

Versiv™ 2

Cabling Certification Product Family

Users Manual

Versiv Software Version 5.1

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Chapter 1: Get Acquainted

Overview of Features

The Versiv™ 2 main and remote units are rugged, hand-held instruments that you configure to certify, troubleshoot, and document copper and fiber optic cabling. The Versiv 2 platform includes these features:

- Operates with DSX CableAnalyzer™ modules to certify twisted pair cabling. See Chapter 2.
- Operates with CertiFiber® Pro Optical Loss Test Set (OLTS) modules to measure optical power loss and length on dual-fiber, multimode and singlemode cabling. See Chapter 6.
- Operates with OptiFiber® Pro OTDR modules to locate, identify, and measure reflective and loss events in multimode and singlemode fibers. See Chapter 7.
- The optional FI-1000 FiberInspector™ video probe connects to the type A USB port on the Versiv 2 main unit to let you inspect the endfaces in fiber optic connectors. See Chapter 5.
- Gives a PASS or FAIL result based on a test limit that you specify.
- Taptive™ user interface lets you quickly navigate through different views of the results and see more information about cables.
- ProjX™ management system lets you set up projects to specify the types of tests and the cable IDs necessary for a job and monitor the progress and status of the job.
- You can connect the tester to a wired or Wi-Fi network and use the LinkWare™ Live web application to manage your projects from a desktop or mobile device.
- LinkWare PC software lets you upload test results to a PC and make professional-quality test reports.

- LinkWare Stats software makes browsable, graphical reports of cable test statistics.

Contact Fluke Networks



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Fluke Networks operates in more than 50 countries worldwide. For more contact information, go to our website.

Register Your Product

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services. If you purchased a Gold Support plan, registration also activates your plan.

To register your product, use LinkWare PC software.

Additional Resources

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

To access the Knowledge Base, log on to www.flukenetworks.com, then click **SUPPORT > Knowledge Base**.

Supplements and Updated Manuals

If necessary, Fluke Networks will put a supplement for this manual, or an updated manual, on the Fluke Networks website. To see if a supplement or updated manual is available, log on to www.flukenetworks.com, click **SUPPORT > Manuals**, then select a product.






Kit Contents

For a list of the contents of your Versiv 2 kit, see the list that came in the product's box or see the lists of models and accessories on the Fluke Networks website. If something is damaged or missing, contact the place of purchase immediately.

Symbols









Table 1 shows the symbols used on the tester or in this manual.

Table 1. 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. |
|  | Consult the user documentation. |
|  | Do not connect this equipment to public communications networks, such as telephone systems. |
|  | 40 year Environment Friendly Use Period (EFUP) under China Regulation - Administrative Measure on the Control of Pollution Caused by Electronic Information Products. This is the period of time before any of the identified hazardous substances are likely to leak out, causing possible harm to health and the environment. |

-continued-

Table 1. Symbols

| | |
|---|---|
|  | <p>Warning: Class 1 (OUTPUT port) and Class 2 (VFL port) lasers. Risk of eye damage from hazardous radiation.</p> |
|  | <p>This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste.</p> <p>To return unwanted products, contact the manufacturer's web site shown on the product or your local sales office or distributor.</p> |
|  | <p>Conformite Europeene. Conforms to requirements of European Union directives. Safety requirements for electrical equipment for measurement, control, and laboratory use.</p> |
|  | <p>Conforms to relevant North American standards.</p> |
|  | <p>Conforms to relevant Australian standards.</p> |
|  | <p>Conforms to relevant Russian standards.</p> |
|  | <p>KCC-REM-FKN-012001001: EMC approval for Korea Class A Equipment (Industrial Broadcasting & Communication Equipment)</p> <p>This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.</p> |
|  | <p>This key turns the tester on and off.</p> |

Safety Information

For the Versiv 2 Main Unit

Warning

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 touch voltages > 30 V AC rms, 42 V AC peak, or 60 V DC.
- 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.
- 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.

- Replace the rechargeable battery after 5 years of moderate use or 2 years of heavy use. Moderate use is defined as recharged twice a week. Heavy use is defined as discharged to cutoff and recharged daily.
- Disconnect the battery charger and move the Product or battery to a cool, non-flammable location if the rechargeable battery becomes hot (>50 °C, >122 °F) during the charge period. The battery door must be closed and locked before you operate the Product.
- The battery door must be closed and locked before you operate the Product.
- Repair the Product before use if the battery leaks.
- Recharge 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.
- 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 direct sunlight.
- Have an approved technician repair the Product.
- Use only AC adapters approved by Fluke Networks for use with the Product to supply power to the Product and charge the battery.

 **Caution**

To prevent damage to the tester or cables under test and to prevent data loss:

- Keep modules attached to the Versiv 2 units to give protection to the module connectors.

- Do not remove the USB flash drive while the LED on the drive flashes. Doing so can corrupt the data on the drive.
- You can lose a USB flash drive, cause damage to it, or accidentally erase the contents of the drive. Thus, Fluke Networks recommends that you save no more than one day of test results on a flash drive, or that you upload results to LinkWare Live. See Chapter 12.

For DSX Modules

Warning

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

- Do not connect the tester to telephony inputs, systems, or equipment, including ISDN inputs. Doing so is a misapplication of this product, which can cause damage to the tester and make a possible shock hazard for the user.
- Always turn on the tester before you connect it to a link. Doing so activates the tester's input protection circuitry.
- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.
- Remove the input signals before you clean the Product.
- Do not put metal objects into connectors.

 **Caution**

To prevent damage to the tester or cables under test, to prevent data loss, and to make sure your test results are as accurate as possible:

- Do not connect the tester to an active network. Doing so causes unreliable test results, can disrupt network operations, and can cause damage to the tester.
- Connect to the adapters only plugs that are made for Ethernet applications, such as RJ45, ARJ45, and Cat 7 plugs. Other types of plugs, such as RJ11 (telephone) plugs, can cause permanent damage to the jacks.
- To make sure your test results are as accurate as possible, do the reference procedure every 30 days. See “Set the Reference” on page 36.
- Do not operate portable transmitting devices, such as walkie-talkies and cell phones, during a cable test. Doing so can cause errors in test results.
- For permanent link adapters, do not twist, pull on, pinch, crush, or make kinks in the cables. See Figure 10 on page 31.

For CertiFiber Pro OLTS Modules

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

To prevent possible eye damage caused by hazardous radiation:

- Do not look directly into optical connectors. Some optical equipment emits invisible radiation that can cause permanent damage to your eyes.
- Keep the module’s OUTPUT ports covered with a dust cap or keep a test reference cord attached. The

OUTPUT ports can emit radiation even when you do not do a test.

- **When you inspect fiber endfaces, use only magnification devices that have the correct filters.**
- **Use the Product only as specified or hazardous laser radiation exposure can occur.**

 **Caution**

To prevent damage to the tester or cables under test and to prevent data loss:

- **Do not connect the tester to an active network. Doing so causes unreliable test results, can disrupt network operations, and can cause damage to the module's receiver.**
- **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 Chapter 4.**
- **Use a video probe to periodically inspect the module's optical connectors for scratches and other damage.**
- **To make sure your test results are as accurate as possible, do the reference procedure frequently. See "About the Reference for Fiber Tests" on page 110.**
- **Use only high-quality test reference cords that comply with the standards. See "About Test Reference Cords and Mandrels" on page 112**

For OptiFiber Pro OTDR Modules

Warning: Class 1 and Class 2 Laser Products

To prevent possible eye damage caused by hazardous radiation:

- Do not look directly into optical connectors. Some optical equipment emits invisible radiation that can cause permanent damage to your eyes.
- Do not do any tests that activate the outputs on the tester unless a fiber is attached to the output.
- When you inspect fiber endfaces, use only magnification devices that have the correct filters.
- Use of controls, adjustments, or procedures not stated herein can possibly result in hazardous radiation exposure.

Caution

To prevent damage to the tester or cables under test:

- Do not connect the OTDR port to an optical source. Doing so can cause damage to the OTDR receiver.
- Do not connect the tester to an active network. Doing so causes unreliable test results, can disrupt network operations, and can cause damage to the OTDR receiver.
- Do not touch reflective surfaces (such as metal) to the end of a fiber cable connected to the OTDR when the OTDR is operating. An open fiber connector endface has about a 4% reflection. Holding a reflective surface near the connector endface can cause more than a 4% reflection, which can damage the photodetector in the OTDR.
- Use proper cleaning procedures to clean all fiber connectors before every use. Neglecting this step or

using improper procedures can cause unreliable test results and may permanently damage the connectors. See Chapter 4.

- Use a video probe to periodically inspect the OTDR connectors for scratches and other damage.
- Read the instructions for splice machines before using the OTDR to monitor splicing procedures. The OTDR can interfere with the light injection detection techniques used by some splicers.

AC Adapter and Battery

You can use the AC adapter (model PWR-SPLY-30W) or the lithium ion battery (model VERSIV-BATTERY) to supply power to the tester.

To remove the battery, see “Remove the Battery” on page 250.

Charge the Battery

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

To charge the battery

Connect the AC adapter to the 15V jack on the left side of the tester. The LED near the AC adapter connector is red when the battery charges, and green when the battery is fully charged.

A fully-charged battery operates for approximately 8 hours of typical use. The battery takes approximately 4 hours to fully charge when the tester is turned off.

Notes

You do not need to fully discharge the battery before you recharge it.

The battery will not charge if its temperature is outside the range of 32 °F to 104 °F (0 °C to 40 °C). The LED near the connection for the AC adapter is yellow if the battery will not charge.

Check the Battery Status

On a main tester

The battery status icon is in the upper-left corner of the screen:



Battery is full.



Battery is approximately half full.



If the AC adapter is not connected, the red bar shows that the battery is very low. Connect the AC adapter to charge the battery and make sure the tester continues to operate.

The red bar also shows if the AC adapter is connected, but the battery is not installed.

On a remote

The LEDs show the battery status at the end of the power-up sequence, as shown in Figure 1.

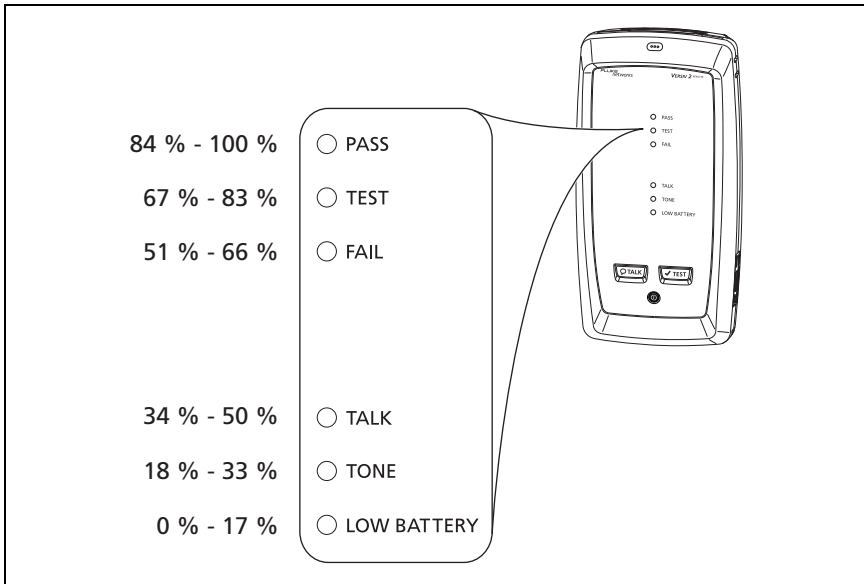



Figure 1. LEDs Show the Remote's Battery Status

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To see more information about a remote's battery status

- 1 Make the connections shown in Figure 2 and turn on both testers.
- 2 For CertiFiber Pro testers, select **Smart Remote** or **Loopback** mode.
- 3 Make sure the connection icon shows at the top of the screen ().
- 4 Tap **TOOLS**, then tap **Battery Status**.

When the AC adapter is not connected, the screen shows the **Time Remaining**, which is the approximate battery life at the present rate of use.

Verify Operation

The tester does a self test when you turn it on. If the tester shows an error or does not turn on, refer to "If the Tester Does Not Operate as Usual" on page 250.

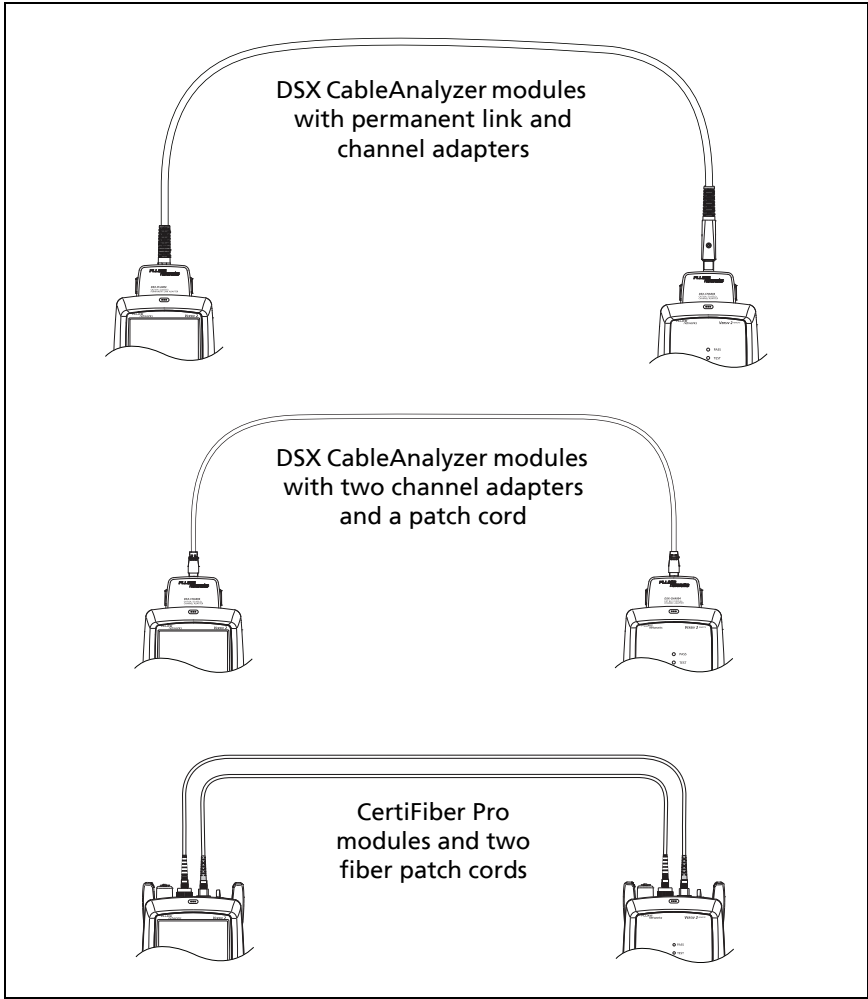


Figure 2. Connections to See the Status of a Remote's Battery

How to Use the Touchscreen

The Versiv 2 main unit's Taptive™ user interface lets you use a touchscreen to control the tester. You can operate the touchscreen with your fingertip or with a stylus that is made for projected capacitance touchscreens.

Caution

For correct operation and to prevent damage to the touchscreen:

- **Touch the screen only with your fingers or with a stylus that is made for projected capacitance touchscreens. Do not use too much force.**
- **Do not touch the screen with sharp objects.**

Note

The touchscreen will not respond if you tap it with your fingernail or an incorrect type of stylus or if you wear non-conductive gloves.

To use the touchscreen

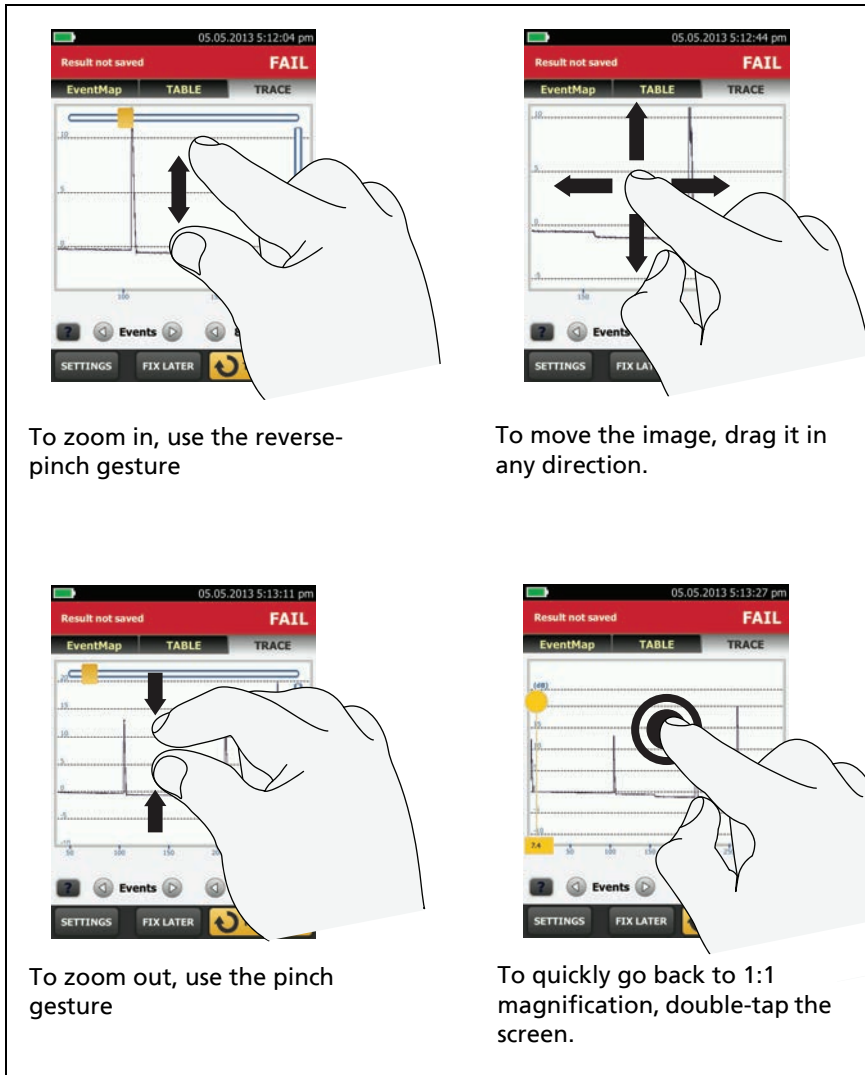
- To select an item on the screen, tap the item lightly with your fingertip.
- To scroll a screen, lightly touch the screen then move your fingertip in the direction you want the screen to move.
- On screens that show a plot, trace, or FiberInspector image, you can drag some items, such as the measurement cursor on a plot or trace or the image on a FiberInspector screen. These screens also have a zoom function, as shown in Figure 3.

