FLUKE networks

SimpliFiber® Pro

Optical Power Meter and Fiber Test Kits

Users Manual

September 2008, Rev. 3 3/2016

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SimpliFiber® Pro Fiber Test Kits

Introduction

The SimpliFiber® Pro Fiber Test kits provide an optical power meter, optical power source, and fiber locator that let you do the following:

- Measure optical power or power loss at multiple wavelengths in one test. The meter measures at 850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, and 1625 nm. Source wavelengths depend on the model used.
- Check fibers for optical activity with CheckActive™ mode.
- Identify links at patch panels with FindFiber™ mode.
- Optional visual fault locator and fiber microscopes let you locate cable faults and inspect fiber endfaces for contamination or damage.
- Save up to 1000 test records. You can use LinkWare™ PC software to upload the records to a PC and create professional-quality test reports.

The Fluke Networks Knowledge Base

Visit our website for a complete list of phone numbers.

⚠ Safety Information

Table 1 describes the international electrical symbols used on the tester and in this manual.

Table 1. International Electrical Symbols

	Warning or Caution: risk of damage or destruction to equipment or software. See explanations in the manual.
	Warning: Risk of electric shock.
	Warning: Class 1 laser (singlemode and FindFiber sources). Risk of eye damage from hazardous radiation.
	Do not put products containing circuit boards into the garbage. Dispose of circuits boards in accordance with local regulations.

⚠Warning: Class 1 Laser (singlemode and FindFiber sources)

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

- Read all safety information before you use the Product.
- Carefully read all instructions.
- Do not open the case. You cannot repair or replace parts in the case.
- Do not modify the Product.
- Use only replacement parts that are approved by Fluke Networks.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Use this Product indoors only.
- Use the Product only as specified, or the protection supplied by the Product can be compromised.
- Do not use and disable the Product if it is damaged.
- Do not use the Product if it operates incorrectly.
- Have an approved technician repair the Product.
- Never look directly into optical connectors. Some sources produce invisible radiation that can permanently damage your eyes.
- Never turn on the source unless a fiber is attached to the port.
- 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.
- Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.
- Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.
- The battery door must be closed and locked before you operate the Product.

- **Repair the Product before use if the battery leaks.**
- **Replace the batteries when the low battery indicator shows to prevent incorrect measurements.**
- **Turn off the Product and disconnect all test leads, patch cords, and cables before you replace the battery.**
- **Be sure that the battery polarity is correct to prevent battery leakage.**
- **Do not disassemble or crush battery cells and battery packs.**
- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

⚠ Caution

To avoid damaging fiber connectors, to avoid data loss, and to ensure maximum accuracy of test results:

- **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.**
- **Cover all connectors with protective caps when not in use.**
- **Never connect the source to an active network. Doing so can disrupt network operations.**

Battery Installation, Life, and Status

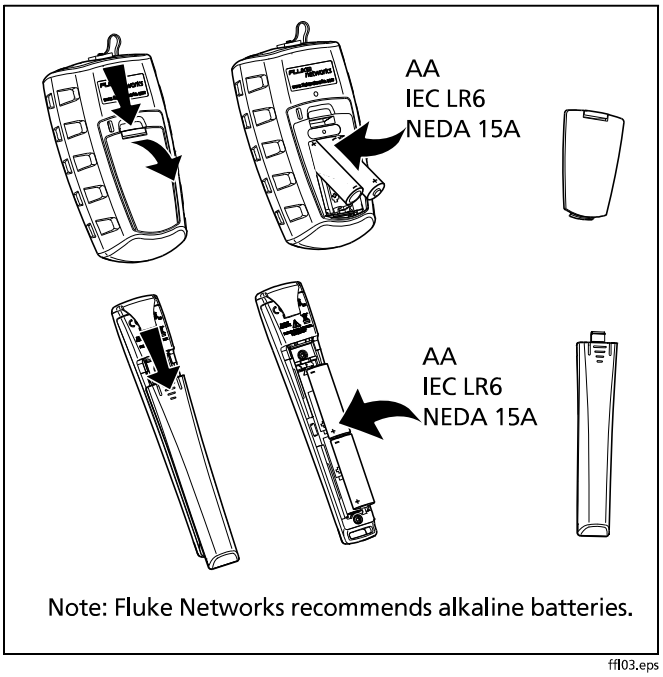


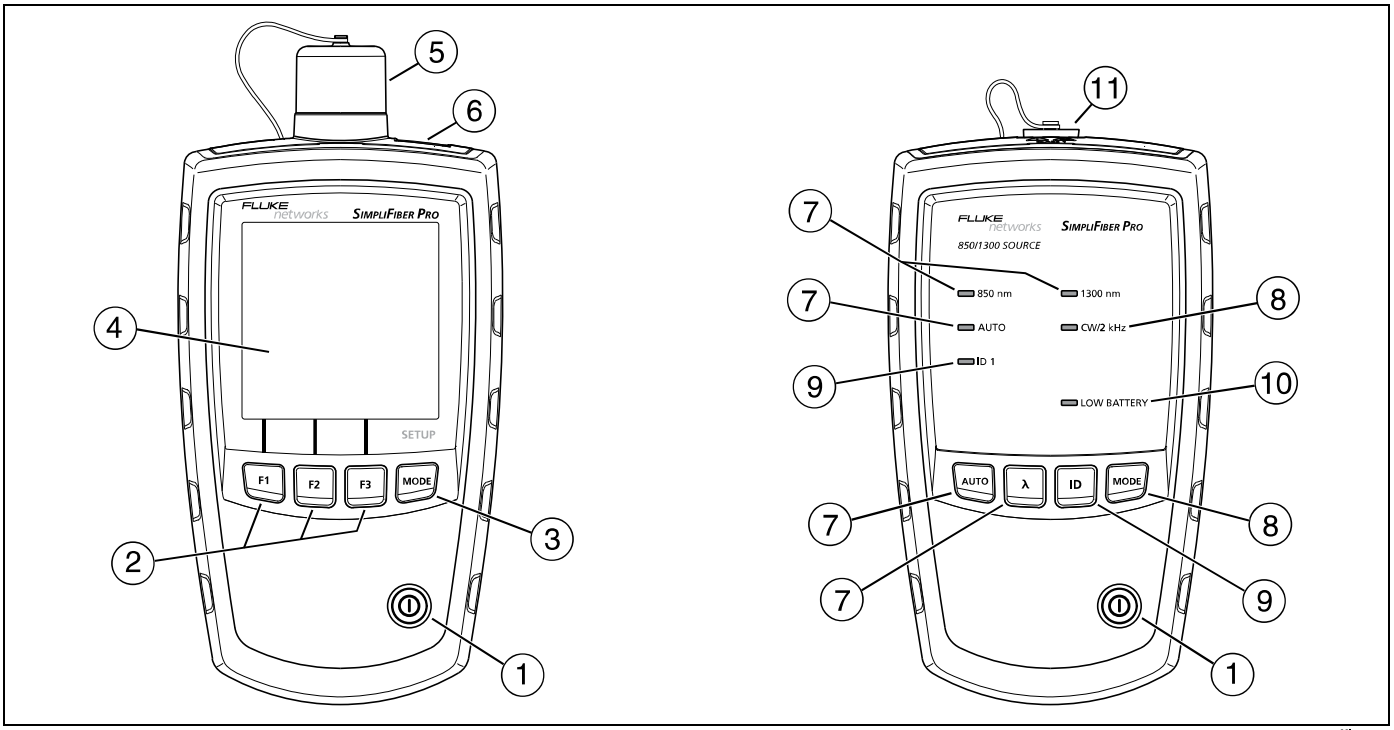
Figure 1. Installing the Batteries

Table 2. Battery Life and Low Battery Indicators

Device	Battery Life[1]	Low Battery Indicator
Meter	>50 hours	! (blinks continuously)
Multimode source	40 hours	**LOW BATTERY** LED blinks continuously[2]
Singlemode sources	30 hours	
FindFiber source	>80 hours	LED blinks continuously

1. Typical. See the specifications.
2. The **LOW BATTERY** LED blinks occasionally if auto power-off is disabled. See page 10.

Meter and Source Features



ffl04.eps

Figure 2. Meter and Source Features

1. ⏻: On/off key.
2. F1 F2 F3: Softkeys, which provide functions related to the current display. The funtions are displayed above the keys.
3. MODE: Selects the meter's measurement mode. To enter setup mode, hold down MODE for 4 seconds. See page 10.
4. LCD display.
5. Input port with interchangeable connector adapter. See page 14.
6. USB port for uploading test records to a PC. See page 31.
7. AUTO: Selects auto wavelength mode. The **AUTO** LED lights. Press λ to change the wavelength. The wavelength LEDs indicate the wavelength. See page 12.
8. MODE: Switches between continuous wave and 2 kHz modulated output signals. The **CW/2 kHz** LED lights if the output is continuous. It blinks if the output is modulated. See page 12.

   Also enables or disables auto power-off. See page 10.
9. ID: Selects FindFiber mode. The **ID** LED lights if the source is in FindFiber mode. See page 18.
10. The **LOW BATTERY** LED blinks continuously if the battery is low. The LED blinks occasionally if auto power-off is disabled. See page 10.
11. Output port with SC adapter.

Display Features

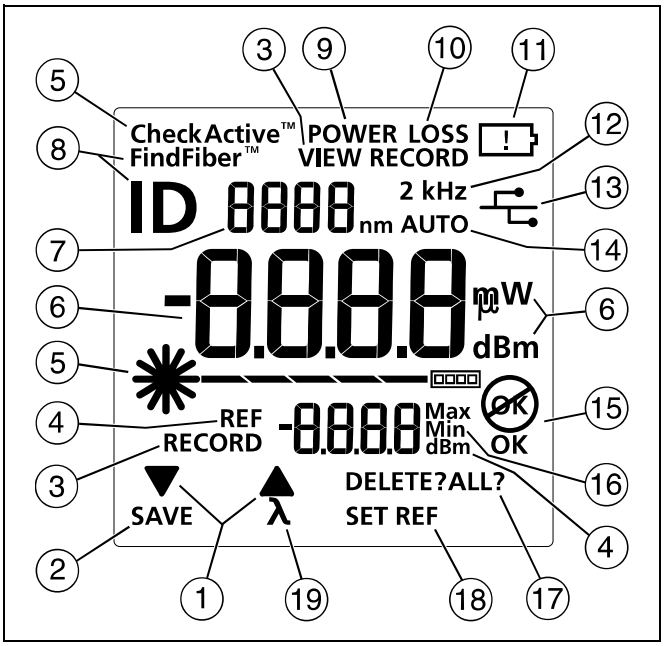


Figure 3. Display Features

1. ▼▲: Indicates that pressing F1 or F2 scrolls through choices in the current mode.
2. **SAVE**: Indicates that pressing F1 saves the power or loss measurement.
3. **RECORD**: Label for the record number. **VIEW RECORD**: Indicates the meter is displaying saved measurements. See page 29.
4. **REF** (reference): Label for the reference level in loss mode. **dBm**: Measurement unit for the reference level. See page 23.
5. **CheckActive™**: Indicators for CheckActive mode. **CheckActive™** indicates the meter is testing for fiber activity. See page 16.
6. Numeric display with units for loss (**dB**) and power measurements (**mW, µW, dBm**).
7. Numeric display for the wavelength.
8. **FindFiber™**: Indicates the meter is testing for a FindFiber source. **ID** is the label for the source's identification number, which appears on the numeric display (6). See page 18.
9. **POWER**: The meter is measuring power. See page 20.
10. **LOSS**: The meter is measuring power loss. See page 26.

