly by holding a white card or paper in front of the fiber connector emitting the light.

*Note*

*The locator's light may not be visible through dark-colored fiber jackets.*

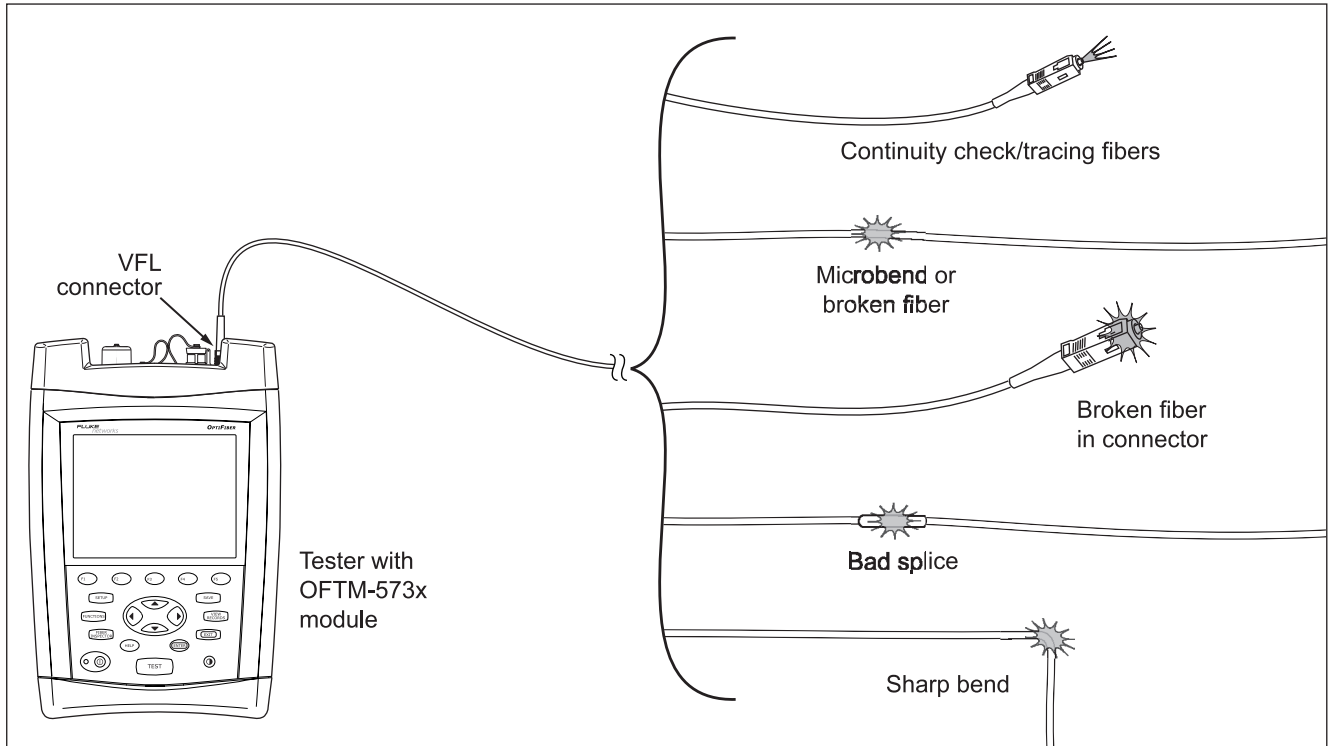


Figure 37. Using the Visual Fault Locator

ajt03f.eps

## Using the Power Meter Option

The power meter option lets you monitor the output power produced by a source such as an optical network interface card or optical test equipment. You can also monitor the power received at the end of the cabling.

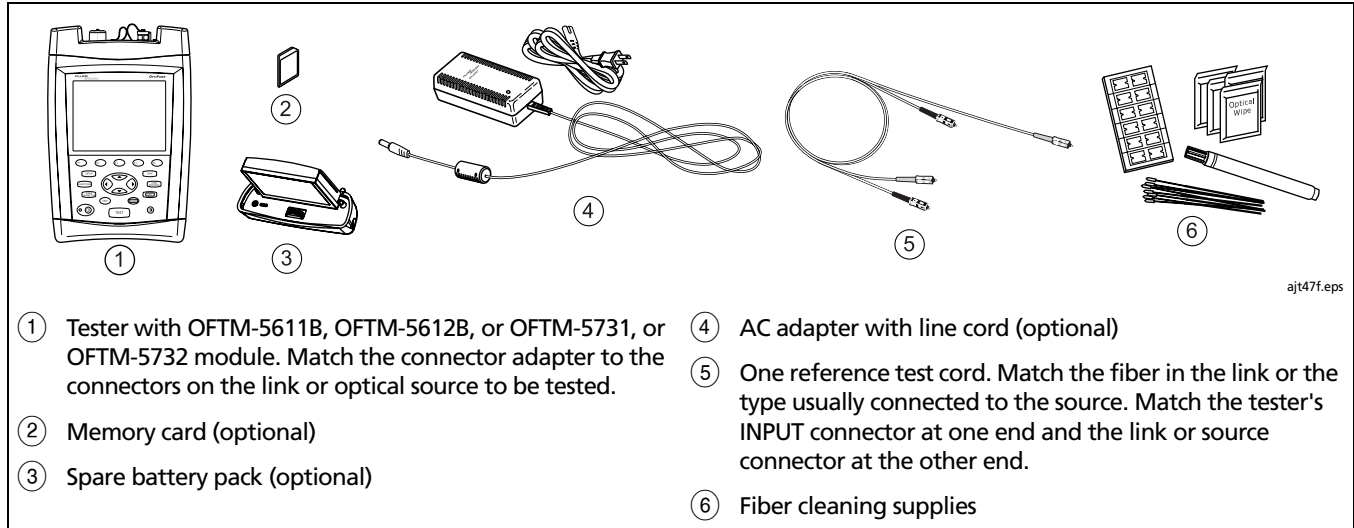
You can monitor power at 850 nm, 1300 nm, 1310 nm, and 1550 nm.