To clean the touchscreen

Turn off the tester, then use a soft, lint-free cloth that is moist with a mild detergent.

Caution

When you clean the touchscreen, do not let liquid get under the plastic around the touchscreen.



To zoom in, use the reverse-pinch gesture

To move the image, drag it in any direction.

To zoom out, use the pinch gesture

To quickly go back to 1:1 magnification, double-tap the screen.

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Figure 3. How to Zoom the Screen

Change the Language

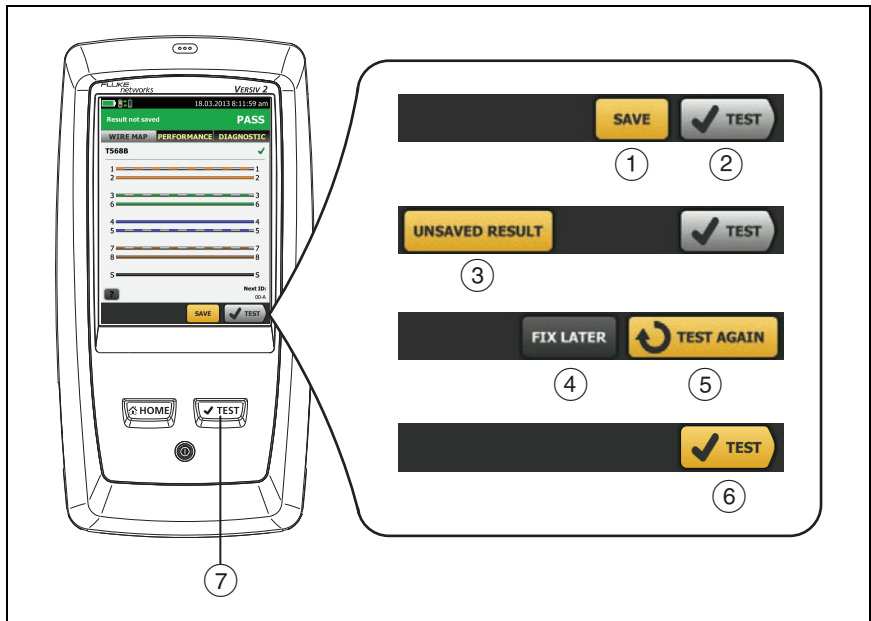
On the home screen, tap the **TOOLS** icon, tap **Language**, then tap a language.

Buttons to Do Tests and Save Results

When a test is completed and more than one button shows at the bottom of the screen, the tester highlights one in yellow to recommend which one to tap. Figure 4 shows the buttons you will see.

Note

To change the **Auto Save** setting, tap the **Next ID** panel on the home screen.






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Figure 4. FIX LATER, TEST AGAIN, and TEST Buttons and the TEST Key

- ① **SAVE** (yellow), ② **TEST** (gray): These buttons show if the test passed and **Auto Save** is off. When you tap **SAVE**, you can save the results with an ID that you make or select. When you tap **TEST**, you can select to save the results or do the test again and not save the results.
- ③ **UNSAVED RESULT**: This button shows if **Auto Save** is off and you go to the home screen when a test is completed. Tap this button to see the result.
- ④ **FIX LATER**: This button shows if the test failed or had a **PASS*** result and the result has not been saved.
- ⑤ **TEST AGAIN**: This button shows if the test failed or had a **PASS*** result. Tap this button to do the test again. If **Auto Save** is on, the tester saves subsequent results with the same ID. If the test fails again, you can tap **FIX LATER** to save the result if necessary.

When you look at a saved result that failed, tap **TEST AGAIN** to do the test again for the same ID and with the same test settings as the saved result.

- ⑥ **TEST** (yellow): This button shows if the test passed and **Auto Save** is on. When **Auto Save** is on, the tester saves results with the next available ID when the test is completed. When you tap **TEST**, the tester does a test for the next available ID.
- ⑦  **TEST**: The  **TEST** key does the same function as the **TEST** button. When **TEST AGAIN** shows, you can press  **TEST** to do a test on the next ID.

Overview of Memory Functions

These are the approximate numbers of tests you can save in a Versiv 2 main tester:

- DSX CableAnalyzer tests: 12,700 Cat 6A Autotest results, with plot data included.
- CertiFiber Pro tests: Autotest results for 30,000 fibers.
- OptiFiber Pro OTDR tests: 2000 OTDR tests on fiber links with an average length of 2 km, and up to 5000 tests for lengths less than 2 km.

The number of test results you can save decreases if you save more tests in each record, or if you save tests that use more memory. For example, records that include OTDR tests and images from the video probe use more memory than records that include OTDR tests and FaultMap tests.

The capacity available for test results depends on the space used by the software and custom test limits in the tester.

To see the memory status

On the home screen, tap the **TOOLS** icon, then tap **Memory Status**.

To make more memory available, you can export results to a USB flash drive, then delete the results in the tester. See “Manage Results on a Flash Drive” on page 218.

Options for Cable IDs

When you save the test results for a cable, you usually give the results the name that is the ID for the cable. There are several methods you can use to make IDs for test results:

- You can use the **CABLE ID SETUP** screen to make a set of sequential IDs. The tester uses the IDs in sequence as the names for the results you save. When **Auto Save** is on, the tester automatically saves each result with the next available ID in the set.

A cable ID set also lets you use IDs again so you can add different results to tests you saved before.

- You can enter an ID each time you do a test. To do this, turn off the **Auto Save** function (see page 20). Each time a test is completed, tap **SAVE** (if the test passed) or **FIX LATER** (if the test failed), then enter an ID manually.
- You can use LinkWare PC software to make a set of IDs, download the set to the tester, then import it into a project.
- After you do a test, you can enter the ID for a test you saved before. This lets you replace results or add different results to a test you saved before.
- If the test failed before, and you saved the results, you can select it on the **RESULTS** screen, then press **TEST AGAIN** to replace the results for that ID.

Notes

Cable IDs are case-sensitive. For example, the tester saves result with the names "A0" and "a0" in two different records.

A cable ID can have a maximum of 60 characters.

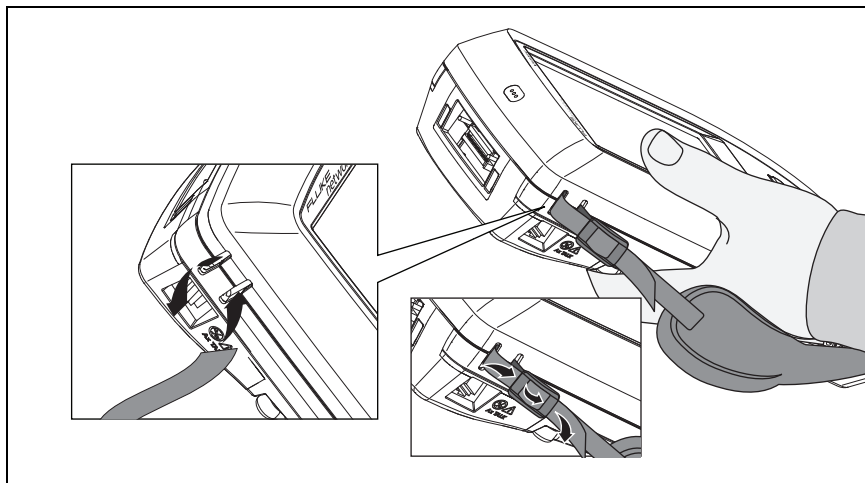
If you delete all the ID sets in a project, the tester makes a default set that starts with 001.

To turn the Auto Save function on or off

- 1 On the home screen, tap the **Next ID** panel.
- 2 On the **CHANGE ID** screen, tap the **On/Off** control next to **Auto Save**.
- 3 Tap **DONE**.

How to Install a Strap

Two types of straps are available for the tester: a hand strap that helps you hold the tester, and an optional carrying strap that lets you carry and hang the tester. Figure 5 shows how to install a strap and how to use the hand strap.



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Figure 5. How to Install a Strap and Use the Hand Strap

How to Remove or Install a Module

Figure 6 shows how to remove and install the module.

Note

It is not necessary to turn off the tester before you remove or install a module.

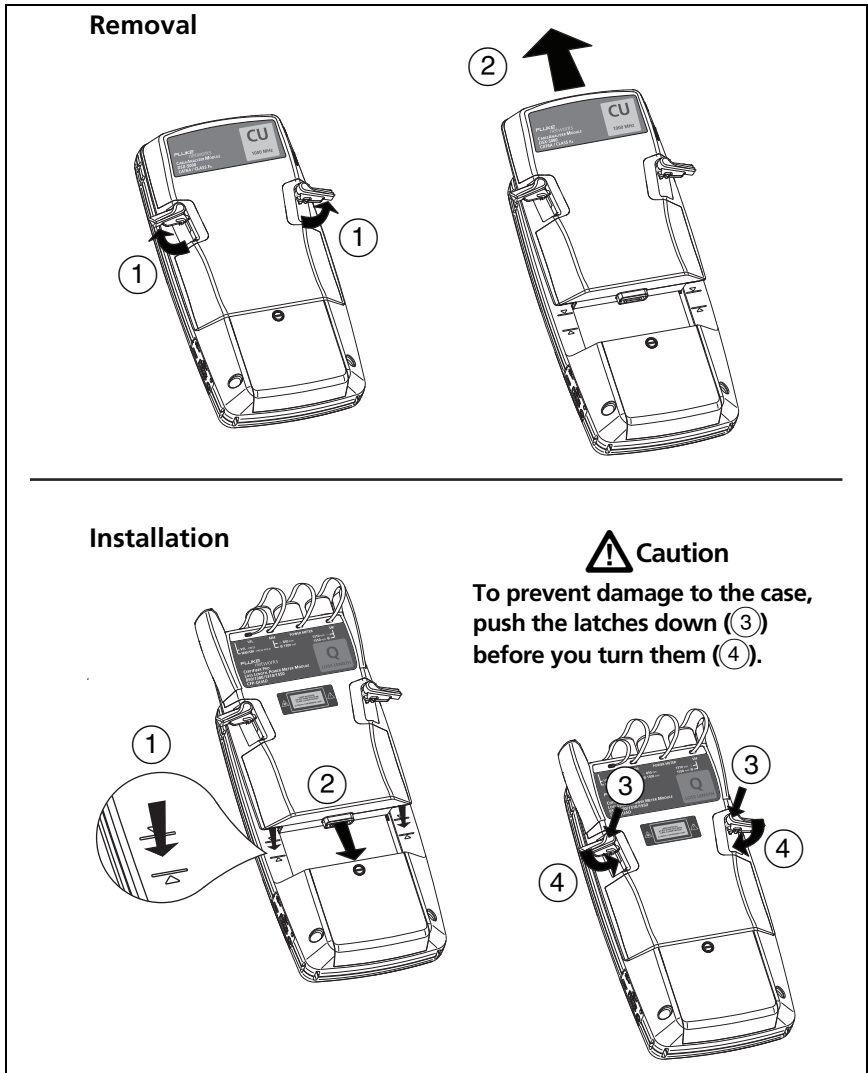


Figure 6. How to Remove and Install a Module

About LinkWare Applications

LinkWare PC Cable Test Management Software

The LinkWare PC Cable Test Management software lets you upload test records to a PC, organize and examine test results, print professional-quality test reports, and do software updates and other maintenance procedures on your tester.

You can download LinkWare PC from the Fluke Networks website.

The LinkWare Live Web Application

The LinkWare Live web application lets you manage your projects from a desktop or mobile device.

To get started with LinkWare Live, see Chapter 12.

LinkWare Stats

The LinkWare Stats Statistical Report software that is included with LinkWare PC software provides statistical analysis of cable test reports and generates browsable, graphical reports.

For instructions about LinkWare PC and LinkWare Stats software, see the guides for getting started and the online help available under **Help** on the LinkWare PC and LinkWare Stats menus.

Chapter 2: Certify Twisted Pair Cabling



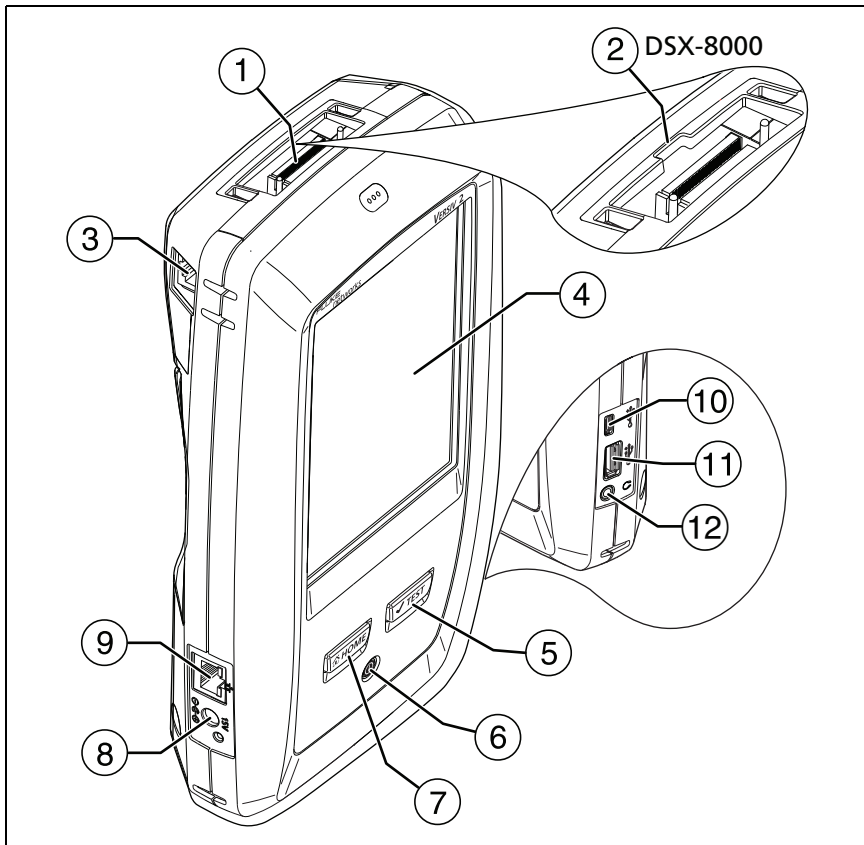
Before you use the DSX CableAnalyzer, read the safety information that starts on page 5.

Overview of Features

The Fluke Networks DSX CableAnalyzer™ modules attach to Versiv™ 2 main and remote units to make rugged, hand-held testers that let you certify, troubleshoot, and document twisted pair network cabling. The testers includes these features:

- DSX-8000 modules certify twisted pair cabling to Cat 8/Class I/II limits (2000 MHz) in less than 16 seconds.
- DSX-5000 modules certify twisted pair cabling to Cat 7_A/Class F_A limits (1000 MHz) in less than 15 seconds.
- Gives a **PASS** or **FAIL** result based on a test limit that you specify.
- You can save approximately 12,700 Cat 6A Autotest results, with plot data, in the tester's internal memory. You can save more results on a removable flash drive.
- AxTalk software, which is available on the Fluke Networks website, lets you do tests for alien crosstalk.





Connectors, Keys, and LEDs



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Figure 7. Main Tester Connectors, Keys, and LEDs

- ① Connector for a link interface adapter
- ② DSX-8000 modules have a recess for the tabs on Cat 8/Class I adapters. You cannot attach Cat 8/Class I adapters to DSX-5000 modules.