⑪ : Low battery indicator. See page 5.

⑫ **2 kHz**: The meter detects a 2 kHz modulated optical signal. See page 12.

⑬ : The meter is connected to a PC through the USB port. See page 31.

⑭ **AUTO**: The meter detects the auto wavelength identifier in the optical signal. See page 12.

⑮ **OK** : The operation succeeded (**OK**) or failed .

⑯ **Max Min**: Indicators for maximum (**Max**) and minimum (**Min**) power measurements. See page 22.

⑰ **DELETE?**: Indicates that pressing F3 deletes the current record. **DELETE ALL?** indicates that pressing F3 deletes all records. See page 29.

⑱ **SET REF**: Indicates that pressing F3 saves the power measurement as the reference value. See page 23.

⑲ **λ**: Indicates that pressing F2 changes the wavelength being measured.

Setting User Preferences

For the meter:

1 To enter setup mode, hold down MODE for 4 seconds.

2 To scroll through the setup items (Table 3), press MODE. To change settings, press F1 ▼.

3 To exit setup mode, press MODE until the meter is in the desired test mode.

For the source:

If auto power-off is enabled, the source turns off after 30 minutes if no keys are pressed.

To disable or enable auto power-off, hold down MODE for 4 seconds.

- If auto power-off is enabled, all LEDs turn on for 3 seconds.
- If auto power-off is disabled, all LEDs blink for 3 seconds and the **LOW BATTERY** LED blinks occasionally.

Table 3. Meter Setup Items

Meter Setup Item	Choices
-88.88 Max Min -88.88	Enable or disable **Min Max** mode for power measurements.
mW µW dBm	Select a unit for power measurements: milliwatts (mW), microwatts (µw), or decibels relative to 1 mW (dBm).
oFF oN	Turn the backlight off or on.
PoFF -- 10 20 30 60	Select a time period for the meter to turn off automatically if no keys are pressed. The meter will not turn off if it is connected to a source that is in **AUTO** or **ID** mode. Dashes (--) indicate auto power-off is disabled.

Continuous Wave/2 kHz Modes

Press MODE to switch the source between continuous wave and 2 kHz modulated output signals.

- Use continuous wave mode (**CW/2 kHz** LED on steady) if making loss or power measurements with a meter other than a SimpliFiber Pro meter.
- Use the 2 kHz modulated output mode (**CW/2 kHz** LED blinking) if locating fibers with a meter other than a SimpliFiber Pro meter.

Auto Wavelength Mode

In auto wavelength mode the source's signal includes an identifier that tells the meter which wavelength to measure. You can set the source to one wavelength or to automatically switch between wavelengths. When the source is automatically switching, the meter can automatically measure loss or power at each wavelength in one test. If you save the measurements, the meter saves all wavelengths measured in one record.

To set the source to auto wavelength mode:

1 If the **AUTO** LED is not on, press AUTO.

2 Press λ to manually switch wavelengths (one wavelength LED is on) or to set the meter to automatically switch between wavelengths (wavelength LEDs blink alternately).

If the meter detects the auto wavelength signal, **AUTO** appears on the display, and the meter automatically measures at the correct wavelength.

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:

Cleaning Bulkhead Connectors (meters, sources and patch panels)

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.

Changing the Connector Adapter

You can change the meter's connector adapter to connect to SC, ST, and LC fiber connectors. Additional adapter styles may be available. Check the Fluke Networks web site for updates.

⚠Caution

- **Cover all connectors with dust caps when not in use.**
- **Store extra connector adapters in the canisters provided.**
- **Do not touch the photodiode lens (see Figure 4).**
- **Do not overtighten the adapter or use tools to tighten the adapter.**

To install a connector adapter, refer to Figure 4 and do the following:

1. Locate the slot in the meter's 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 meter connector's slot and slide the adapter onto the connector.
3. Screw the nut onto the meter connector.

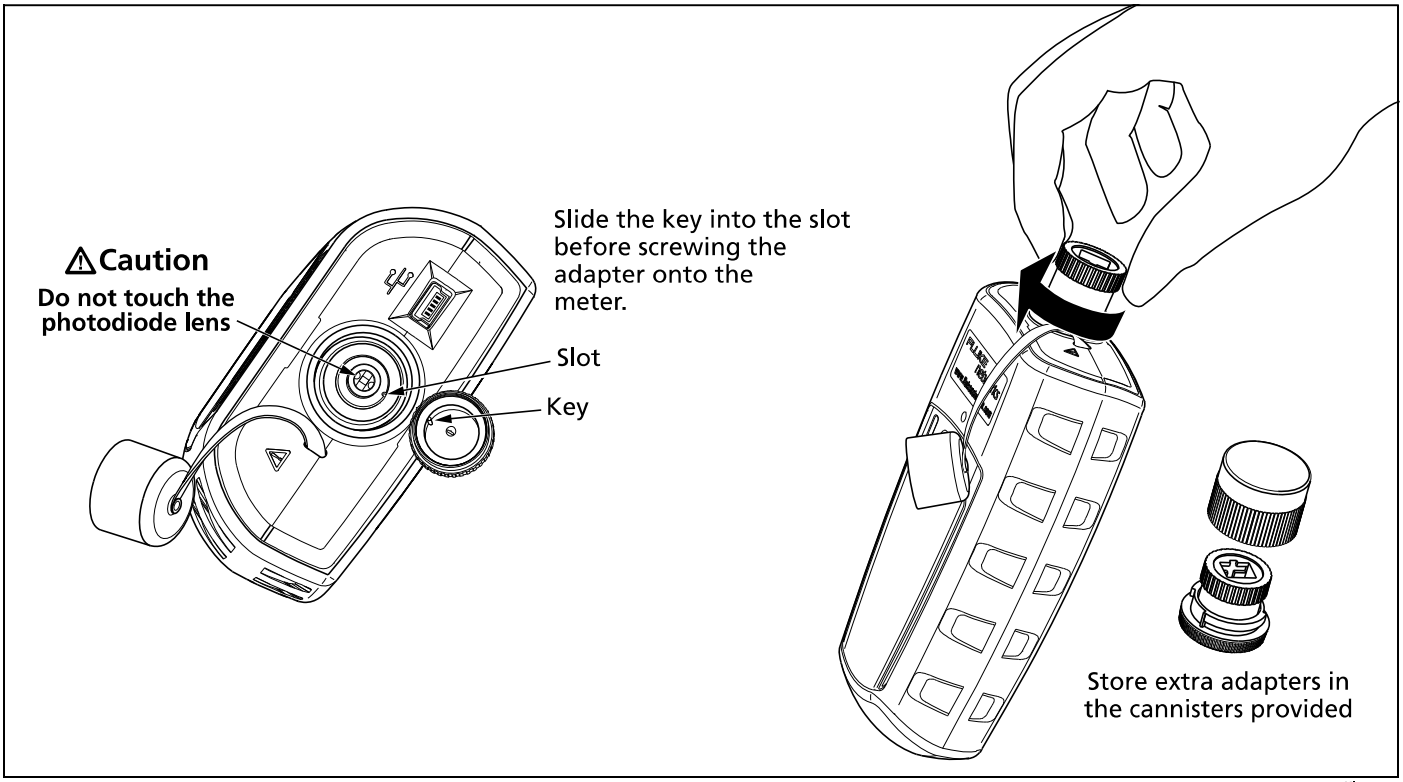


Figure 4. Installing the Connector Adapter

Detecting Active Fibers

The meter's CheckActive™ mode lets you quickly determine if a fiber is connected to active equipment. This mode helps you locate active links and avoid exposure to hazardous radiation.

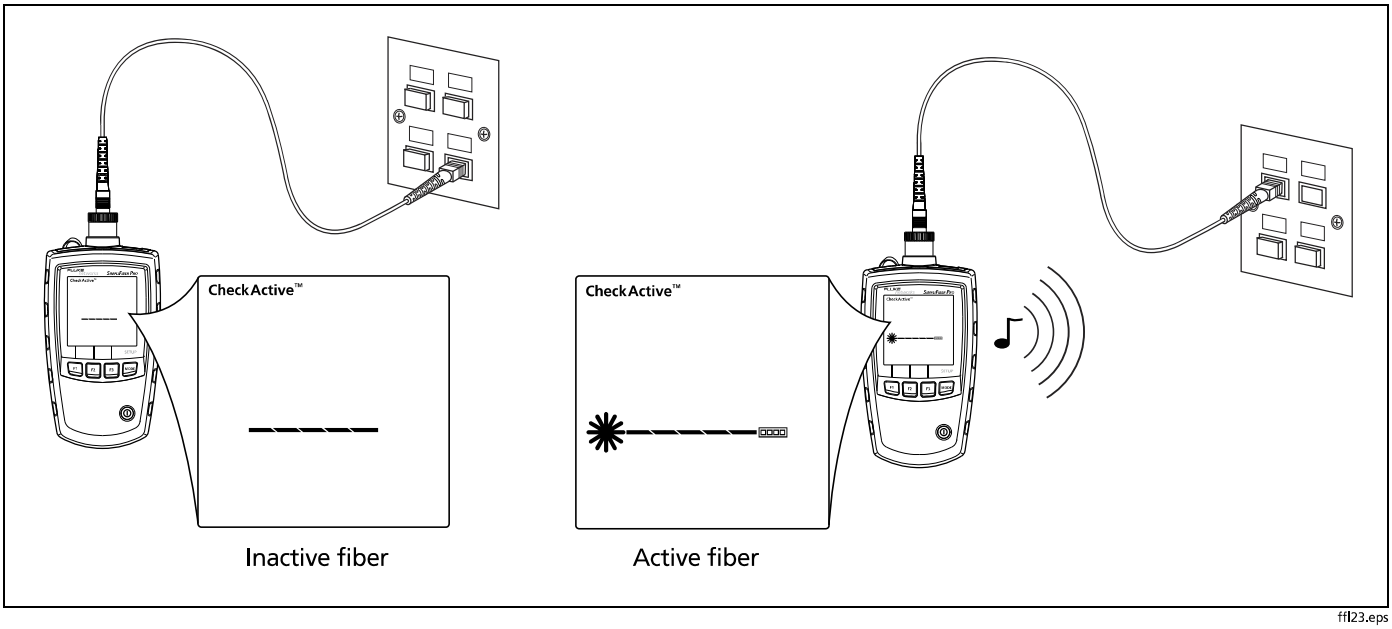
To use CheckActive mode:

1 Press MODE until **CheckActive™** appears.

2 Connect the meter to a fiber. The meter indicates fiber activity as shown in Figure 5.

Note

Ambient light can activate the CheckActive tone. To avoid this, keep a patch cord connected to the meter if the meter is in CheckActive mode.



ffl23.eps

Figure 5. Detecting Active Fibers

Locating Fibers

FindFiber mode helps you quickly identify link connections at patch panels.

