

Fluke Networks DTX-CLT CertiFiber Specs

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DTX-CLT CertiFiber®

Optical Loss Test Set

Users Manual

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DTX-CLT CertiFiber® Optical Loss Test Set

Overview of Features

The DTX-CLT CertiFiber Optical Loss Test Set (OLTS) is a rugged, hand-held instrument used to test and certify fiber optic cabling installations. The tester offers the following functions and features:

- Measures optical power loss and length on dual-fiber cabling. The DTX-MFM2 module tests multimode cabling at 850 nm and 1300 nm. The DTX-SFM2 module tests singlemode cabling at 1310 nm and 1550 nm. The DTX-GFM2 module features a VCSEL for testing multimode cabling at 850 nm and 1310 nm when a VCSEL source is required.
- Each module transmits both wavelengths (850 nm and 1300 nm, 850 nm and 1310 nm, or 1310 nm and 1550 nm).
- Interchangeable connector adapters allow reference and test connections that meet ISO standards for most SFF (small form factor) fiber connectors.
- Provides pass/fail results based on industry-standard limits.

- Visual fault locator helps you locate breaks, bad splices, bends, and check fiber continuity and polarity.
- FindFiber™ function helps you identify and verify fiber connections.

Registration

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services. To register, fill out the online registration form on the Fluke Networks website at www.flukenetworks.com/registration.

Contacting Fluke Networks

Note

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



www.flukenetworks.com



support@flukenetworks.com



+1-425-446-4519

- Australia: 61 (2) 8850-3333 or 61 (3) 9329 0244
- Beijing: 86 (10) 6512-3435
- Brazil: 11 3759 7600
- Canada: 1-800-363-5853
- Europe: +31-(0) 40 2675 600
- Hong Kong: 852 2721-3228
- Japan: 03-6714-3117
- 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.

Accessing the Technical Reference Handbook

The *DTX Series CableAnalyzer Technical Reference Handbook* provides additional information on the tester and the fiber modules. The handbook is available on the CD included with your DTX-CLT CertiFiber and on the DTX CableAnalyzer product page on the Fluke Networks website.

Additional Resources for Cable Testing Information

The Fluke Networks Knowledge Base provides answers to common questions about Fluke Networks products, along with articles on cable testing techniques and technology. To access the Knowledge Base, log on to www.flukenetworks.com, then click **Support > Knowledge Base** at the top of the page.

Unpacking

The DTX-CLT CertiFiber tester comes with the accessories listed below. If something is damaged or missing, contact the place of purchase immediately.

DTX-CertiFiber-M Multimode Kit

- DTX-CLT CertiFiber with lithium-ion battery pack
- DTX-CLT CertiFiber SmartRemote with lithium-ion battery pack
- Two DTX-MFM2 Fiber Modules for testing at 850 nm and 1300 nm
- Two 50/125 μm multimode test reference cords, 2 m, SC/SC
- Two red mandrels for 50 /125 μm fiber with 3 mm jackets
- DTX-CLT CertiFiber Getting Started Guide
- DTX-CLT CertiFiber Product Manuals CD
- LinkWare Software CD

DTX-CertiFiber-S Singlemode Kit

- DTX-CLT CertiFiber with lithium-ion battery pack
- DTX-CLT CertiFiber SmartRemote with lithium-ion battery pack
- Two DTX-SFM2 Fiber Modules for testing at 1310 nm and 1550 nm.
- Two 9/125 μm singlemode test reference cords, 2 m, SC/SC
- DTX-CLT CertiFiber Getting Started Guide
- DTX-CLT CertiFiber Product Manuals CD
- LinkWare Software CD

DTX-CertiFiber-MS Multimode/Singlemode Kit

- DTX-CLT CertiFiber with lithium-ion battery pack
- DTX-CLT CertiFiber SmartRemote with lithium-ion battery pack
- Two DTX-MFM2 Fiber Modules for testing at 850 nm and 1300 nm
- Two 50/125 μm multimode test reference cords, 2 m, SC/SC
- Two red mandrels for 50 /125 μm fiber with 3 mm jackets

-continued-

- Two DTX-SFM2 Fiber Modules for testing at 1310 nm and 1550 nm.
- Two 9/125 μm singlemode test reference cords, 2 m, SC/SC
- DTX-CLT CertiFiber Getting Started Guide
- DTX-CLT CertiFiber Product Manuals CD
- LinkWare Software CD






Note

The test reference cords and connector adapter types provided are suitable for testing SC-terminated links. Other test reference cords and adapter types are required for other connector types or 62.5 /125 μm fiber. Many are available as accessories from Fluke Networks.

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.
	Do not connect this equipment to public communications networks, such as telephone systems.
	Warning: Class 1 laser (OUTPUT port). Risk of eye damage from hazardous radiation. Class 2 laser (VFL port). Do not stare into beam.
	Do not put products containing circuit boards into the garbage. Dispose of circuit boards in accordance with local regulations.

⚠ Warning ⚠

To avoid possible fire, electric shock, or personal injury:

- Do not open the case; no user-serviceable parts are inside.
- Do not modify the tester.
- Use only ac adapters approved by Fluke Networks for use with the DTX tester to charge the battery or power the tester.
- When servicing the tester, use only specified replacement parts.
- Do not use the tester if it is damaged. Inspect the tester before use.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Do not use the tester if it operates abnormally. Protection may be impaired.

⚠ Warning: Class 1 and Class 2 Laser Products ⚠

To avoid possible eye damage caused by hazardous radiation:

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

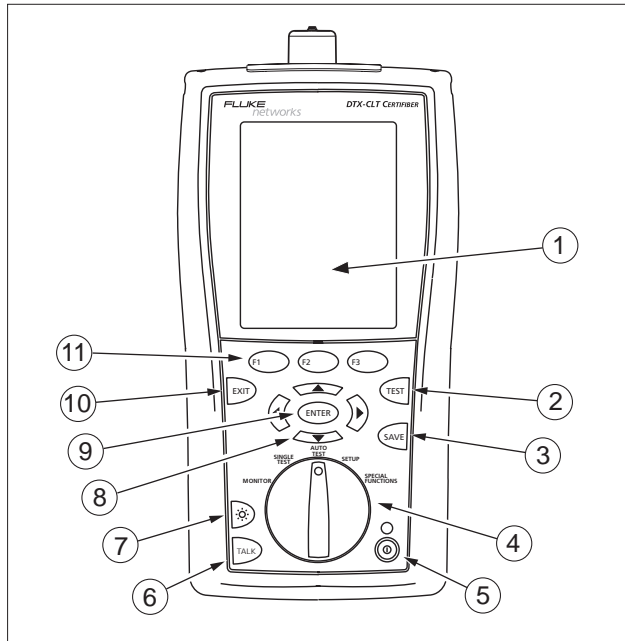
- Never look directly into the visual fault locator output. Momentary exposure to the locator's output will not damage your eyes; however, direct, long-term exposure is potentially hazardous.
- Do not use magnification to view the optical outputs without proper filtering.
- Use of controls, adjustments,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

 **Caution**

To avoid disrupting network operation, to avoid damaging the tester or cables under test, to avoid data loss, and to ensure maximum accuracy of test results:









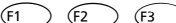
- Never connect the tester to an active network. Doing so may disrupt network operation.
- Always keep fiber modules installed in the testers.
- Turn off the tester before attaching or removing modules.
- When using the fiber modules, use proper cleaning procedures to clean all fiber connectors before every use. Neglecting this step or using improper procedures can cause unreliable test results and may permanently damage the connectors. See page 16.
- Use only high-quality test reference cords that comply with ISO/IEC 14763-3. Test the cords at regular intervals. See Appendix A.
- Cover all connectors with dust caps when not in use.
- Store the connector adapters for the fiber module in the canisters provided.
- Do not touch the photodiode lens (see Figure 6).
- Do not overtighten the adapter or use tools to tighten the adapter.
- Use a Fluke Networks FiberInspector Video Microscope to periodically inspect the fiber module's OUTPUT connector for scratches and other damage.

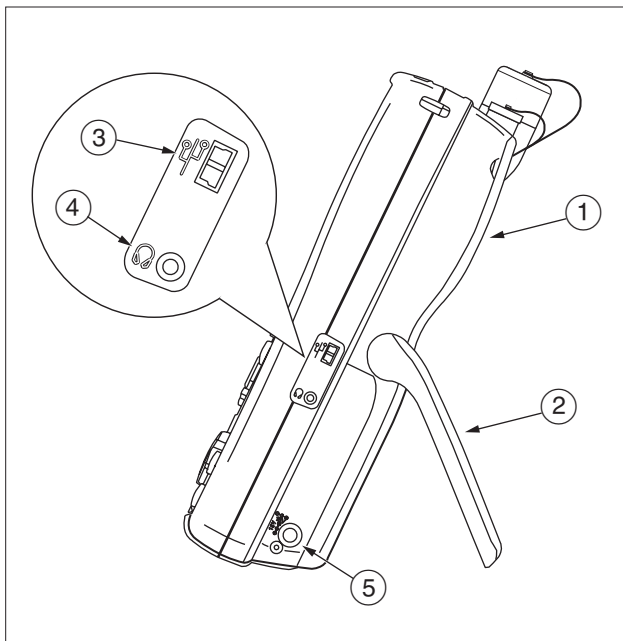
Physical Features



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Figure 1. Tester Front Panel Features

- ① LCD display with backlight and adjustable brightness.
- ②  : Starts the currently selected test.
- ③  : Saves Autotest results in memory.
- ④ Rotary switch selects the tester's modes.
- ⑤  : On/off key.
- ⑥  : Press to use the headset to talk to the person at the other end of the link.
- ⑦  : Press to switch the backlight between bright and dim settings. Hold for 1 second to adjust the display contrast.
- ⑧  : Arrow keys for navigating through screens and incrementing or decrementing alphanumeric values.
- ⑨  : Enter key selects the highlighted item from a menu.
- ⑩  : Exits the current screen without saving changes.
- ⑪  : The softkeys provide functions related to the current screen. The functions are shown on the screen above the keys.



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Figure 2. Tester Side and Top Panel Features

- ① Fiber module. See Figure 4.
- ② Bail.
- ③ USB port for uploading test reports to a PC and for updating the tester's software.
- ④ Headset jack for talk mode.
- ⑤ Connector for the ac adapter. The LED turns on when the tester is connected to ac power.
 - Red: Battery is charging.
 - Green: Battery is charged.
 - Flashing red: Charge timeout. The battery failed to reach full charge within 6 hours. See "Powering the Tester" on page 14.

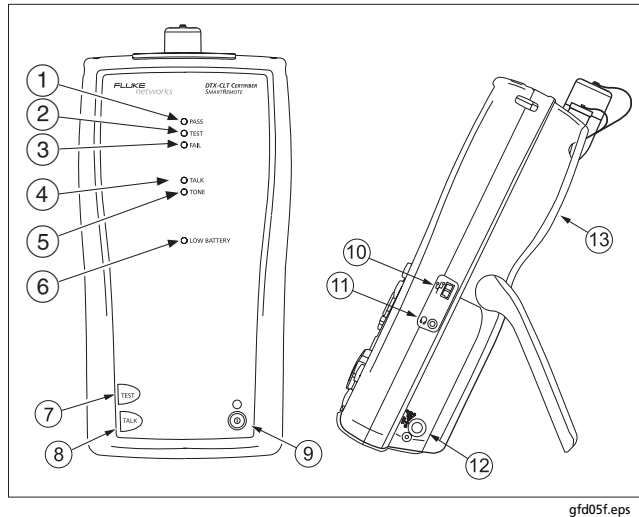


Figure 3. Smart Remote Features

Note

The LEDs also act as a battery gauge. See Figure 9 on page 15.

- ① Pass LED lights when a test passes.
- ② Test LED lights during cable tests.
- ③ Fail LED lights when a test fails.
- ④ Talk LED lights when the smart remote is in talk mode. Press **TALK** to adjust the volume.
- ⑤ The TONE LED is not used for tests on fiber cabling.
- ⑥ Low battery LED lights when the battery is low.
- ⑦ **TEST**: Starts the test currently selected on the main unit.
- ⑧ **TALK**: Press to use the headset to talk to the person at the other end of the link. Press again to adjust the volume. Press and hold to exit talk mode.
- ⑨ **Ⓞ**: On/off key.
- ⑩ USB port for updating the tester's software with a PC.
- ⑪ Headset jack for talk mode.
- ⑫ Connector for the ac adapter, as described in Figure 2.
- ⑬ Fiber module. See Figure 4.

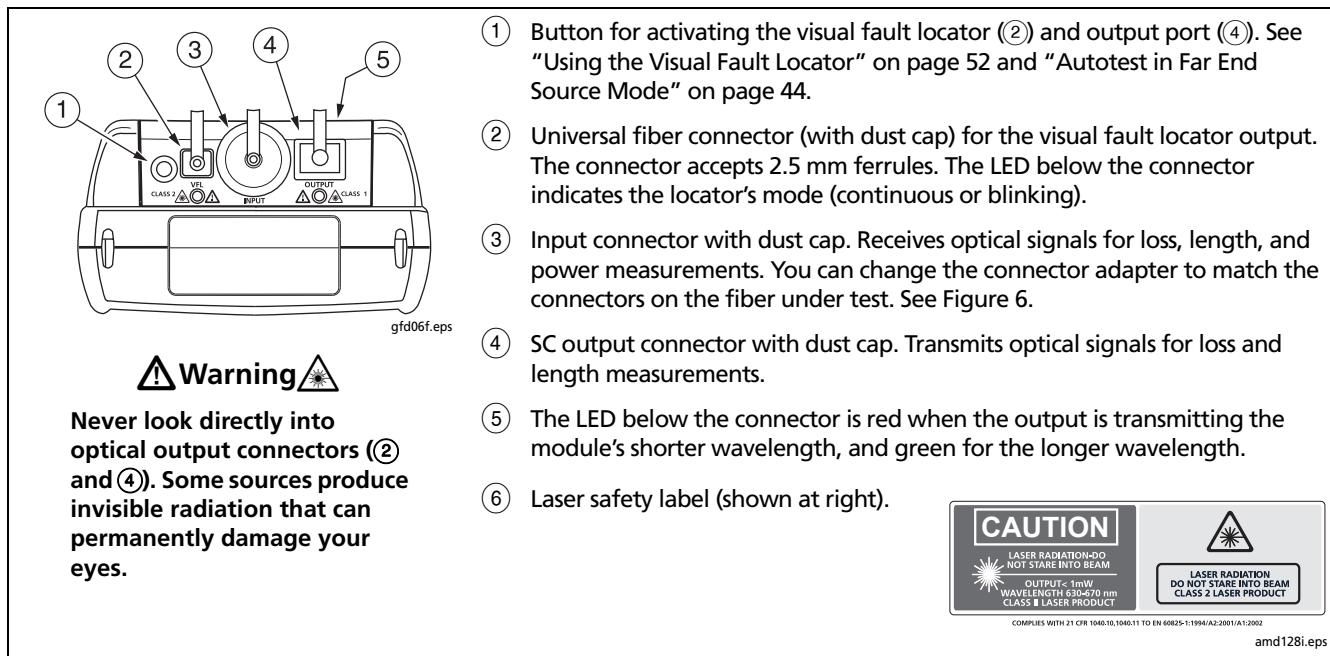


Figure 4. Fiber Module Features

Installing the Connector Adapter

You can change the fiber module's input connector adapter to connect to SC, ST, LC, and FC fiber connectors (Figure 5). Additional adapter styles may be available. Check the Fluke Networks web site for updates.