- ③ RJ45 jack for communications between the main and remote testers when you do alien crosstalk measurements. See “A very long cable will fail the Autotest, but you can measure cable length and compare other results to results from a known- good cable of the same length to see if the cable is good.” on page 61.
- ④ LCD display with touchscreen
- ⑤ : Starts a test. Turns on the tone generator if a remote tester is not connected to the main tester. To start a test, you can also tap **TEST** on the display.
- ⑥ : Power key
- ⑦ : Press  to go to the home screen.
- ⑧ Connector for the AC adapter. The LED is red when the battery charges, and green when the battery is fully charged. The LED is yellow if the battery will not charge. See “Charge the Battery” on page 11.
- ⑨ RJ45 connector: Lets you connect to a network for access to Fluke Networks cloud services.
- ⑩ Micro-AB USB port: This USB port lets you connect the tester to a PC so you can upload test results to the PC and install software updates in the tester.
- ⑪ Type A USB port: This USB host port lets you save test results on a USB flash drive and connect the FI-1000 video probe to the tester.
- ⑫ Headset jack

Note

*If you have two main testers, you can use one as a remote. To select the remote function, tap **TOOLS** > **Main as Remote**.*

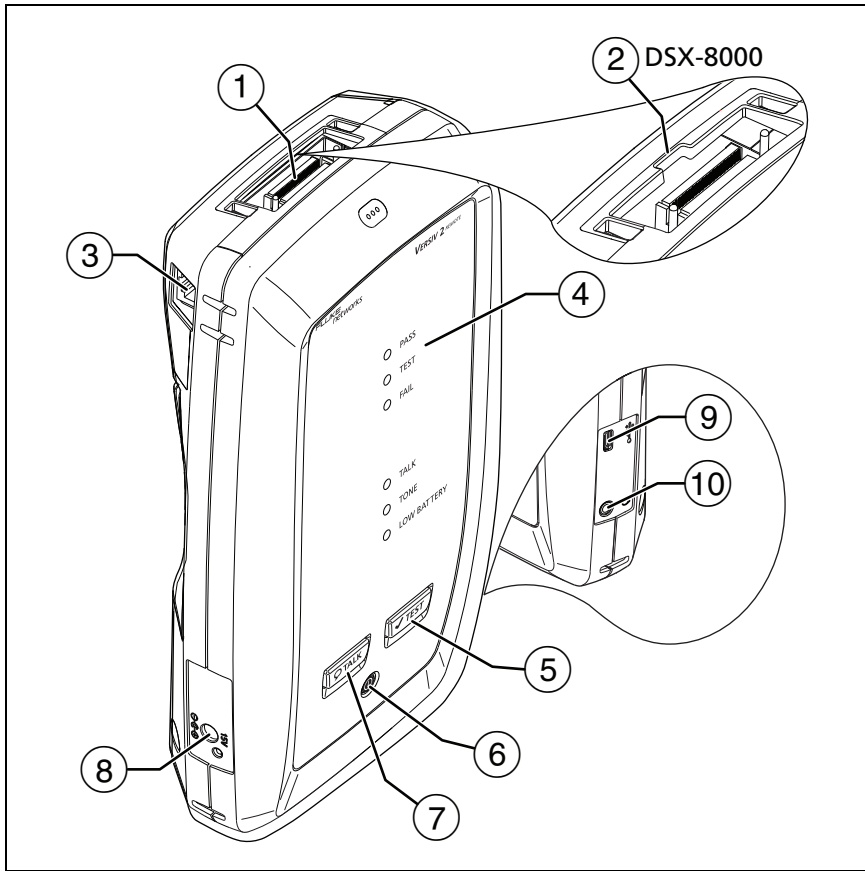








Figure 8. Remote Tester Connectors, Keys, and LEDs

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- ① Connector for a link interface adapter
- ② DSX-8000 modules have a recess for the tabs on Cat 8/Class I adapters. You cannot attach Cat 8/Class I adapters to DSX-5000 modules.

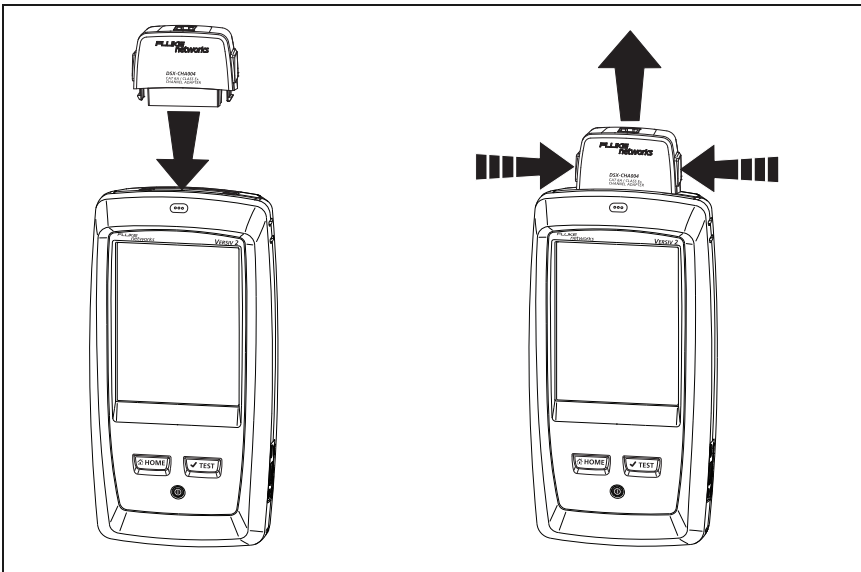
- ③ RJ45 jack for communications between the main and remote testers when you do alien crosstalk measurements. See “A very long cable will fail the Autotest, but you can measure cable length and compare other results to results from a known- good cable of the same length to see if the cable is good.” on page 61.
- ④ **PASS** LED comes on when a test passes.
- TEST** LED comes on during a test.
- FAIL** LED comes on when a test fails.
- TALK** LED comes on when the talk function is on (⑦). The LED flashes until the main tester accepts the request to talk.
- tone** LED flashes and the tone generator comes on if you press  when a main tester is not connected to the remote.
- LOW BATTERY** LED comes on when the battery is low.
- The LEDs also have these functions:
- Battery gauge (see Figure 1 on page 12)
 - Volume indicator for the **TALK** function
 - Progress indicator for software updates
- ⑤ : Starts a test. Turns on the tone generator if a main tester is not connected to the remote.
- ⑥ : Power key
- ⑦ : Press  to use the headset to speak to the person at the other end of the link. Press again to adjust the volume. To turn off the talk function, hold down .
- ⑧ Connector for the AC adapter. The LED is red when the battery charges, and green when the battery is fully charged. The LED is yellow if the battery will not charge. See “Charge the Battery” on page 11.
- ⑨ Micro-AB USB port: This USB port lets you connect the tester to a PC so you can install software updates in the tester.
- ⑩ Headset jack

About Link Interface Adapters

Link interface adapters let you connect the DSX CableAnalyzer to different types of twisted pair links. Figure 9 shows how to attach and remove adapters.

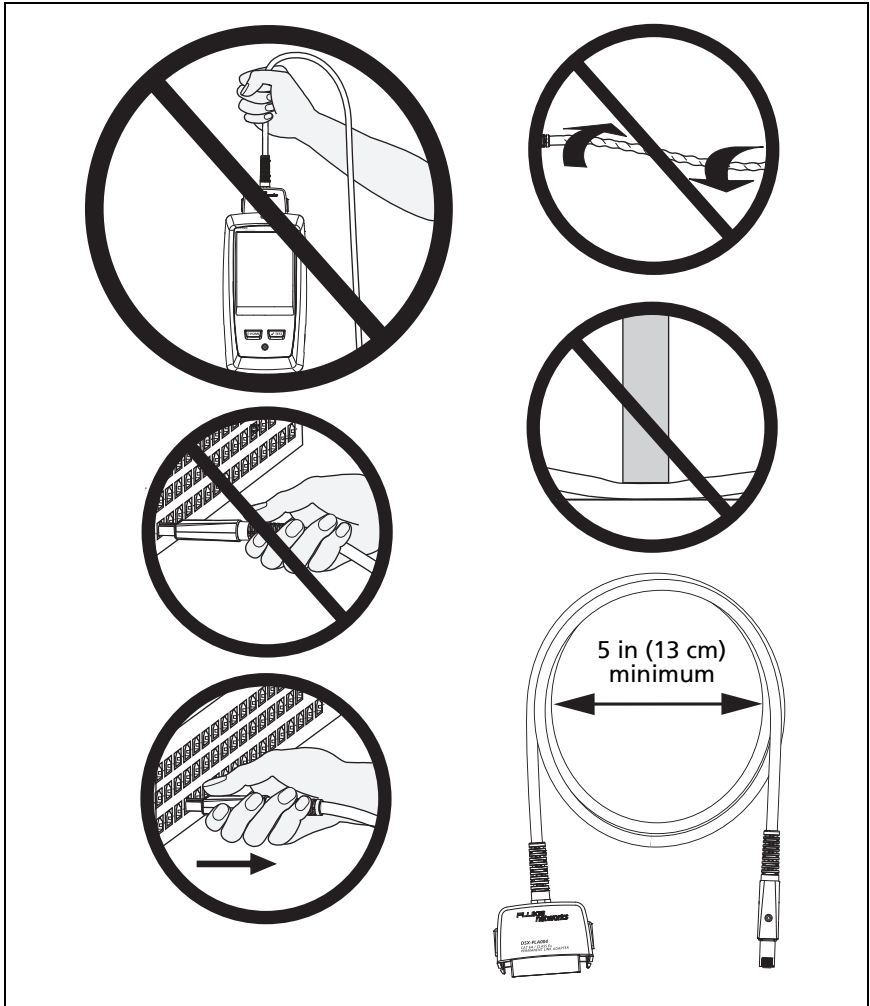
Caution

To prevent damage to the cables on the permanent link adapters and to make sure your test results are as accurate as possible, do not twist, pull on, pinch, crush, or make kinks in the cables. See Figure 10 on page 31.



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Figure 9. How to Attach and Remove Link Interface Adapters



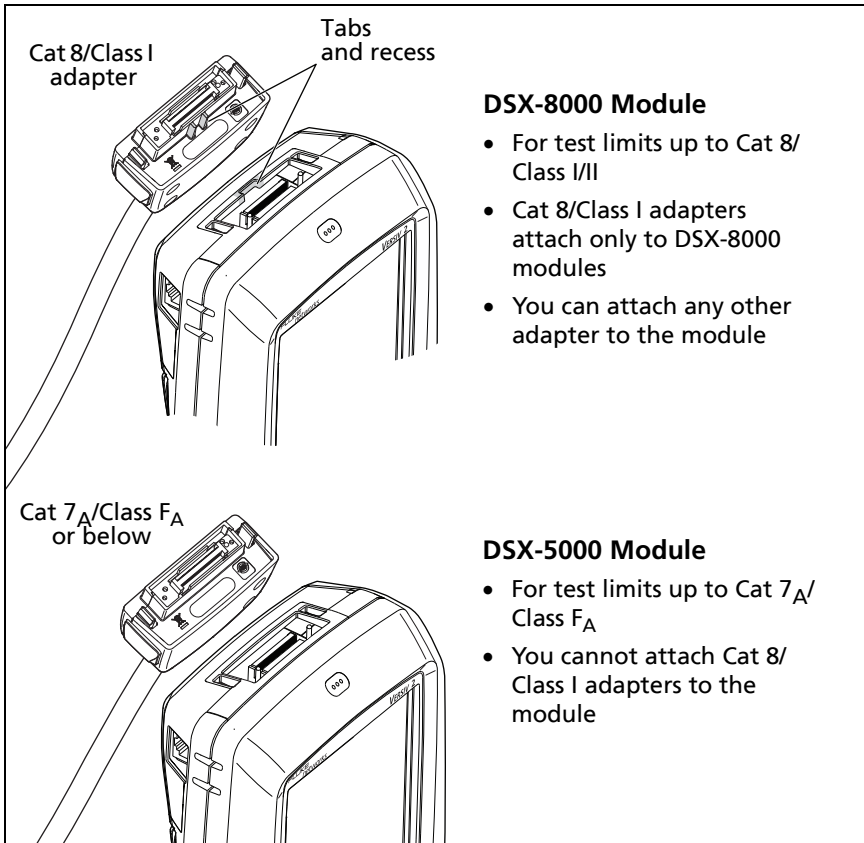
GPU108.EPS

Figure 10. How to Prevent Damage to the Permanent Link Adapter Cables

Adapters for DSX-8000 and DSX-5000 Modules

You can use adapters for test limits up to Cat 7_A/Class F_A and coaxial adapters with DSX-8000 and DSX-5000 modules. Be sure to select a test limit that is appropriate for the adapter.

Cat 8/Class I adapters, such as the DSX-PLA804, have tabs that lets you attach them only to DSX-8000 modules (see Figure 11).

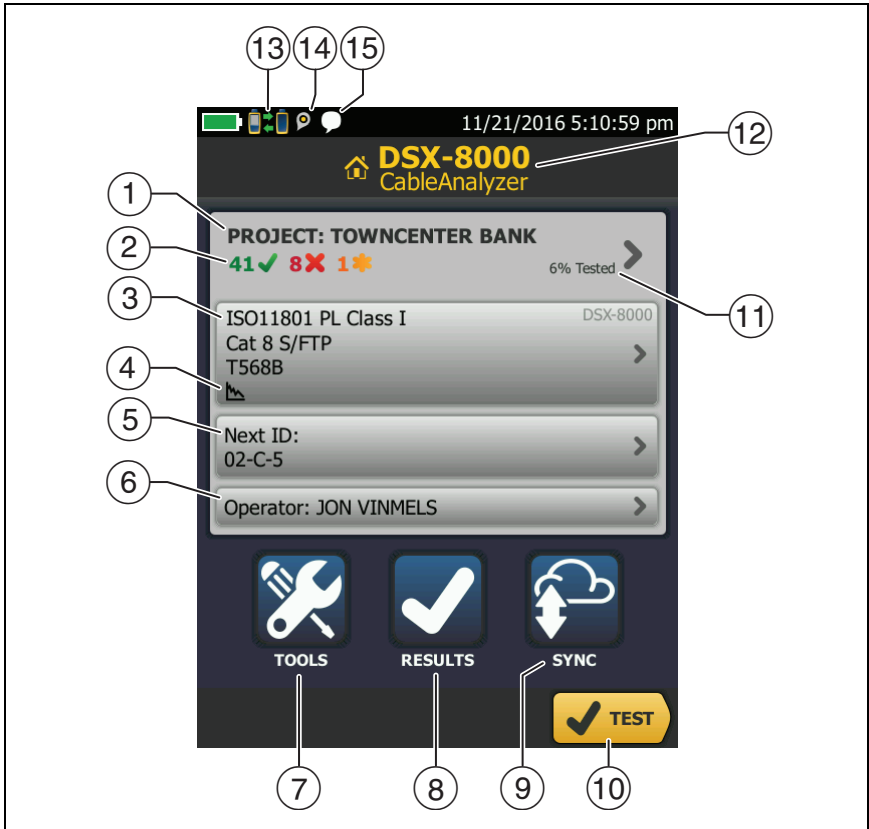


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Figure 11. DSX-8000 and DSX-5000 Module and Adapter Differences

The DSX CableAnalyzer Home Screen





The home screen (Figure 12) shows important test settings. Before you do a test, make sure these settings are correct.



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Figure 12. The Home Screen for the DSX CableAnalyzer






- ① **PROJECT:** The project contains the settings for a job and helps you monitor the status of a job. When you save test results, the tester puts them in the project. Tap the **PROJECT** panel to edit the project settings, select a different project, or make a new project.

- ② Shows a summary of the test results in the project:
- : The number of tests that passed.
 - : The number of tests that failed.
 - : The number of tests with an overall marginal result.
- ③ The test setup panel shows the settings the tester will use when you tap **TEST** or press . To change these settings, tap the panel.

Note

You can set up tests for any module that the tester can use, even when no module is attached.

- ④ Icons show the status of the **Store Plot Data** and **AC Wire Map** settings. See Table 2 on page 40.
- ⑤ **Next ID:** The **Next ID** panel shows the ID that the tester gives to the next test results you save.
- Tap **Next ID** to do these tasks:
- Enter an ID, select a different ID in the ID set, select a different set of IDs, or make a new set. The tester adds the IDs and ID sets you make to the project that shows on the home screen.
 - Turn **Auto Save** on or off.
- ⑥ **Operator:** The name of the person who does the job. You can enter a maximum of 20 operator names. For each operator you can also enter the email address that the operator will use as an ID to sign in to LinkWare Live.
- ⑦ **TOOLS:** The **TOOLS** menu lets you set the reference, see the status of the tester, and set user preferences such as the language and the display brightness.
- ⑧ **RESULTS:** Tap **RESULTS** to see and manage the results that are saved in the tester.
- ⑨ **SYNC:** Tap **SYNC** to sync projects with LinkWare Live.