To use FindFiber mode:

1 Connect the meter and a SimpliFiber source or one or more FindFiber sources to the links as shown in Figure 6.

2 Turn on the meter and the source or FindFiber sources.

- If you are using a SimpliFiber source, press ID on the source.
- To change the number transmitted by a FindFiber source, turn the source off, hold down the power key for about 4 seconds; then release the key when the desired LED turns on.

3 On the meter, press MODE until **FindFiber**™ appears.

4 The meter indicates connectivity as shown in Table 4:

Table 4. FindFiber Source Numbers

Source Connected	ID Number on the Meter
SimpliFiber Pro multimode source	1
SimpliFiber Pro singlemode source 1310/1550 nm	2
SimpliFiber Pro singlemode source 1490/1625 nm	3
FindFiber source	Number indicated by the source's LED
No continuity or incompatible source connected	----

Note

In power or loss mode, **ID** *blinks if the meter is connected to a FindFiber source or a source in ID mode.*

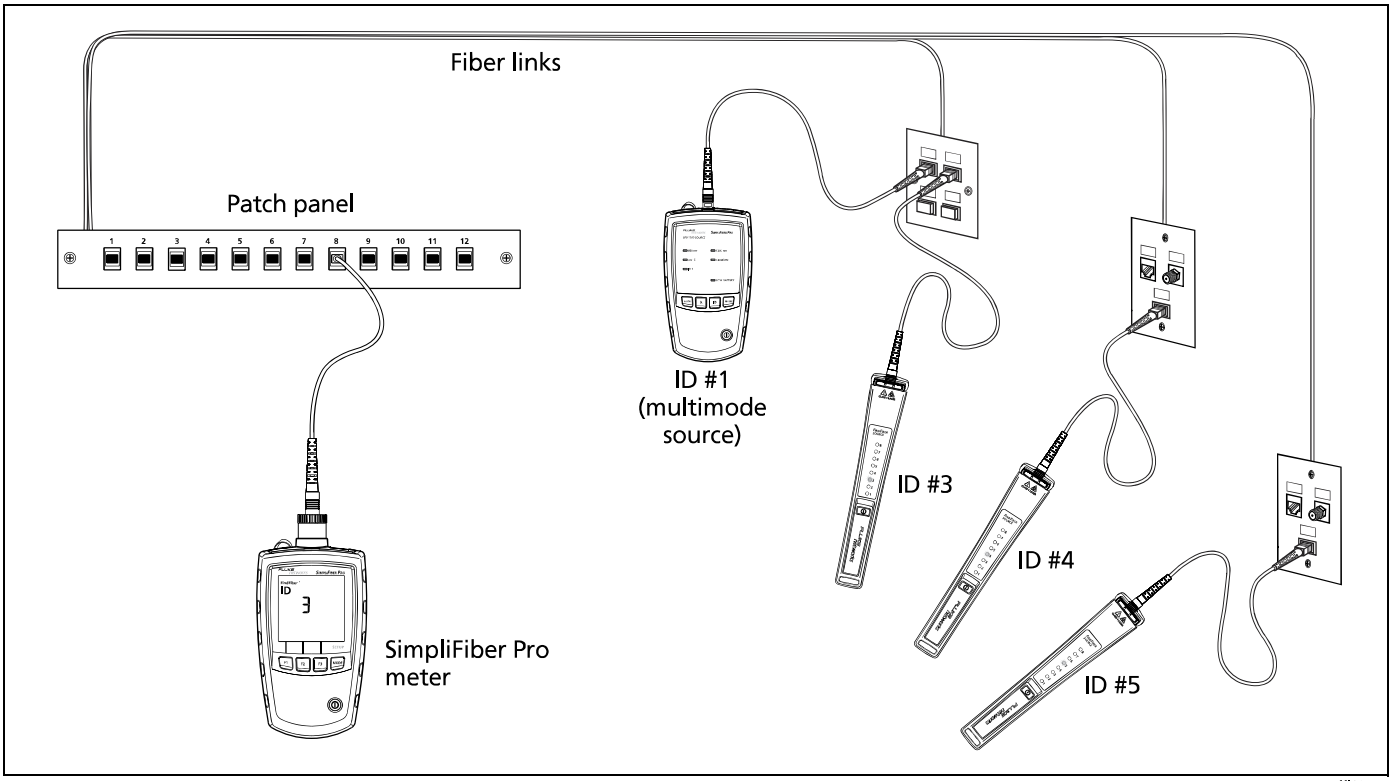


Figure 6. Using FindFiber Mode to Locate Fibers

Measuring Optical Power

The power measurement shows the optical power level produced by a source such as an optical network interface card or optical test equipment.

To measure power:

1 Clean the connectors on the link or source to be tested. Use fiber optic solvent and optical-grade wipes or swabs to clean connectors as described on page 13.

2 On the meter, press MODE until **POWER** appears (Figure 8.)

3 Make the connections shown in Figure 7.

4 On the meter, press F2 **λ** to select the wavelength generated by the source.

5 To save the measurement, press F1 **SAVE.** The meter briefly shows the record number and **OK**.

If the source was automatically switching wavelengths, the meter saves measurements for all wavelengths in one record.

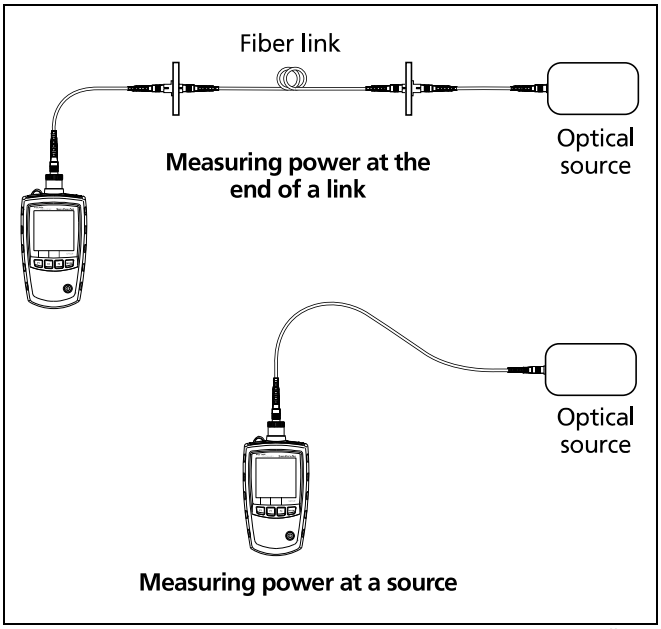
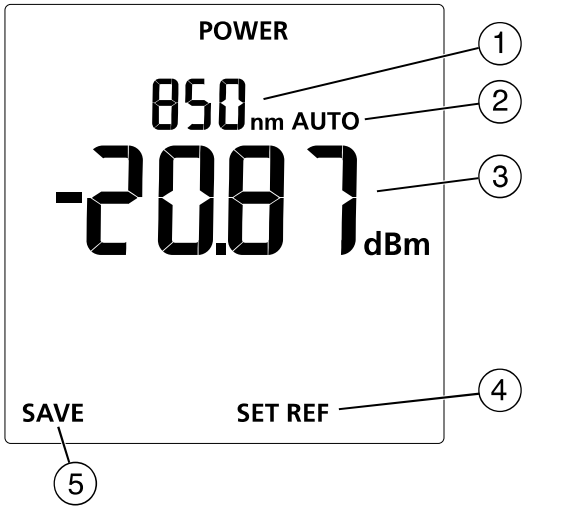


Figure 7. Power Measurement Connections



1. The wavelength being measured.
2. Indicates the meter is in auto wavelength mode.
3. The power measurement. To change the measurement unit see page 10.
4. Pressing F3 **SET REF** saves the measured power level as the reference and switches the meter to loss measurement mode.
5. Pressing F1 **SAVE** saves the measurement. If the source was automatically switching wavelengths, the meter saves measurements for all wavelengths in one record.

Figure 8. Power Measurement Display

Using the Min/Max Function

The **Min/Max** function shows the minimum and maximum power levels measured for each wavelength.

To enable the **Min/Max** function:

1 On the meter, hold down MODE for 4 seconds to enter setup mode.

2 Press F1 ▼ so that -88.88 Max Min appears.

3 Press MODE until **POWER** appears; then press MODE again to see the **Min/Max** measurements (Figure 9).

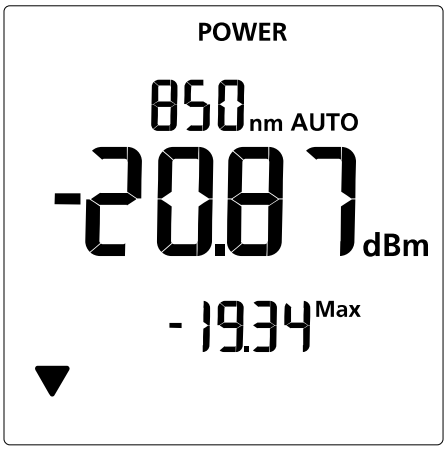
The meter shows the minimum (**Min**) and maximum (**Max**) power levels measured since you entered the power measurement mode at the selected wavelength.

4 To switch between minimum and maximum values, press F1 ▼.

Notes

The meter records new minimum and maximum values each time the wavelength changes.

*You cannot save power measurements or set the reference if **Min** or **Max** appear on the display.*



ffl14.eps

Figure 9. Power Measurement Display with Min/Max Function Enabled

Measuring Loss

The loss measurement shows how much optical power is lost in a link's fiber and connectors.

About 1 Jumper Connections

The reference and test connections shown in this section 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. This is the most commonly used method for testing installed fiber links. Other methods are shown in Appendix D.

1 Jumper connections require connector adapters that match the connectors in the link under test. If you do not have the correct connector adapters, see Appendix D for alternative connections that produce 1 Jumper results.

Testing the Test Reference Cords

You must test your test reference cords at regular intervals. Use the procedure given in Appendix A.

About Referencing

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 for referencing are excluded from test results.

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

- At the beginning of each day.
- Anytime you reconnect a test reference cord to the source.
- Anytime you see a negative loss measurement.

Setting the Reference

You may set the reference from power or loss mode. Fluke Networks recommends using power mode because the meter shows the actual power level produced by the source. In loss mode, the meter shows the difference between the power level and the previous reference level.

To set the reference:

1 Clean the connectors on the meter, source, and a test reference cord. Use fiber optic solvent and optical-grade wipes or swabs to clean connectors as described on page 13.

2 Turn on the meter and source and let them warm up for 5 minutes. Allow additional time if the equipment has been stored above or below ambient temperature.

3 Make the connections shown Figure 10.

4 If the source's **AUTO** LED is not on, press AUTO.

If you want to set the reference for both wavelengths, press λ until the wavelength LEDs blink alternately.

Note

If you are not using a SimpliFiber Pro source, set the source to the desired wavelength and continuous wave output.