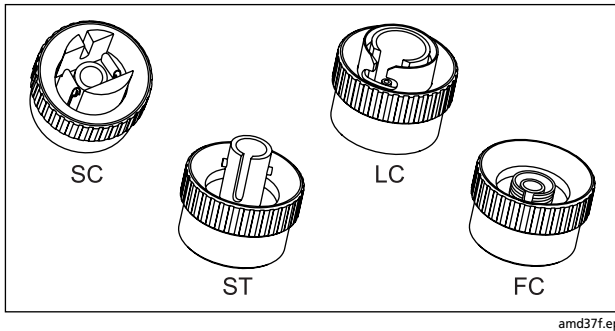


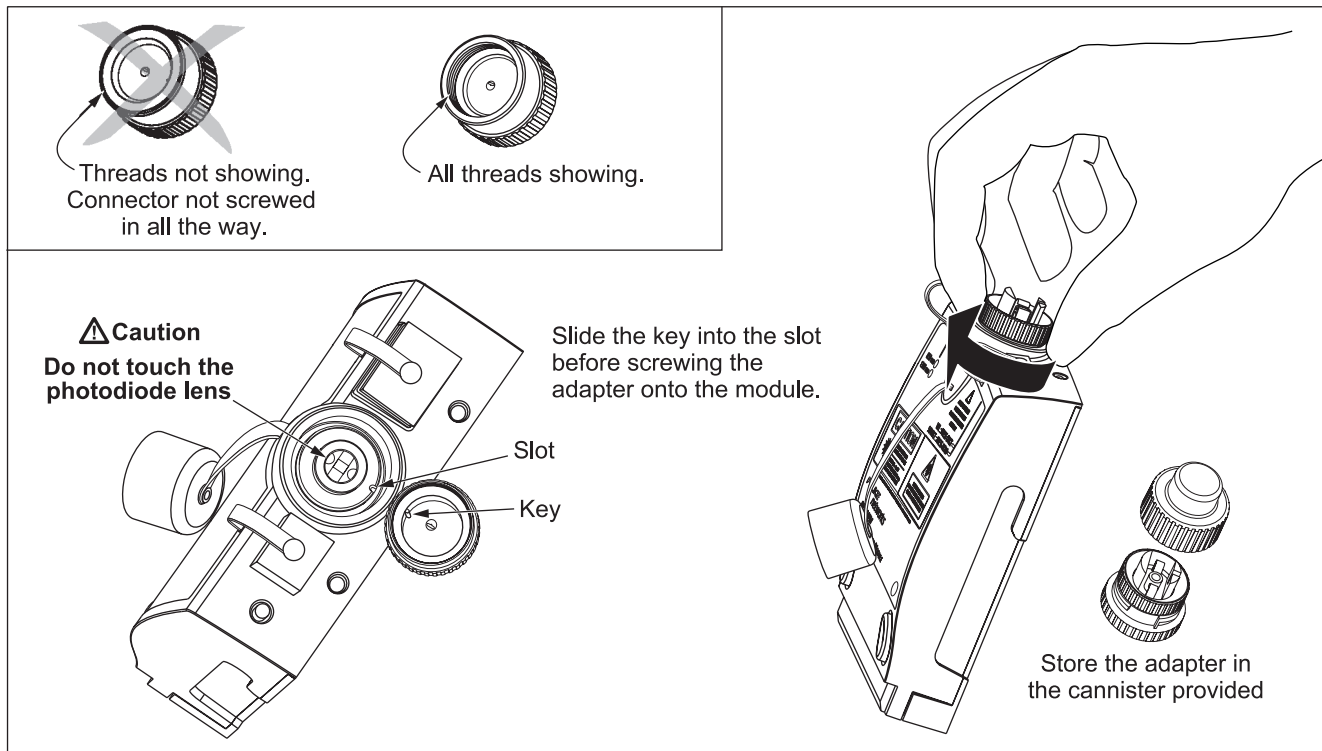
Figure 5. SC, ST, LC, and FC Connector Adapters

⚠ Caution

- **Cover all connectors with dust caps when not in use.**
- **Store the connector adapters for the fiber module in the canisters provided.**
- **Do not touch the photodiode lens (see Figure 6).**
- **Do not overtighten the adapter or use tools to tighten the adapter.**

To install a connector adapter, refer to Figure 6 and do the following:

- 1 Locate the slot in the fiber 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.



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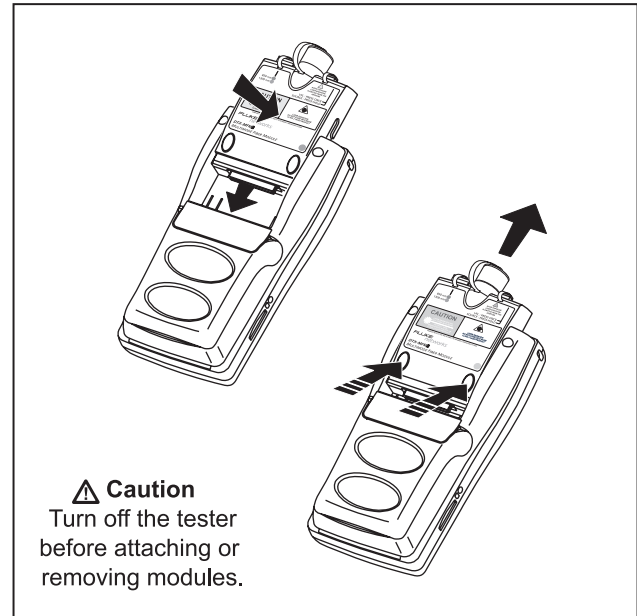
Figure 6. Installing the Connector Adapter

Installing and Removing Fiber Modules

Figure 7 shows how to install and remove the fiber modules.

Caution

To prevent damage to the module connectors, always keep fiber modules installed in the testers.



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Figure 7. Installing and Removing Fiber Modules

Powering the Tester

- You may charge the battery when it is attached or detached from the tester. Figure 8 shows how to remove the battery.
- The battery charges fully in about 4 hours with the tester off. A fully-charged battery lasts for at least 12 hours of typical use.

Note









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

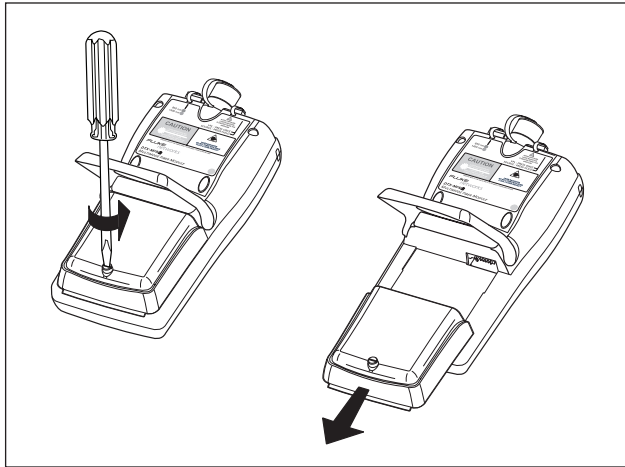
- The battery status icon () near the upper-right corner of main screens shows the battery's charge level. The smart remote's LEDs show the smart remote's battery status at the end of the power-up cycle, as shown in Figure 9.
- For additional battery information, connect the main tester and smart remote through link adapters, turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Battery Status**. See page 64 for information on retraining the battery gauge.

- If the battery does not reach full charge within 6 hours, the battery LED flashes red. Verify that the battery was within the temperature range given above during charging and that the correct ac adapter was used. Disconnect then reconnect ac power and try charging the battery again. If the battery does not charge the second time, retrain the battery gauge. See page 64.

Localizing the Tester

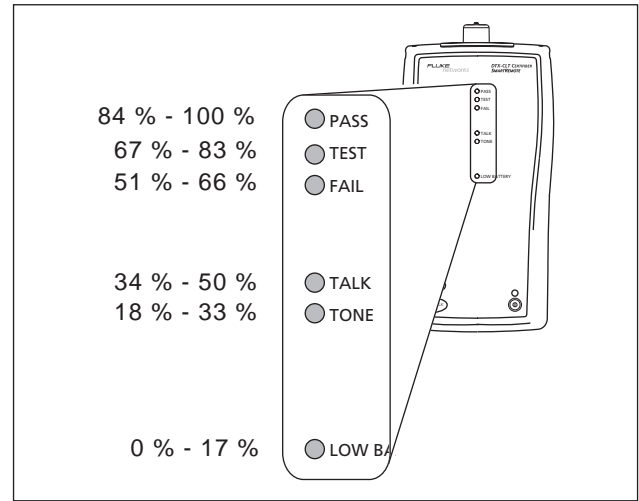
Local settings include **Language**, **Date**, **Time**, **Numeric Format**, **Length Units**, and **Power Line Frequency**.

- 1 Turn the rotary switch to **SETUP**.
- 2 Use  to highlight **Instrument Settings** at the bottom of the list; then press .
- 3 Use  and  to find and highlight **Language** on the bottom of tab **2**; then press .
- 4 Use  to highlight the desired language; then press .
- 5 Use the arrow keys and  to find and change other local settings on tabs **2**, **3**, and **4** under **Instrument Settings**.



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Figure 8. Removing the Battery Pack



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Figure 9. Smart Remote Battery Status Shown After Power-Up

Essentials for Reliable Fiber Test Results

To get reliable fiber test results, you must follow proper cleaning and referencing procedures and, in some cases, use mandrels during testing.

Cleaning 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:

Bulkhead Connectors and the Fiber Module's Output Connector

Note

Use a 2.5 mm foam swab for cleaning the fiber module's 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 endface, 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.

Fiber Module's Input Connector

- 1 Remove the connector adapter to expose the photodiode lens (see Figure 6).
- 2 Use the method described in steps 1 and 2 above to dampen a swab with 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.

Connector Adapters and Fiber Adapters

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

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.

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

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

About Setting the Reference

The reference serves as the baseline power level for loss measurements. Regular referencing helps account for minor variations in source power and connection integrity. Also, since the reference is the baseline for measurements, the losses of the test reference cords and adapters used during referencing are excluded from test results.

Note

Turn on the tester and smart remote and let them sit for 5 minutes before setting the reference. Allow additional time if the modules have been stored above or below ambient temperature.

You should set the reference at these times:

- At the beginning of each day using the remote end setup (Figures 13 through 23) you will use that day.
- Anytime you reconnect a test reference cord to the module's output or other source.
- Anytime the tester warns you that the reference is out of date.
- Anytime you see a negative loss measurement. (See the *Technical Reference Handbook* for more information.)

You must set the reference at these times:

- Anytime you change the fiber module in the tester or smart remote.
- Anytime you start using a different smart remote.
- Anytime you change the **Test Method** in Setup.
- Twenty-four hours after the reference was previously set.

Caution

Do not disconnect the test reference cords from the testers' output ports after setting the reference. Doing so may alter the amount of optical power launched into the fiber and invalidate the reference.

Reference values should not change by more than a few tenths of a dB from day to day. Larger changes may indicate a problem with the test reference cords or connections.

See the sections on Smart Remote, Loopback, and Far End Source modes for details on setting the reference for each mode.

Selecting Test Reference Cords

The DTX Fiber Modules come with high-quality test reference cords.

To ensure that your measurements are accurate and repeatable, use test reference cords provided by Fluke Networks or cords of the same quality. See "Replacing Fiber Test Reference Cords" on page 61.

Testing Your Test Reference Cords

You must test your test reference cords at regular intervals. Use the procedure given in Appendix A to test the cords initially. After that, use the procedure given with the procedures for certifying cabling to monitor the condition of the cords.

Using Mandrels for Testing Multimode Fiber

You should use mandrels when testing multimode fiber with the DTX-MFM2 fiber modules. Mandrels can improve measurement repeatability and consistency. They also allow the use of LED light sources to certify 50 μm and 62.5 μm fiber links for current and planned high bit-rate applications, such as Gigabit Ethernet and 10 Gigabit Ethernet.

Caution

Do not use mandrels when testing with the DTX-GFM2 fiber modules.

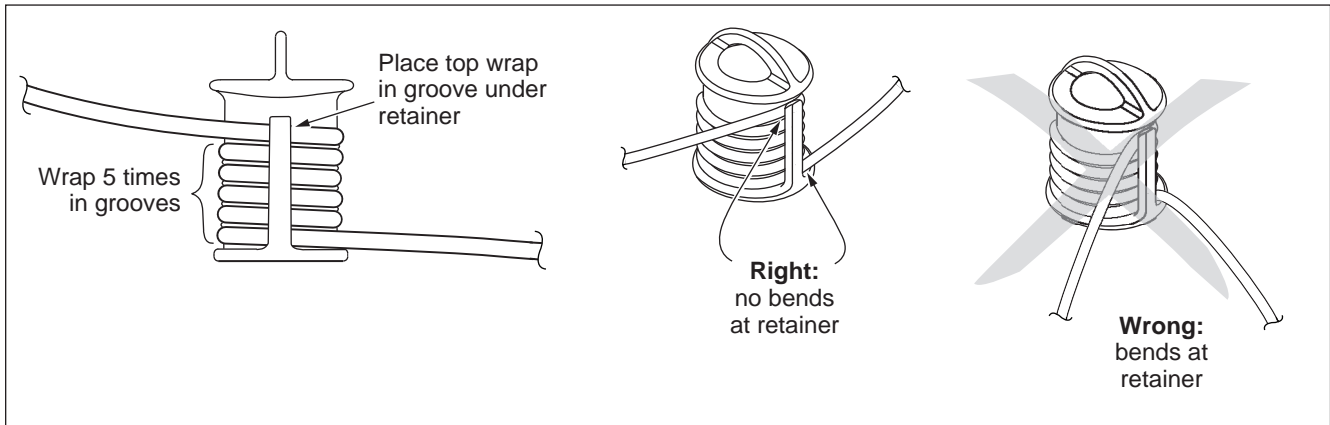
The red mandrels included with the DTX-MFM2 are compliant with ANSI/TIA-568-C for 50 μm fiber with a 3 mm jacket. Mandrels for 62.5 μm fiber are available from Fluke Networks. Refer to the appropriate standard for mandrel requirements if you follow other standards. Table 2 shows a partial list of mandrel requirements for TIA standards.

Figure 10 shows how to wrap the fiber around a mandrel. Place mandrels on the tester's output fibers, as shown in Figures 13 through 23.

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

Table 2. ANSI/TIA-568-C Mandrel Requirements

Fiber core size	Standard	Wraps Around Mandrel	Mandrel Diameter for 250 μm Buffered Fiber	Mandrel Diameter for 3 mm (0.12 in) Jacketed Cable
50 μm	ANSI/TIA-568-C.0 6.4.2.1	5	25 mm (1.0 in)	22 mm (0.9 in)
62.5 μm	ANSI/TIA-568-C.0 6.4.2.1	5	20 mm (0.8 in)	17 mm (0.7 in)





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Figure 10. Wrapping a Test Reference Cord Around a Mandrel

Fiber Test Settings

Table 3 describes the test settings that apply to fiber cabling.

To access the fiber test settings turn the rotary switch to **SETUP**; then select **Fiber Loss**. Use   to see different tabs.

