LinkIQ™
Cable+Network Tester

Users Manual

BC

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Fluke Corporation
P.O. Box 9090
Everett, WA 98206-9090
U.S.A.

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Introduction

The Fluke Networks LinkIQ Cable+Network Tester (the Product or Tester) is a unique handheld test instrument for use in many applications to test twisted pair cables, network connectivity, and Power over Ethernet (PoE). These applications include system integration, cable installation, and network and security system maintenance. The Product provides an automatic test discovery suite that recognizes a connected device and automatically selects the appropriate type of test for the device. See *Automatic Test Discovery*. The Product can be set manually to do a cable or switch test.

The Product shows images on a high-visibility, industrial-quality LCD touch screen. The Product saves data to internal memory which can be transferred to a PC through a direct USB connection to the PC.

The Product includes LinkWare™ PC desktop software. LinkWare PC software is a high-performance, professional software suite for quality analysis and reporting.

The Product is compatible with the MicroScanner™ PoE Remote Identifer and the IntelliTone™ Pro Toner, Tracer, and Probe.

Automatic Test Discovery

The Product is set up in Auto Test mode by default. The automatic test discovery feature recognizes a connected device and automatically selects the appropriate type of test compatible with the device.

Automatic test discovery selects a:

• Cable test if the Product detects a Remote ID. See *Cable Test*.

• Switch test if the Product detects a network device. See *Switch Test*.

• Switch test with Power over Ethernet (PoE) if the Product detects a Power Sourcing Equipment (PSE) device. See *Switch Test*.

Contact Fluke

Fluke Corporation operates worldwide. For local contact information, go to our website: www.flukenetworks.com.

To register your product, or to view, print, or download the latest manual or manual supplement, go to our website.

+1-425-446-5500

info@flukenetworks.com

Safety Information

General Safety Information is in the printed Safety Information document that ships with the Product and at www.flukenetworks.com. More specific safety information is listed where applicable.

A **Warning** identifies hazardous conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

Note

Before you use the Product for the first time, charge the battery for a minimum of 1.5 hours. See Battery.

⚠**Caution**

To activate the input protection circuitry of the Product, turn on the Product before you connect a cable to the Product. To turn on the Product, push ⏻.

Product Familiarization

Unpack the Product and identify the items shown in Table 1.

Parts

Table 1 shows the parts of the Product.

Table 1. Parts

Item	Description	Item	Description
1	Product	5	#1 Office locator (Remote ID 1)[2]
2	Battery charger	6	Office locator holder
3	Universal power adapter kit[1]	7	USB C to USB A cable
4	Hang strap	8	CAT6A Copper patch cable

[1] Not available in all kits.
[2] The Product can work with Remote ID 2 to Remote ID 7 (available separately as REMOTE-ID KIT or included with LIQ-KIT)

Controls and Connections

Table 2 shows the controls and connections of the Product.

Table 2. Controls and Connections

Item	Description	Item	Description
❶	RJ45 jack	❹	LCD touch screen (display)
❷	Hang strap attachment slots	❺	Power button.
❸	USB C input terminal used to charge the battery or upload results to LinkWare PC. The Product cannot do a test while the battery charges or while results upload to LinkWare PC.		