The power meter option is available with OFTM-56x1B, OFTM-56x2B, OFTM-5731, and OFTM-5732 modules.

Figure 38 shows the equipment needed for using the power meter.






*Note*

*The power meter option also lets you measure loss in Far End Source mode.*



**Figure 38. Equipment for Power Meter Tests**

#### Using the Power Meter

- 1 Select Power Meter mode: On the **HOME** screen, press  **Change Test**; then select **Power Meter**. You do not need to select a fiber type or test limit.
- 2 Clean the connectors on the reference test cord, source, and link (if tested).
- 3 Use the reference test cord to connect the source to the tester's INPUT port as shown in Figure 39.
- 4 Turn on the source.
- 5 Press ; then select the appropriate wavelength. **Auto** is used with SimpliFiber sources. See the online help or Technical Reference Handbook for details.
- 6 To change the wavelength after starting the test, press  **Change Wavelength**.
- 7 To save the results, press , select or create a fiber ID; then press  again.

#### **Caution**

If the tester shows an error because the power reading is too high, immediately disconnect the source from the tester. The tester is not designed for measuring higher power levels, such as produced by CATV, optical amplifiers, and cellular systems.



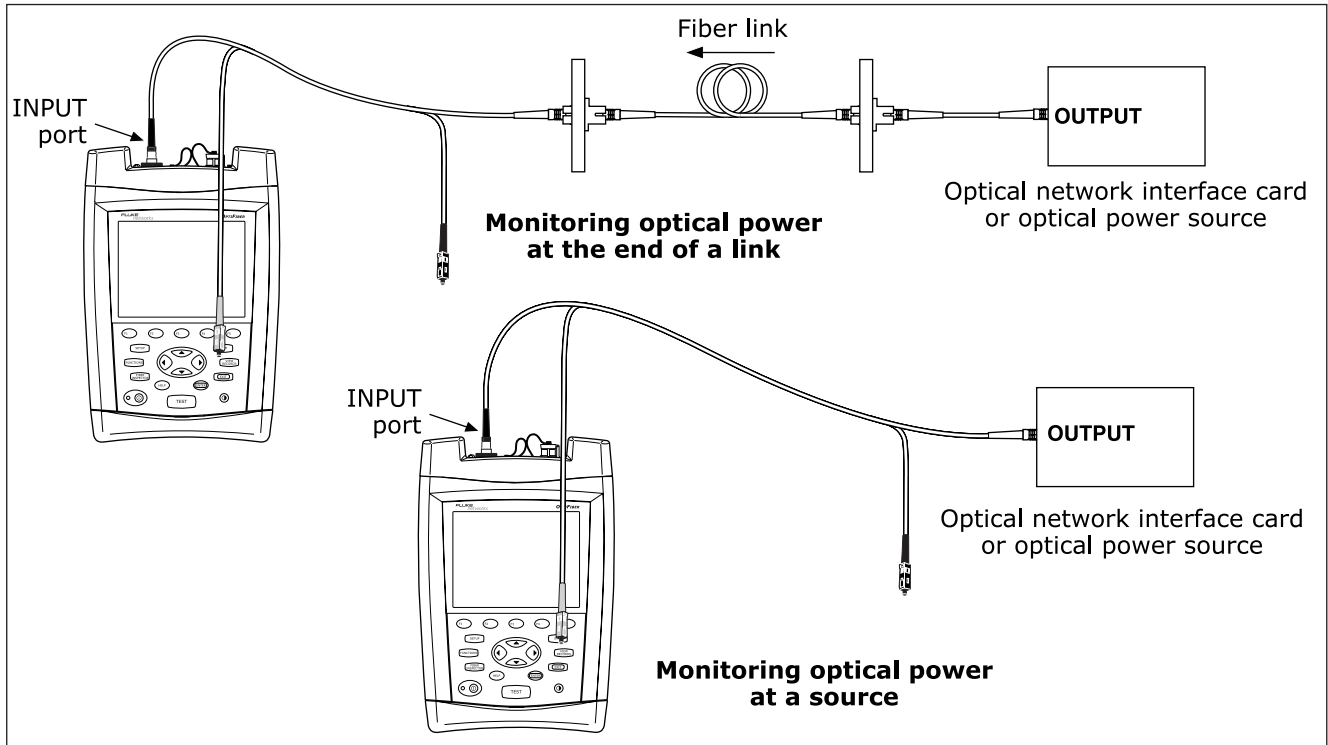



Figure 39. Connections for Monitoring Optical Power

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## Overview of Memory Functions

You can save test results on a removable memory card or in the tester's internal memory. The tester can use multimedia cards (MMC) or secure digital cards (SD).

To select a location for saving tests, press  then select **CURRENT FOLDER** on the **Job** tab.

**Tip:** To avoid confusion regarding the location of test records, save test results on a memory card whenever possible.

You can save results from any fiber test, except the real time trace.

Each test record can hold bi-directional results from each type of test (except ChannelMap, which you run in just one direction). The test direction assigned to saved results is determined by the **THIS END** setting (in Setup) used when the test was run.

You can save the last test you ran anytime before you run another test. This excludes FiberInspector images and power meter results, which you must save at the time of viewing.

If **SAVE WARNING** on the **System** tab is enabled, the tester warns you if you are about to do something that will delete an unsaved test from temporary memory. The unsaved test is retained in temporary memory even if you turn off the tester or remove the battery pack.

## Memory Capacity and Card Sizes Supported

### Caution

**Memory cards may be lost, damaged, or accidentally formatted, resulting in data loss. Therefore, Fluke Networks recommends saving no more than one day's worth of test results on a memory card.**

The number of test records you can save in a given amount of memory space depends on what you save in the records. For example, records that include video probe endface images take more memory than records without images.

The maximum amount of internal memory available for test results depends on the space taken by the tester's software and custom limits.