5 On the meter, press MODE until **POWER** appears (see Figure 8 on page 21).

Notes

*You cannot set the reference if **Min** or **Max** appear on the display. See page 22.*

Setting the reference from power mode lets you see the source's power level before saving it as the reference level. You may also set the reference from loss mode.

6 Press F3 **SET REF.** The meter switches to loss mode, the display shows 0.00 dB, **OK** appears briefly, and the new reference value appears.

If the reference value is less than -60 dBm or if the source is in ID or 2 kHz mode, the meter briefly shows FAIL and OK. Check the connections and the source's mode or try setting the reference again using another test reference cord.

⚠ Caution

If you disconnect the source's output after setting the reference, you must set the reference again to ensure valid measurements.

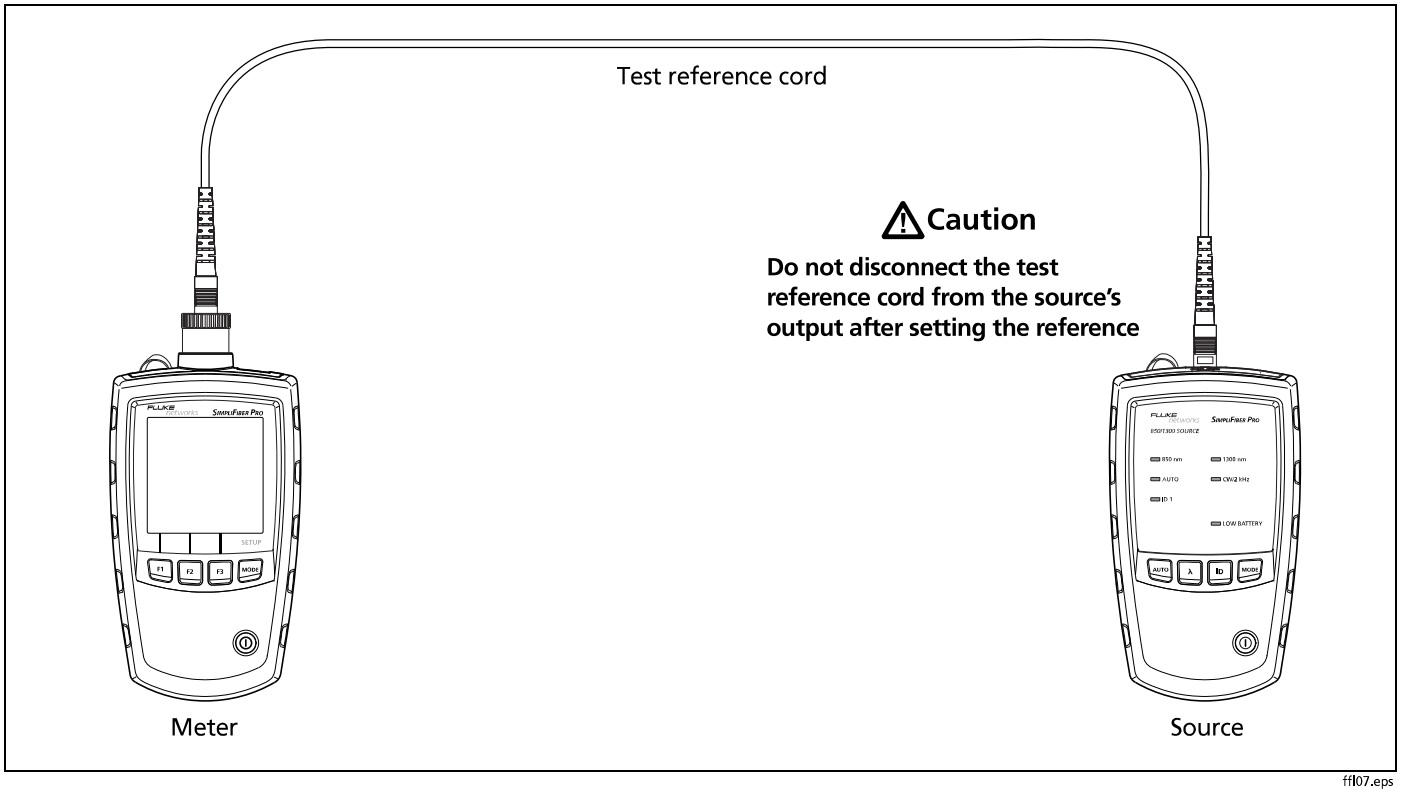


Figure 10. Reference Connections (1 Jumper method)

Measuring Loss

1 Set the reference as described on page 23.

2 Clean the connectors on the link to be tested and on a second test reference cord. Use fiber optic solvent and optical-grade wipes or swabs to clean connectors as described on page 13.

3 Disconnect the test reference cord from the meter; then make the connections shown in Figure 11.

⚠ Caution

Do not disconnect the test reference cord from the source's output. If you do, you must set the reference again to ensure valid measurements.

4 On the meter, press MODE until **LOSS** appears (Figure 12).

5 If the source's **AUTO** LED is not on, press AUTO.

6 If you want the source to automatically switch wavelengths, press λ until the wavelength LEDs blink alternately. Or you may press λ to switch wavelengths as needed.

Note

If you are not using a SimpliFiber Pro source, set the source to the desired wavelength and to continuous wave output. On the meter, press F2 λ to select the wavelength generated by the source.

7 To save the measurement, press F1 **SAVE.** The meter briefly shows the record number and **OK**.

If the source was automatically switching wavelengths, the meter saves measurements for all wavelengths in one record.

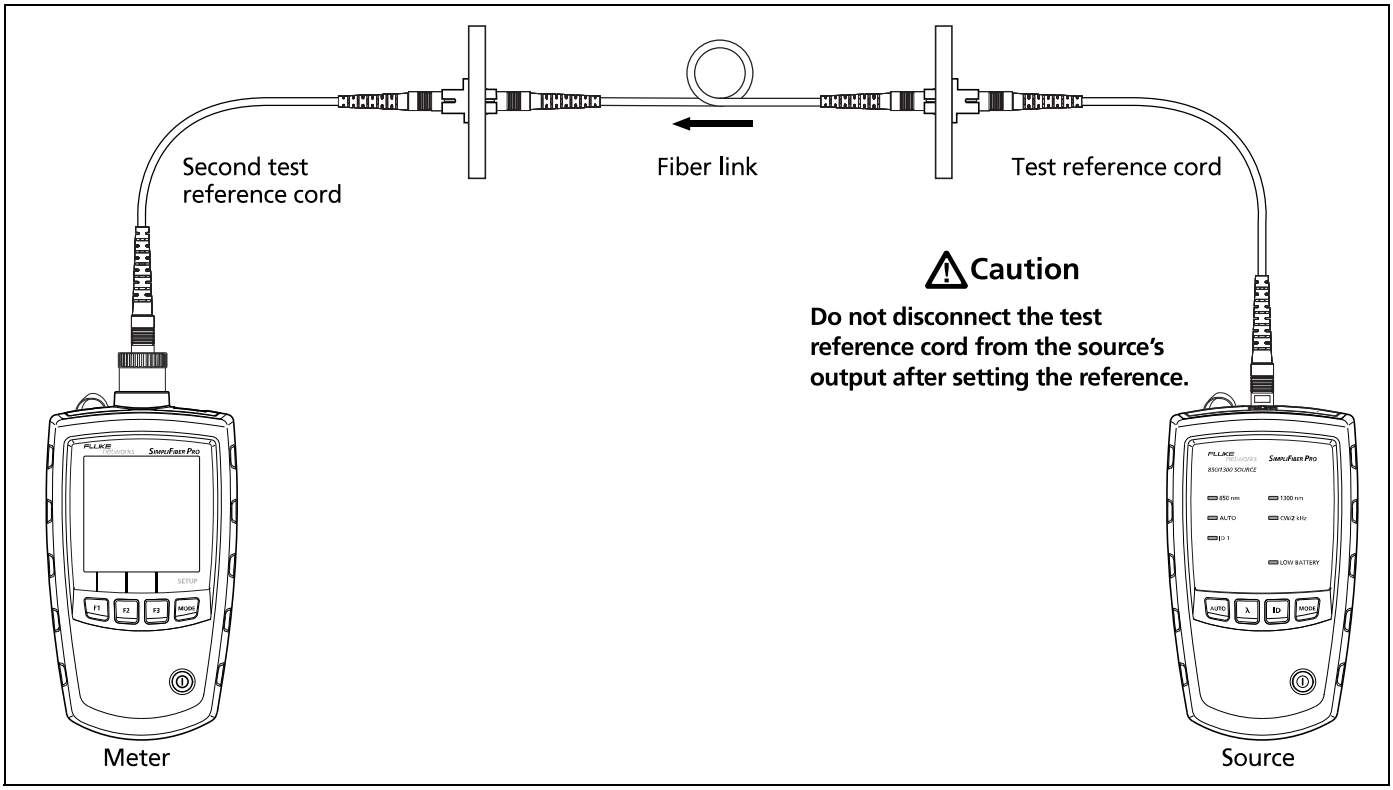
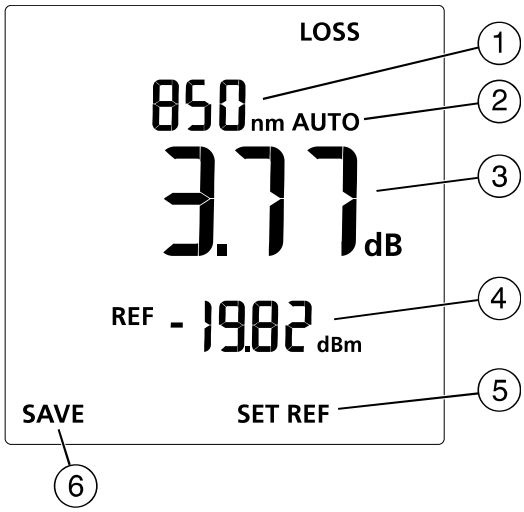


Figure 11. Loss Measurement Connections (1 Jumper method)



1. The wavelength being measured.
2. Indicates the meter is in auto wavelength mode.
3. The loss measurement. If the loss measurement is blinking, the loss is negative and less than -1.0 dB. See "If Loss is Negative" on page 29.
4. The reference value.
5. Pressing F3 **SET REF** saves the measured power level as the reference.
6. Pressing F1 **SAVE** saves the measurement. If the source was automatically switching wavelengths, the meter saves measurements for all wavelengths in one record.

Figure 12. Loss Measurement Display

If Loss is Negative

A negative loss measurement means the reference power level is less than the measured power level. This can be caused by the following:

- The fiber ends were dirty during referencing.
- The connections to the source were disturbed after referencing.
- The was a kink in a test reference cord during referencing.
- The connectors were not properly aligned during referencing.
- The meter and source were not set to the same wavelengths during referencing or testing.
- The testers were much colder during referencing than during testing.
- You did not allow enough time for the source to warm up before setting the reference.
- You measured loss on a fiber that is shorter than the test reference cord used to set the reference.