Hang Strap
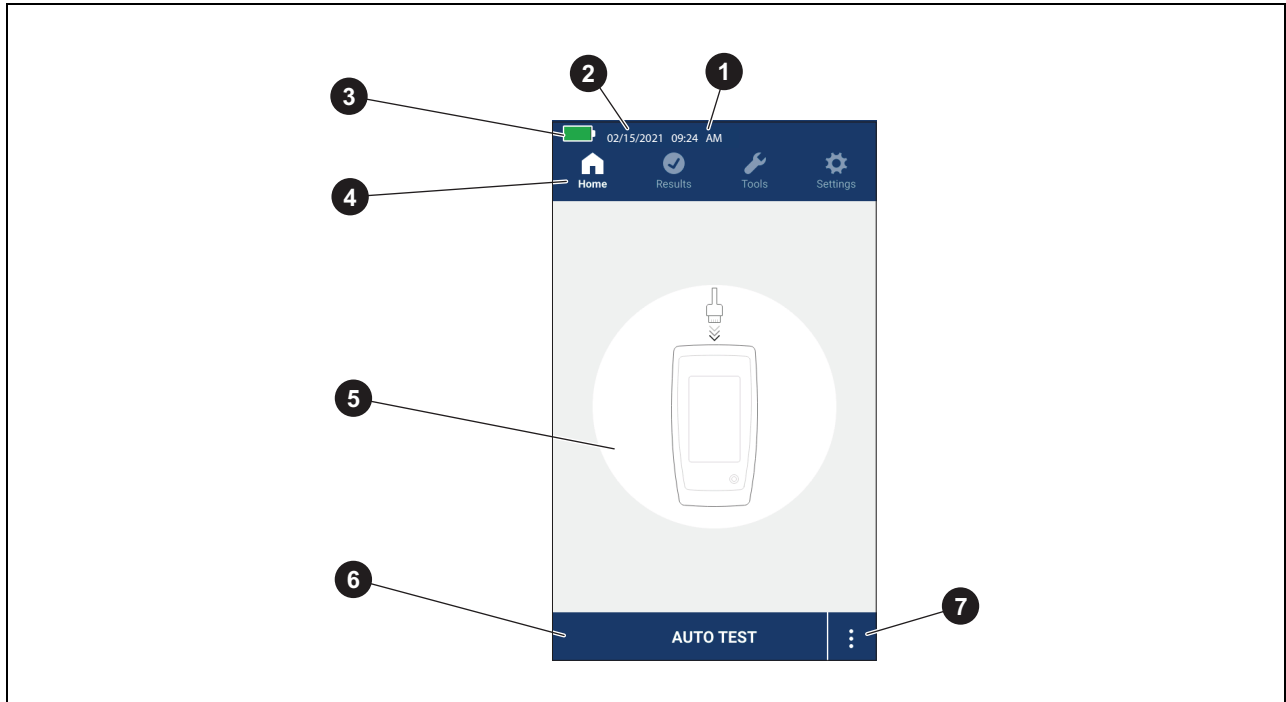
shows how to attach the hang strap.

Figure 1. Hang Strap Attachment

Display

Table 3 shows the items on the display.

Table 3. Display

Item	Description	Item	Description
1	Time	**5**	Results and information screen
2	Date	**6**	Information/Command button. The function changes based on the screen. Tap **AUTO TEST** to do a test and automatically select the appropriate type of test for the device. See *Automatic Test Discovery*.
3	Battery status	**7**	Manual test selection button. Tap to select to do a cable or switch test.
4	Main menu toolbar See *Main Menu*.		

Main Menu

Table 4 lists the submenus available in the Main Menu.

Table 4. Main Menu

Submenu		Function
	Home	If necessary, tap to return to the Home screen. Use the Home screen to start a test or upload results to LinkWare PC.
	Results	Tap to view or manage results. See *Results Menu*.
	Tools	Tap to access additional tools. The tools cannot be used while in a test. See *Tools Menu*.
	Settings	Tap to set user preferences and view information about the Product. See *Settings Menu*.

Menu Controls

To use the menus to change and view settings:

1. Tap an icon on the main menu to open a submenu. See Table 4.

   The foreground of the selected icon changes to white.

2. Tap a menu control to set and change options. See Table 5.

   Some menus contain a scroll bar on the right side to indicate there are additional options. The scroll bar is not a control. To view additional options, touch the display and slide the screen up or down. The scroll bar indicates the location in the menu.

3. To close a submenu and return to the Home screen, tap .

Table 5 is a list of the menu controls.

Table 5. Menu Controls

Item	Control	Function
Slider bar		Adjusts a value. Touch and slide the bar to the left to decrease the value or to the right to increase the value.
Selection indicator		Indicates which of two options is selected.
	0.0	Option selected.

Table 5. Menu Controls (cont.)

Item	Control	Function
Selection indicator	✓/✔	To select an item from a list, tap an option. The indicator shows the selected option. In the Results menu more than one item may be selected at a time. See *Results Menu*.
Option menu button	❯	Tap to open an option menu to adjust a setting.
Numerical value adjuster buttons	←/↓	Decreases a numerical value.
	→/↑	Increases a numerical value.
Back arrow	⬅	Return to the previous screen and, if necessary, save changes.
Exit button	✕	Return to the previous screen without saving changes.
OK button	**OK**	Save changes or do an action. Then, return to the previous screen.
Cancel button	**CANCEL**	Do not do an action and return to the previous screen.

Settings Menu

Table 6 is a list of the options available in the Settings menu. The Product uses the last saved settings when the Product is turned off and back on.

Table 6. Settings Menu

Option Menu	Option	Description
Wire map Settings		
Shield Test	**On**	Uses the continuity of the shield on the cable to determine if a test passes. Default setting.
	Off	Even if a shield is connected to a cable, the continuity of the shield is not used to determine if a test passes.

Table 6. Settings Menu (cont.)