### Notes

*Memory card folders can store a maximum of 500 records each.*

*Loss/length tests in Smart Remote mode take up two records—one for each fiber.*

OptiFiber software version 2.0 supports cards up to 4 gigabytes. Later versions may support larger cards. Check the Fluke Networks Knowledge Base for the latest information.

To see the memory space available, press **FUNCTIONS**; then select **Memory Status**. Press **F1** to switch between the memory card and internal memory status.

### Clearing the Internal Memory

To clear the internal memory, which moves records to the memory card, do the following:

- 1 On the **System** tab in Setup, set the **CURRENT FOLDER** to the desired location on the memory card.
- 2 Press **FUNCTIONS**; then select **Empty Internal Memory**.

## About LinkWare and LinkWare Stats Software

LinkWare™ Cable Test Management software lets you upload OptiFiber test records to PC, view test results, add ANSI/TIA/EIA-606-A administration information to records, and organize, customize, and print test reports.

Details about using LinkWare software are provided in the LinkWare Getting Started Guide and the online help available under Help on the LinkWare menu.

The LinkWare Stats Statistical Report option for LinkWare software provides statistical analysis of cable test reports and generates browsable, graphical reports. LinkWare software includes a demo version of LinkWare Stats. Contact Fluke Networks or visit the Fluke Networks website for more information on LinkWare Stats.

## Maintenance

### **Warning**

- To avoid possible fire, electric shock, personal injury, or damage to the tester:
- Do not open the case. No user-serviceable parts are inside.
- Replacing electrical parts yourself will void the test tool'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 test tool's calibration and compromise its accuracy. If the calibration is void, cable manufacturers might not extend their warranty to the cabling you install.

## Updating the Tester's Software

Keeping your tester's software current gives you access to new features and the latest test limits. Software updates are available on the Fluke Networks website.

The software update procedure also lets you install or remove languages. Additional languages for the tester may be available with software updates.

To see the software version installed in your tester and module exit to the **HOME** display; then press  **Version Info**.

To determine if your tester needs a software update visit the Fluke Networks website to see if an update is available.

You can update an OptiFiber tester's software with LinkWare via a PC or with the tester's software update function via a memory card.

 **Caution**

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

*Note*

*Updating the software does not affect test records saved in internal memory, but may affect factory-installed fiber types or test limits.*

*You may install multiple languages; however, adding languages decreases the internal memory available for saving test results.*

*Changes to the update procedure may be posted on the OptiFiber software page on the Fluke Networks website.*

**Updating via the USB or Serial Port**


- 1 Install the latest version of LinkWare software on your PC. LinkWare is available on the Fluke Networks website.
- 2 Download the OptiFiber update file (“upgrade.ofu”) from the Fluke Networks website, or contact Fluke Networks to get the update by other means. To access the software page, go to [www.flukenetworks.com](http://www.flukenetworks.com); then click on **Support and Downloads**. Save the file to your hard drive.
- 3 Connect the tester’s serial or USB port to the PC. Install a module in the OptiFiber mainframe, then turn on the tester.
- 4 Select **Utilities > OptiFiber Utilities > Software Update** from the LinkWare menu, locate and select the .ofu (OptiFiber update) file; then click **Open**. LinkWare makes initial choices on which software to install based on the versions currently installed in the mainframe and the module. Generally, you should not change these choices except to select languages to install or remove.

-continued-

## OF-500 OptiFiber Certifying OTDR

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- 5 Click **Start** to start the update process.
- 6 The OptiFiber tester reboots after the update is complete. To verify the update, press  **Version Info** from the **HOME** screen.
- 7 If you have additional modules to update, install each module in the tester and repeat steps 4, 5, and 6.
- 4 On the LinkWare menu select **Utilities > OptiFiber Utilities > Create Software Update MMC**.
- 5 Locate and select the .ofu file you downloaded; then click **Open**.
- 6 Locate and select the memory card drive; then click **OK**. LinkWare unzips the update file and copies the files to the memory card.

#### *Updating via a Memory Card Created with LinkWare*

#### **Caution**

**Do not use the PC's operating system to copy the update file to a memory card. The file must be unzipped first. Use LinkWare software to create a memory card for updating the tester.**

- 1 Install the latest version of LinkWare software on your PC. LinkWare is available on the Fluke Networks website.
- 2 Download the OptiFiber update file ("upgrade.ofu") 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](http://www.flukenetworks.com/support). Save the file to your hard drive.
- 3 Put a memory card into the PC's memory card drive.

#### **Caution**

**If you remove the memory card from the MMC reader before the files are completely copied the Windows operating system may report an error and OptiFiber shows the message "Bad update file". If this happens, repeat steps 4 through 6; then leave the card in the reader for a minute or so to ensure the files are completely copied.**

- 7 Put the memory card into the OptiFiber tester.
- 8 Install a module in the OptiFiber mainframe, then turn on the tester.

- 9 Press **FUNCTIONS** on OptiFiber; then select **Install Software Update**. The tester makes initial choices on which software to install based on the versions currently installed in the mainframe and the module. Generally, you should not change these choices except to select languages to install or remove.
- 10 Press **F5** **Start** to start the update process.
- 11 The OptiFiber tester reboots after the update is complete. To verify the update, press **F1** **Version Info** from the **HOME** screen.
- 12 If you have additional modules to update, insert each module and repeat steps 9, 10, and 11.

### Copying Settings Between Testers

You can use LinkWare software to copy settings from one tester to another. See the OptiFiber or LinkWare online help or Technical Reference Handbook for details.

### Optical Connector Care

- Periodically clean and inspect the tester's optical connectors as described on pages 39 and 58.
- Cover the connectors with the protective caps when no cable is connected.
- Periodically clean the protective caps with a lint-free swab or wipe and fiber optic solvent.