Note

*The **Twisted Pair**, **Coax**, and **Network** settings do not apply to the DTX-CLT CertiFiber tester.*

Table 3. Fiber Test Settings

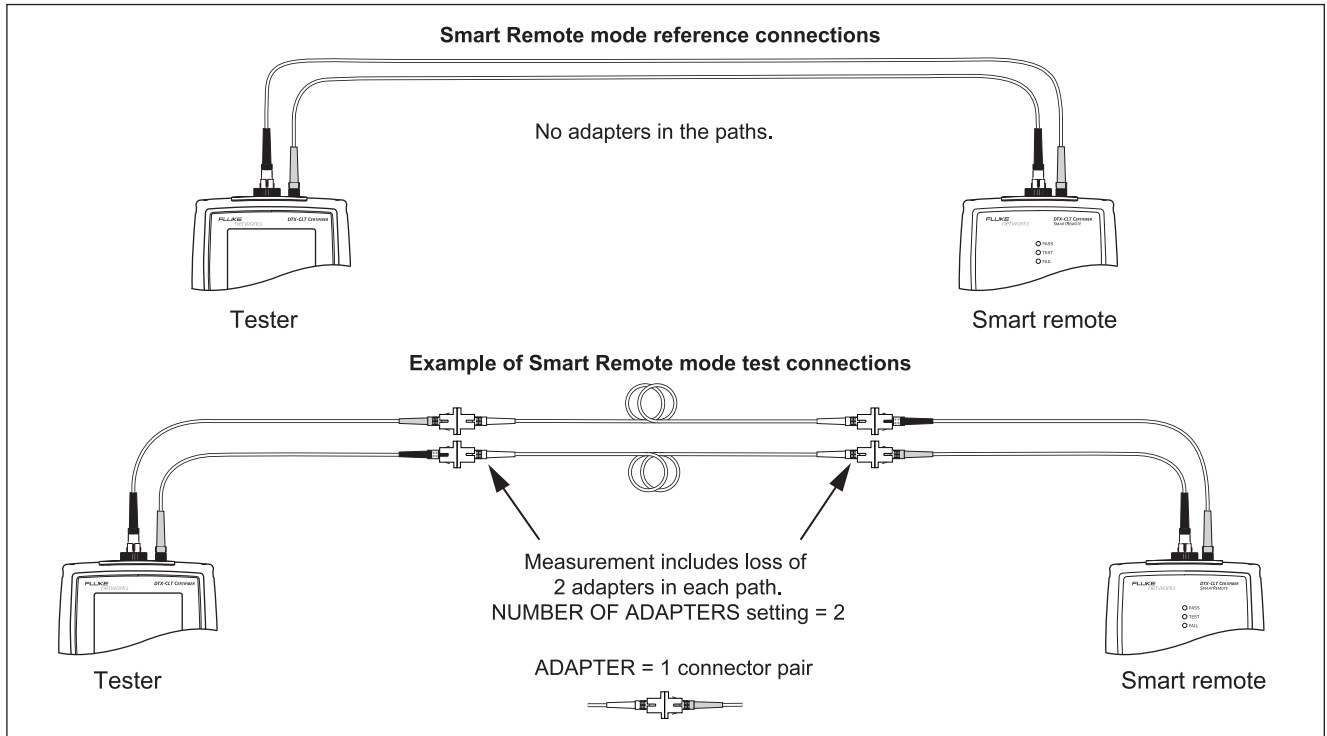
Setting	Description
SETUP > Fiber Loss > Test Limit	Select the appropriate test limit for the job. The tester compares the fiber test results to the selected test limit to produce PASS or FAIL results. Selecting Custom lets you create a test limit. See the Technical Reference Handbook for details.
SETUP > Fiber Loss > Fiber Type	Select a fiber type that is appropriate for the type you will test. Selecting Custom lets you create a fiber type. See the Technical Reference Handbook for details.
SETUP > Fiber Loss > Remote End Setup	<p>Use Smart Remote mode for testing dual-fiber cabling.</p> <p>Use Loopback mode for testing test reference cords and cable spools.</p> <p>Use Far End Source mode with an optical source for testing individual fibers.</p>

-continued-

Table 3. Fiber Test Settings (cont.)

Setting	Description
SETUP > Fiber Loss > Bi-Directional	When enabled in Smart Remote or Loopback mode, the tester prompts you to swap the test connections halfway through the test. The tester can then make bi-directional measurements for each fiber at each wavelength (850 nm/1300 nm, 850 nm/1310 nm, or 1310 nm/1550 nm).
SETUP > Fiber Loss > Number of Adapters SETUP > Fiber Loss > Number of Splices	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 11 shows an example of how to determine the Number of Adapters setting. Only limits that use maximum values for loss per km, loss per connector, and loss per splice use a calculated limit for overall loss. For example, limits for fiber backbones use a calculated loss limit.
SETUP > Fiber Loss > Connector Type	Select the type of connector used in the cabling. This setting affects only the diagrams shown for reference connections. If the cabling's connector type is not listed, use General .

-continued-



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Figure 11. Example of How to Determine the Number of Adapters Setting (singlemode example; mandrels not used)

Table 3. Fiber Test Settings (cont.)

Setting	Description
SETUP > Fiber Loss > Test Method	<p>Loss results include connections added after referencing. The reference and test connections determine which connections are included in results. The Test Method refers to the number of end connections included:</p> <p>2 Jumper: Loss results include one connection at one end of the link.</p> <p>1 Jumper: Loss results include connections at both ends of the link. Select this method for connections shown in this manual. See "About 1 Jumper Connections" on page 26.</p> <p>3 Jumper: Loss results exclude connections at the ends of the link. Only the fiber loss is measured.</p> <p>Different standards have different names for the three test methods. See Appendix B for details. The <i>Technical Reference Handbook</i> provides additional information on test methods.</p> <p>This setting does not affect loss results. It is only saved with the results to record which method you used.</p> <p>This setting does affect the reference and test connection diagrams shown on the tester's display. The diagrams show connections for the method selected.</p>

Table 3. Fiber Test Settings (cont.)

Setting	Description
SETUP > Fiber Loss > Index of Ref. Source (n) > User Defined or Default	<p>The tester uses the index of refraction (n) defined in the currently selected fiber type (Default) or a value you define (User Defined). The default value defined by the selected fiber type represents the typical value for that fiber type. You may enter a different value if necessary. To determine the actual value, change the index of refraction until the measured length matches the known length of a fiber.</p> <p>Increasing the index of refraction decreases the reported length.</p>
SPECIAL FUNCTIONS > Set Reference Patch Lengths (softkey on the View Connections screen)	<p>Setting a reference sets the baseline power level for loss measurements. See "About Setting the Reference" on page 17.</p> <p>After you set the reference, you can enter the lengths of the test reference cords used. The lengths are saved with results to meet TIA reporting requirements for fiber test results.</p>
Settings for saving tests	See "Preparing to Save Tests" on page 27.

About 1 Jumper Connections

The reference and test connections shown in this manual produce 1 Jumper results. 1 Jumper results include the loss of the fiber plus the loss of the connections at both ends of the link. To ensure accurate results, the connection to the fiber module's output port must not be disconnected after the reference is set. Using connector adapters that match the connectors in the fiber under test lets you connect to the fiber without disturbing the output port connection.

Caution

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

If you do not have the correct connector adapters, see Appendix C, "Modified 1 Jumper Method" for alternative connections that produce 1 Jumper results.

To test links with different connectors at each end, see the alternate method described in the Appendix of the *DTX Series CableAnalyzer Technical Reference Handbook* or visit the Fluke Networks Knowledge Base for suggestions.

Preparing to Save Tests

- ❑ Check the memory space available:

Turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Memory Status**.

- ❑ Select a cable ID source:

You can select IDs from a pre-generated list or create an ID after each test. Turn the rotary switch to **SETUP**, select **Instrument Settings**, select **Cable ID Source**; then select a source. See “Cable ID Options” on page 58 for details.

- ❑ Set up a job folder:

On the **Instrument Settings** menu select **Current Folder**. Select an existing folder or press **F1** **Create Folder** to create a new folder.

- ❑ Enter job information:

On the **Instrument Settings** menu press **⏏** to show the tab with the **Operator**, **Site**, and **Company** names. To enter a new name, select a setting, press **F1** **Create**; then use the softkeys, **⏏**, **⏏**, **⏏**, and **ENTER** for editing. Press **SAVE** when you are finished.

- ❑ Enable Auto Save, if desired:

On the **Instrument Settings** menu press **⏏** to show the tab with the **Auto Save Results** setting. Select **Yes** to have the tester automatically save Autotests using the next ID available from the Cable ID Source.

Note

*The **Store Plot Data** setting does not apply to the DTX-CertiFiber tester.*

Certifying Fiber Cabling

The Autotest runs the tests required to certify that fiber cabling meets a particular standard. You run the Autotest in Smart Remote, Loopback, or Far End Source mode, depending on whether you are testing duplex cabling, spools, test reference cords, or single-fiber cabling.

Autotest 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 12 shows the equipment required for testing fiber in Smart Remote mode.

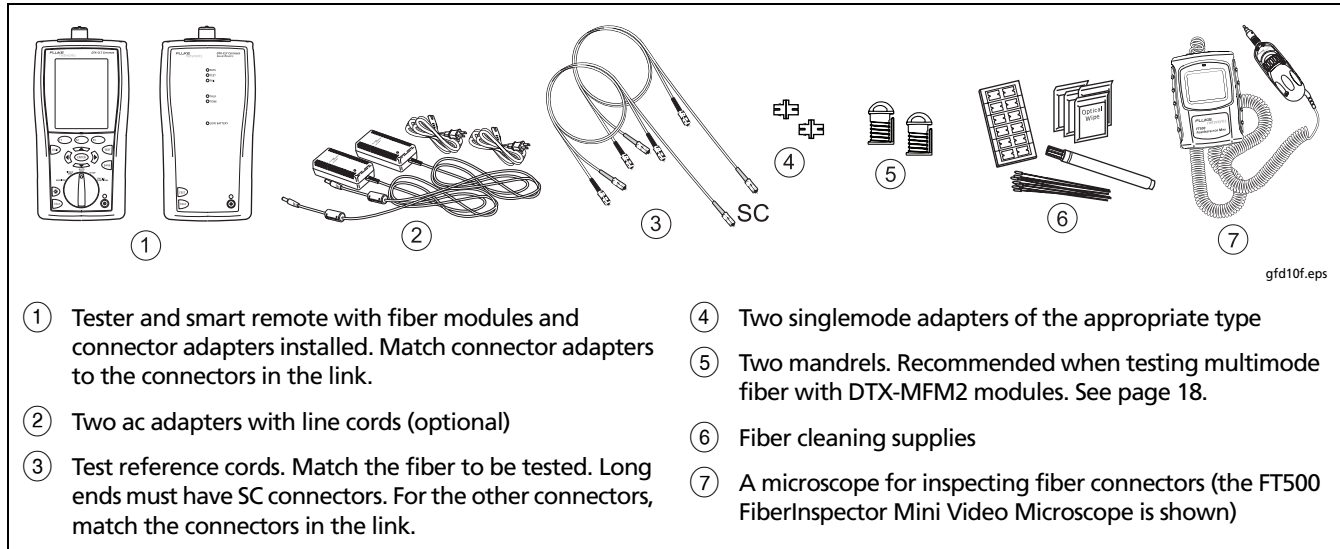





Figure 12. Equipment for Testing in Smart Remote Mode (1 Jumper Method)

Autotest in Smart Remote Mode: Set the Reference

- 1 Turn on the tester and smart remote and let them sit for 5 minutes. Allow additional time if the modules have been stored above or below ambient temperature.
- 2 Turn the rotary switch to **SETUP**, then select **Fiber Loss**. Set the following on the **Fiber Loss** tabs (press  to see other tabs):
 - **Test Limit:** Select the test limit required for the job. Press  **More** to see other lists of limits.
 - **Fiber Type:** Select the fiber type to be tested.
 - **Remote End Setup:** Set to **Smart Remote**.
 - **Bi-directional:** Enable this if you are required to test the fiber in both directions.
 - **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.
- **Connector Type:** Select the connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
- **Test Method:** Refers to the number of adapters represented in the loss results. Select **1 Jumper** if you use the reference and test connections shown in this manual.
- 3 Turn the rotary switch to **SPECIAL FUNCTIONS**, then select **Set Reference**.
- 4 The **Set Reference** screen shows reference connections for the test method you selected. Figure 13 shows connections for the 1 Jumper method. Clean and inspect the connectors on the testers and test reference cords, connect the tester and smart remote; then press .

See Table 3 on page 21 for details on settings.

-continued-

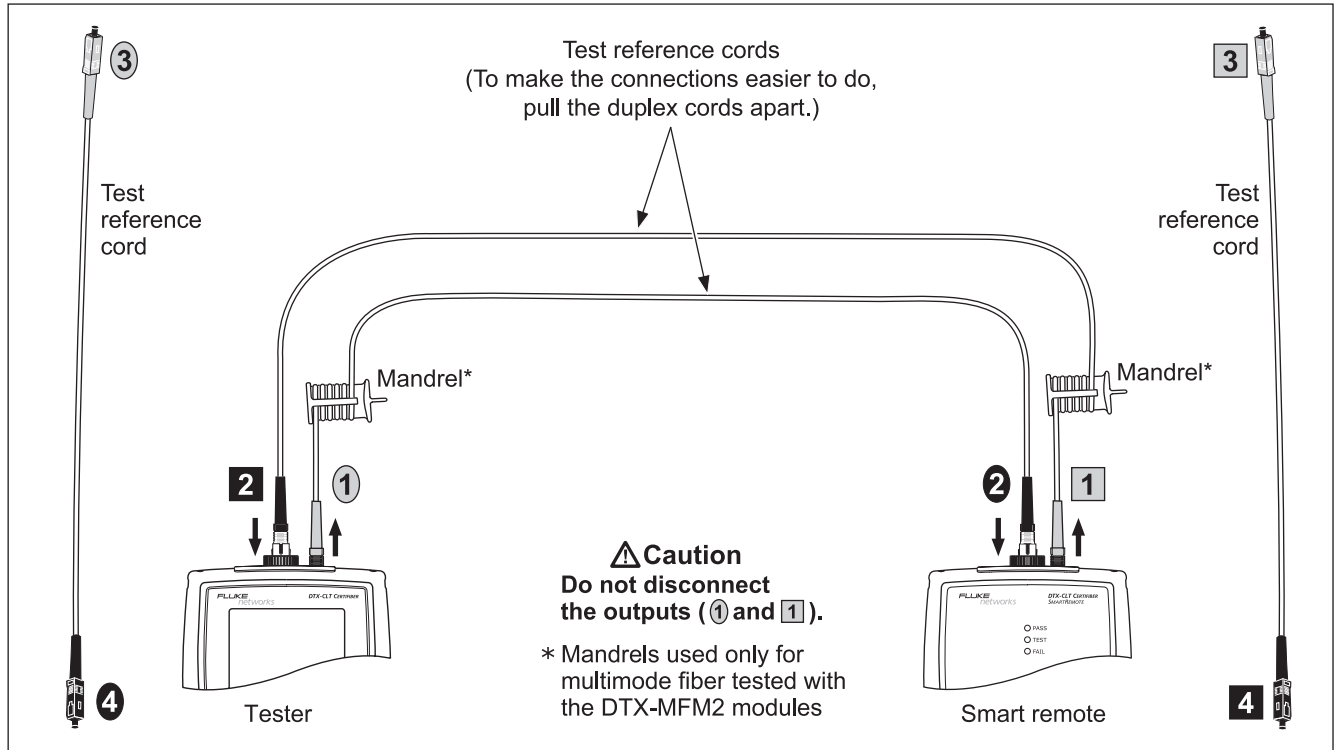




Figure 13. Setting the Reference in Smart Remote Mode (1 Jumper Method)

Autotest in Smart Remote Mode: Make Sure Your Test Reference Cords are Good

Caution

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

- 5 Disconnect the test reference cords from the INPUT ports on the tester and smart remote.
- 6 Make the connections shown in Figure 14.
- 7 Turn the rotary switch to **AUTOTEST**, then press .
- 8 Press  to see the test results. The results for each fiber (**Input Fiber** and **Output Fiber**) must be no more than these limits:

Caution

An overall result of **PASS** does not show that the test reference cords are good. You must compare the loss to the limits given here to make sure the cords are good.

Multimode test reference cord:

850 nm: 0.11 dB or less

1300 nm: 0.10 dB or less

(The limits are different because fiber has more loss at 850 nm than at 1300 nm.)