Option Menu	Option	Description
Allow Crossover	**On**	The wire map of either a straight through cable or a crossover cable is used to determine if a test passes.
	Off	The wire map of a straight through cable is used to determine if a test passes. A wire map of a crossover cable fails. Default setting.
Pinout	<options>	Select to set the pinout configuration to use to do a test. **T568A** is the default setting.
Cable Settings		
Test Limit	**10BASE-T**	Verify if a cable with continuity on at least the 1,2 and 3,6 pairs can support 10BASE-T (10) data rate throughput. Default setting.
	100BASE-TX	Verify if a cable with continuity on at least the 1,2 and 3,6 pairs can support 100BASE-TX (100) data rate throughput.
	1000BASE-T	Verify if a 4-pair cable with continuity on all 4 pairs can support 1000BASE-T (1G) data rate throughput.
	2.5GBASE-T	Verify if a 4-pair cable with continuity on all 4 pairs can support 2.5GBASE-T (2.5G) data rate throughput.
	5GBASE-T	Verify if a 4-pair cable with continuity on all 4 pairs can support 5GBASE-T (5G) data rate throughput.
	10GBASE-T	Verify if a 4-pair cable with continuity on all 4 pairs can support 10GBASE-T (10G) data rate throughput.
NVP	**50-99**	Set the Nominal Velocity of Propagation (NVP) value based on the cable. The default NVP value is **68**.

Table 6. Settings Menu (cont.)

Option Menu	Option	Description
General Settings		
Auto Increment	**On**	Automatically increments the Test ID by one number or letter for the next test.
	Off	Use to manually increment the Test ID.
PoE Test	**On**	Enable PoE detection. Use to do a PoE test after you do a network switch test.
	Off	Disable PoE detection. Use to decrease the time to do a switch test.
CDP/LLDP Timeout	<options>	Tap to select the time in seconds to wait for a CDP/LLDP response before the Product retries network discovery. The default is **30 sec**.
☀	--	Use the slider bar at the right of the image to adjust the brightness of the image.
Auto Shutoff	**On**	The Product turns off after 15 minutes of no use. While the Product charges, Auto Shutoff is disabled.
	Off	The Product remains on until the battery needs to be charged again.
Sound	**On**	The Product emits an audible sound at the completion of a test.
	Off	The Product does not emit an audible sound at the completion of a test.
Numbers	--	Set or view the decimal point indicator.
Units	--	Set or view the units to use in measurements.

Table 6. Settings Menu (cont.)

Option Menu	Option	Description
Date/Time	<options>	Tap to select options to set the date, time, date format, and time format.
About	--	Tap to view the serial number, MAC address, and version information of the Product.
Factory Reset	--	Tap to delete all test results and reset the Product to the factory default settings.

Tools Menu

Table 7 is a list of the options available in the Tools Menu.

Table 7. Tools Menu

Options Menu	Option	Description
Tone Generator	**IntelliTone**	The Product emits a digital tone that an IntelliTone™ probe can use to locate and isolate cables behind walls, at patch panels, or in bundles.
	Analog Tone 1	The Product emits an analog signal that a standard analog probe can use to identify cables in bundles.
	Analog Tone 2	
	Analog Tone 3	
Blink Port Light	--	Tap to blink a port light on a hub or switch to verify connectivity and cable routes.

Tests

Read the warnings below before you do a test.

⚠⚠ Warning

To prevent possible electrical shock, fire, personal injury, or damage to the Product:

- **To activate the input protection circuitry of the Product, turn on the Product before you connect a cable to the Product.**

- **During a test, do not connect a cable to the Product.**

- **During a test, do not disconnect a cable from the Product.**

- **The tester is not intended to be connected to active telephone inputs, systems, or equipment, including ISDN devices. Exposure to the voltages applied by these interfaces may damage the tester and create a potential shock hazard.**

- **Use caution when working in potentially hazardous locations such as an elevated location on a ladder or roof top, especially if work is occurring in proximity to a lightning storm. Also use caution if external communication cables are run at length in parallel to electrical power installation cables. These types of installations can expose communication cables to coupled electrical transients that could be accessible on exposed conductive parts of the equipment during operation. While in general these transients are not expected to be an electric shock hazard, startle reaction from these transients could lead to a secondary hazard such as loss of balance and lead to a fall or other injury. To reduce risk of exposure, limit contact to accessible conductive parts of I/O terminals during operation.**

Cable Test

In a twisted pair cable test, the Product performs a series of radio frequency (RF) tests to determine the transmission parameters of the cable. The parameters are compared to the test limits specified by IEEE 802.3 for Ethernet. Unlike transmission testers that pass bits across the cable, the Product evaluates the physical qualities of the cable.