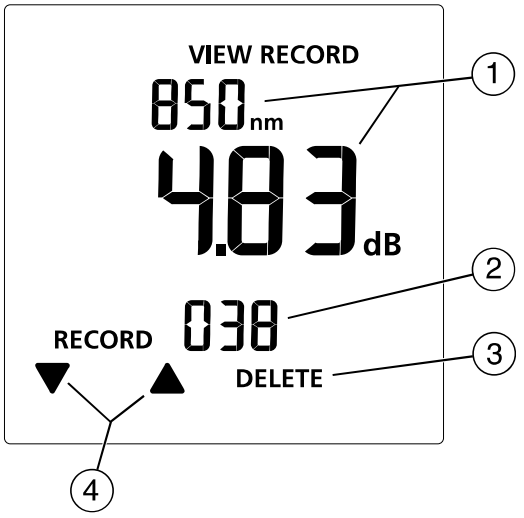
If loss is negative, set the reference again and retest the link.

Memory Functions

The meter stores up to 1000 loss or power records. If memory is full, the meter shows FULL when you try to save a measurement.

Viewing and Deleting Records

To view records, press MODE until **VIEW RECORD** appears. See Figure 13.



1. The wavelength and the measurement. If the record contains measurements for multiple wavelengths, the display alternates between the measurements.
2. The record number.
3. To delete the record you are viewing, press F3 **DELETE** twice.

   If you delete a record below the highest record number, the meter does not reuse the empty memory location. Deleted records show - - - - for the measurement.

   To delete all records, hold down F3 **DELETE** until **DELETE ALL?** appears; then press F3 again.
4. Press F1 ▼ or F2 ▲ to scroll through records.

Figure 13. View Record Display

Uploading Records to a PC

1 Install the latest version of LinkWare PC software on your PC. Download LinkWare PC from the Fluke Networks website.

2 Turn on the meter.

3 Connect the meter to the PC with the USB cable provided, as shown in Figure 14.

4 Start LinkWare PC software on the PC.

5 Click **Import** on the LinkWare PC tool bar; then select **SimpliFiber Pro.**

6 Enter project information; then click **OK.**

7 Import all records from the meter or select records to import.

Note

The meter's record numbers are in the Cable ID column in LinkWare PC.

8 To delete all records in the tester, select **Utilities** > **SimpliFiber Pro** > **Delete All Tests in Memory.**

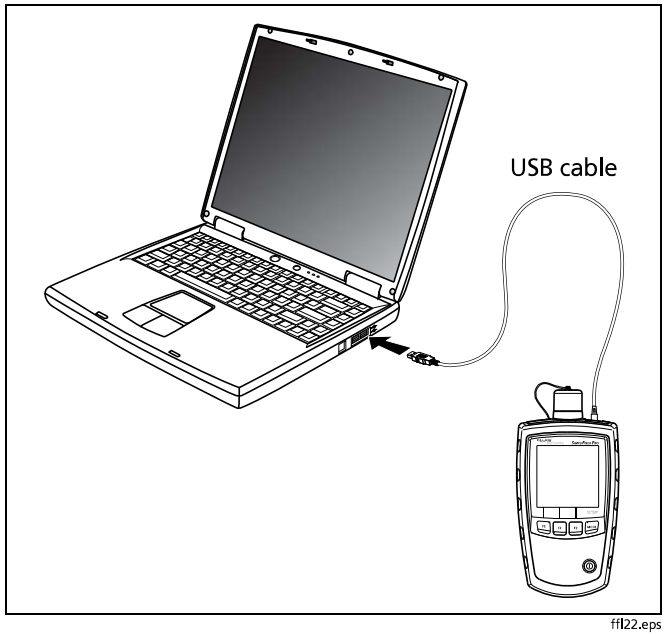


Figure 14. Connecting to a PC

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.**

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 connector as described on page 13.

Checking the Meter's Software Version and Calibration Date

Turn the meter on while holding down the F2 and F3 keys.

Use F1▼ to toggle between the following:

- SoF : Software version
- FAC : Factory calibration date. The day and month (DDMM) is on the top line, and the year (YYYY) is on the bottom line.

To exit this mode, turn the meter off.

Options and Accessories

Specifications

Environmental Specifications

Operating temperature	-10°C to +50°C
Storage temperature	-20°C to +50°C

Meter Specifications

Detector type	InGaAs
Calibrated wavelengths	850 nm, 1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm
Measurement range	+10 dBm to -52 dBm (850 nm) +10 dBm to -60 dBm (1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm)
Power measurement linearity	±0.2 dB (850 nm)[1] ±0.1 dB (1300 nm, 1310 nm, 1490 nm, 1550 nm, 1625 nm)[2]
Power measurement uncertainty[3]	±0.25 dB

1. For 850 nm, ±0.2 dB for power from 0 dBm to -45 dBm, ±0.25 dB for power < -45 dBm.
2. ±0.1 dB for power from 0 dBm to -55 dBm. ±0.2 dB for power > 0 dBm and < -55 dBm.
3. 23°C ±2°C, power level -20 dBm, continuous wave, 62.5/125 µm at multimode wavelengths, 9/125 µm at 1310 nm, 1490 nm, 1550 nm, and 1625 nm; add 0.1 dB for 1625 nm.

Meter Specifications (cont.)

Display resolution, dB or dBm	0.01 dB
Power display units	dBm, mW, µW
Auto-wavelength detection	Yes
Record storage	1000 records, multiple wavelengths per record, sequential-number ID
External interface	USB 2.0, full speed
Optical connector	Removable adapter. SC adapter is standard. Optional adapters include LC, ST, FC
FindFiber ID detection	Yes
Power requirement	2 AA alkaline batteries
Battery life[4]	>50 hours (typical)
Automatic power-off	10, 20, 30, or 60 minutes (can be disabled by the user)
Low battery warning	Low battery icon blinks
Calibration cycle	1 year
Dimensions	6.4 in x 3.2 in x 1.5 in (16.5 cm x 8.0 cm x 3.9 cm)
Weight	11.5 oz (325 g)

4. Measured power levels ≤0 dBm. Battery life depends on the condition and type of batteries used. Fluke Networks recommends alkaline batteries.

Multimode Source

Emitter type	LED: dual 850 nm/1300 nm
Central wavelength	850 nm: ±30 nm 1300 nm: ±20 nm
Spectral width (FWHM)	850 nm: 50 nm (typical) 1300 nm: 170 nm (maximum)
Minimum output power	850/1300 nm: ≥ -20 dBm
Power output stability[1]	±0.1 dB over 8 hours
Auto dual-wavelength switching	Yes. Can be enabled or disabled by the user.
Optical output connector	Fixed SC
FindFiber ID generation	Yes. Fixed at ID 1.
Modes	CW (continuous wave), 2 kHz modulated, auto-wavelength

1. 23°C ±2°C, after 5 minutes of warm-up time.

Multimode Source (cont.)

Power requirement	2 AA alkaline batteries
Battery life[2]	40 hours (typical)
Automatic power off	30 minutes (can be disabled by the user)
Low battery warning	LED blinks
Size	5.6 in x 3.2 in x 1.6 in (14.2 cm x 8.1 cm x 4.1 cm)
Weight	9.8 oz (278 g)

2. In auto-wavelength mode. Battery life depends on the condition and type of batteries used. Fluke Networks recommends alkaline batteries.

1310 nm/1550 nm Singlemode Source

Emitter type	FP laser: dual 1310 nm/1550 nm
Central wavelength	1310 nm: ±20 nm 1550 nm: ±30 nm
Spectral width (RMS)	1310 nm: 2 nm (maximum) 1550 nm: 3 nm (maximum)
Minimum output power	1310 nm/1550 nm: ≥ -7 dBm (typical)
Power output stability[1]	±0.25 dB over 8 hours
Auto dual-wavelength switching	Yes. Can be enabled or disabled by the user.
Optical output connector	Fixed SC
FindFiber ID generation	Yes. Fixed at ID 2.
Modes	CW (continuous wave), 2 kHz, auto-wavelength

1. 23°C ±2°C, after 5 minutes of warm-up time.

1310 nm/1550 nm Singlemode Source (cont.)

Power requirement	2 AA alkaline batteries
Battery life[2]	30 hours (typical)
Automatic power off	30 minutes (Can be enabled or disabled by the user.)
Low battery warning	LED blinks
Size	5.6 in x 3.2 in x 1.6 in (14.2 cm x 8.1 cm x 4.1 cm)
Weight	9.8 oz (278 g)

2. In auto-wavelength mode. Battery life depends on the condition and type of batteries used. Fluke Networks recommends alkaline batteries.

1490 nm/1625 nm Singlemode Source

Emitter type	DFB laser: dual 1490 nm/1625 nm
Central wavelength	1490 nm: ±3 nm 1625 nm: ±5 nm
Spectral width (RMS)	1490 nm: 1 nm (maximum) 1625 nm: 1 nm (maximum)
Minimum output power	1490 nm/1625 nm: ≥ -3 dBm (typical)
Power output stability[1]	±0.25 dB over 8 hours
Auto dual-wavelength switching	Yes. Can be enabled or disabled by the user.
Optical output connector	Fixed SC
FindFiber ID generation	Yes. Fixed at ID 3.
Modes	CW (continuous wave), 2 kHz, auto-wavelength

1. 23°C ±2°C, after 5 minutes of warm-up time.

1490 nm/1625 nm Singlemode Source (cont.)

Power requirement	2 AA alkaline batteries
Battery life[2]	30 hours (typical)
Automatic power off	30 minutes (Can be enabled or disabled by the user.)
Low battery warning	LED blinks
Size	5.6 in x 3.2 in x 1.6 in (14.2 cm x 8.1 cm x 4.1 cm)
Weight	9.8 oz (278 g)

2. In auto-wavelength mode. Battery life depends on the condition and type of batteries used. Fluke Networks recommends alkaline batteries.