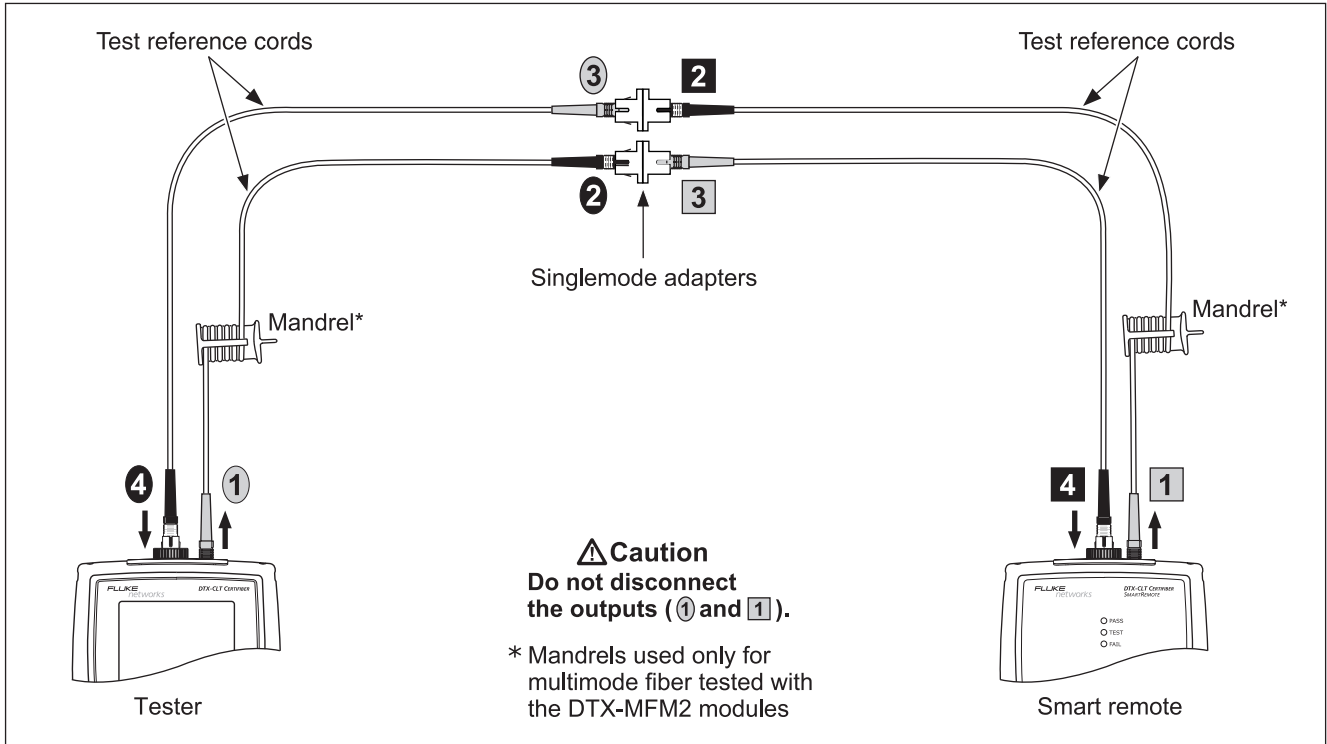
Singlemode test reference cord:

0.20 dB or less for 1310 nm and 1550 nm

- 9 If a result is more than the limit shown above, use the procedure given in Appendix A to test the cords in the path that failed (**Input Fiber** or **Output Fiber**). When you have good test reference cords, set the reference and do these steps (5 through 9) again before you test a fiber link.
- 10 Save the test results to show that you used good test reference cords to test the link.

Note

Fluke Networks recommends that you use this procedure to make sure your test reference cords are good before you test each fiber link.





gfd26.eps




Figure 14. Testing the Test Reference Cords in Smart Remote Mode

Autotest in Smart Remote Mode: Test the Fiber Link

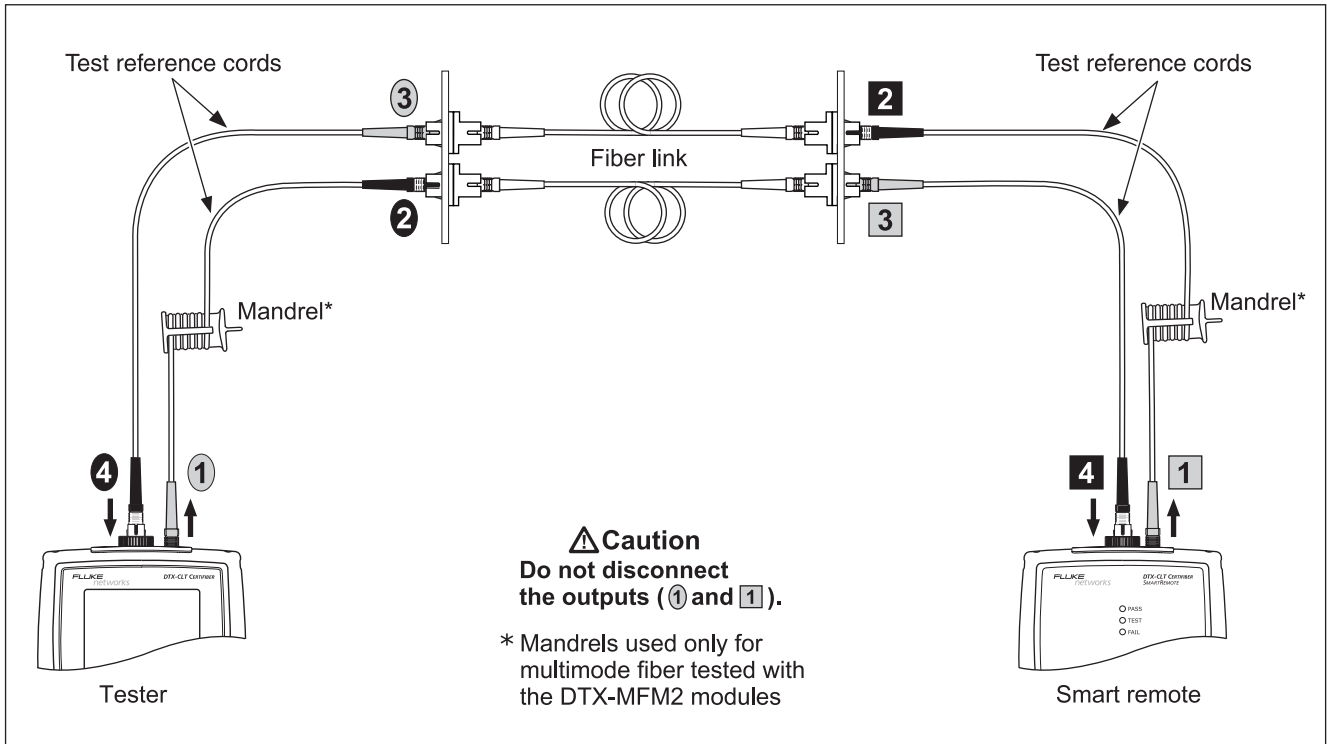
Caution

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

- 11 Clean and inspect the connectors on the cabling to be tested; then connect to the link. The tester shows test connections for the test method you selected. Figure 15 shows connections for the 1 Jumper method.
- 12 Turn the rotary switch to **AUTOTEST**. Verify that the media type is set to **Fiber Loss**. Press  **Change Media** to change it if necessary.
- 13 Press  on the tester or smart remote.
- 14 If **Open** or **Unknown** appears, try the following:
 - Verify that all connections are good.

- Verify that the tester at the other end is on. (The tester cannot activate a sleeping or powered-down tester at the far end through the fiber modules.)
 - Try different connections at the patch panel.
 - Try changing the polarity of the connections at one end.
 - Use the visual fault locator to verify fiber continuity.
- 15 If bi-directional testing is enabled, the tester prompts you to switch the fibers halfway through the test. Switch the fibers at the patch panels or adapters (not at the tester's ports) at both ends of the cabling.
 - 16 To save the results, press , select or create a fiber ID for the input fiber; then press . Select or create a fiber ID for the output fiber; then press  again.

In the results for Smart Remote mode, **Input Fiber** and **Output Fiber** refer to the fibers connected to the main tester's input and output ports. For a bi-directional test, these are the fibers connected to the main tester's input and output ports at the *end* of the test.



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Figure 15. Testing a Fiber Link in Smart Remote Mode (1 Jumper Method)

Autotest in Loopback Mode

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

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

Figure 16 shows the equipment required for testing fiber in Loopback mode.

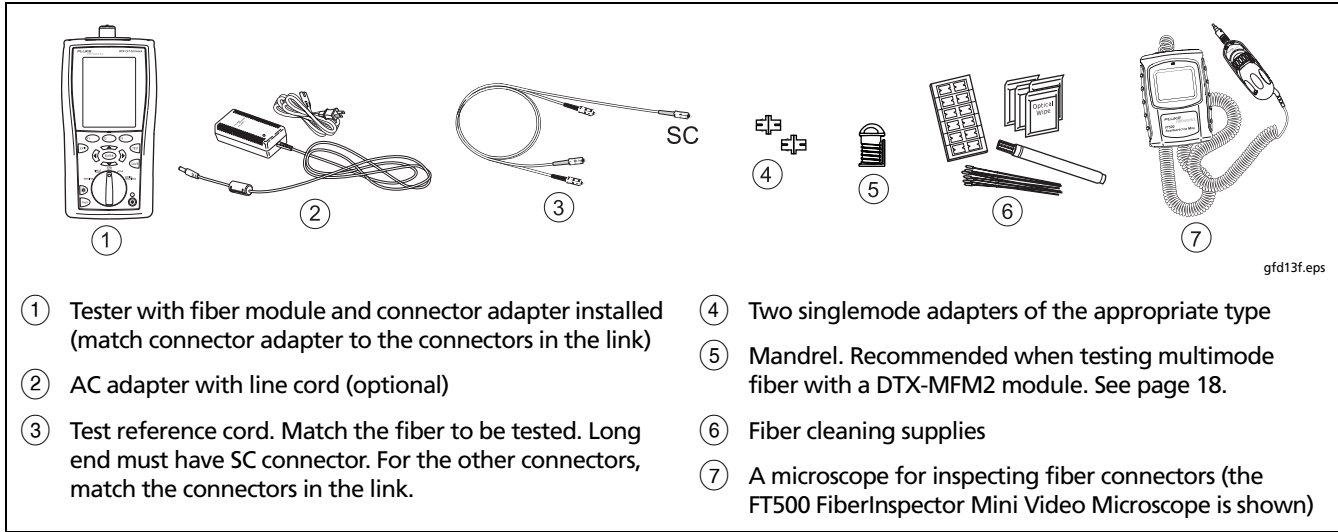





Figure 16. Equipment for Testing in Loopback Mode (1 Jumper Method)

Autotest in Loopback Mode: Set the Reference

- 1 Turn on the tester and smart remote and let them sit for 5 minutes. Allow additional time if the modules have been stored above or below ambient temperature.
 - 2 Turn the rotary switch to **SETUP**, then select **Fiber Loss**. Set the following on the **Fiber Loss** tabs (press  to see other tabs):
 - **Test Limit:** Select the test limit required for the job. Press  **More** to see other lists of limits.
 - **Fiber Type:** Select the fiber type to be tested.
 - **Remote End Setup:** Set to **Loopback**.
 - **Bi-directional:** Enable this if you are required to test the fiber in both directions.
 - **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.
 - **Connector Type:** Select the connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
 - **Test Method:** Refers to the number of adapters represented in the loss results. Select **1 Jumper** if you use the reference and test connections shown in this manual.
 - 3 Turn the rotary switch to **SPECIAL FUNCTIONS**, then select **Set Reference**.
 - 4 The **Set Reference** screen shows connections for the test method you selected. Figure 17 shows connections for the 1 Jumper method. Clean and inspect the connectors on the tester and test reference cord, connect the tester's INPUT and OUTPUT ports; then press .
- See Table 3 on page 21 for details on settings.

-continued-

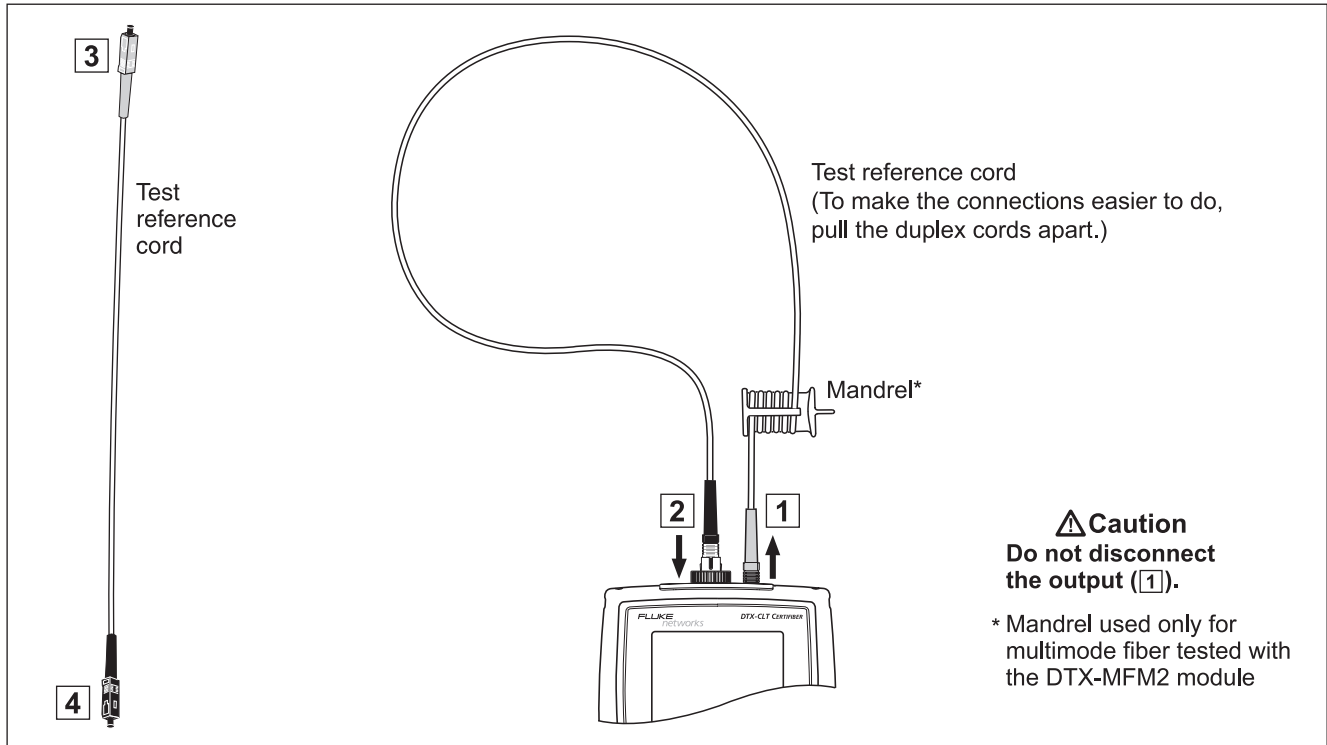




Figure 17. Setting the Reference in Loopback Mode (1 Jumper Method)

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Autotest in Loopback Mode: Make Sure Your Test Reference Cords are Good

Caution

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

- 5 Disconnect the test reference cord from the INPUT port on the tester.
- 6 Make the connections shown in Figure 18.
- 7 Turn the rotary switch to **AUTOTEST**, then press .
- 8 Press  to see the test result. The result must be no more than these limits:

Caution

An overall result of **PASS** does not show that the test reference cords are good. You must compare the loss to the limits given here to make sure the cords are good.

Multimode test reference cord:

850 nm: 0.11 dB or less

1300 nm: 0.10 dB or less

(The limits are different because fiber has more loss at 850 nm than at 1300 nm.)

Singlemode test reference cord:

0.20 dB or less for 1310 nm and 1550 nm

- 9 If a result is more than the limit shown above, use the procedure given in Appendix A to test the cords. When you have good test reference cords, set the reference and do these steps (5 through 9) again before you test a fiber link.
- 10 Save the test results to show that you used good test reference cords to test the link.

Note

Fluke Networks recommends that you use this procedure to make sure your test reference cords are good before you test each fiber link.