- ⑩ **TEST:** Tap **TEST** to do the test shown in the test setup panel.
- ⑪ The percentage of the project that is completed. The percentage is the number of IDs used for saved results divided by the total number of used and available IDs in the project. The number of IDs includes IDs for copper and fiber cable.
- % Tested** does not show if your project contains only a **Next ID** list. See “About Next ID Sets” on page 225 for more information about the **Next ID** list.
- ⑫ The type of module attached to the main Versiv 2 unit.
- ⑬  This icon shows when the tester’s link interface adapter is connected to the adapter on a Versiv 2 remote and the remote is turned on.
-  **DSX-5000 only:** The arrows on the remote connection icon are orange when the main and remote use long-range communication mode. See “Long-Range Communication Mode (DSX-5000)” on page 61.
- ⑭  The asset management icon shows when the owner of a LinkWare Live account has enabled the asset management service on the tester. See “About the Asset Management Service” on page 238.
- ⑮  This icon shows when the talk function is on. To use the talk function:
- 1 Connect the main and remote testers together through a link that has one or more good wire pairs.
 - 2 Connect headsets to the headset jacks on the testers.
 - 3 Press the button on one of the headset microphones or press  on the remote, then speak into the microphone.

Make Sure Your Tester is Ready to Certify Cabling

To make sure your tester meets its accuracy specifications, follow these guidelines:

- Keep the tester's software current. The latest software is available on the Fluke Networks website. See "Update the Software" on page 243.
- Set the reference for the twisted pair adapters every 30 days. See page 36.
- Make sure that you select the correct cable type for the job, and that the NVP for the cable is correct. See Table 2 on page 39.
- Make sure you select the correct test limit for the job. See Table 2 on page 39.
- Make sure the cords and connectors for all test equipment and patch cords are in good condition.
- Make sure the battery is fully charged.
- Send the modules to a Fluke Networks service center every 12 months for factory calibration.

Set the Reference

The reference procedure for twisted pair cable sets the baseline for insertion loss, ACR-F, and DC resistance measurements.

Set the reference at these times:

- When you want to use the tester with a different module. The tester can save reference values for eight different pairs of modules.
- When you attach Class F/F_A link interface adapters, such as the optional DSX-PLA011 TERA™ adapters.
- Every 30 days, at minimum.

To ensure maximum accuracy of test results, set the reference daily. It is not necessary to set the reference when you change the

link interface adapters (unless you attach Class F/F_A link interface adapters).

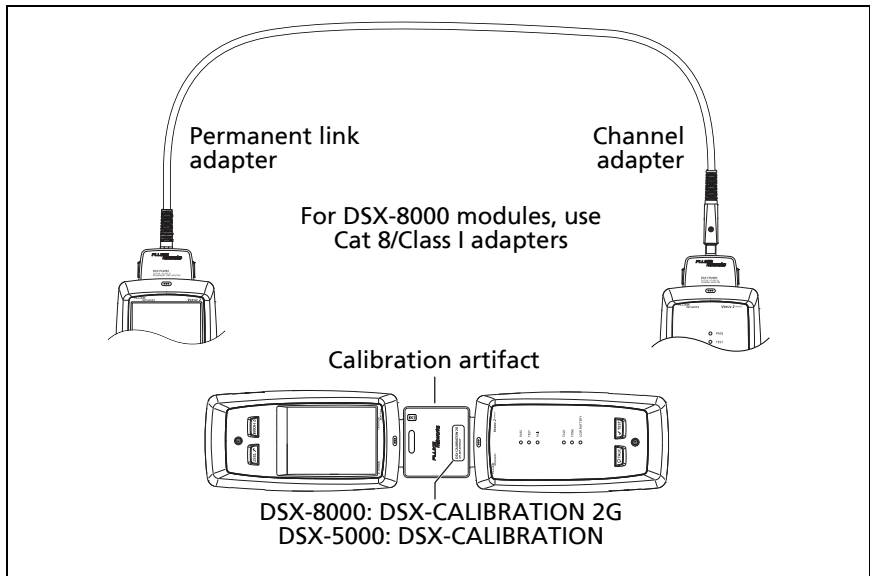
To set the reference

- 1 Install DSX modules in the tester and the remote.
- 2 Turn on the tester and the remote a minimum of 5 minutes before you set the reference.

Note

Set the reference only after the testers are at an ambient temperature between 50 °F and 104 °F (10 °C and 40 °C).

- 3 Use the appropriate adapters or a calibration artifact to connect the main and remote testers together as shown in Figure .On the home screen, tap **TOOLS**, then tap **Set Reference**.
- 4 On the **SET REFERENCE** screen tap **TEST**.



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Figure 13. Reference Connections for Twisted Pair Cable



Settings for Twisted Pair Tests

Table 2 gives descriptions of the settings for twisted pair tests. To set up a project, which includes the settings in Table 2, cable IDs, and operator names, see Chapter 11.

To set up a twisted pair test

- 1 On the home screen, tap the test setup panel.
- 2 On the **CHANGE TEST** screen, select a twisted pair test to change, then tap **EDIT**.
Or to set up a new twisted pair test, tap **NEW TEST**. If no module is installed, the **MODULE** screen shows. Tap the correct copper module.
- 3 On the **TEST SETUP** screen, tap the panels to change settings for the test. See Table 2.
- 4 On the **TEST SETUP** screen, tap **SAVE** when your test setup is completed.
- 5 On the **CHANGE TEST** screen, make sure the button next to the test is selected, then tap **USE SELECTED**.

Table 2. Settings for Twisted Pair Tests

| Setting | Description |
|--------------------|--|
| Module | Select DSX-8000 CableAnalyzer or DSX-5000 CableAnalyzer . See Figure 11 on page 32. |
| Cable Type | Select a cable type that is correct for the type you will test. To see a different group of cable types, tap MORE , then tap a group. To make a custom cable type, tap Custom in the Cable Groups list. |
| NVP | <p>Nominal velocity of propagation. The tester uses the NVP and the propagation delay to calculate the length of the cable.</p> <p>The default value is defined by the selected cable type and is the typical NVP for that cable type. To enter a different value, tap the NVP panel, then tap  or  on the NVP screen to increase or decrease the value.</p> <p>To find the actual value for a cable, connect a known length of the cable to the tester, tap MEASURE on the NVP screen, then change the NVP until the measured length matches the known length. Use a cable at least 30 m (100 ft) long.</p> <p>When you increase the NVP value, the calculated length increases.</p> |
| Shield Test | <p>This setting shows only when you select a shielded cable type.</p> <p>On: The wire map test includes a DC test for shield continuity and AC tests for shield quality. The wire map test fails if the shield is open or the AC test results are unsatisfactory.</p> <p>Off: The wire map shows the shield if the shield has continuity. The tester does not do AC tests for shield quality. The wire map test does not fail or show the shield if the shield is open.</p> |

-continued-

Table 2. Settings for Twisted Pair Tests (continued)




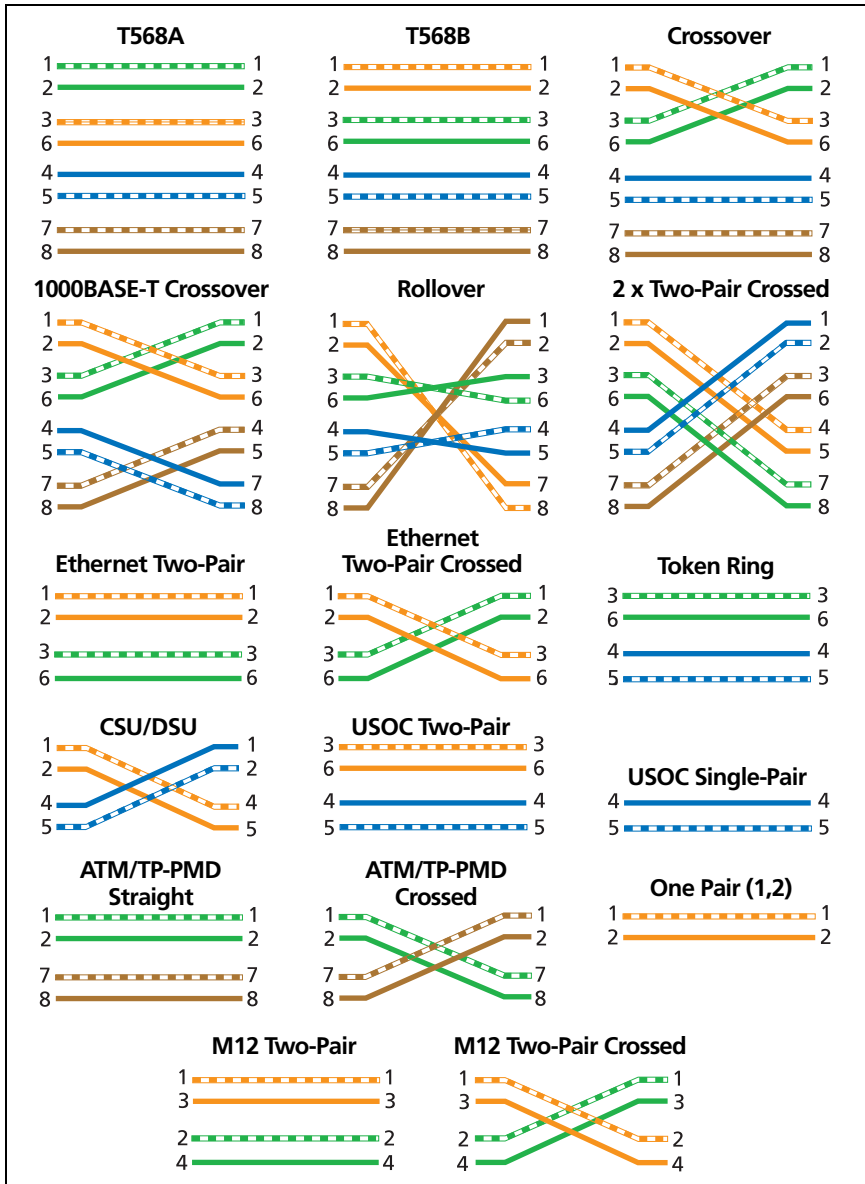
| | |
|------------------------------------|---|
| <p>Test Limit</p> | <p>Select the correct test limit for the job. To see a different group of limits, tap MORE, then tap the name of a group.</p> |
| <p>Store Plot Data</p> | <p>Off : The tester does not save plot data for frequency-domain tests or for the HDTDR/HDTDX analyzers. You can see the plots before you save the test and exit the results screen. The saved results show frequency-domain measurements in a table and do not include the HDTDR/HDTDX plots.</p> <p>On : The tester saves plot data for all frequency-domain tests required by the selected test limit and for the HDTDR/HDTDX analyzers.</p> |
| <p>HDTDR/HDTDX</p> | <p>Fail/Pass* only: The tester shows HDTDR and HDTDX analyzer results only for Autotests with PASS*, FAIL*, or FAIL results.</p> <p>All Autotests: The tester shows HDTDR and HDTDX analyzer results for all Autotests.</p> <p>To get HDTDR/HDTDX analyzer results you can also tap TOOLS > Diagnostics.</p> <p>For more information about the HDTDR and HDTDX analyzers, see the Technical Reference Handbook.</p> |
| <p>Outlet Configuration</p> | <p>The Outlet Configuration specifies which wire pairs are tested and which wire numbers the wire map shows for the pairs. See Figure 14.</p> <p>To see the wire map for a configuration, tap Outlet Configuration, tap the configuration name on the OUTLET CONFIG screen, then tap SAMPLE.</p> <p>To select a configuration, tap a name on the OUTLET CONFIG screen, then tap USE SELECTED.</p> <p style="text-align: center;"><i>Note</i></p> <p style="text-align: center;"><i>The OUTLET CONFIG screen shows only the configurations that are applicable to the selected Test Limit.</i></p> <p>To make a custom outlet configuration, tap CUSTOM on the OUTLET CONFIG screen, then tap MANAGE, then tap Create.</p> |

Table 2. Settings for Twisted Pair Tests (continued)

| | |
|--------------------|---|
| AC Wire Map | <p>The AC Wire Map test lets you do tests on links connected through midspan PoE (Power over Ethernet) devices. See the Technical Reference Handbook.</p> <p>When the AC Wire Map test is on, this icon shows on the home screen: </p> <p style="text-align: center;"><i>Notes</i></p> <p><i>Always turn off the AC wire map test when you will not do tests through a PoE device. The AC wire map test increases the time for an Autotest. It also disables the resistance and shield continuity tests.</i></p> <p><i>The DSX-8000 modules do not support the AC wire map test.</i></p> |
|--------------------|---|



GPU85.EPS

Figure 14. Outlet Configurations

How to Do an Autotest


When you tap **TEST** on the main tester or press  on the main or remote tester, the testers do an Autotest. The Autotest includes all the tests necessary to certify that the cabling meets or exceeds the performance requirements specified in the selected test limit.

Figure 15 shows the equipment for Autotests on twisted pair cable.

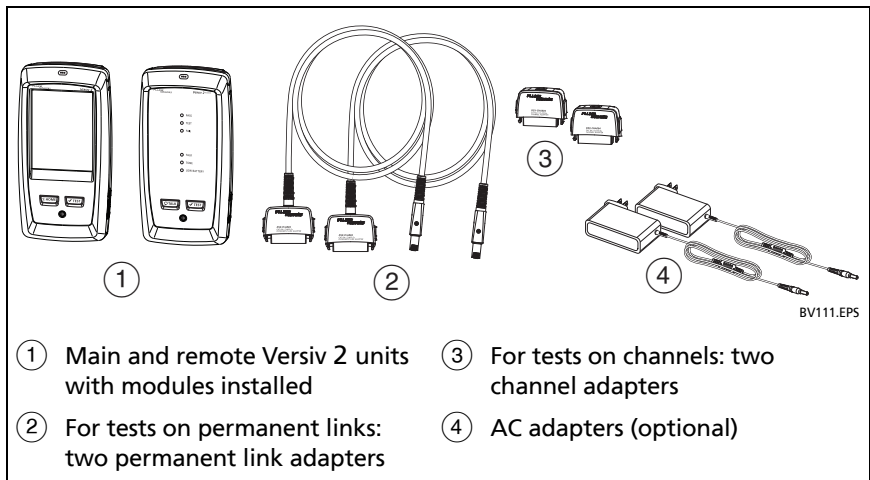



Figure 15. Equipment for Autotests on Twisted Pair Cable

To do an Autotest on twisted pair cable

- 1 Attach permanent link or channel adapters to the main and remote testers.
- 2 Make sure that the home screen shows the correct settings for the job.

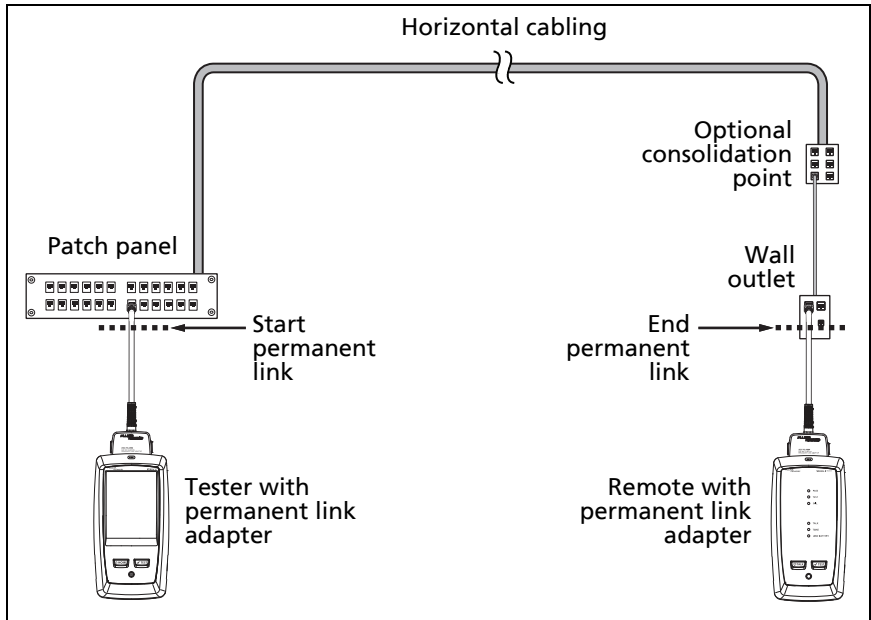
To make sure that other settings are correct, tap the test setup panel, make sure the correct test is selected on the **CHANGE TEST SCREEN**, then tap **EDIT** to see more settings. Table 2 on page 39 describes the settings.

- 3 Connect the testers to the link as shown in Figure 16, 17, 18, or 19.
- 4 Tap **TEST** on the main tester or press  on the main or remote tester.

If the tester at the other end of the cable is in sleep mode or is off, your tester's tone generator turns on the other tester.

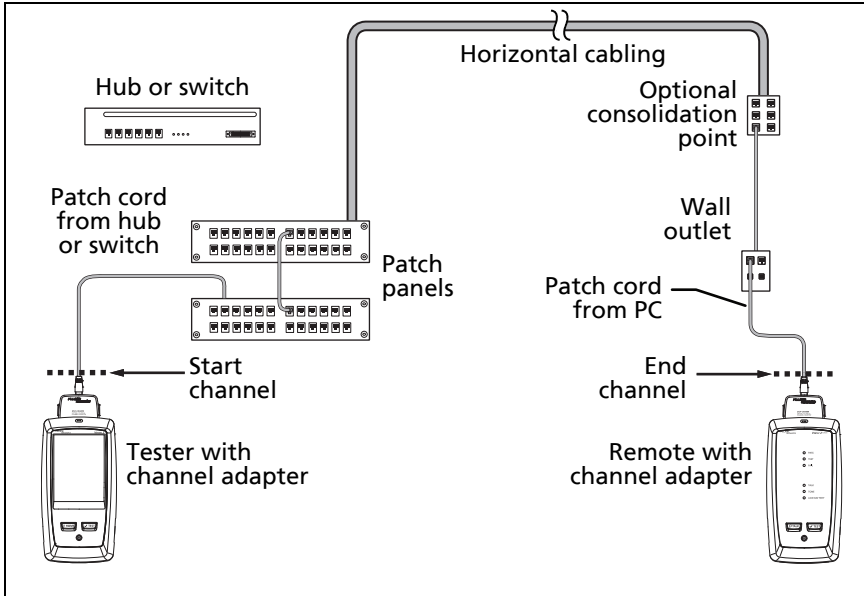
If the two testers are not connected:

- Your tester's tone generator stays on. Then, you can use a tone probe if necessary to find the cable to connect to the other tester.
- Or, tap **MEASURE** to do the tests that do not require a remote tester. Because the tester cannot complete all tests and some tests always fail with no remote connected, the result for an Autotest without a remote is always **FAIL**.