### Replacing Reference Test Cords and Launch Fibers

Choose replacement reference test cords and launch and receive fibers that meet the following requirements:

- Core and cladding size: match the fiber to be tested
- Connector polish: UPC for reference test cords and launch fibers
- Reference test cord length: minimum 2 m; maximum 5 m
- Launch and receive fiber length: 100 m minimum for multimode; 130 m minimum for singlemode

To ensure optimum performance from your tester, get replacement reference test cords and launch fibers from Fluke Networks.

### Replacing the Battery

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



Note

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

An internal lithium battery maintains the tester's clock and other settings when you remove the battery pack. This battery typically lasts about 5 years. When the battery begins to fail, the tester will lose the current date and time when you remove the battery pack. If the lithium battery fails, send the tester to a Fluke Networks service center for a replacement.

### Cleaning

Clean the display with glass cleaner or isopropyl alcohol and a soft, lint-free cloth. Clean the case with a soft cloth dampened with water or water and a mild soap.



Caution

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


### Storage

- Before storing the tester or an extra battery for an extended period, charge the battery to between 70 % and 90 % of full charge (2 or 3 LEDs lit on the battery's gauge). Check the battery every 4 months and recharge if necessary.
- Keep a battery attached to the tester during storage. Removing the battery for long periods shortens the life of the lithium battery that maintains the clock.
- See "Environmental and Regulatory Specifications" on page 101 for storage temperatures.



## Calibration

The tester requires a traceable calibration once a year to ensure that it meets or exceeds the published accuracy specifications. Contact an authorized Fluke Networks Service Center for information on getting your tester calibrated.

To see when the tester last received a traceable calibration, press  **Version Info** from the **HOME** display.

## Options and Accessories


For the latest list of OptiFiber options and accessories and a complete list of fiber test accessories visit the Fluke Networks website at [www.flukenetworks.com](http://www.flukenetworks.com).

To order options and accessories contact an authorized Fluke Networks distributor or contact Fluke Networks as described on page 3.


## If Something Seems Wrong

If something seems wrong with the tester, refer to Table 2.

If the problem continues, refer to “Getting Help” below.

**Tip:** Online help is available for many error messages. Press  when an error message appears to see information about the error.


## Getting Help

If Table 2 does not help you solve a problem with the tester, contact Fluke Networks for additional help. If possible, have the tester’s serial number, software and hardware versions, and calibration date available. Press  **Version Info** from the **HOME** display to see this information.




For warranty information, refer to the warranty at the beginning of this manual. If the warranty has lapsed, contact Fluke Networks for repair prices.

Table 2. Troubleshooting the Tester

**Symptom 1: The keypad does not respond.**

Press and hold  until the tester turns off. Then turn the tester on again. If the problem persists, try updating the tester's software.

**Symptom 2: System error occurs.**

Press  **OK**, or press  for more information. If the tester does not recover, press and hold  until the tester turns off. If the error recurs, update the tester's software. If the tester already has the latest software, contact Fluke Networks for assistance.

**Symptom 3: A module is installed, but the message "No Module Installed" or "Problem with Module" shows on the screen.**

The module and mainframe may have incompatible software versions. Install the latest software version in the module and mainframe.

Verify that the module is pushed completely into the mainframe. Inspect the module and mainframe connectors for contamination or damage.

**Symptom 4: The tester will not turn on, even with the ac adapter connected.**

The battery may be completely discharged. Let the battery charge for a few minutes with the tester off.

**Symptom 5: The tester will not turn on even though the battery is charged.**

The battery's safety switch has tripped. Connect the ac adapter for a few minutes to reset the switch.

Table 2. Troubleshooting the Tester (cont.)

**Symptom 6: The noise level on the OTDR trace has increased or the OTDR connector reflection has a large deadzone. (See Figure 40.)**

The fiber endface in the OTDR connector may be dirty or damaged. Clean the connector and inspect the endface with a fiber video microscope. If an endface is damaged, contact Fluke Networks for service information.

**Symptom 7: The reference test cords and adapters are good, but the reference power level is too low.**

Clean the tester's INPUT and OUTPUT connectors and use a fiber microscope to inspect the endfaces. If an endface is damaged, contact Fluke Networks for service information.

**Symptom 8: A loss/length test produces a negative loss reading.**

There is a problem with the reference. Set the reference and test the cabling again. See "Diagnosing Loss/Length Test Failures" in the online help or Chapter 6 of the Technical Reference Handbook for details.

**Symptom 9: Test results appear to be incorrect.**

The tester may not be configured correctly. If you are using Manual OTDR mode, try testing in Auto OTDR mode.

In the Technical Reference Handbook see "Diagnosing OTDR Test Failures" in Chapter 3, "Diagnosing Loss/Length Test Failures" in Chapter 6, and "Power Meter Results" in Chapter 8 for information on how misconfigurations may affect your test results. This information is also provided in the online help.