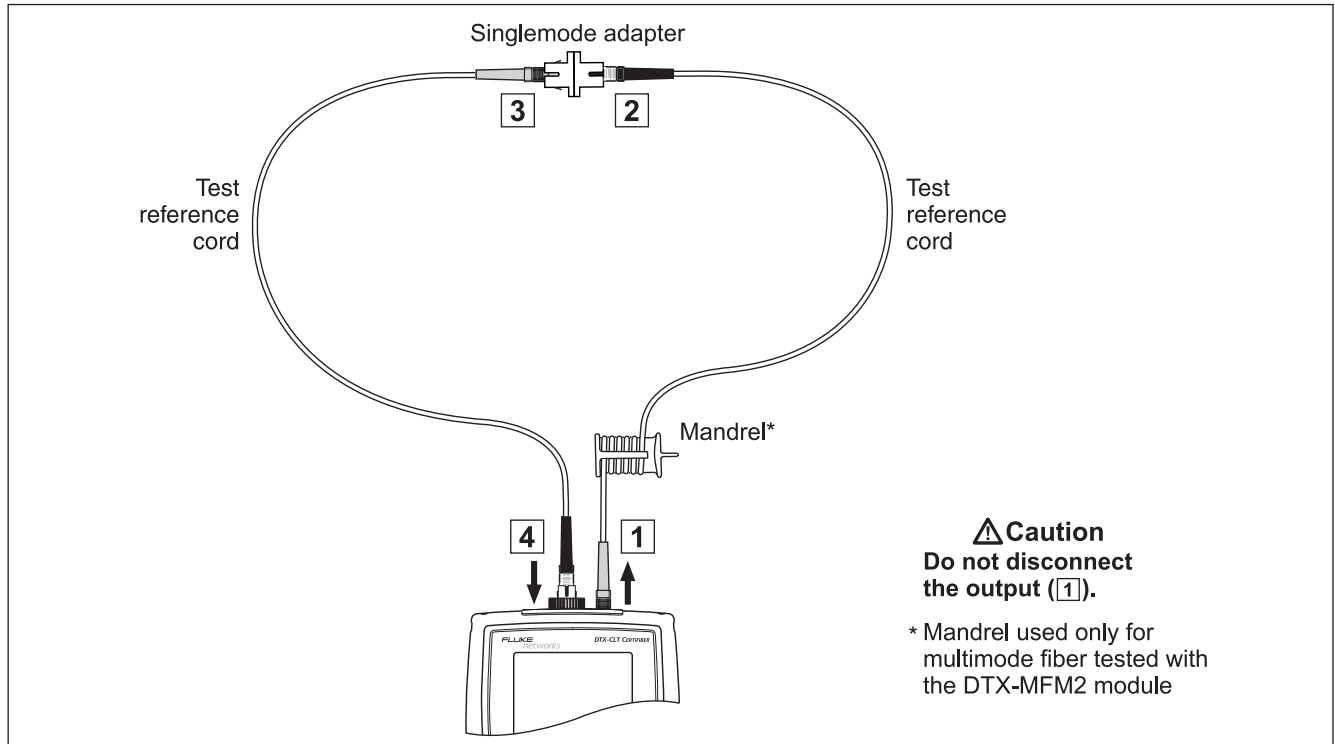






Figure 18. Testing the Test Reference Cords in Loopback Mode

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Autotest in Loopback Mode: Test the Fiber

Caution

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

- 11 Clean and inspect the connectors on the cabling to be tested; then connect to the cabling. The tester shows connections for the test method you selected. Figure 19 shows connections for the 1 Jumper method.
- 12 Turn the rotary switch to **AUTOTEST**. Verify that the media type is set to **Fiber Loss**. Press  **Change Media** to change it if necessary.
- 13 Press .
- 14 If bi-directional testing is enabled, the tester prompts you to switch the fibers halfway through the test. Switch the fibers at the adapters (not at the tester's ports).
- 15 To save the results, press , select or create a fiber ID; then press  again.

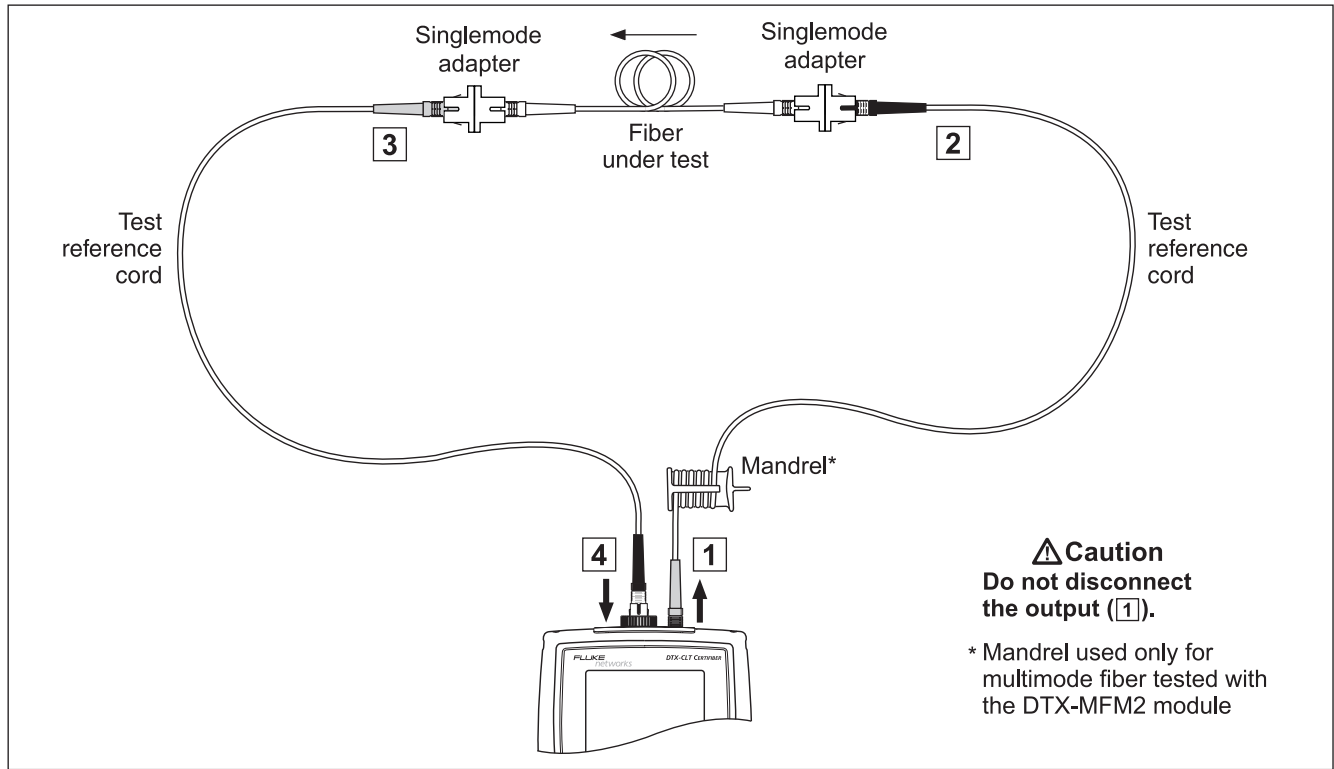


Figure 19. Testing a Fiber in Loopback Mode (1 Jumper Method)

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Autotest in Far End Source Mode

Use Far End Source mode to measure loss at one wavelength on individual fibers.

Far End Source mode requires a stand-alone optical source. Figure 20 shows the equipment required for testing fiber in Far End Source mode.

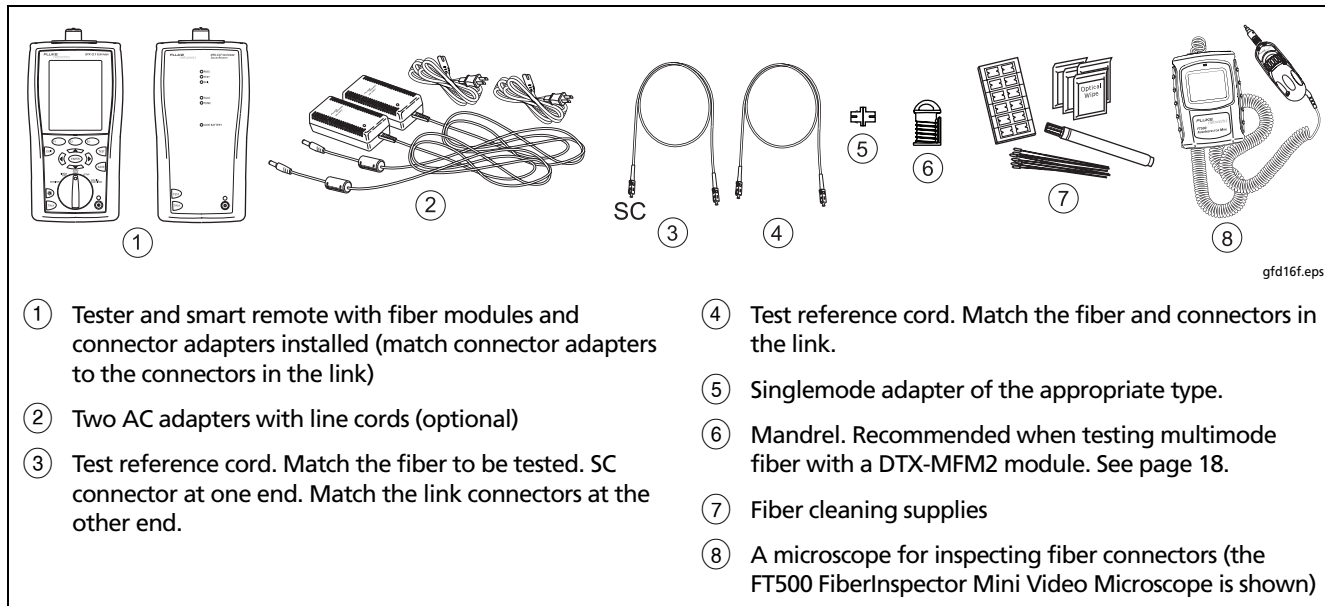




Figure 20. Equipment for Testing in Far End Source Mode (1 Jumper Method)

Autotest in Far End Source Mode: Set the Reference

- 1 Turn on the tester and smart remote and let them sit for 5 minutes. Allow additional time if the modules have been stored above or below ambient temperature. For other sources, warm up according to the manufacturer's recommendations.
- 2 Turn the rotary switch to **SETUP**, then select **Fiber Loss**. Set the following on the **Fiber Loss** tabs (press  to see other tabs):
 - **Test Limit:** Select the test limit required for the job. Press  **More** to see other lists of limits.
 - **Fiber Type:** Select the fiber type to be tested.
 - **Remote End Setup:** Set to **Far End Source**
 - **Bi-directional:** Does not apply to Far End Source mode.
 - **Number of Adapters** and **Number of Splices:** Does not apply to Far End Source mode.
 - **Connector Type:** Select the connector type used in the cabling to be tested. Select **General** if the exact type is not listed.
 - **Test Method:** Refers to the number of adapters represented in the loss results. Select **1 Jumper** if you use the reference and test connections shown in this manual.


See Table 3 on page 21 for details on settings.

-continued-

Autotest in Far End Source Mode: Set the Reference (cont.)

- 3 Hold down the button on the smart remote's fiber module for 3 seconds to turn on the output port at 850 nm (DTX-MFM2/GFM2) or 1310 nm (DTX-SFM2). Press again to switch to 1300 nm (DTX-MFM2), 1310 nm (DTX-GFM2), or 1550 nm (DTX-SFM2).

The LED is red for the shorter wavelength and green for the longer wavelength.

For other sources, verify the output is set to the correct wavelength and is in continuous-wave mode.
- 4 Turn the rotary switch to **SPECIAL FUNCTIONS**, then select **Set Reference**.
- 5 The **Set Reference** screen shows connections for the test method you selected. Figure 21 shows connections for the 1 Jumper method. Clean and inspect the connectors on the tester, test reference cord, and source, connect the tester and source; then press .

-continued-

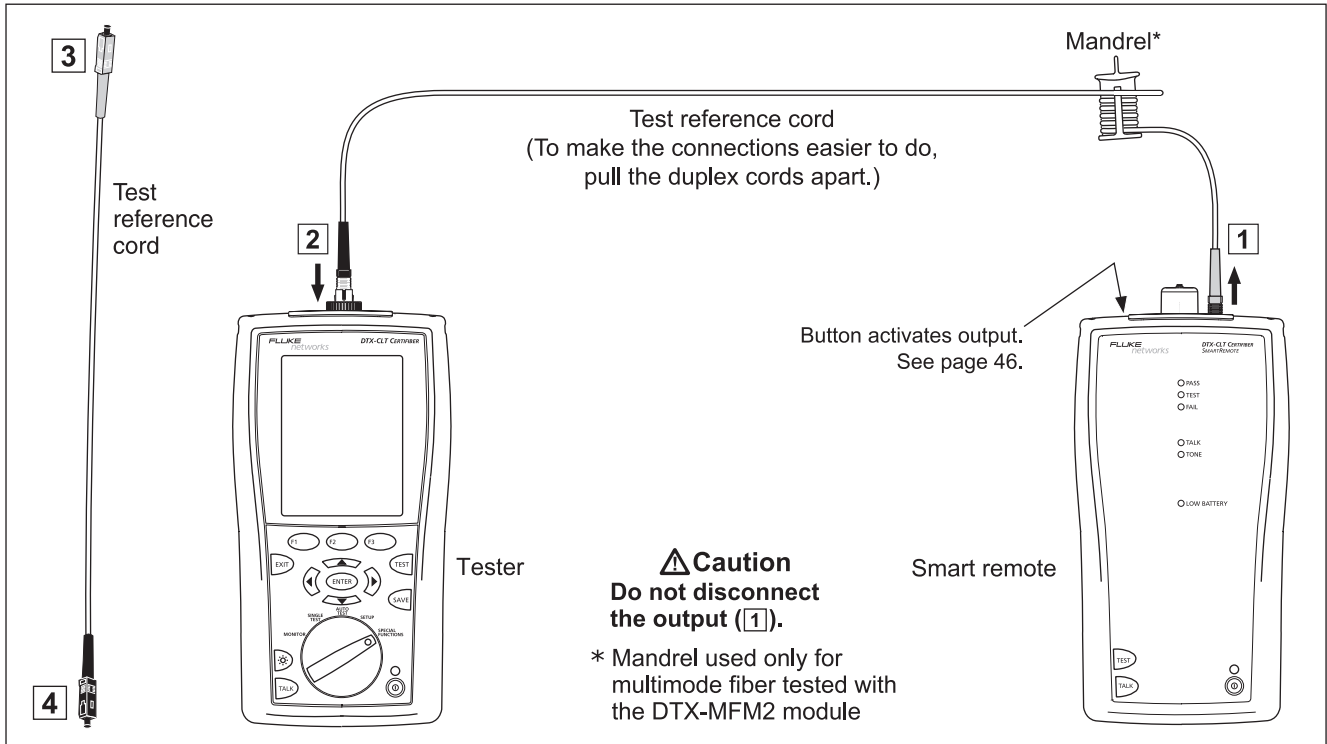




Figure 21. Far End Source Mode Reference Connections (1 Jumper Method)

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Autotest in Far End Source Mode: Make Sure Your Test Reference Cords are Good

Caution

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

- 6 Disconnect the test reference cord from the INPUT port on the tester.
- 7 Make the connections shown in Figure 22.
- 8 Turn the rotary switch to **AUTOTEST**, then press .
- 9 Press  to see the test result. The result must be no more than these limits:

Caution

An overall result of **PASS** does not show that the test reference cords are good. You must compare the loss to the limits given here to make sure the cords are good.

Multimode test reference cord:

850 nm: 0.11 dB or less

1300 nm: 0.10 dB or less

(The limits are different because fiber has more loss at 850 nm than at 1300 nm.)

Singlemode test reference cord:

0.20 dB or less for 1310 nm and 1550 nm

- 10 If a result is more than the limit shown above, use the procedure given in Appendix A to test the cords. When you have good test reference cords, set the reference and do these steps (6 through 10) again before you test a fiber link.
- 11 Save the test results to show that you used good test reference cords to test the link.

Note

Fluke Networks recommends that you use this procedure to make sure your test reference cords are good before you test each fiber link.