- Transmission parameters used to qualify the cable:
  - Insertion loss
  - Return loss
  - NEXT loss
  - Delay skew
  - Length
  - Wire map
- Cable qualification to IEEE 802.3 standards:
  - 10BASE-T
  - 100BASE-TX
  - 1000BASE-T
  - 2.5GBASE-T
  - 5GBASE-T
  - 10GBASE-T
- Measures length up to 304.8 m (1000 feet)
- Uses wire maps to show:
  - Opens
  - Shorts
  - Split pairs
  - Miswires
- Delay skew between pairs

Do a Cable Test

Cable tests pass or fail based on the settings selected for the test. To pass a test:

- The Product must detect a Remote ID.
- The wire map must match the selected wire map settings.
- The cable under test must meet or exceed the selected test limit.

To do a cable test:

1. Turn on the Product.
2. If necessary, adjust the settings. See *Settings Menu*.

3. Connect one end of the CAT6A copper patch cable or other approved cable into the RJ45 jack on the Product. See Figure 2.

Figure 2. Cable Test Set Up
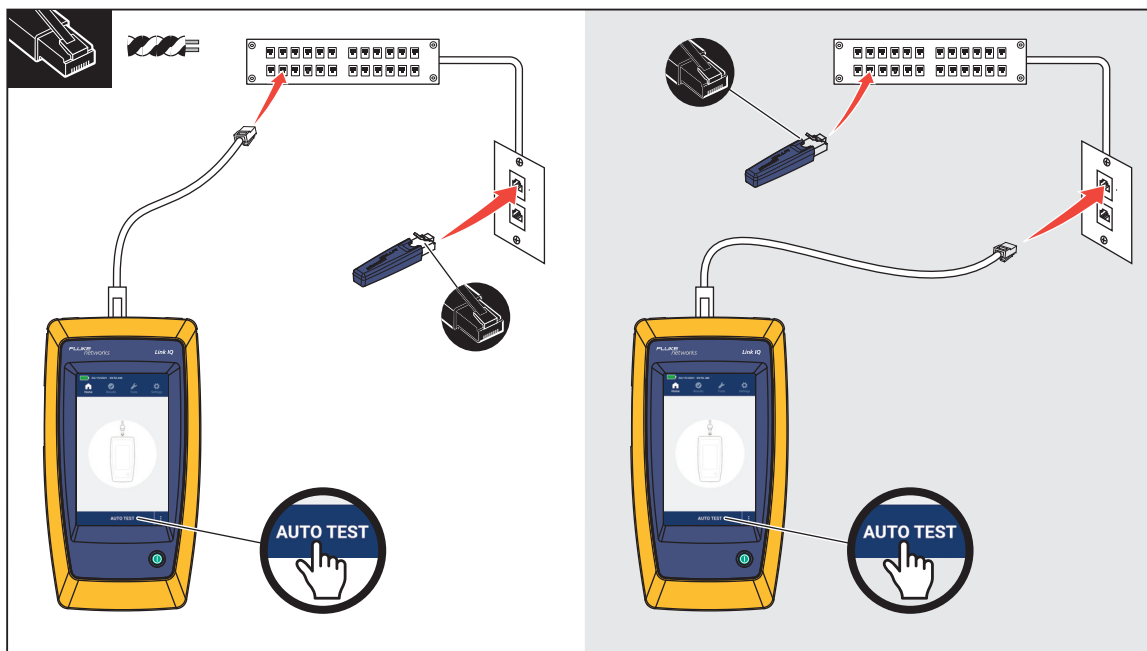
4. Connect the other end of the patch cable into an RJ45 jack or into an adapter that is connected to the near end of the cable under test. Then, connect the Remote ID into an RJ45 jack or adapter that is connected to the far end of the cable under test.

    Or,

    Connect the Remote ID into an RJ45 jack or into an adapter that is connected to the near end of the cable under test. Then, connect the other end of the patch cable into an RJ45 jack or into an adapter that is connected to the far end of the cable under test.

5. Tap **AUTO TEST** to do a test.

    The results show on the display. See Table 8.

6. To save the results. See *Save a Test Result*.

Table 8 shows the results of a cable test.