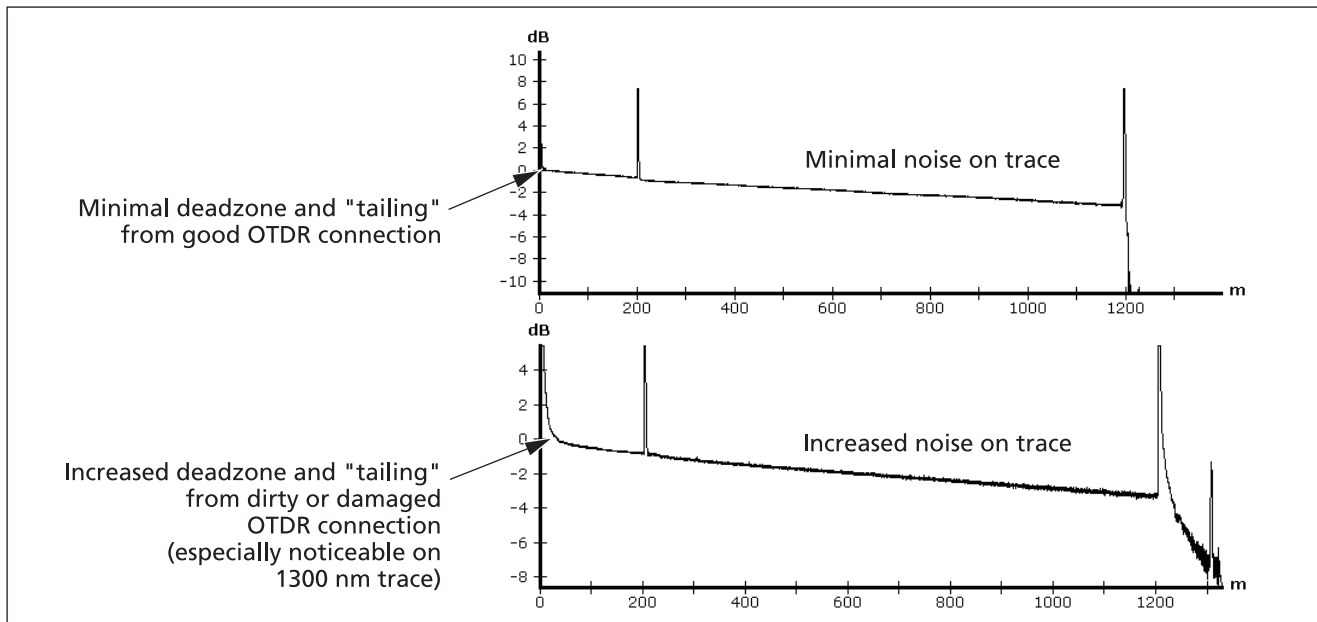
**Symptom 10: The message "Selected test limit or fiber type is not valid with this test" appears.**

You need to select a different test limit or fiber type. For details, press  when the message appears.

### Signs of a Bad OTDR Connector

Figure 40 shows traces from OTDRs with good and poor OTDR port connections. The tester's **OTDR Port Connection**

**Quality gauge** (page 30) lets you know if the connection is poor. Use a fiber microscope to inspect the connector for dirt and damage. If the connector is damaged, contact Fluke Networks for service information.



ajt34f.eps

Figure 40. Traces Showing Good and Bad OTDR Connectors

## Specifications

Specifications apply at 23 °C (73 °F), unless otherwise noted.

### Environmental and Regulatory Specifications

<b>Operating temperature*</b>	32 °F to 104 °F (0 °C to 40 °C)
<b>Storage temperature</b>	-4 °F to +140 °F (-20 °C to +60 °C)
<b>Operating relative humidity (% RH without condensation)</b>	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)
<b>Vibration</b>	Random, 2 g, 5 Hz-500 Hz
<b>Shock</b>	1 m drop test with and without module
<b>Safety</b>	CSA C22.2 No. 1010.1: 1992 EN 61010-1 1 <sup>st</sup> Edition + Amendments 1, 2
<b>Altitude</b>	3000 m
<b>EMC</b>	EN 61326-1
* Using battery power. With ac power: 0 °C to 45 °C. Real Time Trace function used for no more than 5 minutes in a 15-minute period. Maximum ambient temperature is 35 °C for continuous use of the Real Time Trace function.	

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#### OTDR Specifications for OFTM-561xB Multimode Modules

<b>Testing speed</b>	< 10 s for two wavelengths at 2 km with 25 cm resolution < 30 s for two wavelengths at 400 m with 3 cm resolution <sup>1</sup>
<b>Output/input connector</b>	Removable/cleanable SC adapter, UPC polish
<b>Emitter type</b>	Fabry-Perot laser diode
<b>Laser classification</b>	Class I CDRH Complies to EN 60825-2
<b>Output wavelengths</b>	850 nm ± 20 nm 1300 nm ± 20 nm
<b>Fiber types tested</b>	50/125 µm or 62.5/125 µm multimode
1. For Auto OTDR mode. Manual OTDR mode: < 100 s.	

### OTDR Specifications for OFTM-561xB Multimode Modules (cont.)

<b>Event deadzones<sup>2</sup></b>	850 nm: 0.5 m typical 1300 nm: 1.3 m typical
<b>Attenuation deadzones<sup>3</sup></b>	850 nm: 4.5 m typical 1300 nm: 10.5 m typical
<b>Maximum measurement range<sup>4</sup></b>	850 nm: 3 km 1300 nm: 7 km
<b>Dynamic range<sup>5</sup></b>	850 nm: >15 dB typical 1300 nm: >14 dB typical
<b>Output power</b>	850 nm: > 110 mW-pk 1300 nm: > 22 mW-pk
<ol style="list-style-type: none"> <li>2. Measured at 1.5 dB below reflection peak for typical connector with UPC polish (reflectance &lt; -37 dB multimode) using narrowest pulse width (4 ns at 850 nm; 8 ns otherwise) at near end (100 m, which excludes dispersion). See Figure 41.</li> <li>3. Measured at <math>\pm 0.5</math> dB beyond backscatter for typical connector with UPC polish (reflectance of &lt; -37 dB multimode) using 40 ns pulse width (20 ns at 850 nm) at near end (100 m, which excludes dispersion). See Figure 41.</li> <li>4. Distance ranges for typical fiber loss. For typical fiber with backscatter coefficients of -67 dB at 850 nm and -74 dB at 1300 nm. Manual mode provides a nominal 8 km range for multimode; however, the typical ranges for measuring loss are shown here.</li> <li>5. SNR=1 method. Subtract 1.56 dB to compare to Telecordia 98 % method.</li> </ol>	

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**OTDR Specifications for OFTM-561xB Multimode Modules (cont.)**

<b>Loss threshold<sup>6</sup></b>	0.2 dB
<b>Distance accuracy<sup>7</sup></b>	$\pm 1 \text{ m} \pm 0.005 \%$ of distance $\pm 50 \%$ of resolution $\pm$ index of refraction error
<b>Linearity<sup>8</sup></b>	$\pm 0.07 \text{ dB/dB}$
<b>Sampling resolution</b>	3 cm to 50 cm
<b>Reflectance accuracy<sup>9,10</sup></b>	$\pm 4 \text{ dB}$
<b>Optical return loss accuracy<sup>9,10</sup></b>	$\pm 4 \text{ dB}$
<b>Minimum pulse width</b>	850 nm: 4 ns 1300 nm: 8 ns
<b>Real time trace refresh rate</b>	2 updates per second typical

- 6. 6 dB above the noise floor.
- 7. Does not apply to event table.
- 8. Not applicable to OTDR tests using the narrowest pulse width (4 ns at 850 nm; 8 ns otherwise).
- 9. Not applicable to OTDR tests using the narrowest pulse width (4 ns at 850 nm; 8 ns otherwise).
- 10. Not applicable to hidden events. Upper limit of -40 dB reflectance typical at the near end (100 m).