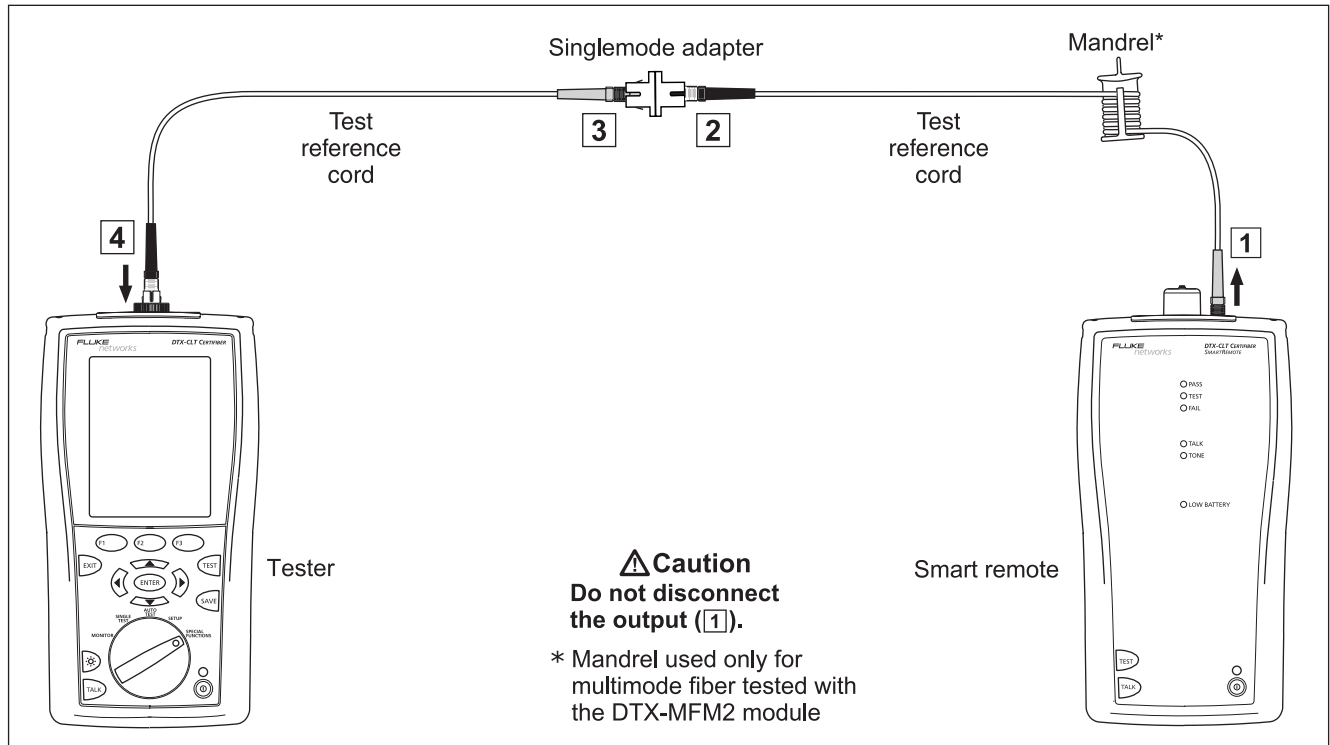





Figure 22. Testing the Test Reference Cords in Far End Source Mode

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Autotest in Far End Source Mode: Test the Fiber

Caution

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

- 12 Clean and inspect the connectors on the cabling to be tested; then connect the tester and source to the cabling. The tester shows connections for the test method you selected. Figure 23 shows connections for the 1 Jumper method.
- 13 Turn the rotary switch to **AUTOTEST**, press ; then select the wavelength set on the smart remote.
- 14 To save the results, press , select or create a fiber ID; then press  again.

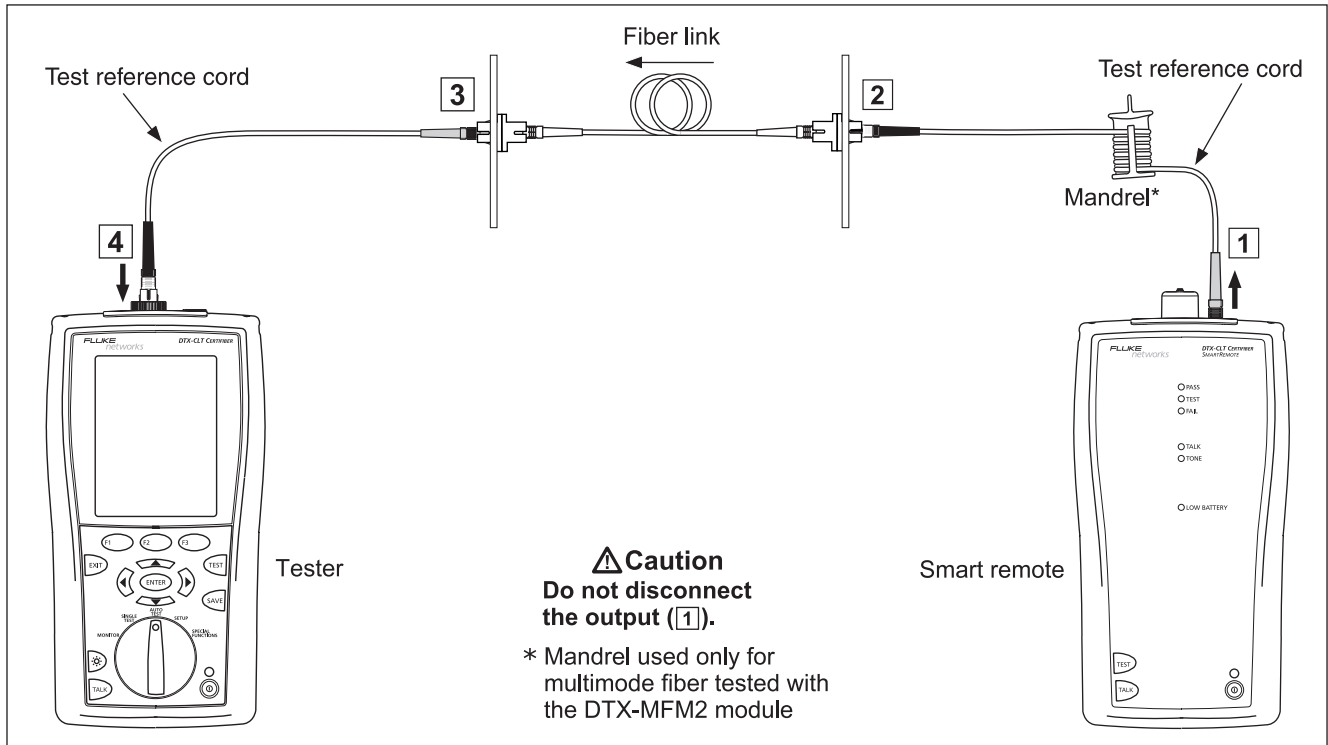


Figure 23. Testing a Link in Far End Source Mode (1 Jumper Method)

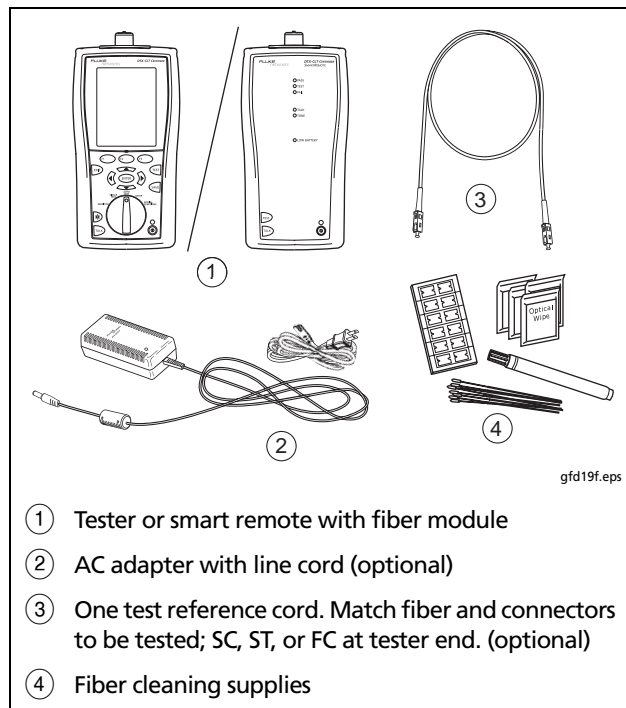
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Using the Visual Fault Locator

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

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

Figure 24 shows the equipment needed for using the visual fault locator.



- ① Tester or smart remote with fiber module
- ② AC adapter with line cord (optional)
- ③ One test reference cord. Match fiber and connectors to be tested; SC, ST, or FC at tester end. (optional)
- ④ Fiber cleaning supplies

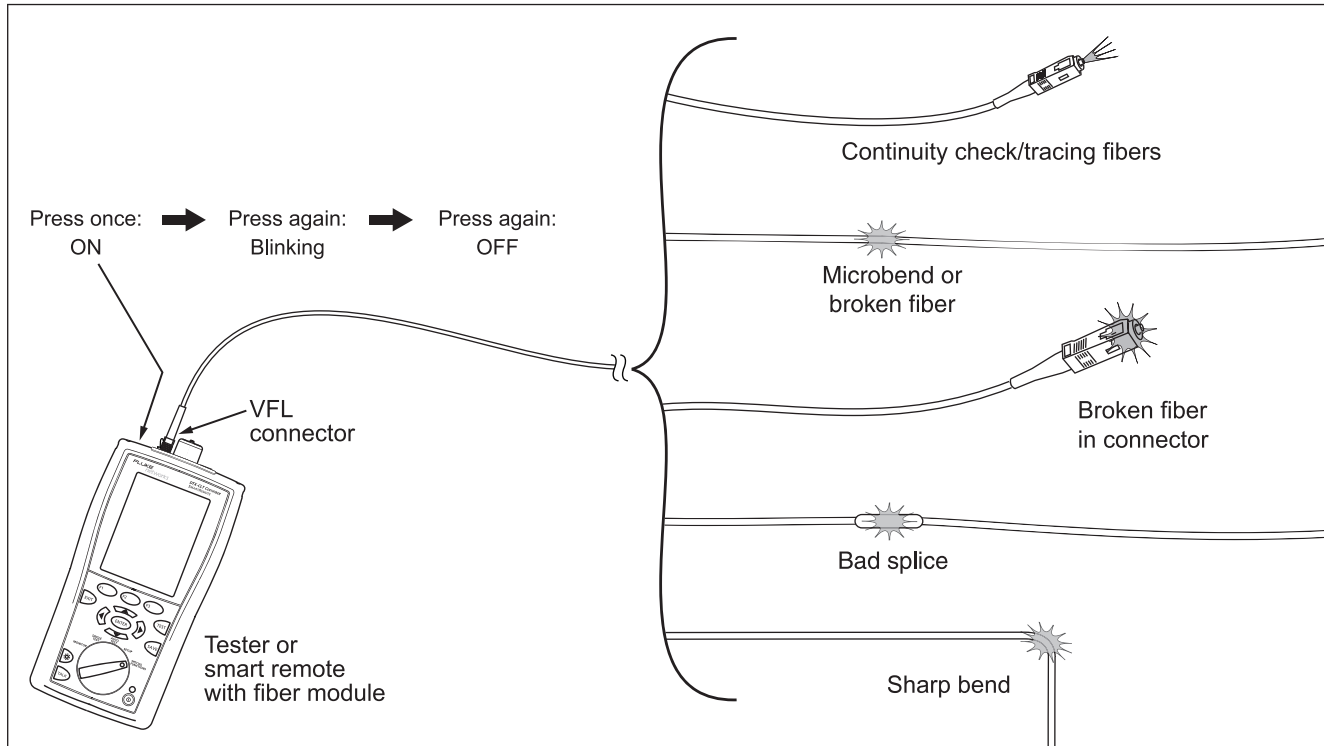
Figure 24. Equipment for Using the Visual Fault Locator

Using the Visual Fault Locator

- 1 Clean the connectors on the test reference cord, if used, and the fiber to be tested.
- 2 Connect the fiber directly to the tester's VFL port or connect using the test reference cord.
- 3 Turn on the visual fault locator by pressing the button near the VFL connector, as shown in Figure 25. Press again to switch to flashing mode. Press again to turn off the locator.
- 4 Look for the red light to locate fibers or faults (Figure 25):
 - To check continuity or trace fiber connections, look for the red light at the end of the fiber. View the VFL's light indirectly by holding a white card or paper in front of the fiber connector emitting the light.
 - To locate faults, move along the fiber from either end, looking for a red glow coming from the fiber jacket or a connector housing.

Note

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



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Figure 25. Using the Visual Fault Locator

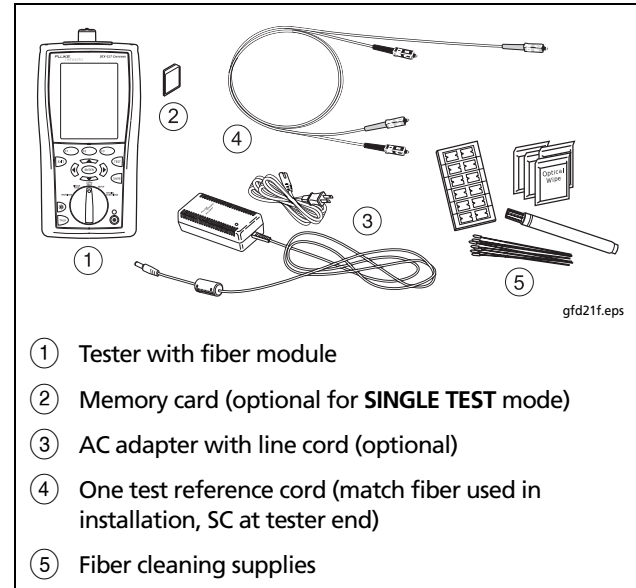
Monitoring Optical Power

The power meter lets you monitor the optical power produced by a source such as an optical network interface card or optical test equipment.

The tester offers two versions of the power meter function:

- **SINGLE TEST** mode: Takes one power measurement at 850 nm and 1300 nm (DTX-MFM2), 850 nm and 1310 nm (DTX-GFM2), or 1310 nm and 1550 nm (DTX-SFM2). You can save the power measurement in this mode.
- **MONITOR** mode: Monitors power continuously at the input port at 850 nm, 1300 nm, 1310 nm, or 1550 nm. This measurement cannot be saved.

Figure 26 shows the equipment required for monitoring power in the **MONITOR** mode.



- ① Tester with fiber module
- ② Memory card (optional for **SINGLE TEST** mode)
- ③ AC adapter with line cord (optional)
- ④ One test reference cord (match fiber used in installation, SC at tester end)
- ⑤ Fiber cleaning supplies

Figure 26. Equipment for Monitoring Optical Power

Monitoring Optical Power

- 1 Clean the tester's input port and the test reference cord and source connectors.
- 2 Use the test reference cord to connect the source to the tester's input port, as shown in Figure 27. Turn on the source.
- 3 Turn the rotary switch to **MONITOR**. If the media type is not set to **Fiber Loss**, press **(F1) Change Media** to change it.
- 4 Select **Power Meter**. You do not need to select a fiber type or test limit.
- 5 Select the correct wavelength; then press **(TEST)**.

To change the wavelength after starting the test, press **(F3) Change λ** .