FindFiber Source Specifications

Emitter type	Laser
Source connector	Fixed SC
FindFiber ID numbers	1 through 8. Default is 3.
Power indicator	LED
Power requirement	2 AA alkaline batteries
Battery life	>80 hours (typical)
Automatic power-off	30 minutes
Low battery indicator	Blinking LED
Size	7.1 in x 1.3 in x 1.0 in (17.9 cm x 3.2 cm x 2.5 cm)
Weight	4.4 oz (125 g)

Certifications, Compliance, and Regulatory Information

CE	Conforms to relevant European Union directives
	Conforms to relevant Australian standards
C SP US	Listed by the Canadian Standards Association
Laser safety	Complies with 21CFR.1040.10,11, and EN60825-1, 2:2007 (Class 1, Hazard Level 1)

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

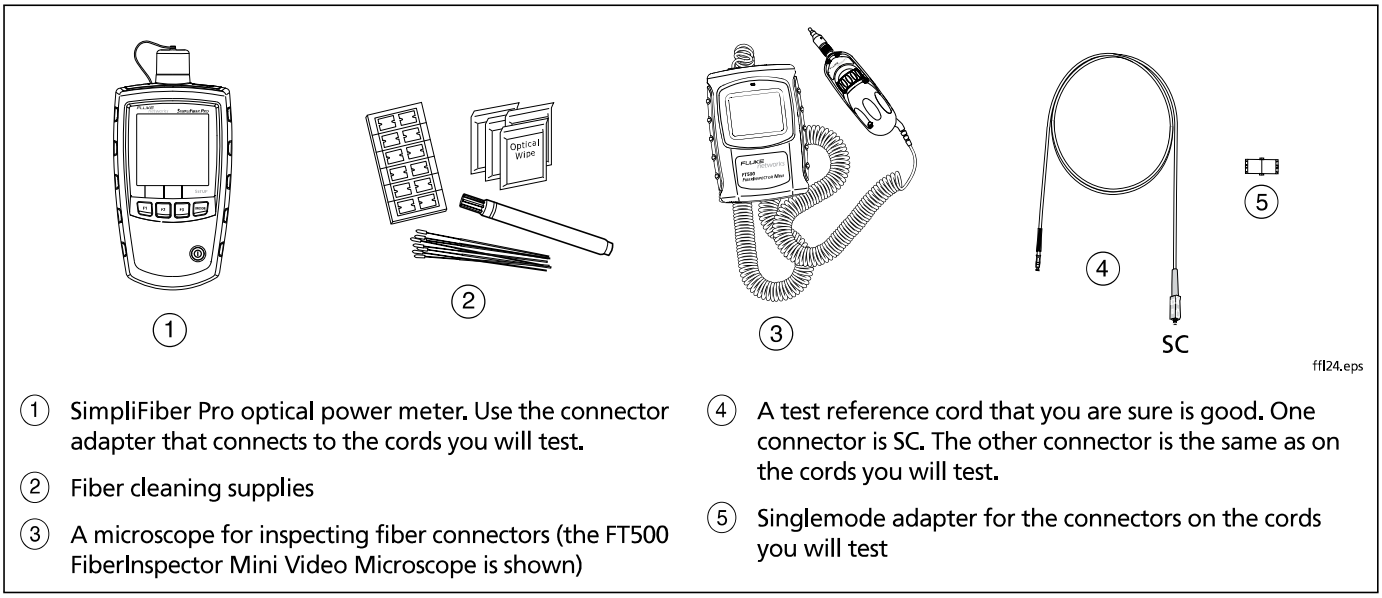
After you do the test given in this Appendix, use the procedure given with the procedures for certifying cabling to monitor the condition of the cords.

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.



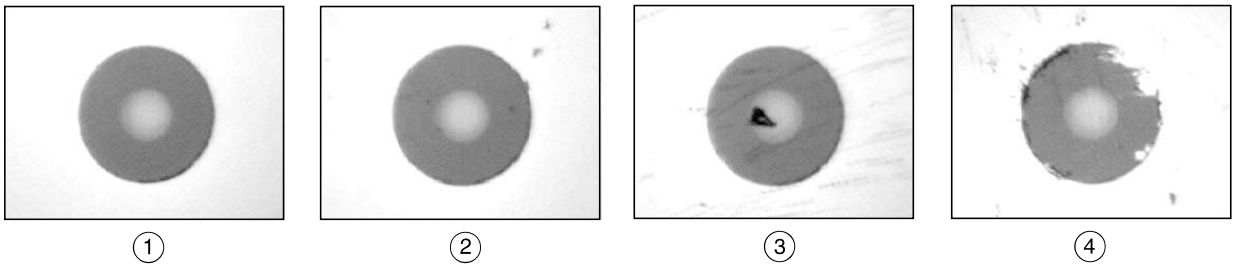
1. SimpliFiber Pro optical power meter. Use the connector adapter that connects to the cords you will test.
2. Fiber cleaning supplies
3. A microscope for inspecting fiber connectors (the FT500 FiberInspector Mini Video Microscope is shown)
4. A test reference cord that you are sure is good. One connector is SC. The other connector is the same as on the cords you will test.
5. Singlemode adapter for the connectors on the cords you will test

Figure A-1. Equipment for Testing the Test Reference Cords

1 Clean and Inspect the Connectors

1-1 Test reference cords must have endfaces that are clean and have no damage. Always use correct procedures to clean endfaces. See page 13 or use the procedures given with your cleaning supplies.

1-2 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.



① A clean endface that has no damage. This is the only condition that you can accept for a test reference cord.

② Dirt that is not on the core does not change the loss measurement, but the dirt can move when you connect the fiber.

③ Dirt is on the core. Also, there are scratches that were caused by incorrect procedures for cleaning.

④ The cladding has damage. This does not change the loss measurement, but can cause damage to other endfaces.

Figure A-2. Examples of Fiber Endfaces

2 Set the Reference

2-1 Set the reference as described on page 24.

2-2 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, 1310/1550 nm, the reference value must be better than -8.00 dBm (for example, -7.50 dBm is a better value)
- For 9/125 µm fiber, 1490/1625 nm, the reference value must be better than -4.00 dBm (for example, -3.50 dBm is a better value)

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

3 Test the Cord in Both Directions

3-1 Disconnect the test reference cord from the meter (Figure A-3, ①).

3-2 Connect the cord you want test (Figure A-3, ②).

3-3 On the meter, press MODE until **LOSS** appears.

3-4 If the source's **AUTO** LED is not on, press AUTO.

3-5 If you want the source to automatically switch wavelengths, press λ until the wavelength LEDs blink alternately. Or you may press λ to switch wavelengths as needed.

Note

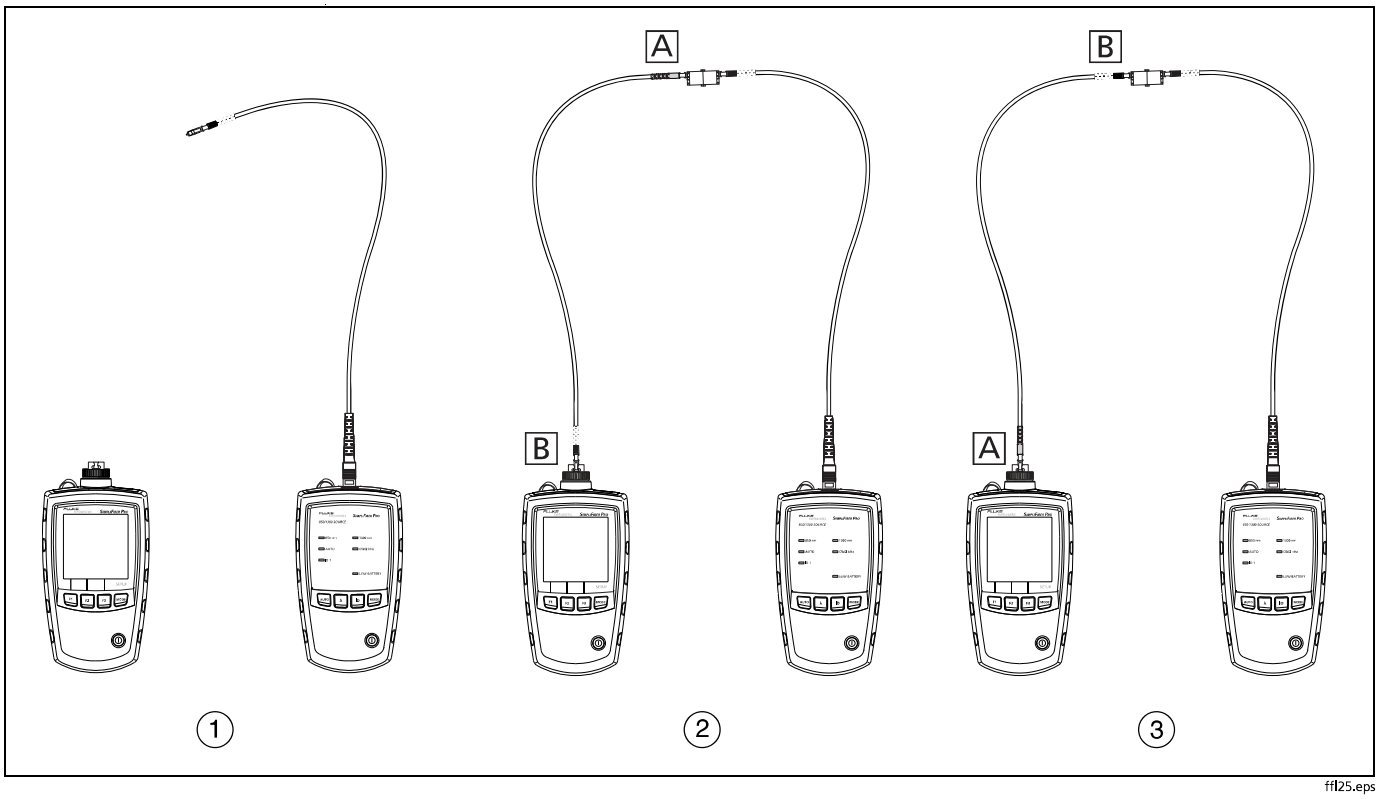
If you are not using a SimpliFiber Pro source, set the source to the desired wavelength and to continuous wave output. On the meter, press F2 λ *to select the wavelength generated by the source.*

3-6 Compare the loss measurement 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.

3-7 Connect the cord in the opposite direction (Figure A-3, ③), then repeat step 3-6.



ffl25.eps

Figure A-3. Connections for Testing a Test Reference Cord

Appendix B: Using Mandrels

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 µm and 62.5 µm fiber links for current and planned high bit-rate applications, such as Gigabit Ethernet and 10 Gigabit Ethernet. Mandrels are available from Fluke Networks.

⚠Caution

Do not use mandrels when testing singlemode fiber.

Figure B-1 shows how to wrap the fiber around a mandrel. Place the mandrel at the source's output, as shown in Figure B-2.