### OTDR Specifications for OFTM-573x Singlemode Modules

<b>Testing speed per wavelength</b>	Auto OTDR mode: 15 seconds typical Manual OTDR mode: user-selectable from 15 seconds to 3 minutes. <b>Auto, Auto Test Time</b> , and <b>Auto Deadzone</b> settings: 5 seconds to 3 minutes
<b>Output/input connector</b>	Removable/cleanable SC adapter, UPC polish
<b>Emitter type</b>	Fabry-Perot laser diode
<b>Laser classification</b>	Class I CDRH Complies to EN 60825-2
<b>Output wavelengths</b>	1310 nm $\pm$ 25 nm 1550 nm $\pm$ 30 nm
<b>Fiber types tested</b>	9/125 $\mu$ m singlemode

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OTDR Specifications for OFTM-573x Singlemode Modules (cont.)

<b>Event deadzones<sup>1</sup></b>	1310/1550 nm: 1 m typical
<b>Attenuation deadzones<sup>2</sup></b>	1310/1550 nm: 8 m typical
<b>Maximum measurement range<sup>3,4</sup></b>	1310 nm: 60 km 1550 nm: 60 km

1. For singlemode: measured at 1.5 dB below the reflection peak for a typical singlemode UPC connector (< -50 dB reflection using 5 ns pulse width). Refer to Figure 41.
2. For singlemode: measured at  $\pm 0.5$  dB beyond the backscatter for a typical singlemode UPC connector (< -50 dB reflection using 20 ns pulse width). Figure 41.
3. For typical fiber with backscatter coefficients of -77 dB at 1310 nm and -82 dB at 1550 nm.
4. Distance ranges for loss in a typical fiber. Greater than 3 dB above the noise floor at 60 km.
5. EDZ: Event deadzone. ADZ: Attenuation deadzone. EDZ is valid only for Fresnel (non-saturating) reflections.

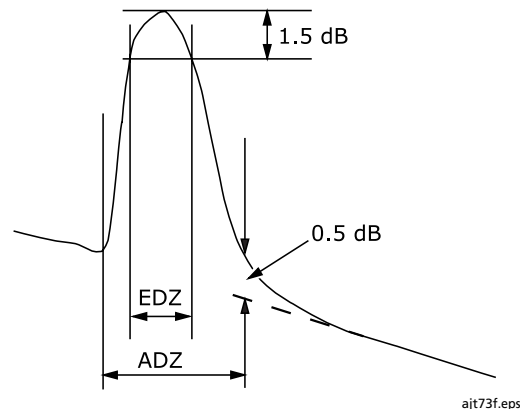


Figure 41. Event and Attenuation Deadzone Measurement Methods<sup>5</sup>

### OTDR Specifications for OFTM-573x Singlemode Modules (cont.)

<b>Dynamic range<sup>6,7</sup></b>	1310 nm: 26 dB typical with 10 $\mu$ s pulse width 1550 nm: 24 dB typical with 10 $\mu$ s pulse width
<b>Output power</b>	1310 nm: > 28 mW-pk 1550 nm: > 24 mW-pk
<b>Loss threshold</b>	0.01 dB to 1.50 dB inclusive, settable in 0.01 dB increments
<b>Distance accuracy<sup>8</sup></b>	$\pm 1$ m $\pm 0.005$ % of distance $\pm 50$ % of resolution $\pm$ index of refraction error
<b>Linearity</b>	$\pm 0.05$ dB/dB
<b>Sampling resolution</b>	3 cm to 400 cm
<p>6. For typical fiber, with backscatter coefficients of -77 dB at 1310 nm and -82 dB at 1550 nm.</p> <p>7. SNR=1 method. Subtract 1.56 dB to compare to Telecordia 98 % method; 3 minutes of averaging.</p> <p>8. Does not apply to the event table.</p>	

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**OTDR Specifications for OFTM-573x Singlemode Modules (cont.)**

<b>Reflectance accuracy<sup>9</sup></b>	$\pm 4$ dB
<b>Optical return loss accuracy<sup>10</sup></b>	$\pm 4$ dB
<b>Pulse widths (nominal)</b>	1310 / 1550 nm: 5 ns, 20 ns, 40 ns, 100 ns, 300 ns, 1 $\mu$ s, 3 $\mu$ s, 10 $\mu$ s
<b>Real time trace refresh rate</b>	2 updates per second typical
9. Not applicable to hidden events or 5 ns pulse width; does not include error due to backscatter coefficient.	
10. Not applicable to 5 ns pulse width; does not include error due to backscatter coefficient.	