Table 8. Cable Test Results Screen
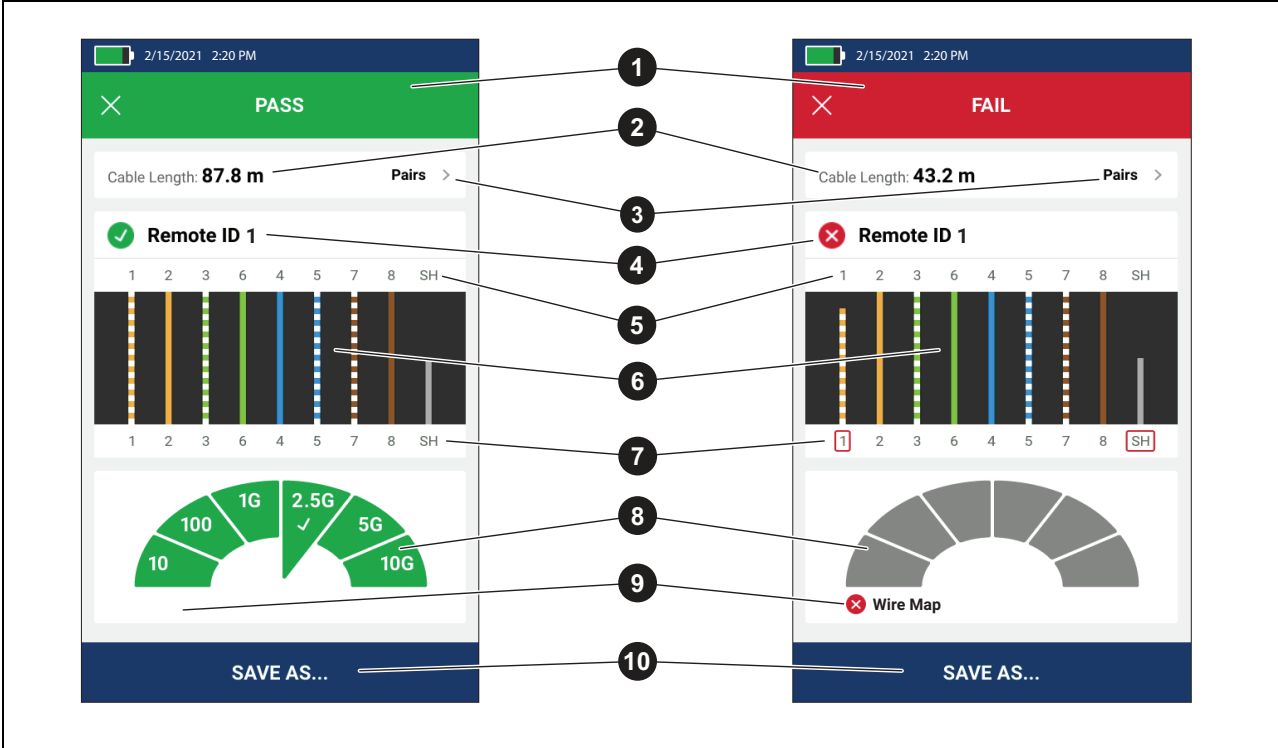
Item	Description	Function
1	Result label	The background is green if the test passed. The background is red if the test failed. The background is blue if the screen is for information only.
2	Cable length	Shows the length of the shortest pair in the cable.
3	**Pairs** button	Tap to open the PAIRS screen. If a cable end length is found, the lengths of the cable pairs show.

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Table 8. Cable Test Results Screen (cont.)