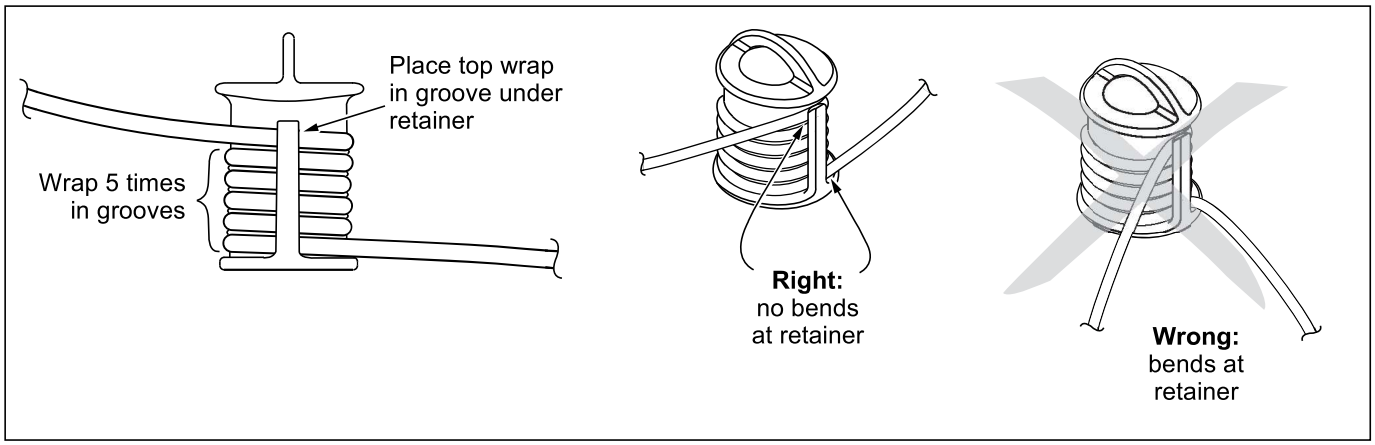
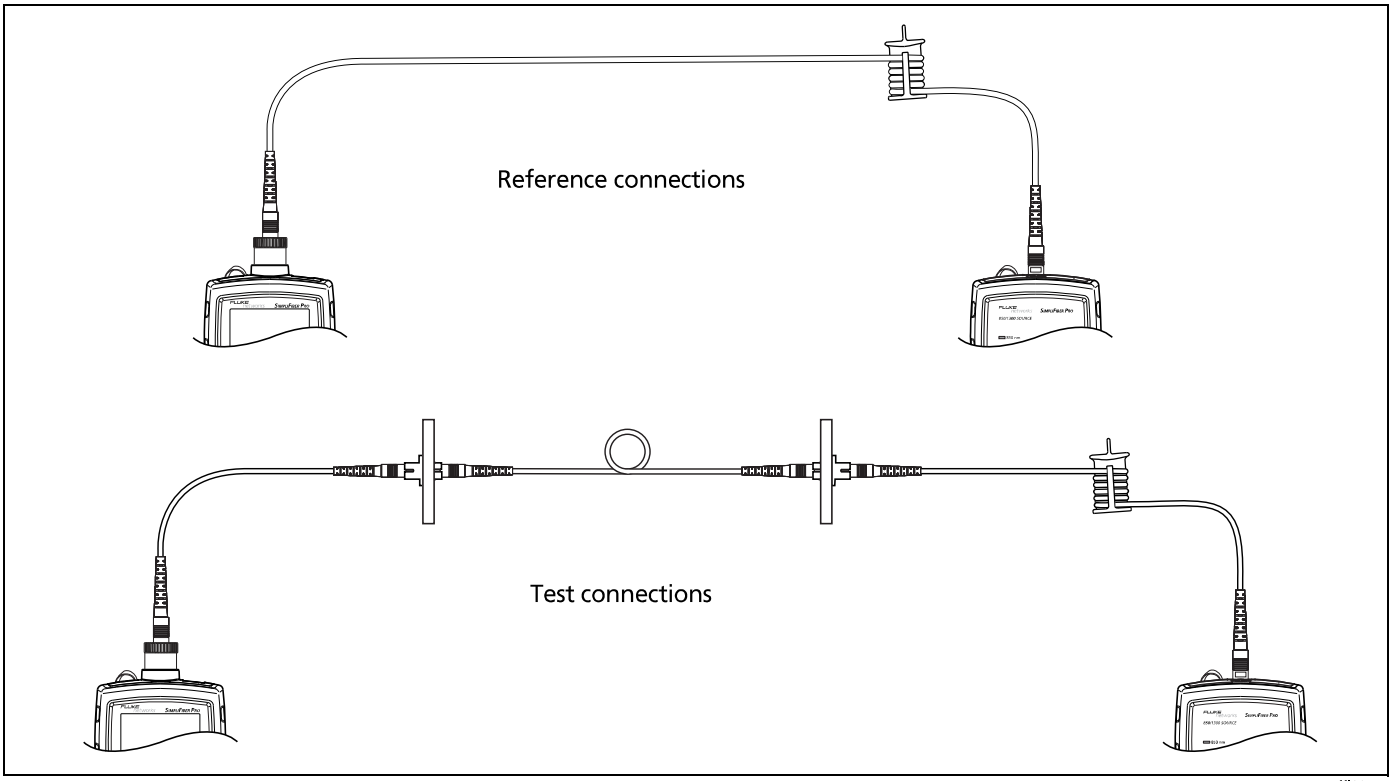


Figure B-1. Wrapping a Test Reference Cord Around a Mandrel



ffl16.eps

Figure B-2. Mandrel Placement

Appendix C: Fiber Test Method Names

Industry standards use different names for equivalent fiber test methods. Tables C-1and C-2 show the names used in this manual and by four common industry standards for the three fiber test methods.

Table C-1. Reference Method Names fore TIA/EIA Standards

Link End Connections Included in Loss Results	Method Name in This Manual	TIA-526-14B (multimode)	TIA/EIA-526-7 (singlemode)
2 connections	1 Jumper	One-Cord Reference Method (was Method B)	Method A.1
1 connection	2 Jumper	Two-Cord Reference Method (was Method A)	Method A.2
None	3 Jumper	Three-Cord Reference Method (was Method C)	Method A.3

Table C-2. Reference Method Names for IEC Standards

Link End Connections Included in Loss Results	Method Name in This Manual	IEC 61280-4-1 (multimode)	IEC 61280-4-2 (singlemode)
2 connections	1 Jumper	One-Cord Reference Method (was Method 2)	One-Cord Reference Method (was Method A1)
1 connection	2 Jumper	Two-Cord Reference Method (was Method 1)	Two-Cord Reference Method (was Method A2)
None	3 Jumper	Three-Cord Reference Method (was Method 3)	Three-Cord Reference Method (was Method A3)

Appendix D: Loss Test Methods

Introduction

The number of fiber connections represented in loss test results depends on the reference and test connections. This appendix describes the three common methods: 1 Jumper, 2 Jumper, and 3 Jumper.

Note

See Appendix C for a cross-reference of the method names in various standards.

This appendix also describes modified connections you can use if you do not have the correct connector adapters for the meter.

1 Jumper Method

Results from the 1 jumper method account for the loss of two connections plus the fiber in the link. This method is suitable for testing premises fiber, where patch cords are typically used at both ends of the link and connector loss is a significant portion of the total loss.

1 jumper reference connections cancel out the effects of the test reference cords, as shown in Figure D-1.

Loss results for the1 jumper method therefore represent both connections plus the fiber in the link. ANSI/TIA/EIA-526-14A and 526-7 specify the1 jumper method for testing multimode and singlemode premises fiber, where connector loss is a significant portion of the total loss.

Note

To get 1 jumper results when you do not have the correct connector adapters for the meter, see "Modified 1 Jumper Method" on page 62.

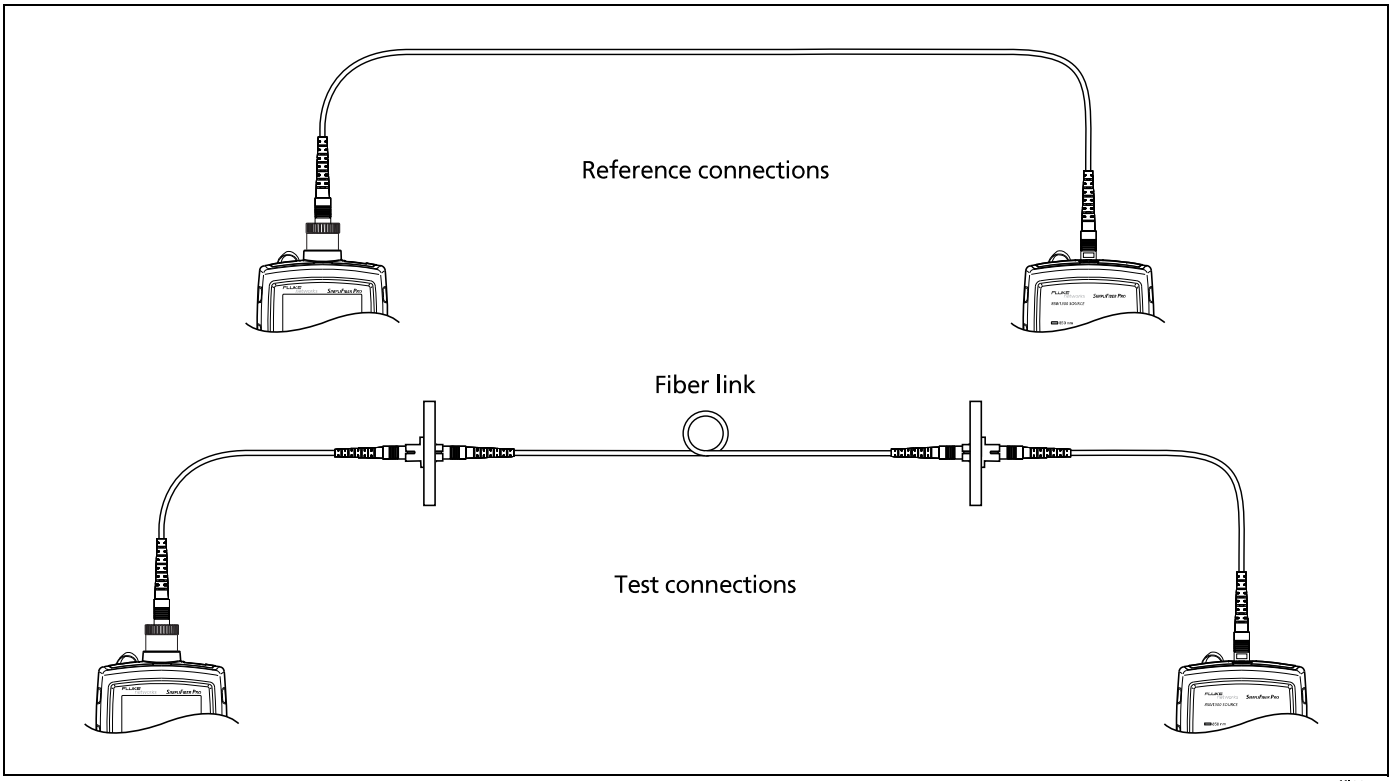


Figure D-1. Reference and Test Connections for the 1 Jumper Method

2 Jumper Method

Results from the 2 jumper method account for the loss of one connection plus the fiber in the link. This method is suitable for links where the fiber's loss is a significant portion of the total loss, such as when the link is long or a patch cord is used at only one end.

2 jumper reference connections cancel out the effects of one connection and two test reference cords, as shown in Figure D-2.

The test connections add one connection, plus the fiber in the link, to each path. Loss results for the 2 jumper method therefore represent only one connection plus the fiber in the link.

Because the results omit one connection, ANSI/TIA/EIA-526-14A and 526-7 do not recommend the 2 jumper method for testing premises fiber, where patch cords are typically used at both ends of a link and connector loss is a significant portion of total loss.