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1-877-742-TEST (8378)  
Fax: (732) 222-7088  
salesteam@Tequipment.NET**

### Power Meter Specifications

<b>Testing speed, worst case</b>	4.5 s (Far End Source mode)
<b>Input connector</b>	Interchangeable SC/ST/FC/LC (non contact)
<b>Detector type</b>	InGaAs
<b>Calibrated wavelengths</b>	850 nm, 1300/1310 nm, 1550 nm
<b>Power measurement range</b>	1300/1310 nm and 1550 nm: 0 dBm to -60 dBm 850 nm: 0 dBm to -52 dBm
<b>Display resolution</b>	dB or dBm display: 0.01  Linear display ( $\mu\text{W}$ ):  <ul style="list-style-type: none"> <li>&gt; 400: 1</li> <li>&gt; 40: 0.1</li> <li>&gt; 4: 0.01</li> <li>&gt; 0.4: 0.001</li> <li><math>\leq 0.4</math>: 0.0001</li> </ul>

-continued-

**Power Meter Specifications (cont.)**

<b>Power measurement uncertainty (accuracy)</b>	$\pm 0.25 \text{ dB}^1$
<b>Measurement linearity (18 °C to 28 °C constant temperature)</b>	1300/1310 nm and 1550 nm: $\pm 0.1 \text{ dB}^2$ 850 nm: $\pm 0.15 \text{ dB}^3$
<b>Auto wavelength detect</b>	On OFTM-573x modules when used with a SimpliFiber source
<b>Re-calibration period</b>	1 year
<b>Display update rate</b>	1 reading per second
<p>1. Under the following conditions:</p> <ul style="list-style-type: none"> <li>• Power level: -20 dBm, continuous wave</li> <li>• At 850 nm: 62.5/125 <math>\mu\text{m}</math> fiber with 0.275 NA</li> <li>• At 1310 nm and 1550 nm: 9 /125 <math>\mu\text{m}</math></li> <li>• Ambient temperature: 23 °C <math>\pm</math> 5 °C</li> </ul> <p>2. Linearity for 1300 nm, 1310 nm, and 1550 nm:</p> <ul style="list-style-type: none"> <li>• Between 0 dBm and -55 dBm: <math>\pm 0.1 \text{ dB}</math></li> <li>• &lt; -55 dBm: <math>\pm 0.2 \text{ dB}</math></li> </ul> <p>3. Linearity for 850 dBm:</p> <ul style="list-style-type: none"> <li>• Between -15 dBm and -52 dBm: <math>\pm 0.15 \text{ dB}</math> typical performance</li> <li>• Between 0 dBm and -15 dBm: <math>\pm 0.5 \text{ dB}</math> typical performance</li> </ul>	

## Loss/Length Specifications

Specification	OFTM-5x12B Multimode Modules	OFTM-5732B Singlemode Modules
<b>Testing speeds (excluding referencing times)</b>	Far End Source mode: 4.5 s Loopback mode: 5 s typical Smart Remote detection: 3 s Smart Remote mode, unidirectional: 15 s Smart Remote mode, bi-directional: 30 s plus time to swap fibers	Far End Source mode: 4.5 s Loopback mode: 5 s typical Smart Remote detection: 3 s Smart Remote mode, unidirectional: 15 s Smart Remote mode, bi-directional: 30 s plus time to swap fibers
<b>Output connector</b>	SC with PC polish	SC with PC polish
<b>Input connector</b>	Interchangeable SC/ST/FC/LC (non contact)	Interchangeable SC/ST/FC/LC (non contact)
<b>Fiber types tested</b>	9 /125 $\mu\text{m}$ to 62.5 /125 $\mu\text{m}$ multimode	9 /125 $\mu\text{m}$ singlemode
<b>Output wavelengths</b>	Multimode LED source: 850 nm and 1300 nm	Laser source: 1310 nm and 1550 nm
<b>Laser classification</b>	NA	Class I CDRH Complies to EN 60825-2

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Loss/Length Specifications (cont.)

Specification	OFTM-5612B Multimode Modules	OFTM-5732 Singlemode Modules
<b>Maximum length measurement</b>	5 km of 50 $\mu$ m or 62.5 $\mu$ m multimode fiber	20 km of 9 $\mu$ m singlemode fiber
<b>Measurement range<sup>1</sup></b>	2 km for Smart Remote and Loopback modes 20 km for Far End Source mode <sup>2</sup>	10 km for Smart Remote and Loopback modes 60 km for Far End Source mode <sup>2</sup>
<b>Length measurement accuracy</b>	$\pm 1.5$ m plus $\pm 2$ % of length	$\pm 1.5$ m plus $\pm 2$ % of length
<b>Propagation time accuracy</b>	$\pm 15$ ns plus $\pm 2$ % of propagation time	$\pm 15$ ns plus $\pm 2$ % of propagation time
<b>Output power (nominal)</b>	> -20 dBm minimum; -19.5 dB nominal	> -8 dBm minimum; -7 dBm nominal
<b>Output power stability over 8-hour period (after 5 minute warmup)</b>	$\pm 0.1$ dB at 73 °F (23 °C)	$\pm 0.1$ dB at 73 °F (23 °C)
<b>Detector type</b>	InGaAs	InGaAs

1. Far End Source mode does not include length or propagation delay measurements.  
2. 60 km at 1310/1550 nm on singlemode fiber, 20 km at 1300 nm on multimode fiber, 5 km at 850 nm on multimode fiber.



**Loss/Length Specifications (cont.)**

Specification	OFTM-5612B Multimode Modules and OFTM-5732 Singlemode Modules
Calibrated wavelengths	850 nm, 1300/1310 nm, 1550 nm
Auto wavelength detect	On OFTM-573x modules when used with a SimpliFiber source
Power measurement range	850 nm: 0 dBm to -52 dBm 1300/1310 nm and 1550 nm: 0 dBm to -60 dBm
Display Resolution	dB or dBm display: 0.01  Linear display ( $\mu$ W):  <ul style="list-style-type: none"> <li>&gt; 400: 1</li> <li>&gt; 40: 0.1</li> <li>&gt; 4: 0.01</li> <li>&gt; 0.4: 0.001</li> <li><math>\leq</math> 0.4: 0.0001</li> </ul>

-continued-

Loss/Length Specifications (cont.)