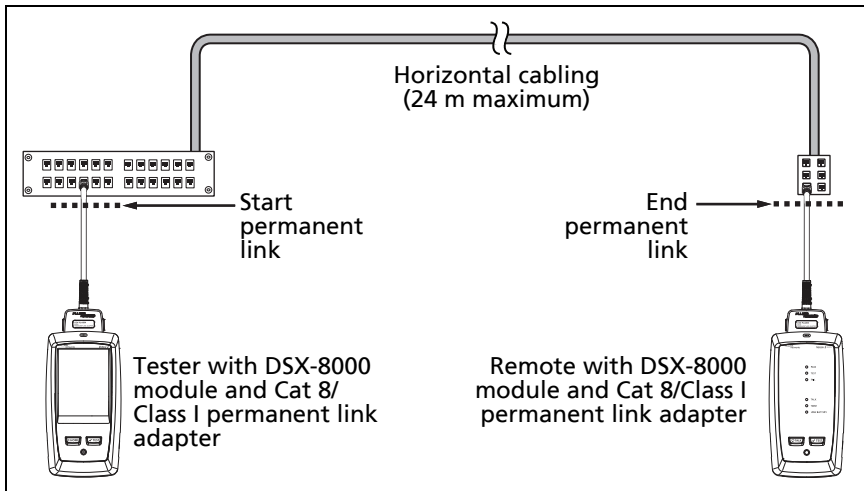
BV97.EPS

Figure 16. Permanent Link Connections for Links Up to Cat 7_A



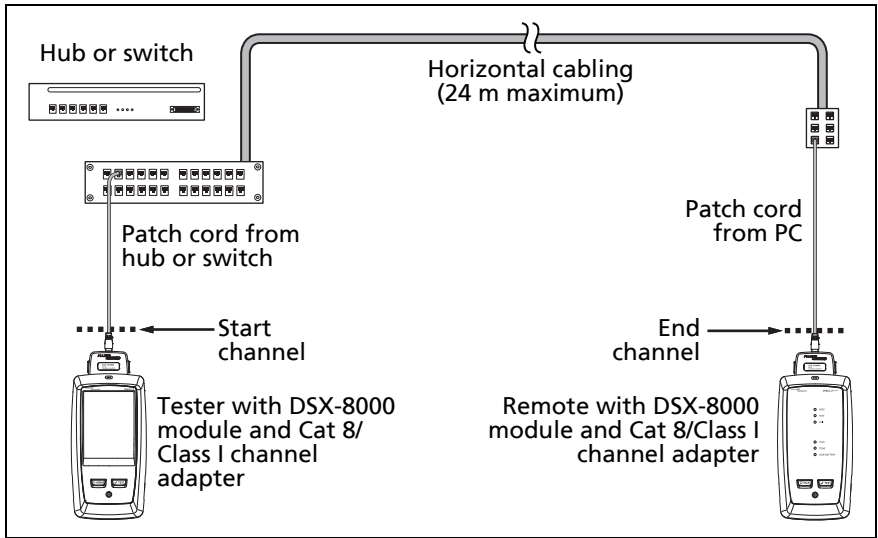
BV96.EPS

Figure 17. Channel Connections for Links Up to Cat 7_A



BV201.EPS

Figure 18. Permanent Link Connections for Cat 8/Class I Links



BV202.EPS

Figure 19. Channel Connections for Cat 8/Class I Links

“Bad Patch Cord” Message

To comply with standards for tests on channels, the tester removes the effects of the channel adapters and their connections from the test results. Before it removes these effects, the tester makes sure that the plugs on the patch cord do not have too much near-end crosstalk (NEXT). Too much NEXT is frequently caused by too much untwisted wire in the plug. If a plug is bad, the tester shows the message **Bad patch cord at main** or **Bad patch cord at remote**, and does not remove the effects of the channel adapters and their connections. The tester saves the message with the results.

If you see one of these messages, replace the patch cord or install a new plug at the bad end.

How to Certify Patch Cords

To certify patch cords, you must use the DSX-PCxx Patch Cord Adapters and the correct patch cord test limit. You cannot use channel adapters and test limits to certify patch cords because channel tests do not measure the performance of the patch cord plugs.

To purchase a DSX-PCxxS Patch Cord Adapter Set, contact an authorized Fluke Networks distributor.

Twisted Pair Autotest Results

The tests listed below apply to twisted pair cabling.

Note

Some tests are not included in some test limits.

- Wire map
- Resistance
- Resistance unbalance in a pair
- Resistance unbalance between pairs
- Length
- Propagation delay
- Delay skew
- Insertion loss (attenuation)
- Impedance
- NEXT (near-end crosstalk)
- PS NEXT (power-sum near-end crosstalk)
- ACR-N (attenuation to crosstalk ratio at the near end)
- PS ACR-N (power-sum attenuation to crosstalk ratio, near end)
- ACR-F (attenuation to crosstalk ratio at the far end)
- PS ACR-F (power-sum attenuation to crosstalk ratio, far end)

- Return loss
- TCL (transverse conversion loss)
- CDNEXT (common-mode to differential mode near-end crosstalk)
- CMRL (common-mode return loss)
- ELTCTL (equal level transverse conversion transfer loss)
- HDTDR and HDTDY analyzers (optional tests, not required by any test limit)

Automatic Diagnostics

If an Autotest on twisted pair cabling fails, the DSX CableAnalyzer automatically gives you information about faults. To see the information, tap the **FAULT INFO** tab. Figure 20 shows examples of diagnostic information.

To get only diagnostics results, select **Diagnostics** from the **TOOLS** menu. These results do not include a **PASS/FAIL** status.

The diagnostic screens show connectors in grey when other faults possibly affect the results for the connector.

For NEXT failures caused by multiple connectors, the diagnostic screen shows the worst connector in red.

Future Versiv 2 software releases may include additional diagnostics. The latest software is available at no charge on the Fluke Networks website.

For more information on diagnostics, including video training modules, see the Knowledge Base on the Fluke Networks website.

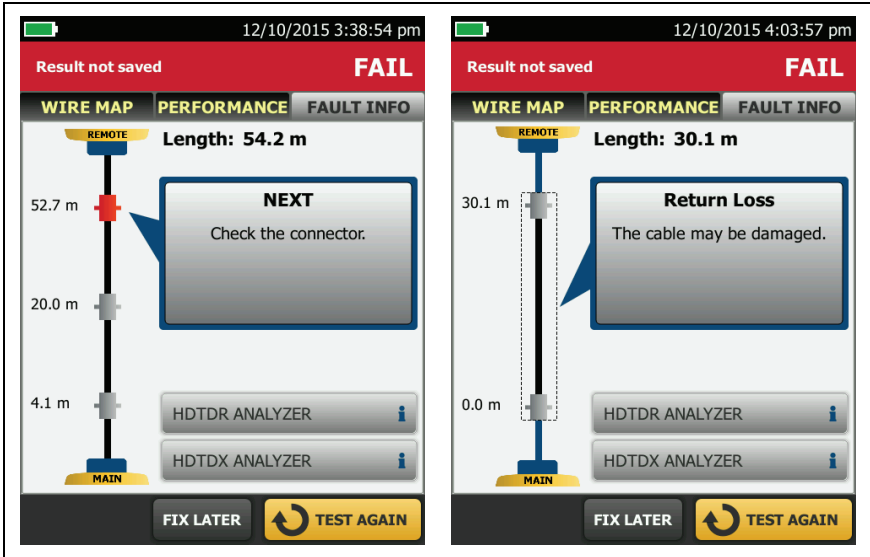


Figure 20. Examples of Fault Information Screens

PASS*/FAIL* Results

A result shows an asterisk when measurements are in the tester's accuracy uncertainty range (Figure 21) and the asterisk is required by the selected test limit. These results are marginal.

- 🌸 A **PASS*** shows that the cable's performance is satisfactory. If a cable must get a **PASS** result to agree with your requirements for quality, identify and correct the problems with the cable and do the Autotest again.
- 🌸 Usually, a **FAIL*** is not a satisfactory result. The tester shows a **FAIL** for the overall result. Identify and correct the problems with the cable and do the Autotest again.

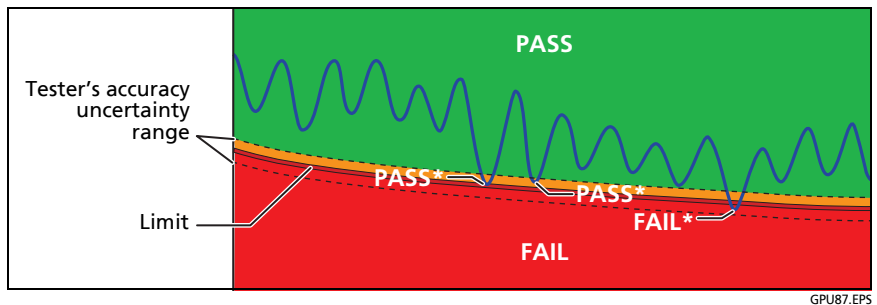


Figure 21. PASS* and FAIL* Results

GPU87.EPS

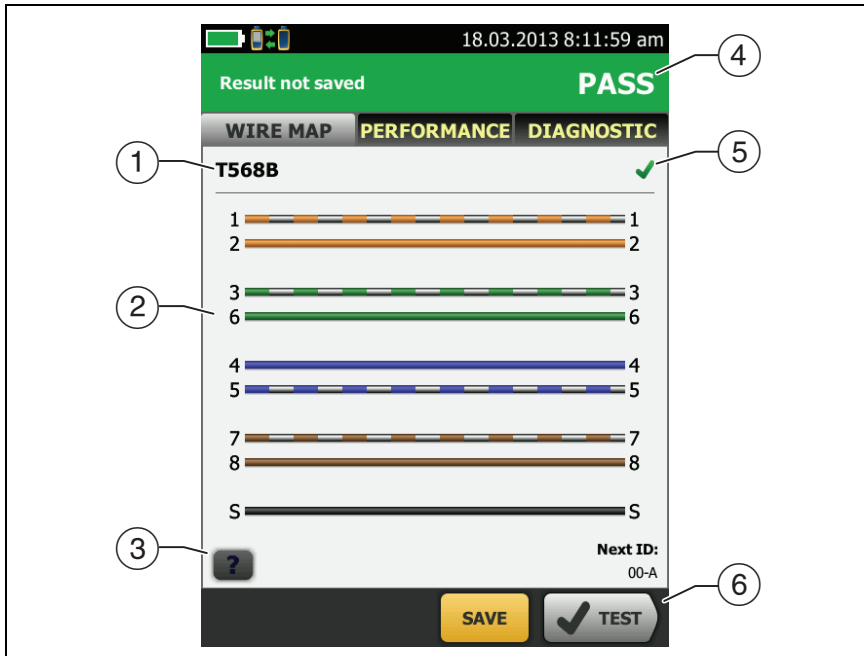
WIRE MAP Tab

The **WIRE MAP** tab shows the connections between the ends of the cable under test. The tester compares the connections to the selected **Outlet Configuration** to get a **PASS** or **FAIL** result.





If the wire map test fails, you can continue or stop the Autotest. Or, you can tap **SCAN ON** to do the wire map test continuously while you look for the fault. To continue the Autotest after you correct the fault, tap **SCAN OFF**, then tap **CONTINUE**.

If you leave then return to the **WIRE MAP FAIL** screen, the **SCAN ON** button goes away. To see the button again, tap **TEST AGAIN**. You can also select the continuous wire map test as a single test from the **TOOLS** menu. See "Continuous Tests" on page 60.

Figure 22 shows an example of a wire map screen. For information on AC wire map screens, see the Technical Reference Handbook.

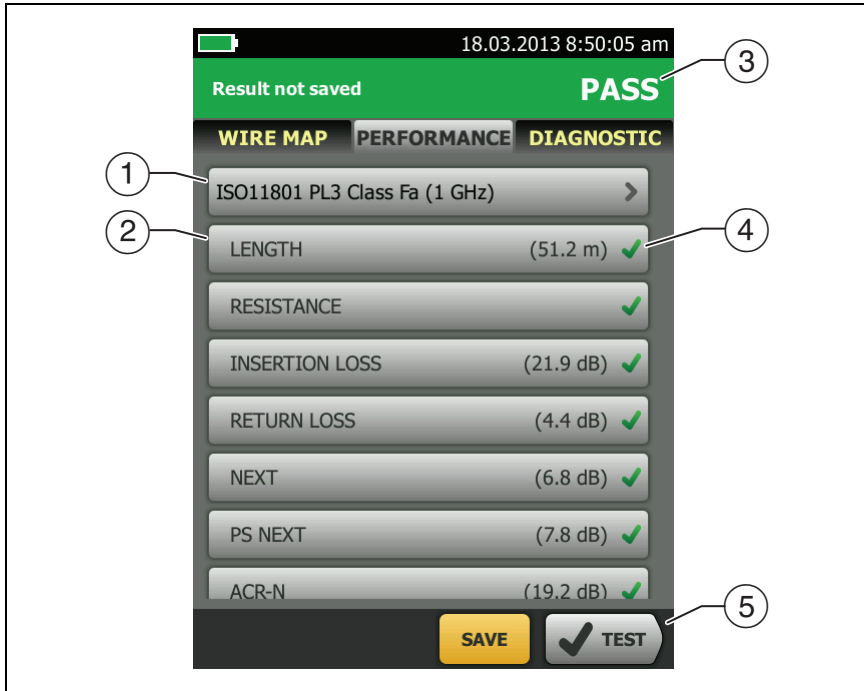


GPU59.EPS

- ① The name of the outlet configuration used for the test. The outlet configuration is a setting on the **TEST SETUP** screen.
- ② The wire map of the cabling. The main tester is at the left side of the wire map.
- ③ Tap  to see information about wire map faults. If  shows, tap it to see a message about the results, such as **Bad patch cord at remote**.
- ④ The overall result for the Autotest. If the result shows an asterisk, See "PASS*/FAIL* Results" on page 51.
- ⑤ The result for the wire map test:
 -  The wire map does not agree with the outlet configuration selected for the test.
 -  The wire map agrees with the outlet configuration selected for the test.
- ⑥ When more than one button shows at the bottom of the screen, the tester highlights one in yellow to recommend which one to tap. See "Buttons to Do Tests and Save Results" on page 17.

PERFORMANCE Tab

The **PERFORMANCE** tab (Figure 23) shows the overall result for each test that is required by the selected test limit.





GPU86.EPS


Figure 23. PERFORMANCE Tab

- ① The test limit and cable type used for the test. To see all the settings used for the test, tap the panel.
- ② To see detailed results for a test, tap the panel.
- ③ The overall result for the Autotest. If the result shows an asterisk, See "PASS*/FAIL* Results" on page 51.
- ④ The overall result for the test:

✖ The results exceed the limit.

 The results are within the limit.

 The selected test limit does not have a limit for the test, or a dB rule applies. See the Technical Reference Handbook.

 The results are within the range of accuracy uncertainty for the tester. See “PASS*/FAIL* Results” on page 51.

The measurement shown for frequency-domain results is the worst margin. (The insertion loss plot is different. See the Technical Reference Handbook.)

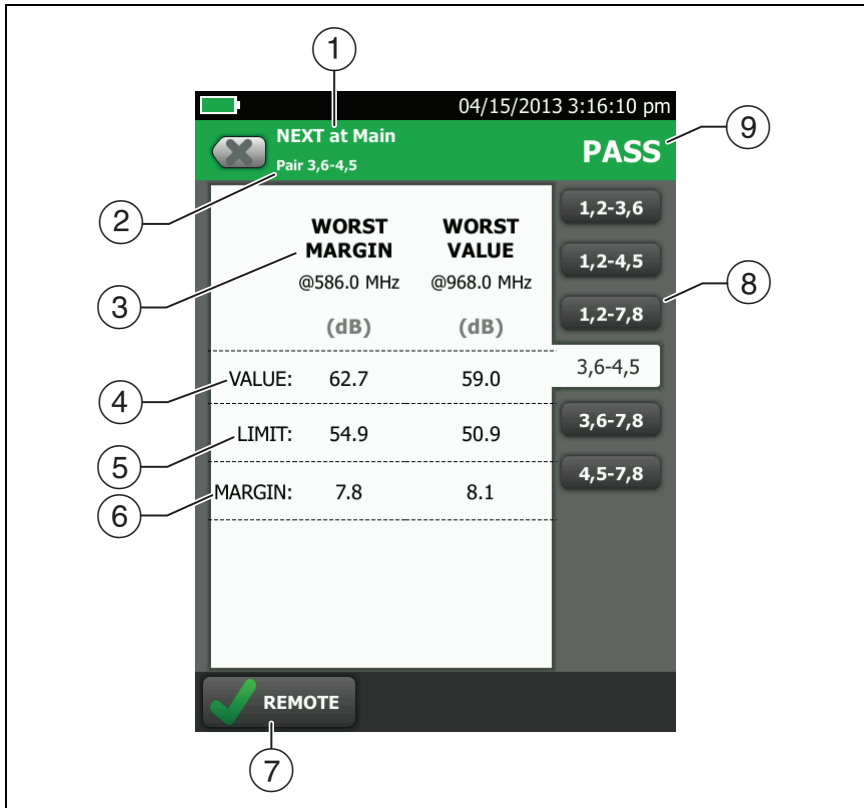
- ⑤ When more than one button shows at the bottom of the screen, the tester highlights one in yellow to recommend which one to tap. See “Buttons to Do Tests and Save Results” on page 17.