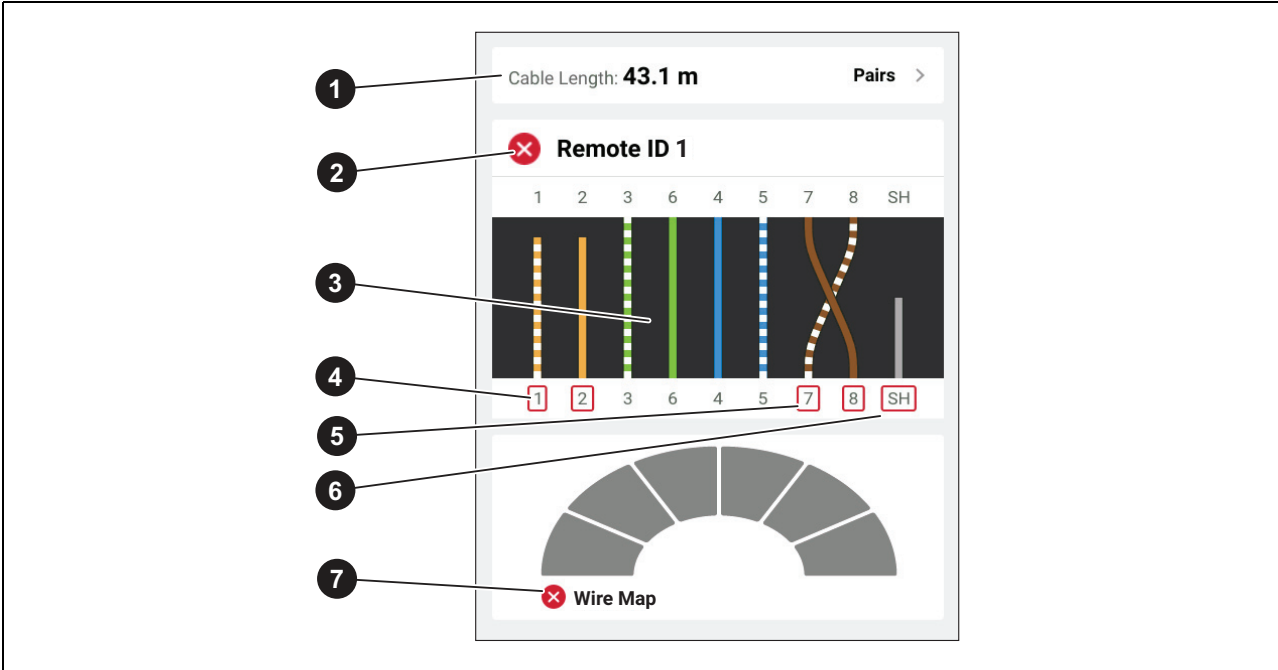| Item	Description	Function
④	Remote ID label	Shows the Remote ID number used in the test and information about the test. ✅ **Remote ID** The Product detects the Remote ID and the wire map test passes. ❌ **Remote ID** The Product detects the Remote ID, but the wire map test fails. ❌ **No Remote ID** There is a short on the cable under test, so the Product cannot detect the Remote ID. The wire map test fails. ℹ️ **No Remote ID** The test did not detect the Remote ID because a Remote ID is not connected. See *Wire Map Screens*.
⑤	Wire and shield identifiers (far end)	Numbers: Indicates which wire from the near end maps to which wire on the far end. SH: Indicates the shield on the far end of a cable.
⑥	Wire map results	Shows the results of the wire map. See *Wire Map Screens*.
⑦	Wire and shield identifiers (near end)	A red box around a wire number indicates that the wire did not pass based on the settings selected for the test. A red box around SH indicates that the continuity of the shield test did not pass.
⑧	Cable performance results	When a wire map passes, the results show: • The cable performance capability. • Whether the cable performance test passes (green) or fails (red) based on the test limit selected for the test. If a wire map fails, the segments show gray because the Product cannot determine the cable performance capability.

Table 8. Cable Test Results Screen (cont.)

Item	Description	Function
9	Fail explanation label	When a test fails, the label shows the reason why the test fails.
10	**SAVE AS...**	When there is memory available to save the result, tap **SAVE AS...** to save the result. See *Save a Test Result*.

Wire Map Screens

Table 9 shows a wire map of a cable test that failed for multiple reasons.

Table 9. Multiple Failures

Item	Description
1	Pairs 1,2 are the shortest pair of the cable and open at 43.1 m.
2	The Product detected the Remote ID, and the wire map failed. The wires are not wired correctly based on the settings selected for the test.

Table 9. Multiple Failures (cont.)

Item	Description
❸	The wire map shows how the cable is wired. The wire map passes or fails based on the settings selected for the test. For this test, the settings are set to test: • A straight through cable (**Allow Crossover** can be **On** or **Off** to test a straight through cable.) • The continuity of the shield on the cable (**Shield > On**) • The test limit is set to ≥1000BASE-T (1G) to verify a 4-pair cable.
❹	Pairs 1,2 fail because they are open.
❺	Pairs 7,8 fail because they are a reverse pair.
❻	The continuity of the shield fails because the continuity of the shield cannot be verified.
❼	Because the wire map failed, the Product cannot test the performance capability of the cable.