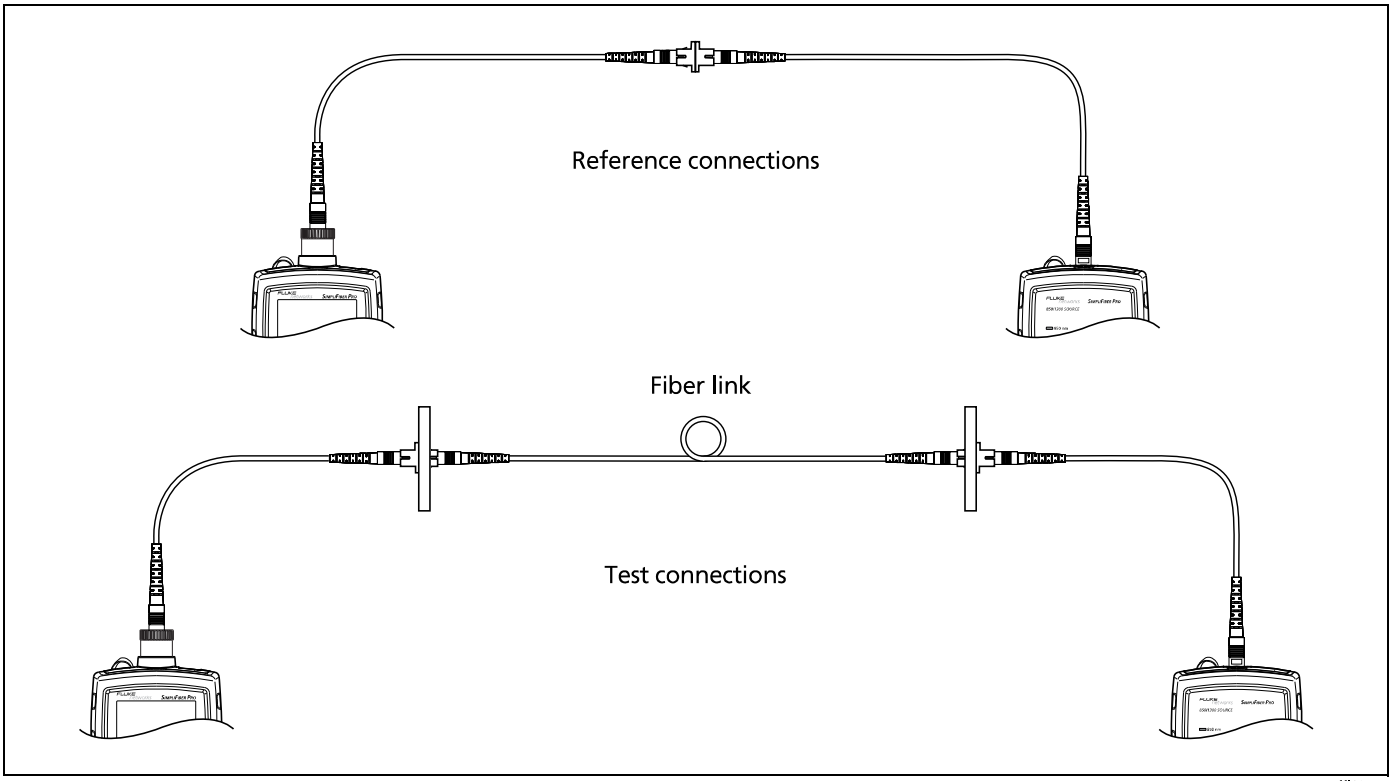


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Figure D-2. Reference and Test Connections for the 2 Jumper Method

3 Jumper Method

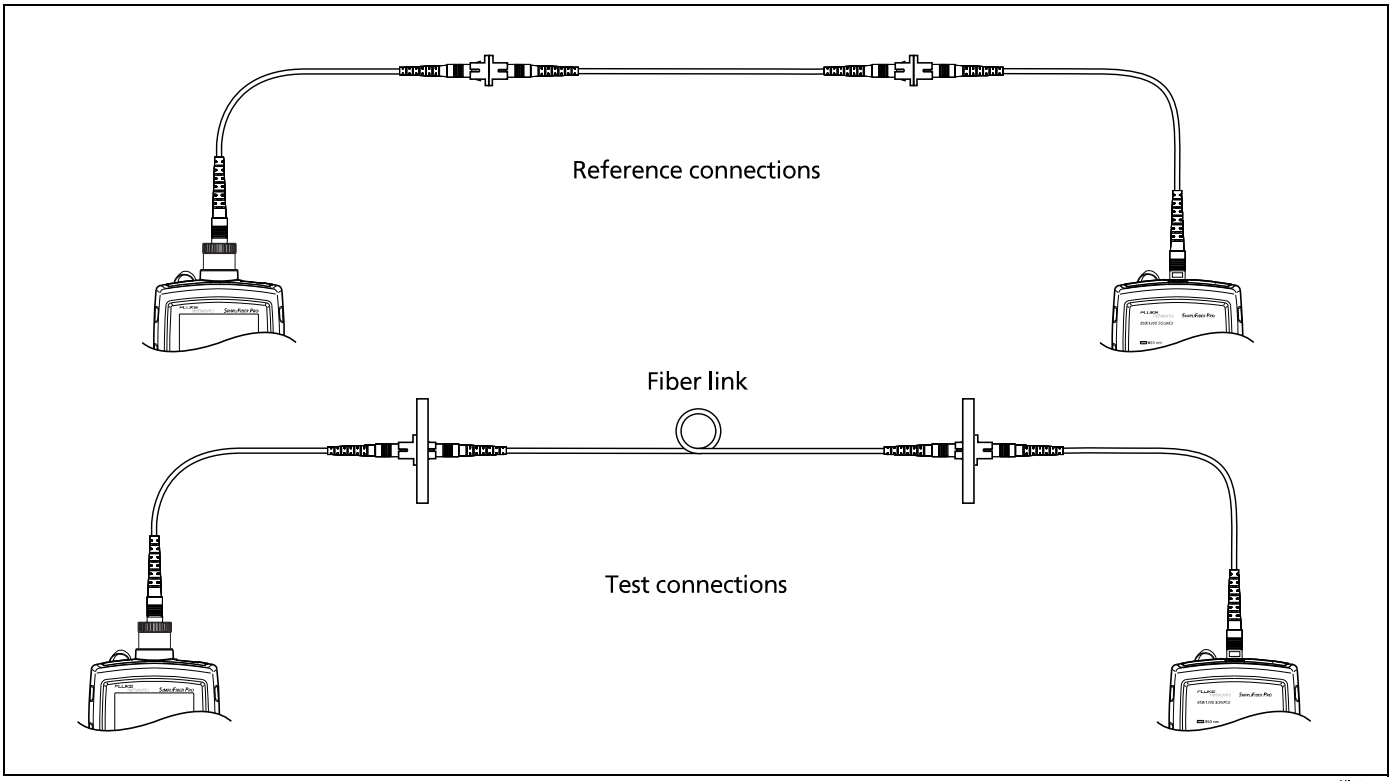
Results from the 3 jumper method account for the loss of only the fiber in the link. This method is suitable for testing links where the fiber's loss is the majority of the total loss, such as when the link is very long or patch cords are not used at either end.

3 jumper reference connections cancel out the effects of two connections and the test reference cords, as shown in Figure D-3.

The test connections add only the fiber in link. Loss results for the 3 jumper method therefore represent only the fiber in the link.

Because the results omit both connections in the link, ANSI/TIA/EIA-526-14A and 526-7 do not recommend the 3 jumper method for testing premises fiber, where patch cords are typically used at both ends of the link and connector loss is a large portion of the total loss.

You can use this method to measure the loss of channels when the patch cords for equipment are already connected.



ffl12.eps

Figure D-3. Reference and Test Connections for the 3 Jumper Method

Modified 1 Jumper Method

This section describes 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 on the link. This method lets you connect to the link without disturbing the source's output connections after setting the reference.

Figure D-4 shows reference and test connections for one fiber in a duplex cable with LC connectors.

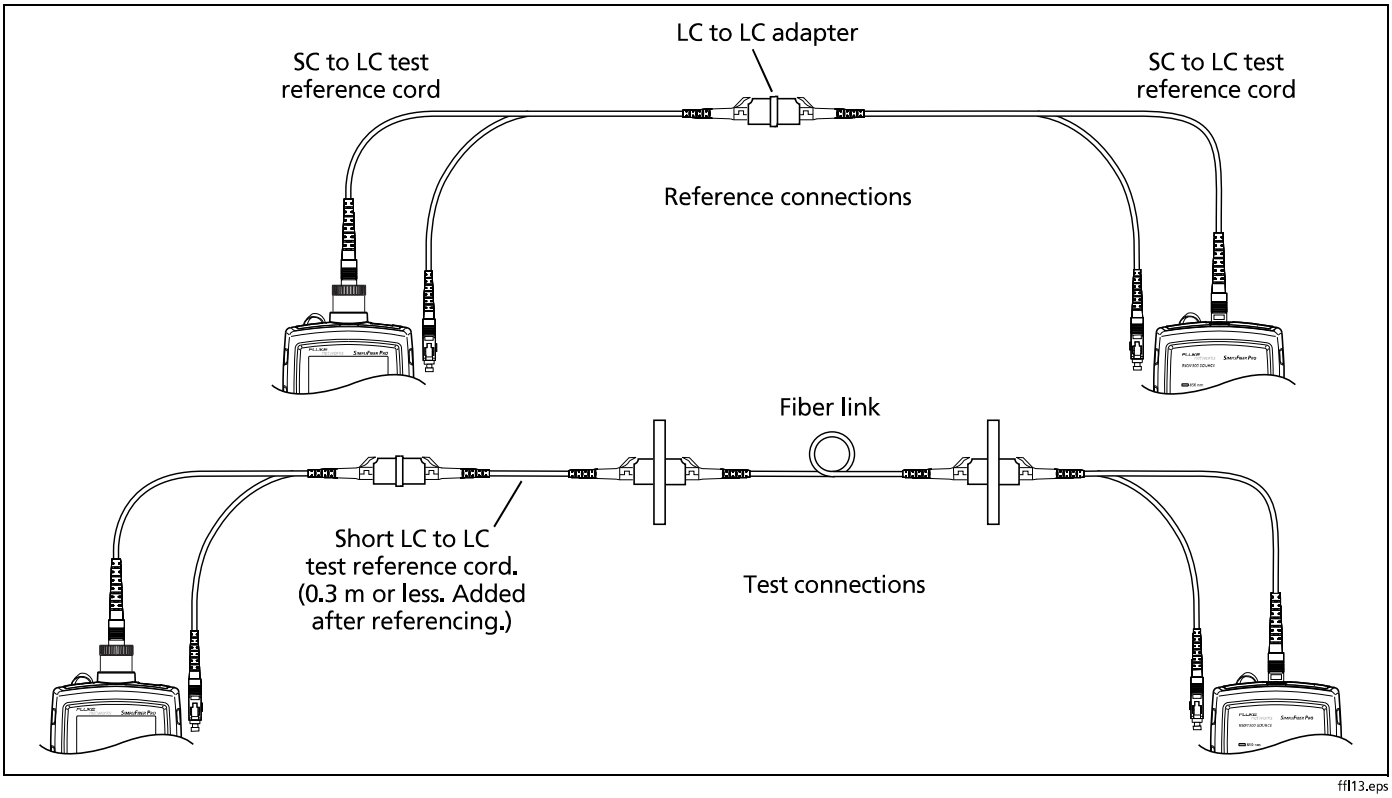


Figure D-4. Reference and Test Connections for the Modified 1 Jumper Method

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