Frequency-Domain Results

Frequency-domain results are the measurements that change with frequency, such as insertion loss and crosstalk.

How to Save Frequency-Domain Results as a Plot or a Table

If **Store Plot Data** is on when you do a test, the saved results show as plots. If **Store Plot Data** is **Off**, the tester does not save plot data for frequency-domain tests or for the HDTDR/HDTDX analyzers. You can see the plots before you save the test and exit the results screen. Figures 24 and 25 show examples of the two types of screens. Also see “Store Plot Data” on page 40.

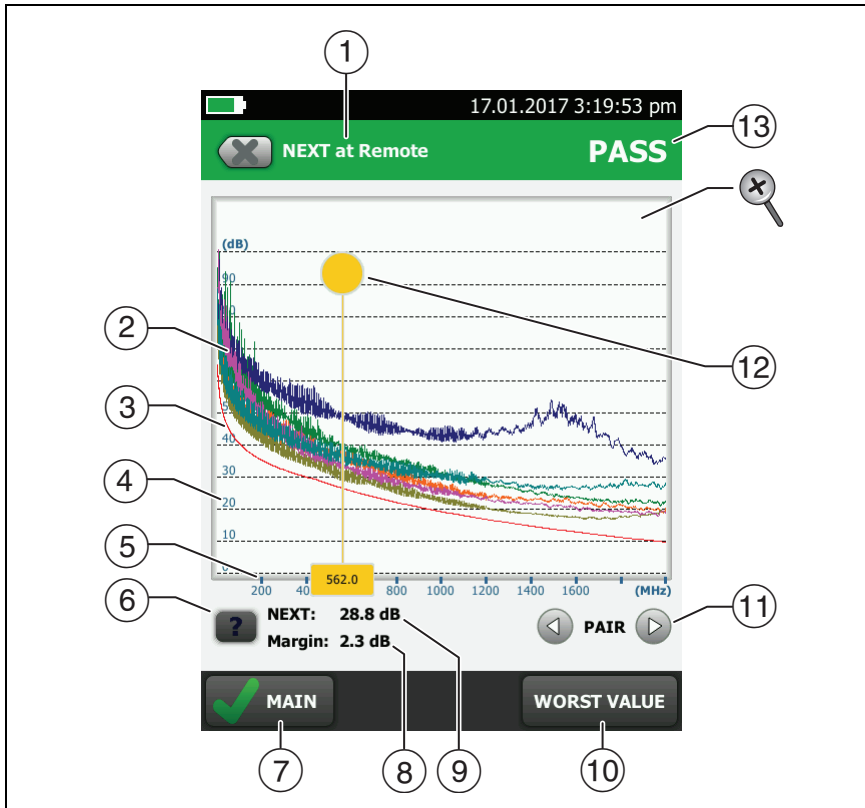


GPU104.EPS

Figure 24. Tabular Results Screen for a Frequency-Domain Test

- ① The location where the tester made the measurements. To switch between results for the main and remote, tap **REMOTE** or **MAIN** (7).
- ② The results are for the wire pair or pairs shown. To see the results for a different pair or pairs, tap a tab on the right side of the screen (8).
- ③ **WORST MARGIN** is the measurement that is nearest to the limit line or exceeds the limit by the largest amount. **WORST VALUE** is the worst measurement.

- ④ The measured value.
- ⑤ The limit specified by the selected test limit.
- ⑥ **MARGIN** is the difference between the measured value and the limit. The value is in a red box if the measurement exceeds the limit.
- ⑦ To switch between results for the main unit and the remote, tap **REMOTE** or **MAIN**.
- ⑧ To see the results for a different pair or pairs, tap a tab.
- ⑨ The result for the pair. If the result shows an asterisk, see "PASS*/FAIL* Results" on page 51.








GPU71.EPS

Figure 25. Plot Screen for a Frequency-Domain Test




- ① The location of the measurements. To switch between results for the main and remote, tap **REMOTE** or **MAIN** (⑦).
- ② Measured values for the wire pairs.
- ③ The limit line (in red) for the measurement.

Note

If the limit line is black, the tester does not evaluate the measurement at those frequencies because a dB rule applies. See the Technical Reference Handbook.

- ④ The vertical scale is the measured value in decibels.
- ⑤ The horizontal scale is the frequency range in megahertz.
- ⑥ To see help for the screen, tap .
- ⑦ To switch between results for the main unit and the remote, tap **REMOTE** or **MAIN**.
- ⑧ The margin at the cursor's location. The margin is the difference between the measured value and the limit. The margin is negative if the pair failed.
- ⑨ The measured value at the cursor's location.
- ⑩ When you first look at the plot, the cursor is at the frequency of the worst margin. To move the cursor to the worst value, tap **WORST VALUE**. (The insertion loss plot is different. See the Technical Reference Handbook.)
- ⑪ To see the plots for pairs, tap  or . To select pairs to show on the plot, touch  or  for one second to see the **SELECT PAIRS** window. Select the pairs you want to see, then tap **OK**.
- ⑫ When you first look at the plot, the cursor is at the frequency of the worst margin. To move the cursor to the worst value, tap **WORST VALUE** (⑩). The box at the bottom of the cursor shows the frequency at the cursor's position.

To move the cursor to other points, touch and drag the yellow circle at the top of the cursor.



To move the cursor in small increments, tap the yellow circle, then tap the arrow buttons that show on the plot ( or .
- ⑬ The overall result for the test. If you look at pairs, the result is for those pairs. If the result shows an asterisk, see "PASS*/FAIL* Results" on page 51.
-  To zoom in and out, use the pinch, reverse-pinch, and double-tap gestures on the touchscreen. You can also use the zoom controls to change the magnification on the frequency and decibels scales independently. See Figure 3 on page 16.

DIAGNOSTIC and FAULT INFO Tabs

If the Autotest failed or had a marginal result, the **FAULT INFO** tab shows. If the test passed and you selected **All Autotests** for the **HDTDR/HDTDX** setting on the **TEST SETUP** screen, the **DIAGNOSTIC** tab shows. These tabs give you access to the HDTDR and HDTDX analyzer plots. The plots help you locate the causes of NEXT and return loss failures. See the Technical Reference Handbook.

Continuous Tests

To do the wire map, length, or resistance test continuously, go to the home screen, tap **TOOLS > Single Tests**, then tap a test.


The wire map test compares the results to the outlet configuration specified by the selected test limit and shows  if the connections agree or  if they do not.

The length and resistance tests do not compare the results to a test limit.

To save the result, tap **SCAN OFF > SAVE**. The saved test has an  for the overall result.

Long-Range Communication Mode (DSX-5000)

DSX-5000 modules have a long-range communication mode that lets you do tests on very long cables, such as spools of cable and long links used for voice communications. The DSX-5000 automatically uses this mode when the cable is too long for normal communications between the main and remote testers. For example, a Cat 6 cable longer than approximately 200 m will cause the testers to use long-range communication mode.

When the testers use long-range communication mode, the arrows on the connection icon are orange: 

Note

Tests take more time to complete in long-range communication mode. For example, an Autotest can take 90 seconds to two minutes to complete.

A very long cable will fail the Autotest, but you can measure cable length and compare other results to results from a known- good cable of the same length to see if the cable is good.

About the AxTalk Analyzer Kit

The DSX CableAnalyzer kit includes the hardware and AxTalk Analyzer software you need to do tests for alien crosstalk on twisted pair cabling. Alien crosstalk is noise, or crosstalk, transmitted between adjacent cables in a bundle or patch panel. Alien crosstalk is a primary source of noise in cabling used for 10GBASE-T applications and above.

For instructions on how to do alien crosstalk tests, install the AxTalk Analyzer software, which is available on the Fluke Networks website, then see the online help in the software.

Chapter 3: Certify Coaxial Cabling

The optional DSX-CHA003 coaxial adapters let you use the DSX CableAnalyzer to certify coaxial cabling for network and video applications.

Set the Reference for Coaxial Tests

To use DSX-CHA003 adapters, you must set the reference for coaxial tests. The reference procedure sets a baseline for insertion loss and resistance measurements.

Set the reference at these times:

- When you want to use the tester with a different module. The tester can save reference values for eight different pairs of modules.
- Every 30 days, at minimum.
- To ensure maximum accuracy of test results, set the reference daily.

Note

It is not necessary to set the reference again if you use different coaxial adapters.

To set the reference

- 1 Make the connections shown in Figure 26.
- 2 Turn on the tester and the remote a minimum of 5 minutes before you set the reference.

-continued-

Notes

Set the reference only after the testers are at an ambient temperature between 10 °C and 40 °C (50 °F and 104 °F).

The tester will not let you set the reference if the patch cord is longer than 30 cm (12 in).

You can also set the reference with a 50 Ω patch cord.

- 3 On the home screen, select a coaxial cable test.
- 4 On the home screen, tap **TOOLS**, then tap **Set Reference**.
- 5 On the **SET REFERENCE** screen tap **TEST**.

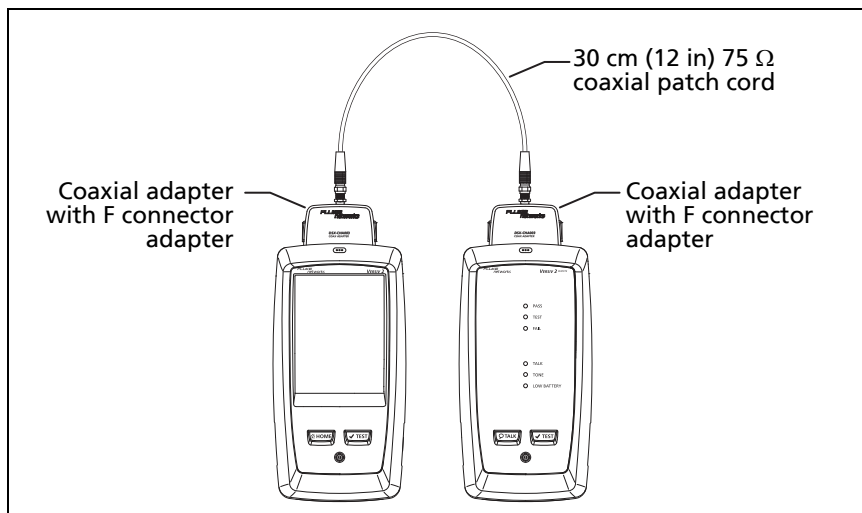


Figure 26. BV179.EPS Reference Connections for Tests on Coaxial Cabling

Settings for Coaxial Tests





Table 3 gives descriptions of the settings for coaxial tests. To set up a project, which includes the settings in Table 3, cable IDs, and operator names, see Chapter 11.

To set up a coaxial test

- 1 On the home screen, tap the test setup panel.
- 2 On the **CHANGE TEST** screen, select a coaxial test to change, then tap **EDIT**.

Or to set up a new coaxial test, tap **NEW TEST**. If no module is installed, the **MODULE** screen shows. Tap **DSX-8000 CableAnalyzer** or **DSX-5000 CableAnalyzer**.
- 3 On the **TEST SETUP** screen, tap the panels to change settings for the test. See Table 3.
- 4 On the **TEST SETUP** screen, tap **SAVE** when your test setup is completed.
- 5 On the **CHANGE TEST** screen, make sure the button next to the test is selected, then tap **USE SELECTED**.

Table 3. Settings for Coaxial Tests

| Setting | Description |
|------------------------|--|
| Module | Select DSX-8000 CableAnalyzer or DSX-5000 CableAnalyzer . |
| Cable Type | Select a cable type that is correct for the type you will test. To see a different group of cable types, tap MORE , then tap a group. To make a custom cable type, tap Custom in the Cable Groups list. |
| NVP | <p>Nominal velocity of propagation. The tester uses the NVP and the propagation delay to calculate the length of the cable.</p> <p>The default value is defined by the selected cable type and is the typical NVP for that cable type. To enter a different value, tap the NVP panel, then tap  or  on the NVP screen to increase or decrease the value.</p> <p>To find the actual value for a cable, connect a known length of the cable to the tester, tap MEASURE on the NVP screen, then change the NVP until the measured length matches the known length. Use a cable at least 30 m (100 ft) long.</p> <p>When you increase the NVP value, the calculated length increases.</p> |
| Test Limit | Select the correct test limit for the job. To see a different group of limits, tap MORE , then tap the name of a group. |
| Store Plot Data | <p>Off : The tester does not save plot data for insertion loss or for the HDTDR analyzer. You can see the plots before you save the test and exit the results screen. The saved results show insertion loss measurements in a table and do not include the HDTDR plot.</p> <p>On : The tester saves plot data for the insertion loss test and for the HDTDR analyzer.</p> |

How to Do an Autotest

Figure 27 shows the equipment for tests on coaxial cabling.

Notes

You can do the HDTDR, length, and resistance tests without a remote tester. See “Tests Without a Remote” on page 72.

*If you have two main testers, you can use one as a remote. To select the remote function, tap **TOOLS** > **Main as Remote**.*

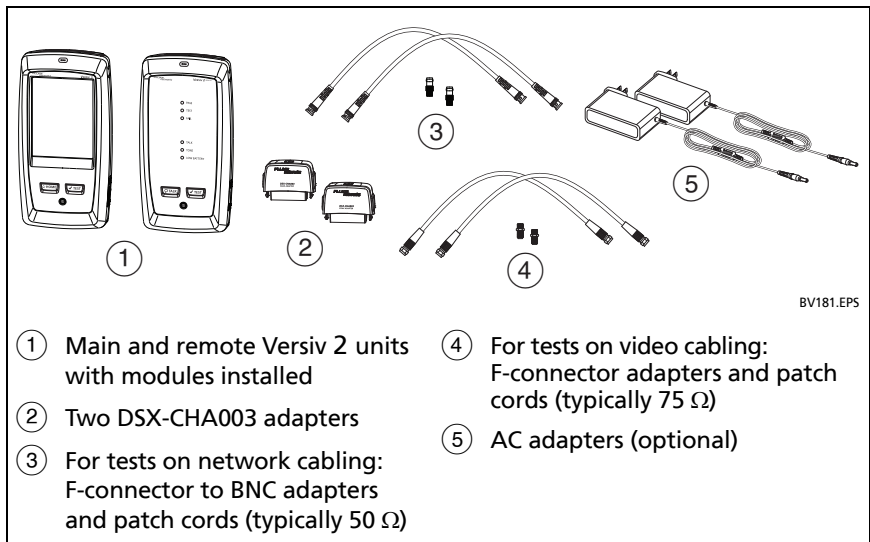


Figure 27. Equipment for Tests on Coaxial Cabling

To do an Autotest


- 1 Attach coaxial adapters to the main and remote testers.
- 2 Make sure that the home screen shows the correct settings for the job.

To make sure that other settings are correct, tap the test setup panel, make sure the correct test is selected on the **CHANGE TEST** screen, then tap **EDIT** to see more settings. Table 3 on page 66 describes the settings.

- 3 Connect the testers to the link as shown in Figure 28.