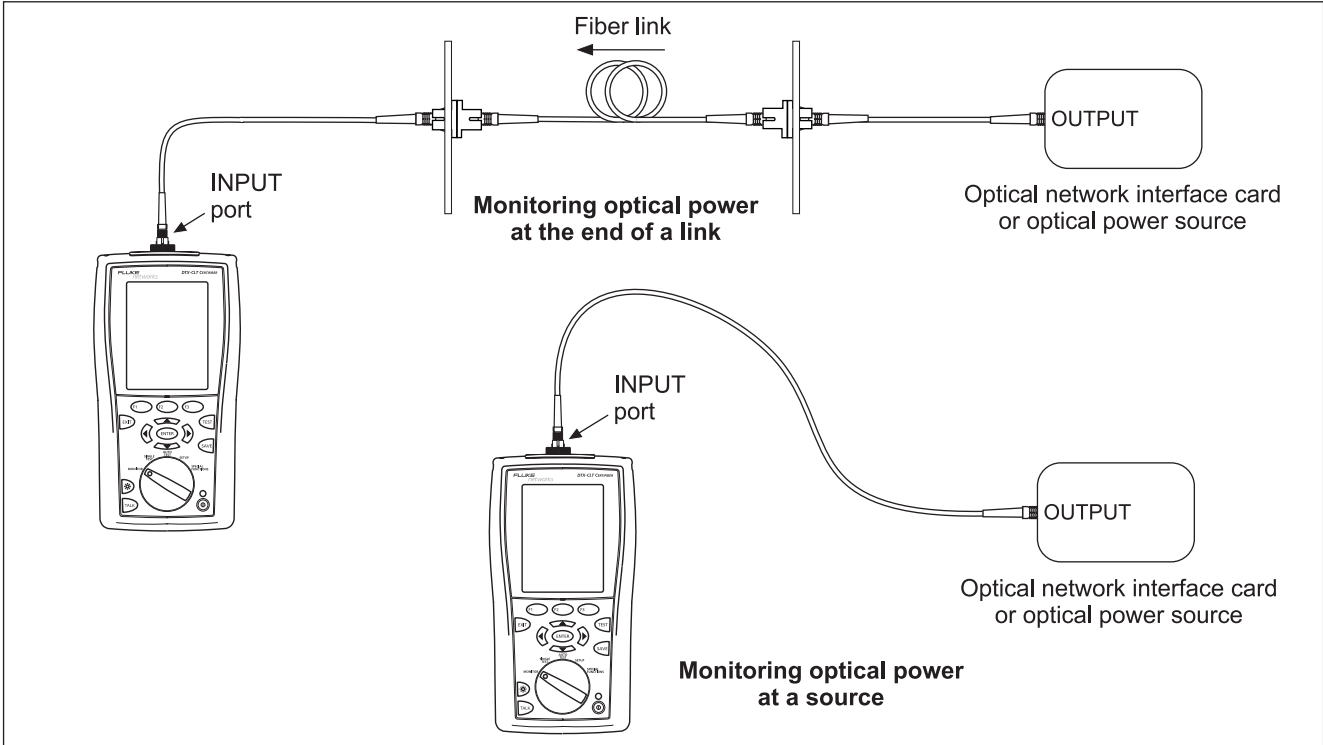




Figure 27. Connections for Monitoring Optical Power


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Cable ID Options














You can select cable IDs from a pre-generated list or you can create an ID after each test.

To select a source for cable IDs, turn the rotary switch to **SETUP**, select **Instrument Settings**, select **Cable ID Source**; then select a source:

- **Auto Increment:** Increments the last character of the ID each time you press .
- **List:** Lets you use an ID list created in LinkWare software and downloaded to the tester.
- **Auto Sequence:** Lets you use a list of sequential IDs generated from a template. The horizontal, backbone, and campus templates follow the ID formats specified in the ANSI/TIA/EIA-606-A standard. The **Free Form** template lets you create your own pattern.
- **None:** Lets you create an ID each time you press .

After you press , you can also edit an existing ID before using it for saving results.

To create a list of sequential IDs, do the following:

- 1 On the **Auto Sequence** screen, select a template.
- 2 On the **Auto Sequence** screen, select **Start ID**. Use the softkeys,  , , , and  to enter the first ID in the sequential list. Press  when you are finished.
- 3 Select **Stop ID**. Use the softkeys,  , , , and  to enter the last ID in the sequential list. Press  when you are finished.
- 4 Press  **Sample List** to see what the list will look like.

Used IDs are marked with a "\$" in cable ID lists.

Memory Functions

The DTX-CLT CertiFiber can store a minimum of 3300 Autotest results from single or bi-directional tests on fiber cabling. The maximum capacity of internal memory depends on the space taken by the tester's software.

Viewing Results

To view saved results, do the following:

- 1 Turn the rotary switch to **SPECIAL FUNCTIONS**; then select **View/Delete Results**.
- 2 If necessary, press **F1** **Change Folder** to find the result you want to view.
- 3 Highlight the result; then press **ENTER**.

Deleting Results


To delete results or folders, do the following:

- 1 Turn the rotary switch to **SPECIAL FUNCTIONS**, then select **View/Delete Results**.
- 2 If necessary, press **F1** **Change Folder** to find the results you want to delete.
- 3 Do one of the following:

- To delete one result, highlight it, press **F2** **Delete**, press **F3** **Delete**; then press **F3** **Yes**.
- To delete all results in the current folder, the current folder, or all results in the tester (internal memory), press **F2** **Delete**; then select an option. Press **F3** **Delete**; then press **F3** **Yes**.

Uploading Results to a PC

To upload results to a PC, do the following:

- 1 Install the latest version of LinkWare software on your PC.
- 2 Turn on the tester.
- 3 Connect the tester to the PC with the USB cable provided.
- 4 Start LinkWare software on the PC.
- 5 Click **Import**  on the LinkWare toolbar. Select the tester's model from the list.

Note

The DTX-CLT CertiFiber shows as "DTX-CLT" on LinkWare menus.

- 6 Select the records you want to import; then click OK.

Options and Accessories

For a complete list of options and accessories visit the Fluke Networks website at www.flukenetworks.com.

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

About LinkWare and LinkWare Stats Software

The LinkWare™ Cable Test Management software included with your tester lets you do the following:

- Upload test records to PC.
- View test results.
- Add ANSI/TIA/EIA-606-A administration information to records.
- Organize, customize, and print professional-quality test reports.
- Update the tester's software.
- Create and download data to the DTX, such as Setup data and cable ID lists.
- Transfer custom limits between testers.

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

Updates to LinkWare software are available on the Fluke Networks website.

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 tester'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 tester's calibration and compromise its accuracy. If the calibration is void, cable manufacturers might not extend their warranty to the cabling you install.

Cleaning

Clean the display with glass cleaner 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.

Clean the optical connectors as described on page 16.

Replacing Fiber Test Reference Cords

Choose replacement fiber optic test reference cords that meet the following requirements:

- They meet the requirements of ISO/IEC 14763-3.
- Core and cladding size: match the fiber to be tested
- Connector polish: PC or UPC. Use APC only for tests on cabling with APC connectors.
- Test reference cord length: maximum 5 m

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

Factory Calibration

The tester requires calibration at a service center 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.

Updating the Tester's Software

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

To see the software version installed in your tester or smart remote, connect the testers through link adapters, turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Version Information**.

To get a software update, download the update from the Fluke Networks website or contact Fluke Networks to get the update by other means.


Caution

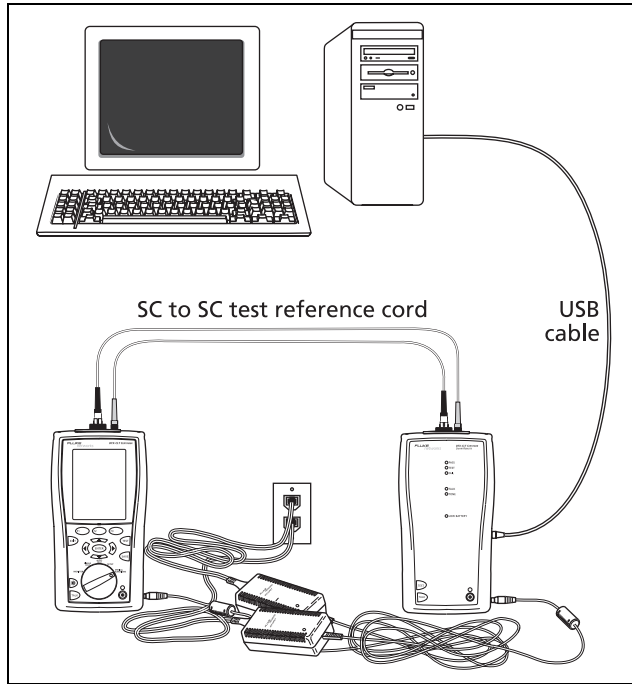
To avoid unexpected loss of power, connect the ac adapter to the tester when updating the software.

Note

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

Updating with a PC

- 1 Install the latest version of LinkWare software on your PC.
- 2 Download the DTX-CLT CertiFiber update file from the Fluke Networks website, or contact Fluke Networks to get the update by other means. Save the file to your hard drive.
- 3 Make the connections shown in Figure 28. Turn on the tester and the smart remote.
- 4 Select **Utilities > DTX Utilities > Software Update** from the LinkWare menu, locate and select the .dtx (DTX update) file; then click **Open**.
- 5 When the tester is updated, it reboots, then prompts you about updating the smart remote's software. Press  **OK** to update the smart remote's software.
- 6 To verify the update, turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Version Information**.



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Figure 28. Updating the Software with a PC

Updating with Another Tester

You can update a tester's software using another tester that is already updated.

- 1 Make the connections shown in Figure 29.

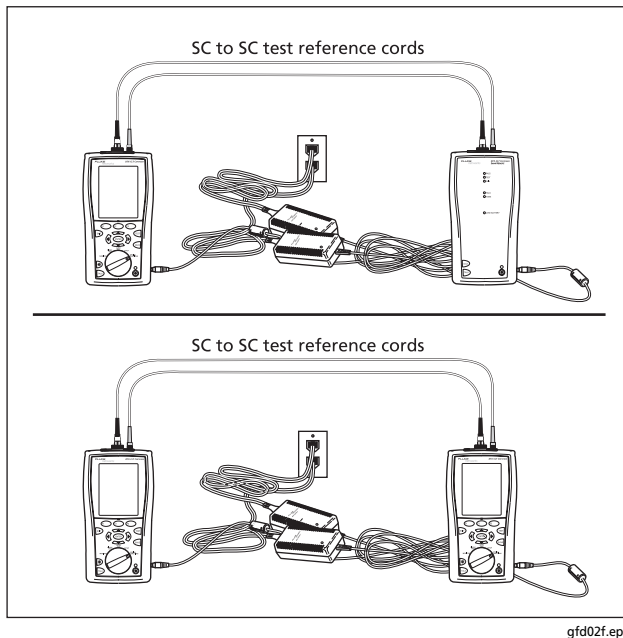
Note

One of the testers must be a main tester.

- 2 Turn on both testers. The testers compare software versions. If one has more recent software, the main tester prompts you about updating the older software.
- 3 Press **F2** **OK** to start the update process.
- 4 To verify the update, turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Version Information**.

Updating the Limits or Cable Types Database

Fluke Networks may release a test limits or cable types database that is not part of a software update. To install a new database in your tester, use the **Modify DTX Test Limits** utility in LinkWare software. See the LinkWare online help for details.



**Figure 29. Updating the Software
with an Updated Tester**

Retraining the Battery Gauge

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

Retraining can take 17 to 30 hours. The time is shorter if you start with the batteries discharged and modules (such as the fiber module) installed in the main and remote testers.

To retrain the battery gauge:

- 1 Make the connections shown in Figure 29.
- 2 Turn on both testers.
- 3 Turn the rotary switch to **SPECIAL FUNCTIONS**; then select **Battery Status**. Verify that both the main and remote battery gauges are shown. If the remote gauge is missing, check the connections between the two units.
- 4 Press **F1** **Train Battery**.

To abort the retraining, hold down the power key (Ⓢ) on the main and remote testers until they turn off.

- 5 Retraining is complete when the testers have turned off and the LED by the ac adapter connection is green.

Using the Smart Remote with an OptiFiber™ Certifying OTDR

You can use a DTX Series smart remote with a DTX-MFM2 or DTX-SFM2 fiber module as the remote for a Fluke Networks OptiFiber Certifying OTDR. The DTX remote takes the place of a second OptiFiber tester for measuring loss and length with the OptiFiber loss/length option in Smart Remote mode. You can buy a smart remote separately for this purpose. See the Fluke Networks website or contact Fluke Networks for details.

Certification, Compliance, and Regulatory Information



Conforms to relevant Australian standards



Conforms to relevant European Union directives.



Listed by the Canadian Standards Association.

Laser safety

OUTPUT port: Class 1
VFL port: Class 2
Complies with EN60825-1 and EN61010-1 (CE) and CFR21

CSA Standards

CAN/CSA-C22.2 No. 1010.1-92 + Amendment 2: 1997 and CAN/CSA-C22.2 No. 1010.1 2000 (2nd edition) Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.

Safety

CAN/CSA-C22.2 No. 1010.1-92 + Amendment 2: 1997;
Overvoltage Category II, Pollution degree 2, 30 V.

EN61010, 2nd Edition, MEASUREMENT (Installation)
CATEGORY I, Pollution Degree 2 per IEC1010-1 refers to the
level of Impulse Withstand Voltage protection provided.
Equipment of MEASUREMENT CATEGORY I is

for measurements performed on circuits not directly
connected to mains.

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.

Appendix A: How to Test Your Test Reference Cords

Why You Must Do this Test

To get accurate measurements of loss, you must use high-quality test reference cords that are in good condition and comply with ISO/IEC 14763-3. Measurements of optical power loss are very much affected by the condition of the endfaces on the fiber connectors. Dirty endfaces and endfaces with damage are the most common causes of problems in fiber links.

When You Must Do this Test

Test your test reference cords at these times:

- At the start of each day
- When you move your equipment to a different area
- When you change your equipment to test links that have a different type of connector

After you do the test given in this Appendix, use the procedure given with the procedures for certifying cabling to monitor the condition of the cords.

Equipment You Must Have

Figure A-1 shows the equipment you must have to test your test reference cords.

Caution

To do this procedure, you must have a fiber microscope. You cannot be sure that your cords are good unless you can examine the endfaces on the connectors. An endface that is dirty or has damage can give a good loss measurement, but can cause problems later. See Figure A-2.

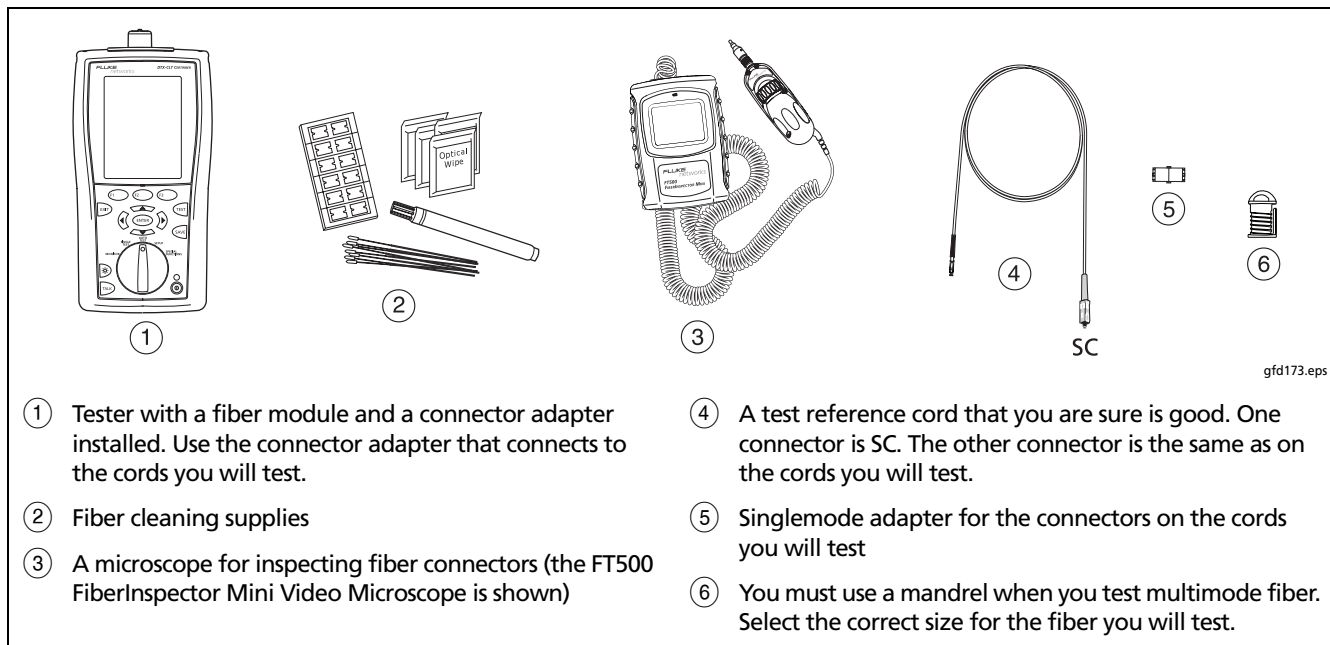


Figure A-1. Equipment for Testing Test Reference Cords

1. Set Up the Tester

1-1 Turn on the tester. Wait for a minimum of 5 minutes for the tester to become stable. Wait for a longer time if the tester is much colder or hotter than the work area.