Figure 3 shows a wire map of a cable test that fails because wires 4, 5, 7, and 8 are open. The wires are not connected on the far end and the test limit is set to ≥1000BASE-T (1G) to verify a 4-pair cable. With a test limit set to 10BASE-T or 100BASE-TX, the wire map of the cable test passes. The length of the wires on the wire map indicates the distance to the open.
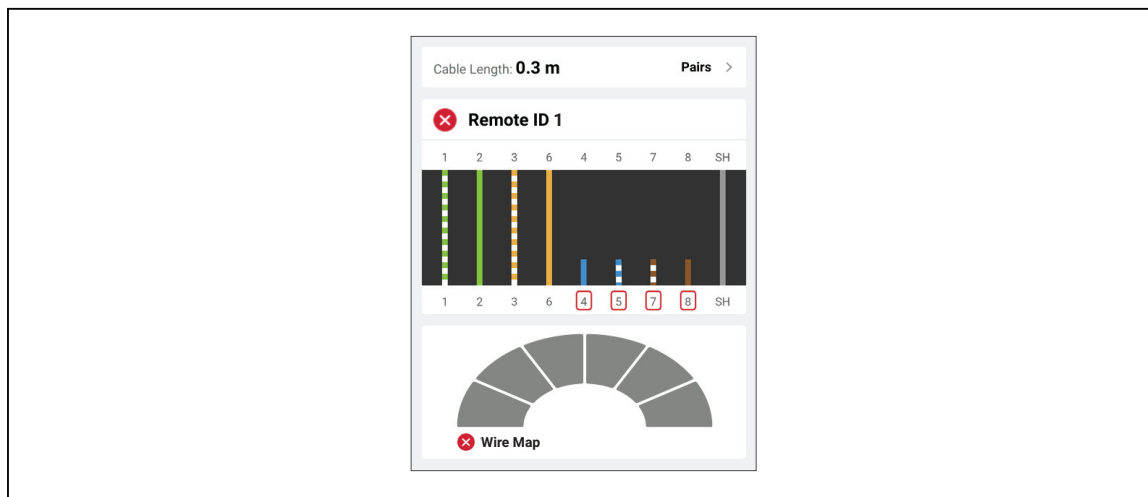
Figure 3. Open Pairs

Figure 4 shows a wire map that fails because wires 1 and 2 are shorted together. The length of the wire on the wire map indicates the distance to the short. With wires shorted together, the Product cannot detect the Remote ID. Repair the short and do the test again to verify the wire map of the other pairs.
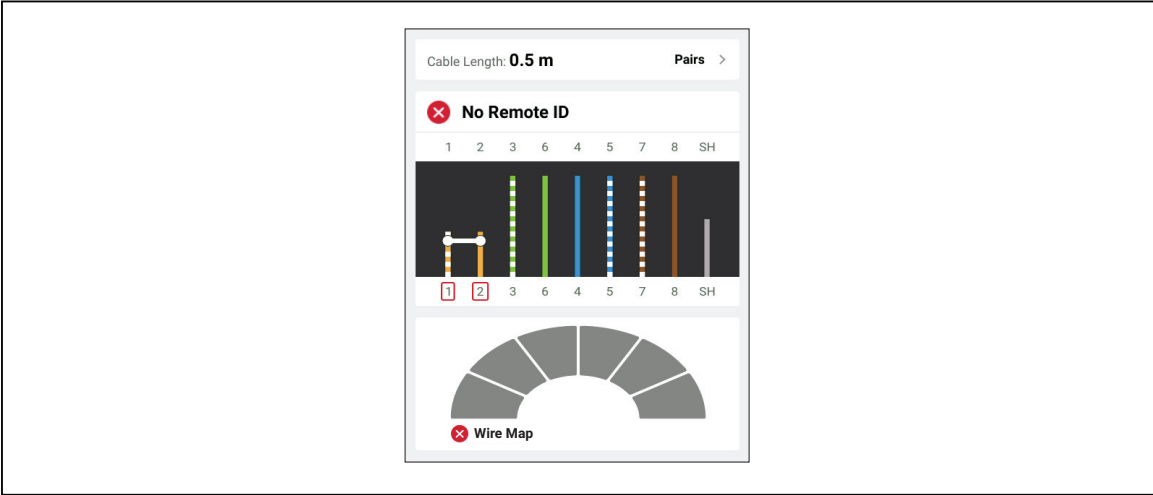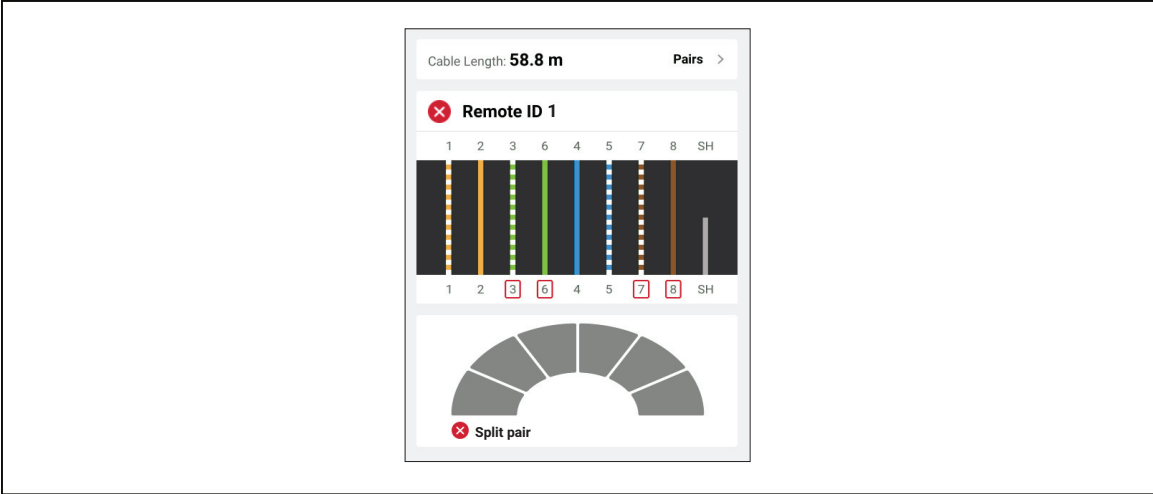
Figure 4. Wires Shorted Together