Caution

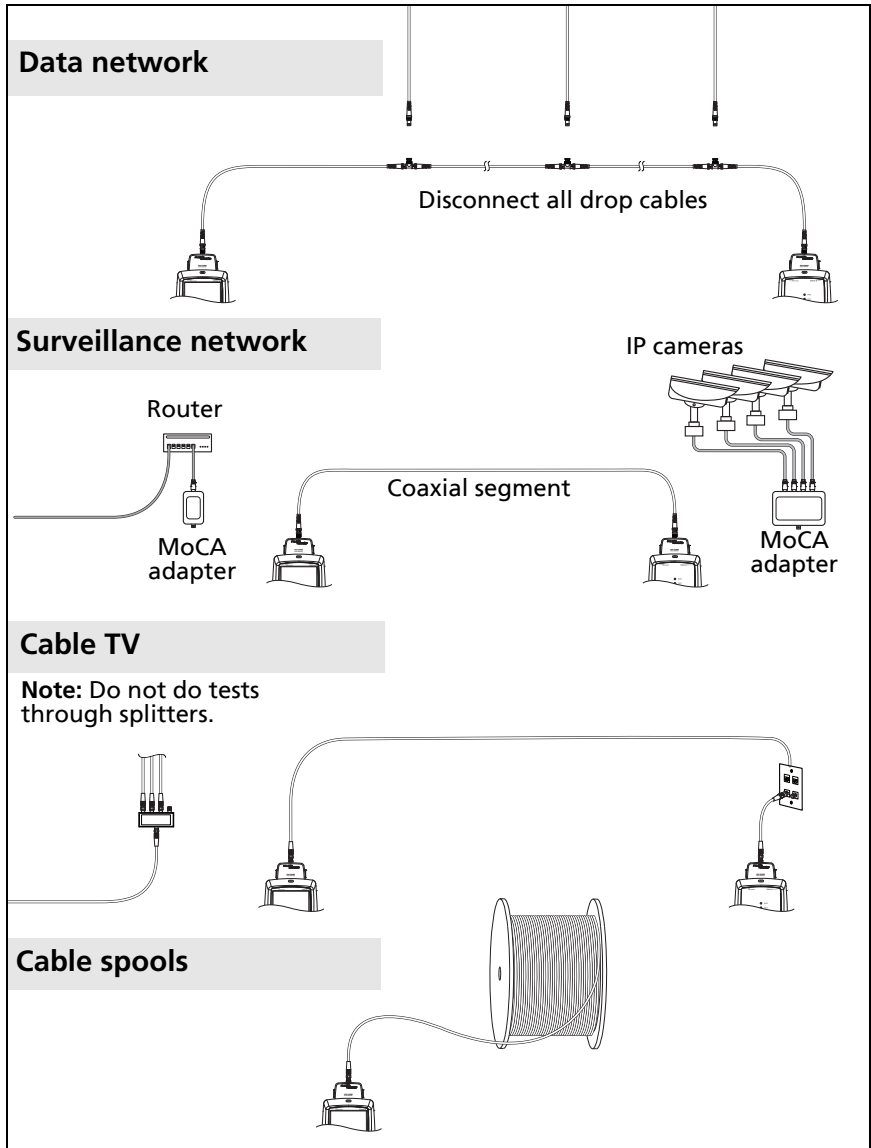
To make sure your results are reliable:

- **Disconnect all taps and devices from the cable.**
 - **Do not do tests through splitters (See “About Splitters” on page 71).**
- 4 Tap **TEST** on the main tester or press  on the main or remote tester.

If the tester at the other end of the cable is in sleep mode or is off, your tester’s tone generator turns on the other tester.

If the two testers are not connected:

- Your tester’s tone generator stays on so you can use a tone probe to find the cable to connect to the other tester.
- Or, tap **MEASURE** to do the length and resistance tests, which do not require a remote tester. Because the tester cannot complete all tests, and the reflection at the end of the cable exceeds the 15% limit for the HDTDR test, the result for an Autotest without a remote is always **FAIL**.



BV184.EPS

Figure 28. Examples of Connections for Tests on Coaxial Cabling

Coaxial Autotest Results

Note





Not all test limits include all the tests shown in Figure 29.



Figure 29. Autotest Results for Coaxial Cabling

GPU182.EPS

- ① The test limit and cable type used for the test.
- ② To see detailed results for a test, tap the panel.
- ③ The overall result for the Autotest. If the result shows an asterisk, See "PASS*/FAIL* Results" on page 51.

- ④ The **DIAGNOSTIC** tab shows the HDTDR analyzer button, which you can tap to see the HDTDR plot. The plot helps you find faults on the cable. The HDTDR plot for coaxial cable includes limit lines and a **PASS/FAIL** result.
- ⑤ The overall result for the test:
 -  The results exceed the limit.
 -  The results are within the limit.
 -  The selected test limit does not have a limit for the test.
 -  The results are within the range of accuracy uncertainty for the tester. See "PASS*/FAIL* Results" on page 51.

The measurement shown for the insertion loss plot is the worst value if the test passed, or the worst margin if the test failed.
- ⑥ When more than one button shows at the bottom of the screen, the tester highlights one in yellow to recommend which one to tap. See "Buttons to Do Tests and Save Results" on page 17.

To do the resistance test continuously, select the test from the **TOOLS** menu. This function helps you locate intermittent faults.

About Splitters

If you get these results, there might be a splitter on the cable:

- The tester cannot find the remote.
- The tester loses communication with the remote. The test might continue, then lose communication again as the splitter interferes with the communication signal.
- The length test shows **End not found**.
- The resistance test shows an open.
- The HDTDR plot shows a reflection that has an unusual shape.


Because splitters can cause unreliable test results, you should not do tests through them.

Tests Without a Remote

You can do the length, resistance, and HDTDR tests without a remote tester. Table 4 describes the effects of a remote on tests.

- 1 Attach a coaxial adapter to the main tester.
- 2 Make sure that the home screen shows the correct settings for the job.

To make sure that other settings are correct, tap the test setup panel, make sure the correct test is selected on the **CHANGE TEST** screen, then tap **EDIT** to see more settings. Table 3 on page 66 describes the settings.

- 3 Connect the tester as shown in Figure 30.
- 4 To do an Autotest: Tap **TEST** on the main tester or press  on the main or remote tester. When the **MEASURE** button shows, tap it to do the length and resistance tests, which do not require a remote tester.

To do only the length or resistance test: On the home screen tap **TOOLS > Single Tests**, then tap a test.

To do only the HDTDR test: On the home screen tap **TOOLS > Diagnostics**, then tap **HDTDR**.

Note

*Because the tester cannot complete all tests, and the reflection at the end of the cable exceeds the 15% limit for the HDTDR test, the result for an Autotest without a remote is always **FAIL**.*

Table 4. Remote Requirements for Coaxial Tests

| Test | Remote Requirements* |
|--|---|
| HDTDR analyzer | Optional. Without a remote, the plot shows large reflections at the end of the cabling. |
| Resistance | A remote or a terminator is required for a loop resistance measurement. |
| Length | Not required. Because a coaxial cable terminator eliminates signal reflections, the tester cannot measure the length of terminated cabling. The tester shows End not found in this case. |
| Impedance | Optional. Without a remote or terminator, the tester cannot measure the impedance of cables longer than 984 ft (300 m). The tester shows Unknown in this case. |
| Propagation delay | Not required. Because a coaxial cable terminator eliminates signal reflections, the tester cannot measure the propagation delay of terminated cabling. In this case, the tester shows End not found . |
| Insertion Loss | Required. |
| * If a remote is not required for a test, the test runs without activating the toner when no remote is detected. | |

Figure 30. Connections for Coaxial Tests Without a Remote

Continuous Tests

To do the length or resistance test continuously, go to the home screen, tap **TOOLS > Single Tests**, then tap a test.

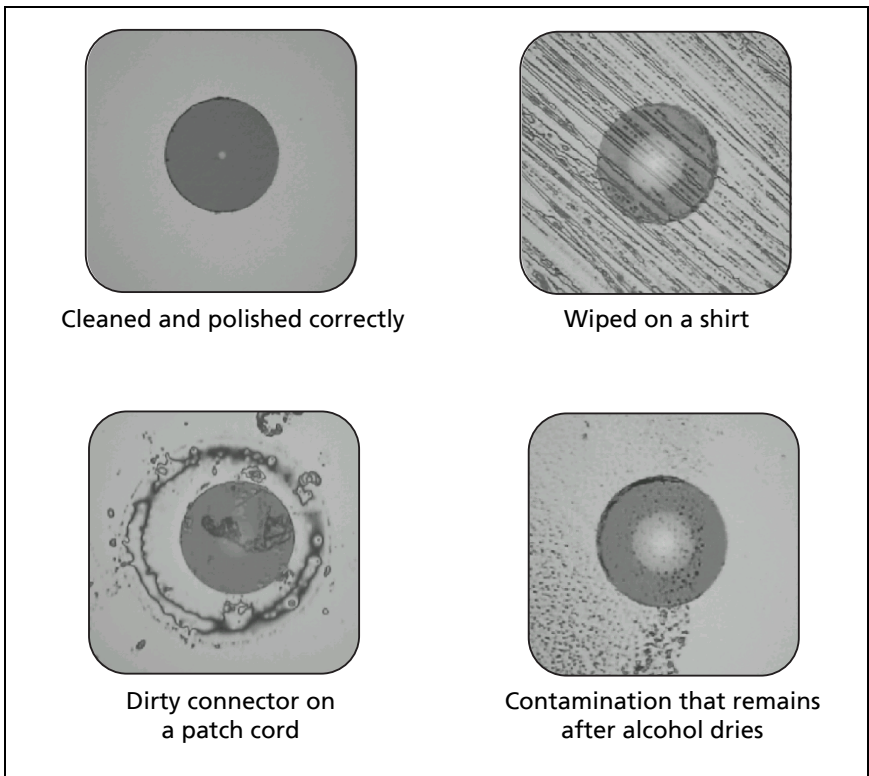
The length and resistance tests do not compare the results to a test limit.

To save the result, tap **SCAN OFF > SAVE**. The saved test has an  for the overall result.

Chapter 4: Clean Fiber Endfaces

Always Clean Endfaces Before Tests

When a fiber optic link does not operate correctly, the cause is frequently a dirty endface in a connector. Figure 31 shows examples of dirty endfaces and an endface that has been correctly cleaned and polished.



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Figure 31. Examples of Clean and Dirty Fiber Endfaces

Always clean and inspect the endfaces in fiber connectors before you make connections. Fluke Networks recommends that you use a mechanical device, such as the Fluke Networks Quick Clean™ Cleaner, to clean connectors on network equipment. If you do not have such a device, if the device does not clean the connector sufficiently, or when you clean connectors on test reference cords, use other optical-grade supplies such as wipes and solvent.

Figure 32 shows the equipment you use to clean and inspect fiber endfaces.

 **Warning** 

To prevent possible eye damage caused by hazardous radiation:

- Do not look directly into optical connectors. Some optical equipment emits invisible radiation that can cause permanent damage your eyes.
- Before you clean an endface, turn off any optical sources (laser or LED) that are connected to the fiber.
- When you inspect endfaces, use only magnification devices that have the correct filters.

 **Caution**

To prevent damage to connectors and to keep contamination off of endfaces:

- Always cover unused connectors and adapters with protective caps.
- Always keep unused protective caps in a clean, sealed container to prevent contamination.

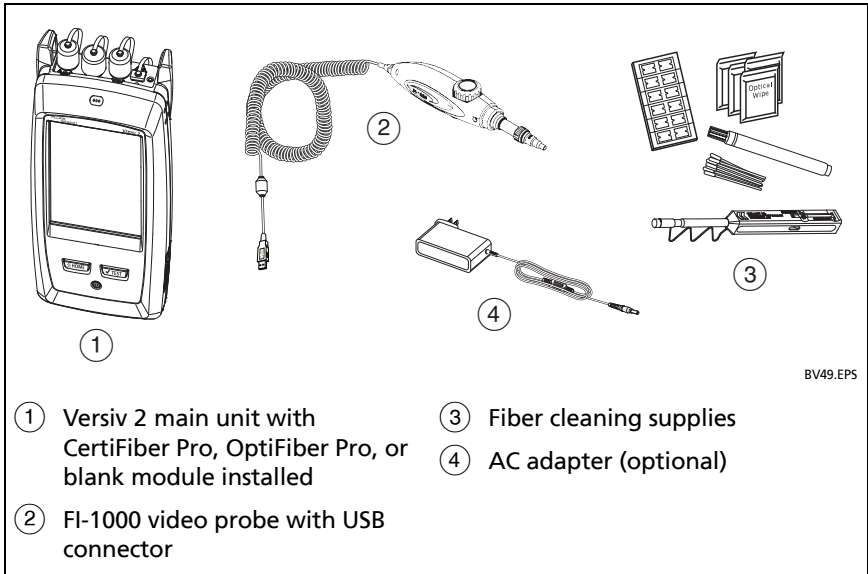


Figure 32. Equipment to Clean and Inspect Fiber Endfaces

How to Use a Fluke Networks Quick Clean Cleaner

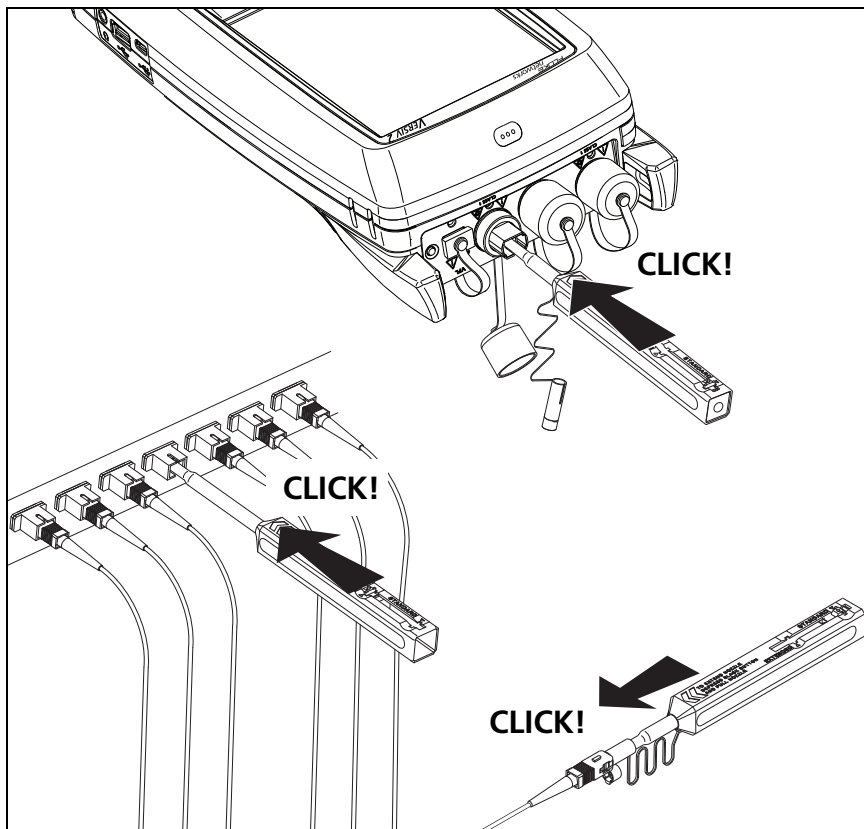
Caution

To prevent damage to the device and to connectors and to keep contamination off of endfaces, read all instructions and obey all safety precautions given in the instructions for the device you use to clean connectors.

To clean the connectors on test reference cords, use wipes and solvent. The Quick Clean cleaner cleans the fiber core, but can leave contamination around the core. The contamination can move to the core when you make connections. See “To Clean Connector Ends” on page 81.

- 1 Use the video probe to inspect the connector. If it is dirty, continue to step 2.
- 2 To clean a bulkhead connector, remove the cap. To clean the connector on a fiber cable, remove only the tip of the cap.
- 3 If necessary for a bulkhead connector, extend the tip of the device.
- 4 Push the device straight into the connector until you hear a loud click. See Figure 33. Then remove the device.
- 5 Use the video probe to inspect the connector. If necessary, clean and inspect the connector again.

If the mechanical device does not clean the connector sufficiently, use a swab and solvent to clean the connector.



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Figure 33. How to Use the One Click Cleaner

How to Use Wipes, Swabs, and Solvent

Caution

To prevent damage to connectors and to keep contamination off of endfaces:

- Always discard wipes or swabs after you use them.
- Do not let solvent dry on an endface. Some solvents leave a residue after they dry.
- If you must use alcohol as a solvent, make sure you use 99%-pure, anhydrous alcohol.
- Put wipes on a soft surface, such as a stack of wipes, that will conform to the shape of the fiber endface.
- When you rub fiber endfaces against a dry cleaning pad, always use short strokes (~1 cm or ~0.4 in). Long strokes against a dry pad can cause a build-up of static charge that can attract dust to the endface.

To Clean Bulkhead Connectors

- 1 Use a video probe to inspect the connector. If it is dirty, continue to step 2.
- 2 Touch the tip of a fiber optic solvent pen or swab soaked in solvent to a lint-free dry wipe or fiber cleaning card.
- 3 Touch a new, dry swab to the solvent spot on the wipe or card. 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 Use a video probe to inspect the connector. If necessary, clean and inspect the connector again.

To Clean the Optical Connectors on the Modules

To clean the optical connectors on the modules, first use the procedure given under “To Clean Bulkhead Connectors”.

If a connector is very dirty or the procedure above does not make it clean, use this procedure:

- 1 Unscrew the adapter on the connector.
- 2 Clean the ferrule or photodiode lens with a dry, optical-grade wipe made for fiber optic connectors.
- 3 Use a video probe to inspect the connector. If necessary, clean and inspect the connector again.
- 4 If the connector stays dirty, use a wipe that is moist with optical-grade solvent to clean the endface. Dry the ferrule or lens with a dry wipe.

To Clean Fiber Adapters

At regular intervals, clean fiber adapters with a swab and fiber optic solvent. Dry with a dry swab.

To Clean Connector Ends

- 1 Use a video probe to inspect the connector. If it is dirty, continue to step 2.
- 2 Touch the tip of a fiber optic solvent pen or swab soaked in solvent to a lint-free dry wipe or fiber cleaning card.
- 3 Rub the connector end-face across the solvent spot, then back and forth once across the dry area of the wipe or card. Typically, one or two short strokes (~1 cm or ~0.4 in) are sufficient to dry the endface.
- 4 Use a video probe to inspect the connector. If necessary, clean and inspect the connector again.