1-2 Turn the rotary switch to **SETUP**, then make these settings:

- **Test Limit:** Select the applicable limit:

Standard	Test Limit for Multimode	Test Limit for Singlemode
ANSI/TIA-568-C	TIA-568-C Multimode	TIA-568-C Singlemode ISP
ISO/IEC 14763-3	ISO/IEC 14763-3	ISO/IEC 14763-3

- **Fiber Type:** Select the type of cable you will test. This sets the index of refraction (n). The test limits shown above use n to calculate the length of the fiber, then they use the length to calculate the limit for loss. Thus, you must use the correct value of n to get an accurate measurement of loss. If you cannot find the correct fiber type, you can enter the value of n for your fiber on tab 3 of the setup menus. Get the value of n from the cable vendor.
- **Remote End Setup: Loopback**
- **Bi-Directional: Yes**
- **Number of Adapters: 1**
- **Connector Type:** Select the type of connector that is on the cords you will test
- **Test Method: 1 Jumper**

2. Clean and Inspect the Connectors

2-1 Test reference cords must have endfaces that are clean and have no damage. Always use correct procedures to clean endfaces. See page 16 or use the procedures given with your cleaning supplies.

2-2 After you clean an endface, use a fiber microscope to examine the endface. Figure A-2 shows examples of what you can see with a fiber microscope.

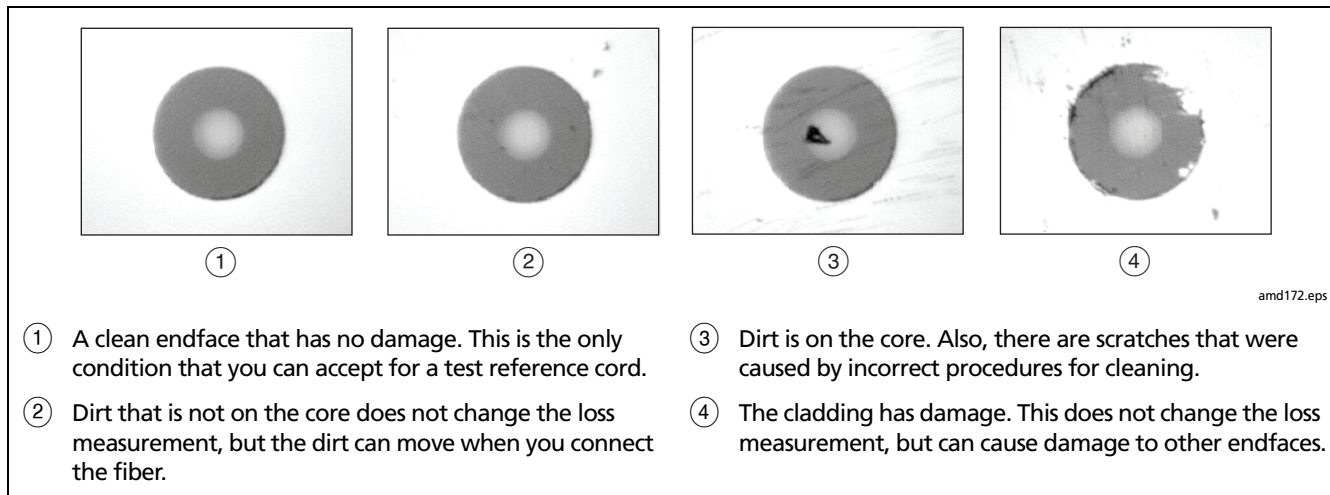


Figure A-2. Examples of Fiber Endfaces

3. Set the Reference

3-1 Make the connections shown in Figure A-3.

3-2 Turn the rotary switch to **SPECIAL FUNCTIONS**, then select **Set Reference**. If both a fiber module and a twisted pair or coaxial adapter are attached, select **Fiber Module** next.

3-3 Make sure that the reference value is good:

- For 50/125 μm fiber, the reference value must be better than -24.50 dBm (for example, -23.50 dBm is a better value)
- For 62.5/125 μm fiber, the reference value must be better than -20.00 dBm (for example, -19.50 dBm is a better value)
- For 9/125 μm fiber, the reference value must be better than -8.00 dBm (for example, -7.50 dBm is a better value)

If the value is not good, do the reference procedure again with a different test reference cord.

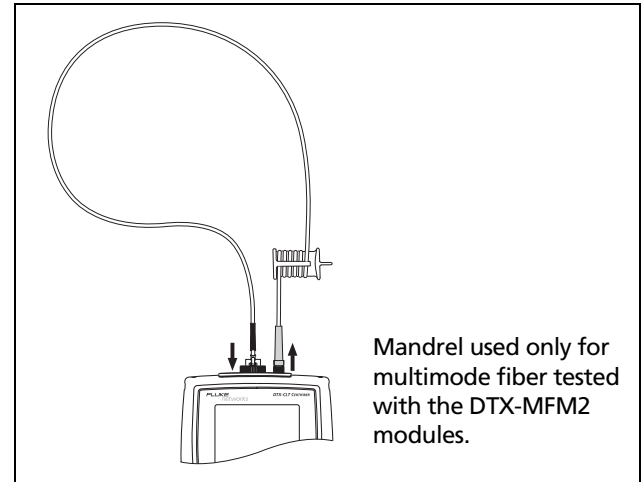






Figure A-3. Reference Connections

4. Test the Cord in Both Directions

- 4-1 Disconnect the test reference cord from the INPUT port of the tester (Figure A-4, ①).
- 4-2 Connect the cord you want test (Figure A-4, ②).
- 4-3 Turn the rotary switch to **AUTOTEST**, then press . This test measures the loss of connector  shown in Figure A-4.
- 4-4 When the first part of the test is completed, connect the cord in the opposite direction (Figure A-4, ③).
- 4-5 Press  **OK**. This test measures the loss of connector  shown in Figure A-4.

5. Read the Loss Measurements

Compare the loss measurement for each direction to these limits:

- Multimode test reference cord: 0.10 dB or less
- Singlemode test reference cord: 0.20 dB or less

If the connectors show no contamination or damage, but the loss is higher than these limits, the cord does not comply with ISO/IEC 14763-3. Do not use the cord as a test reference cord.

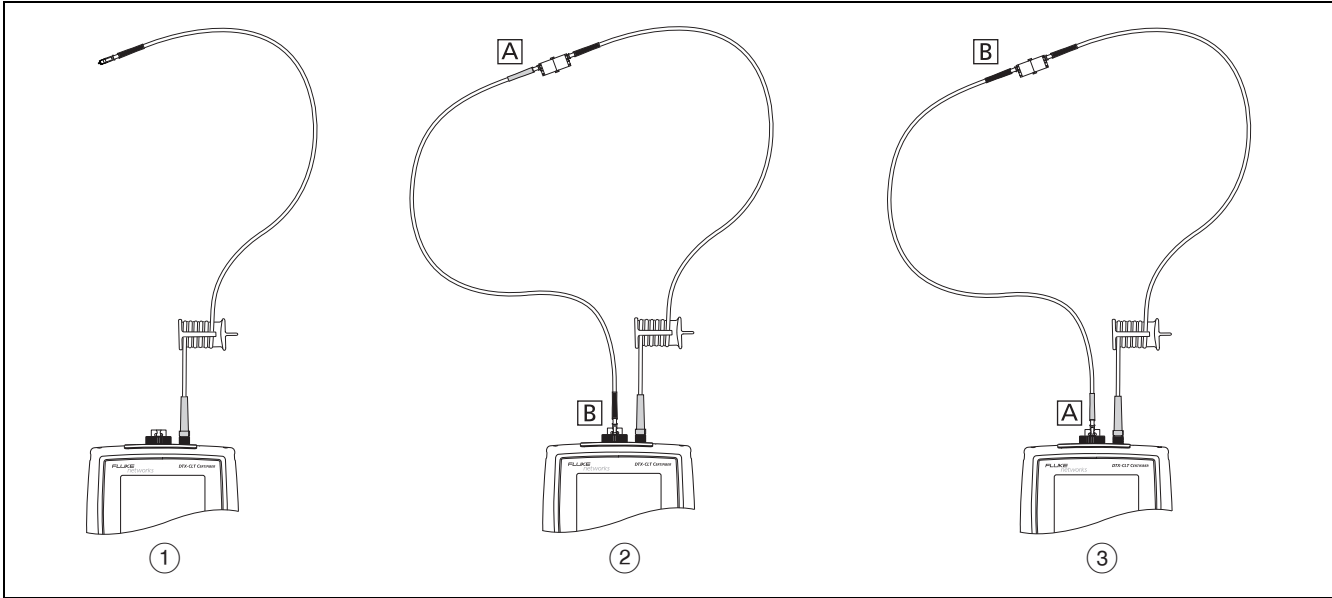


Figure A-4. Connections for Testing a Test Reference Cord

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Appendix B: Test Method Reference Table

Industry standards use different names for equivalent test methods. Table B-1 shows the names used in this manual and by four common industry standards for the three fiber test methods

Table B-1. Test Method Names

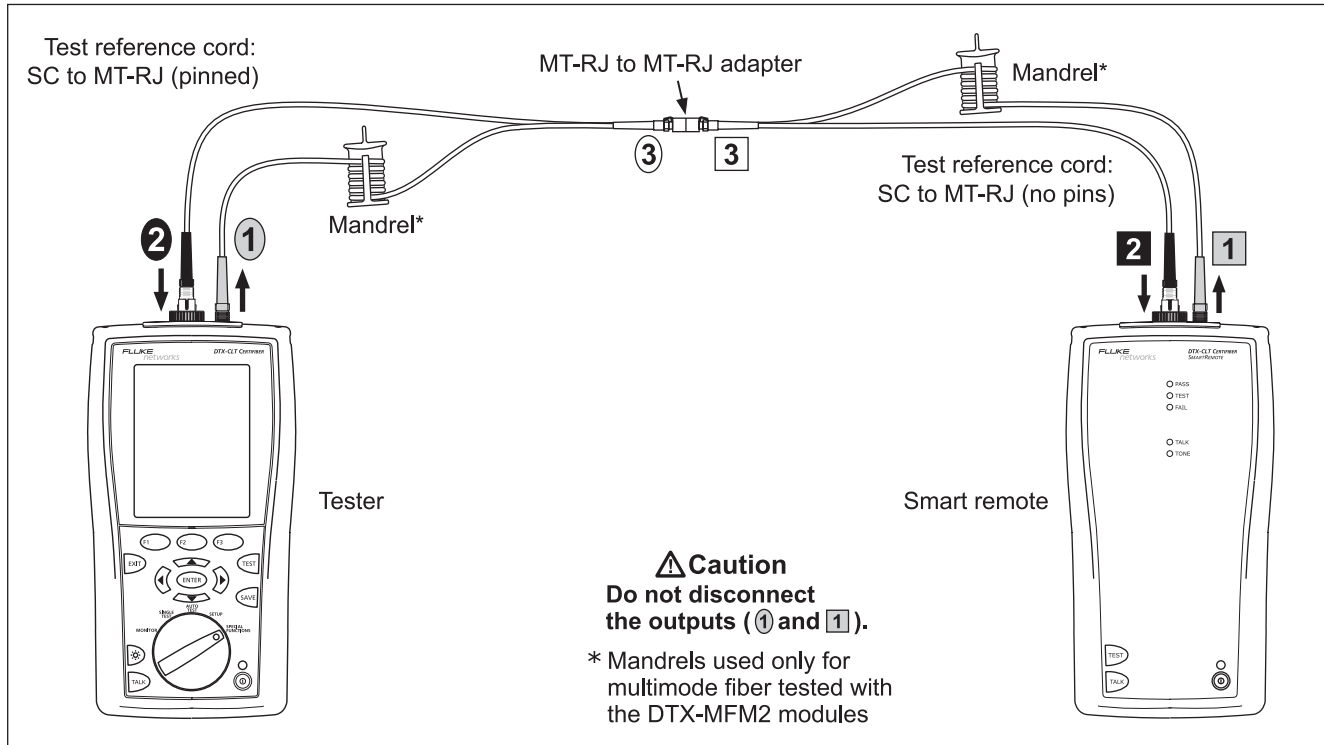
Link End Connections Included in Loss Results	This Manual	TIA/EIA-526-14A (multimode)	TIA/EIA-526-7 (singlemode)	IEC 61280-4-1 (multimode)	IEC 61280-4-2 (singlemode)
1 connection	2 Jumper	Method A	Method A.2	Method 1	Method A2
2 connections	1 Jumper	Method B	Method A.1	Method 2	Method A1
None	3 Jumper	Method C	Method A.3	Method 3	Method A3

Appendix C: Modified 1 Jumper Method

This Appendix shows modified reference and test connections that produce 1 Jumper results. Use these connections if you need 1 Jumper results but do not have connector adapters that match the connectors in the fiber under test. This method lets you connect to the fiber without disturbing the fiber modules' output connections after setting the reference.

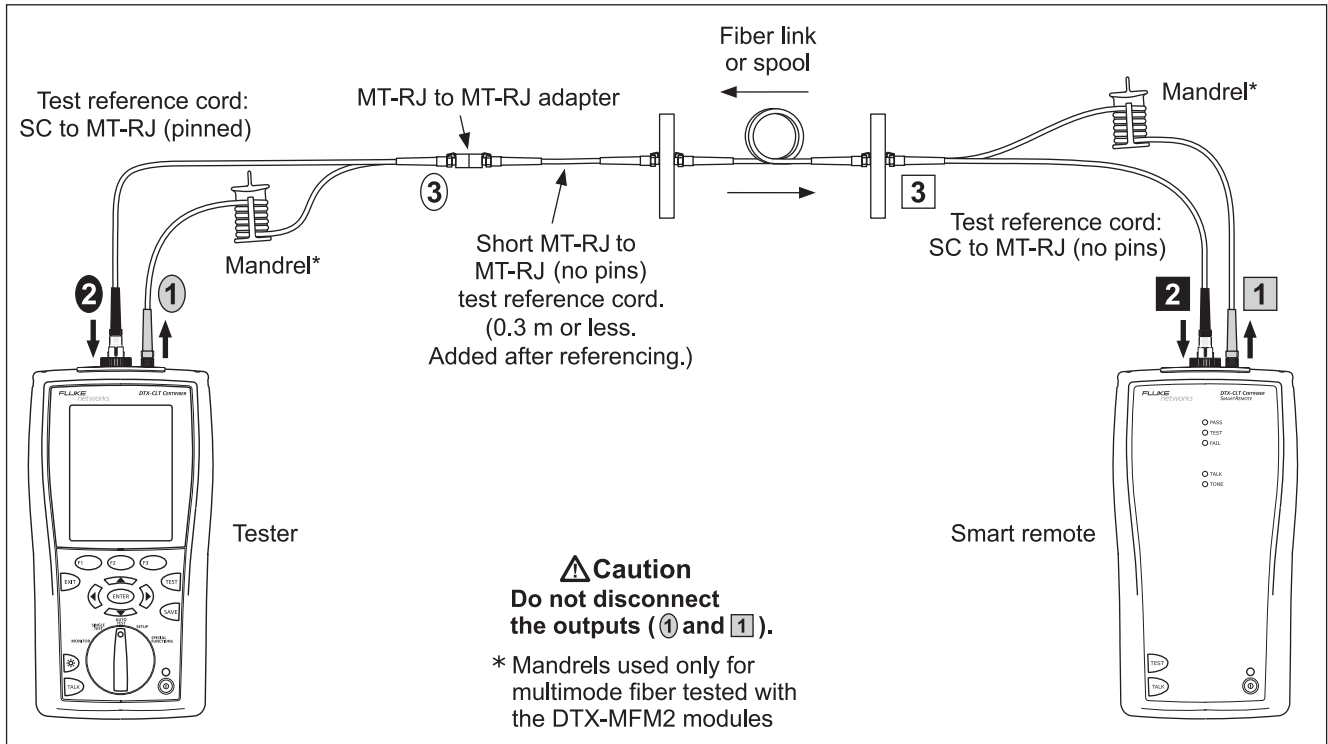
Figures C-1 and C-2 show reference and test connections for a fiber with MT-RJ connectors.

To test links with different connectors at each end, visit the Fluke Networks Knowledge Base for suggestions.



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Figure C-1. Modified 1 Jumper Method: Smart Remote Mode Reference Connections



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Figure C-2. Modified 1 Jumper Method: Smart Remote Mode Test Connections

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