Specification	OFTM-5612B Multimode Modules	OFTM-5732 Singlemode Modules
Power measurement uncertainty (accuracy) <sup>3</sup>	± 0.25 dB	± 0.25 dB
Measurement linearity <sup>4,5</sup> (18 °C to 28 °C constant temperature)	1300 nm: ± 0.1 dB 850 nm: ± 0.15 dB	± 0.1 dB
Dynamic range for main-remote communication and nominal length measurement	12 dB	22 dB
Re-calibration period	1 year	1 year
Display update rate	1 reading per second	1 reading per second
<p>3. Under the following conditions:</p> <ul style="list-style-type: none"> <li>• Power level: -20 dBm, continuous wave</li> <li>• At 850 nm: 62.5/125 µm fiber with 0.275 NA</li> <li>• At 1310 nm and 1550 nm: 9 /125 µm</li> <li>• Ambient temperature: 23 °C ± 5 °C</li> </ul>		
<p>4. Linearity for 1300 nm, 1310 nm, and 1550 nm:</p> <ul style="list-style-type: none"> <li>• Between 0 dBm and -55 dBm: ± 0.1 dB</li> <li>• &lt; -55 dBm: ± 0.2 dB</li> </ul>		
<p>5. Linearity for 850 dBm:</p> <ul style="list-style-type: none"> <li>• Between -15 dBm and -52 dBm: ± 0.15 dB typical performance</li> <li>• Between 0 dBm and -15 dBm: ± 0.5 dB typical performance</li> </ul>		

**Visual Fault Locator Specifications (OFTM-573x Modules)**

<b>On/off control</b>	Controlled by the OptiFiber software (no hardware switch)
<b>Output power (into SM fiber)</b>	$316 \mu\text{w} (-5 \text{ dBm}) \leq \text{peak power} \leq 1.0 \text{ mw} (0 \text{ dBm})$
<b>Operating wavelength</b>	650 nm nominal
<b>Spectral width (RMS)</b>	$\pm 3 \text{ nm}$
<b>Output modes</b>	Continuous wave and pulse mode (2 Hz-3 Hz blink frequency)
<b>Connector adapter</b>	2.5 mm universal
<b>Laser safety</b>	Class II CDRH Complies to EN 60825-2

## OF-500 OptiFiber Certifying OTDR

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#### Power

<b>Battery type</b>	Lithium ion battery pack, 7.2 V
<b>Battery life</b>	8 hours of Auto OTDR operation with OFTM-5612 module, dual wavelength, 1 test run and saved every 5 minutes, no FiberInspector probe attached, 150 m of fiber
<b>Charge time</b>	6 hours maximum from total discharge

#### Traceable Calibration Period

To ensure maximum accuracy of test results, have the tester calibrated at a Fluke Networks authorized service center every 12 months.

#### Certifications and Compliance



Conformite Europeene. Conforms to the requirements of the European Union and the European Free Trade Association (EFTA).



Listed by the Canadian Standards Association.

#### Memory for Test Results

Test results can be stored on a removable MultiMediaCard (MMC), Secure Digital (SD) memory card, or in internal memory. Memory card capacity depends on the type of records saved. Typical capacity for a 16 MB card is over 400 OTDR tests.

The amount of internal memory available for test results depends on the space used by the tester's software and custom test limits.

To see the memory space available for different record types on an installed memory card or in internal memory, press



; then select **Memory Status**.

## Serial Interfaces

The tester has a USB client interface and an EIA/TIA-232 (RS-232; DB9) interface for uploading test results to a PC and updating the tester's software.

The RS-232 serial port connects to a PC with a null-modem cable. Tables 3 and 4 and show the pin connections for the cable and the 9-to-25-pin adapter available from Fluke Networks.

**Table 3. RS-232 Interface Cable Connections**

Tester End (female DB9)		Direction	PC End (female DB9)	
Signal Name	Pin		Pin	Signal Name
Data carrier detect	1	←	4	Data terminal ready
Receive data	2	←	3	Transmit data
Transmit data	3	→	2	Receive data
Data terminal ready	4	→	1	Data carrier detect
Signal ground	5	←→	5	Signal ground
Not connected	6		6	Not connected
Request to send	7	→	8	Clear to send
Clear to send	8	←	7	Request to send
Not connected	9		9	Not connected

Table 4. 9-to-25-Pin Adapter

9-pin Connector	25-pin Connector
3	2
2	3
7	4
8	5
6	6
5	7
1	8
4	20
9	22
Shell	Shell

### Keyboard Port

Six-pin mini DIN (PS/2)

### Video Port for FiberInspector Probe

NTSC input jack

### Dimensions (with module and battery installed)

10.6 in x 7.5 in x 2.5 in (26.9 cm x 19.1 cm x 6.4 cm)

### Weight (with module and battery installed)

4.5 lb (1.9 kg)


### Display

Six-inch diagonal, full VGA, passive color, transmissive LCD with backlight.

### Fan

The fan turns on when the module temperature reaches about 95 °F (35 °C) and turns off at about 86 °F (30 °C).

### FiberInspector Probe Specifications

<b>Magnification</b>	Switchable between 250X and 400X
<b>Camera type</b>	0.33 in (8.38 mm) CCD with adjustable focus
<b>Light source</b>	LED
<b>Connection to OptiFiber tester</b>	8-pin mini DIN to NTSC video port
<b>Power source</b>	Powered by the OF-500 OptiFiber tester
<b>Lighting technique</b>	Coaxial
<b>Dimensions</b>	1.8 in x 1.7 in x 5.5 in (45.7 mm x 43.2 mm x 140 mm) (length depends on adapter tip)
<b>Weight</b>	0.4 lb (180 g)
<b>Temperature range</b>	Operating: 32 °F to 104 °F (0 °C to 40 °C) Storage: 14 °F to 140 °F (-10 °C to +60 °C)
<b>Humidity range</b>	Operating: 0 % to 45 % RH non-condensing Storage: 0 % to 95 % RH non-condensing
<b>Certifications</b>	 (when used with the OF-500 OptiFiber tester)

### **Regulatory Information**

This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15, Subpart J of the FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of the equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.



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**salesteam@Tequipment.NET**



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