Notes

For APC connectors, hold ferrule against the cleaning area at the same angle (typically 8°) as the ferrule endface.

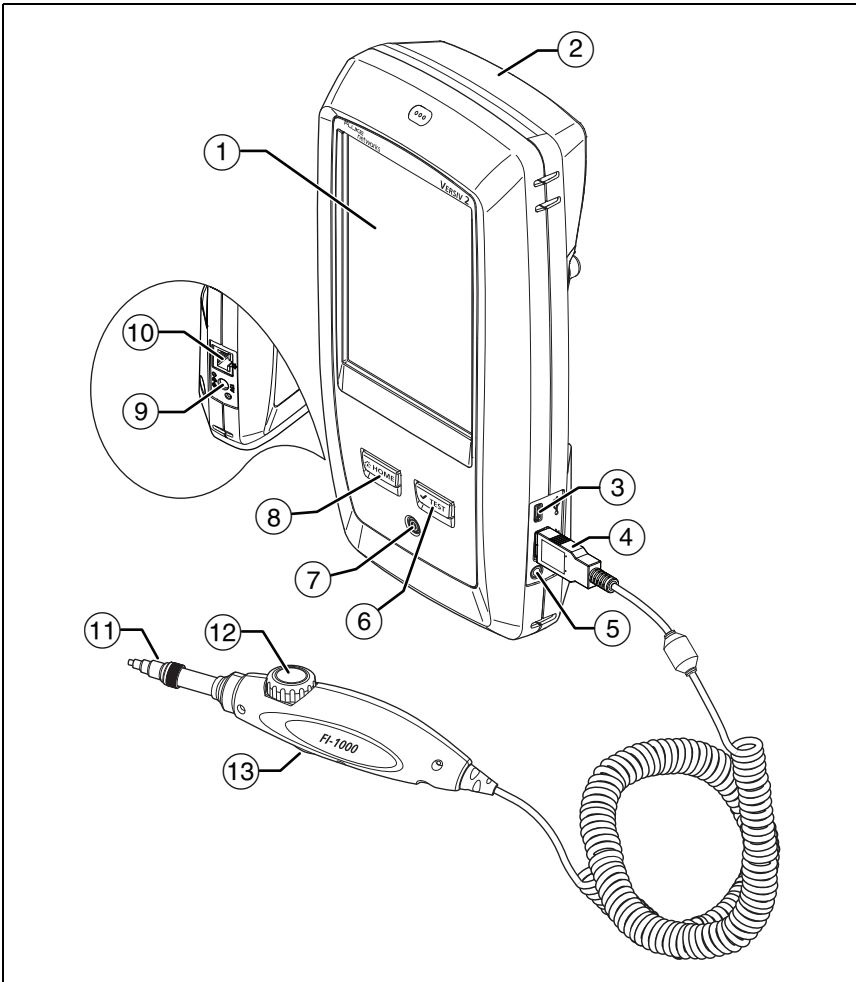
For some connector types, such as VF-45, it is necessary to use a different method to clean the endface.

Chapter 5: Inspect Fiber Endfaces

The optional FI-1000 FiberInspector™ video probe connects to the type A USB port on the Versiv 2 main unit to let you inspect the endfaces in fiber optic connectors. The probe lets you see dirt, scratches, and other defects that can cause unsatisfactory performance or failures in fiber optic networks.

The FI-1000 probe is included with the FI-7000 kit. The probe is an optional accessory for the CertiFiber Pro and OptiFiber Pro testers.

Connectors, Keys, and LEDs






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Figure 34. Connectors, Keys, and LEDs

- ① LCD display with touchscreen.
- ② Blank module included with the FI-7000 kit. Keep the module installed to give protection to the module connectors.

You can use the FiberInspector function with any module installed and with no module installed.

- ③ Micro-AB USB port: This USB port lets you connect the tester to a PC so you can upload test results to the PC and install software updates in the tester.
- ④ Type A USB port: This USB host port lets you save test results on a USB flash drive, connect the FI-1000 video probe to the tester.
- ⑤ Headset jack.
- ⑥ : Starts a test. To start a test, you can also tap **TEST** on the display.
- ⑦ Power key.
- ⑧ : Press  to go to the home screen.
- ⑨ Connector for the ac adapter.
- ⑩ RJ45 connector: Lets you connect to a network for access to Fluke Networks cloud services.
- ⑪ Removable tip for different types of connectors.
- ⑫ Dial for focus adjustment.
- ⑬ The button starts the FiberInspector test and switches the probe between still and live modes.

Settings for FiberInspector Tests

Table 5 gives descriptions of the settings for FiberInspector tests. To set up a project, which includes the settings in Table 5, cable IDs, and operator names, see Chapter 11.

To set up a FiberInspector test

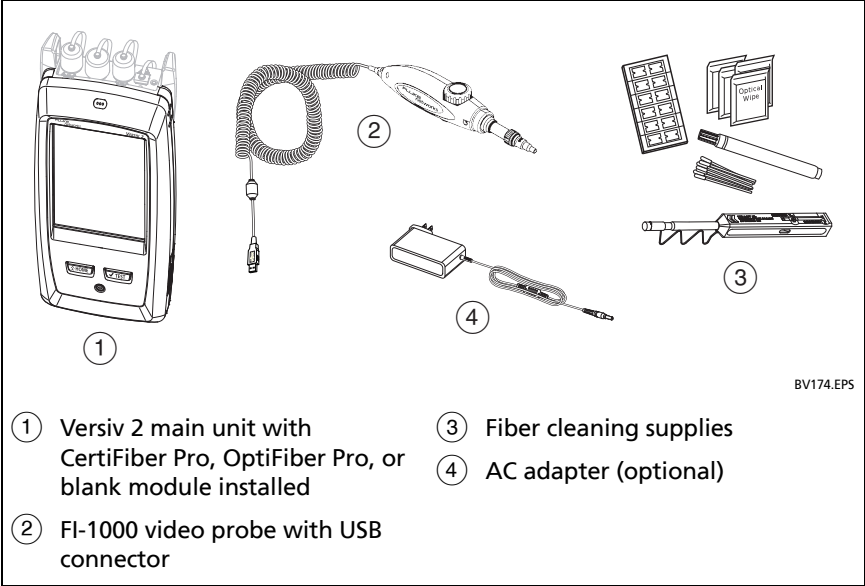
- 1 On the home screen, tap the test setup panel.
- 2 On the **CHANGE TEST** screen, select a FiberInspector test, then tap **EDIT**.
Or to set up a new FiberInspector test, tap **NEW TEST**. If no module is installed, the **MODULE** screen shows. Tap **FiberInspector** or **FI-7000**.
- 3 On the **TEST SETUP** screen, tap the panels to change settings for the test. See Table 5.
- 4 On the **TEST SETUP** screen, tap **SAVE** when your test setup is completed.
- 5 On the **CHANGE TEST** screen, make sure the button next to the test is selected, then tap **USE SELECTED**.

Table 5. Settings for FiberInspector Tests

| Setting | Description |
|-------------------|---|
| Module | Select a CertiFiber Pro or OptiFiber Pro module or FI-7000. |
| Test Type | Select FiberInspector . |
| Test Limit | To give images a PASS or FAIL result manually, select Manual . Or, select a limit to compare scratches and defects to specific criteria for size and location. To see a different group of limits, tap MORE , then tap the name of a group. To make a custom limit, tap Custom in the Limit Groups list. See the Technical Reference Handbook. |

How to Do the FiberInspector Test

Figure 35 shows the equipment for a FiberInspector test.




- ① Versiv 2 main unit with CertiFiber Pro, OptiFiber Pro, or blank module installed
- ② FI-1000 video probe with USB connector
- ③ Fiber cleaning supplies
- ④ AC adapter (optional)

Figure 35. Equipment for the FiberInspector Test

To do the FiberInspector test

Refer to Figures 36 and 37.



- 1 Connect the FI-1000 probe to the type A USB port on the side of the tester.
- 2 Install the correct tip on the probe.
- 3 Clean the connector that you will inspect.
- 4 Use the buttons on the probe or the tester to start the test:
 - Press the button on the probe.
 - If the FiberInspector test shows on in the test setup panel on the home screen, tap **TEST** or press .

On the home screen, tap the **TOOLS** icon, then tap **FiberInspector**.

- 5 Insert the probe into the connector.
- 6 To adjust the focus, turn the dial on the probe clockwise or counterclockwise.

Figure 38 describes the FiberInspector display.

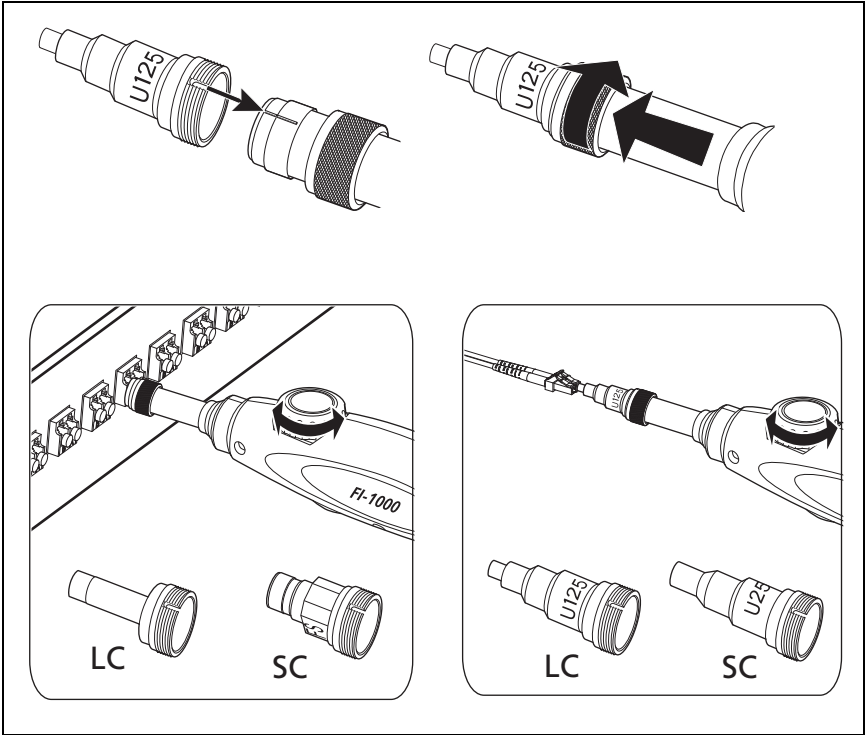
- 7 To save the image, tap **SAVE**.
- 8 On the **SAVE RESULT** screen, select **End 1** or **End 2**, make sure the **Cable ID** and **End** name are correct, then tap **SAVE**.

Saved FiberInspector results show these icons for **End 1** and **End 2**:  

Notes

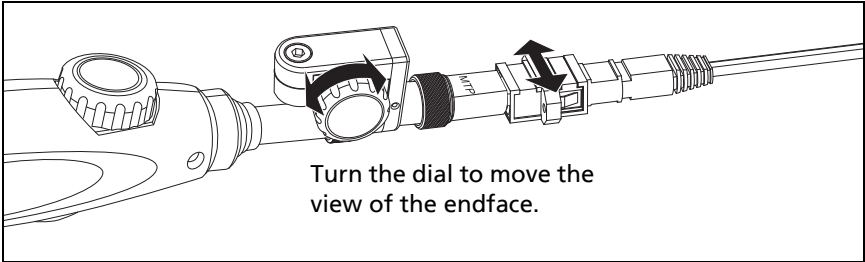
*The **Auto Save** function does not operate with the FiberInspector test.*

Continuous use of the video probe decreases the battery life. To increase the battery life, connect the ac adapter when you use the probe for more than a few minutes.



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Figure 36. How to Use the FI-1000 Probe



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Figure 37. How to Use the Optional MPO/MTP Inspection Tip




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Figure 38. FiberInspector Image with Manual Grading Selected




Note

To see the buttons for the measurement axes and core scales and to change the magnification of the screen, you must first tap  to put the screen in still mode.




- ① You can use the round, horizontal, and vertical scales to measure the size of the fiber core and cladding. You can also measure the size of particles, scratches, and other defects on the endface.

To show the scales, tap , then tap **SCALE ON** (③). Drag the image to the center of the screen if necessary.

- Outer, blue ring: 250 μm
- Middle, green rings: 120 μm and 130 μm
- Inner, yellow rings: 25 μm and 62.5 μm (to change the size, tap **NEXT SCALE**)

- ② To adjust the brightness or contrast of the image, tap , then move the bars on the controls. To hide the controls, tap  again.
- ③ To show the scales (①), tap , then tap **SCALE ON**. To change the size of the measurement ring for the fiber core, tap **NEXT SCALE**.
- ④ **Manual limit selected:** To give a **PASS** or **FAIL** grade to the image, tap **GRADE**. See ⑥.

Test limit selected: To see an analysis of the defects, tap **ANALYZE**. See “Automatic Analysis of Scratches and Defects” on page 92.

- ⑤ To put the screen in still mode and turn off the probe, press the button on the probe or tap . To turn the probe on again, press the button on the probe or tap .
- ⑥ To give the image a grade of **PASS** or **FAIL**, tap **GRADE** (④). If you set the grade to **FAIL**, then save the image, the ID for the image is in the list of tests to do again.
-  To zoom in and out, use the pinch, reverse-pinch, and double-tap gestures on the touchscreen. See Figure 3 on page 16.

Automatic Analysis of Scratches and Defects

Note

This function operates correctly only with the FI-1000 probe.

When you select a limit for the FiberInspector test, the tester can compare the size, location, and number of scratches and defects to the limit's criteria. Limits for the FiberInspector test are from standards such as IEC 61300-3-35. The limits specify the maximum size and number of scratches and defects allowed in the core, cladding, adhesive, and contact zones on the fiber endface.

To do an endface analysis

- 1 Make sure the test setup shows the correct FiberInspector test limit.
- 2 Do the FiberInspector test.
- 3 Make sure the image is in focus, then tap **ANALYZE**.

The tester highlights the scratches and defects in red or green (see Figure 39):

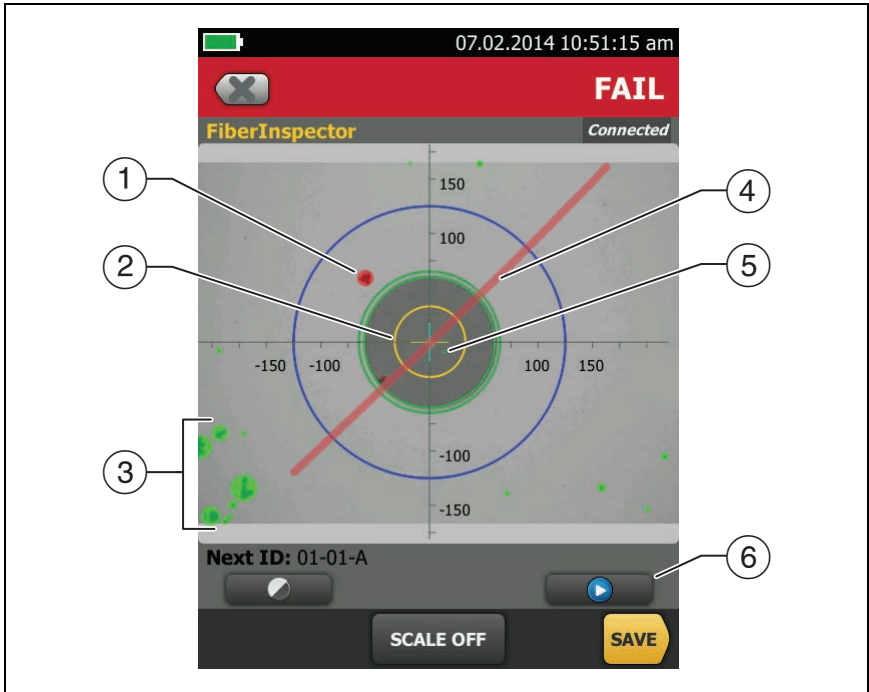
- **Red: FAIL.** The scratch or defect is larger than the maximum size that the limit allows, is closer to the fiber core than the limit allows, or there are more scratches or defects than the limit allows.
- **Green: PASS.** The limit allows the scratch or defect because it is too small or too far from the core to cause problems, or there are fewer than the maximum allowed number of scratches or defects of that size.

See Figure 39:

- ① A defect, such as a particle of dirt, a chip, or a pit. This defect is red because it is larger than the limit allows.
- ② The measurement rings show after you tap **ANALYZE**. The sizes of the rings are specified by the limit. To specify different sizes, make a custom endface limit. See the Technical Reference Handbook.


⚠ Caution

If a defect is possibly a dirt particle, clean the endface and do the inspection again. You must remove all loose particles because they can move into the core when you make connections.



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Figure 39. FiberInspector Image with Defect Analysis

- ③ These defects are green because they are too far away from the core to cause problems.
- ④ This scratch is red because it goes through the fiber core.
- ⑤ This defect is green because the limit allows a maximum of five defects of that size or smaller in the cladding area.
- ⑥ To do the analysis again, tap  then tap **ANALYZE**.