Figure 5 shows a wire map of a cable test that fails because pairs 3,6 and 7,8 are split pairs.
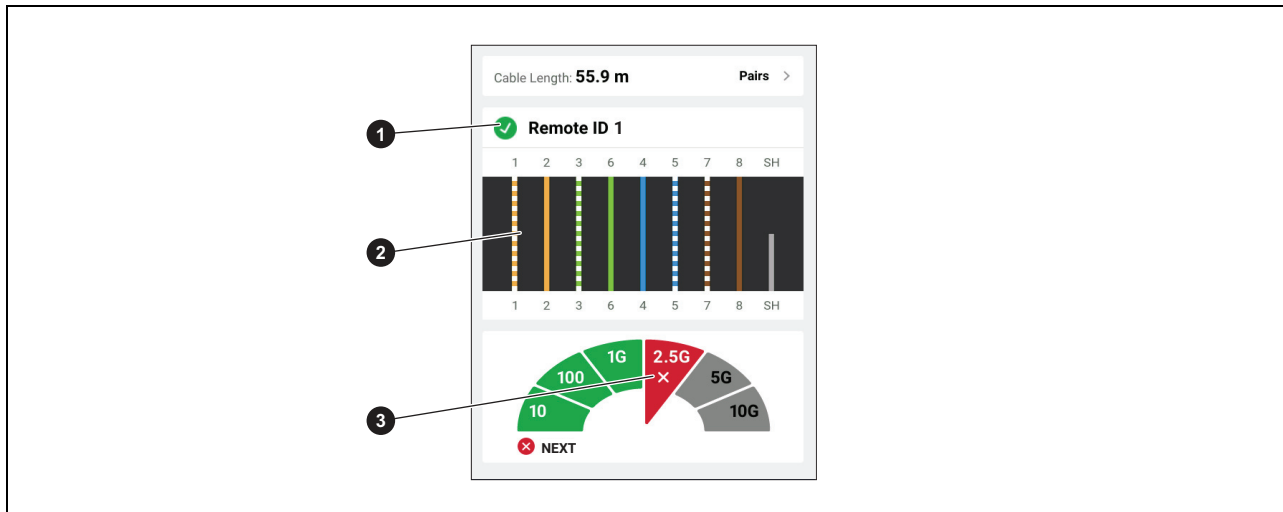
Figure 5. Split Pairs

Test Limit Failure

Table 10 shows a cable test that fails because of near end cross talk (NEXT).

Table 10. NEXT Failure

Item	Description
1	The Product detected the Remote ID, and the wire map passed.
2	The wire map passes because: • The wires are all connected correctly on both the near and far ends for a straight through cable. **Allow Crossover** can be **On** or **Off** to test a straight through cable. • The continuity of the shield is not included as part of the test (**Shield > Off**).
3	The cable can support 10BASE-T (10), 100BASE-TX (100), and 1000BASE-T (1G) data rate throughputs. The cable cannot support 2.5BASE-T (2.5G) data rate throughput. The test fails because the test limit is set to verify the cable can support a 2.5BASE-T (2.5G) data rate throughput.

Switch Test

In a network connectivity test, the Product performs a series of queries to determine and report information about a switch or device. The Product determines information about the device and reports advertised data rates with full-duplex or half-duplex. See *Switch Test*.

In a Power over Ethernet (PoE) test, the Product reports the power class that the device can negotiate if the device is Power Sourcing Equipment (PSE) compliant with the IEEE 802.3 standard. Additionally, the Product places a load on the PSE to determine if the PSE can support the load of the negotiated power level at the Powered Device (PD).

The PSE is a device, such as a switch, that can provide PoE. The PD is a device that can receive PoE from a PSE.
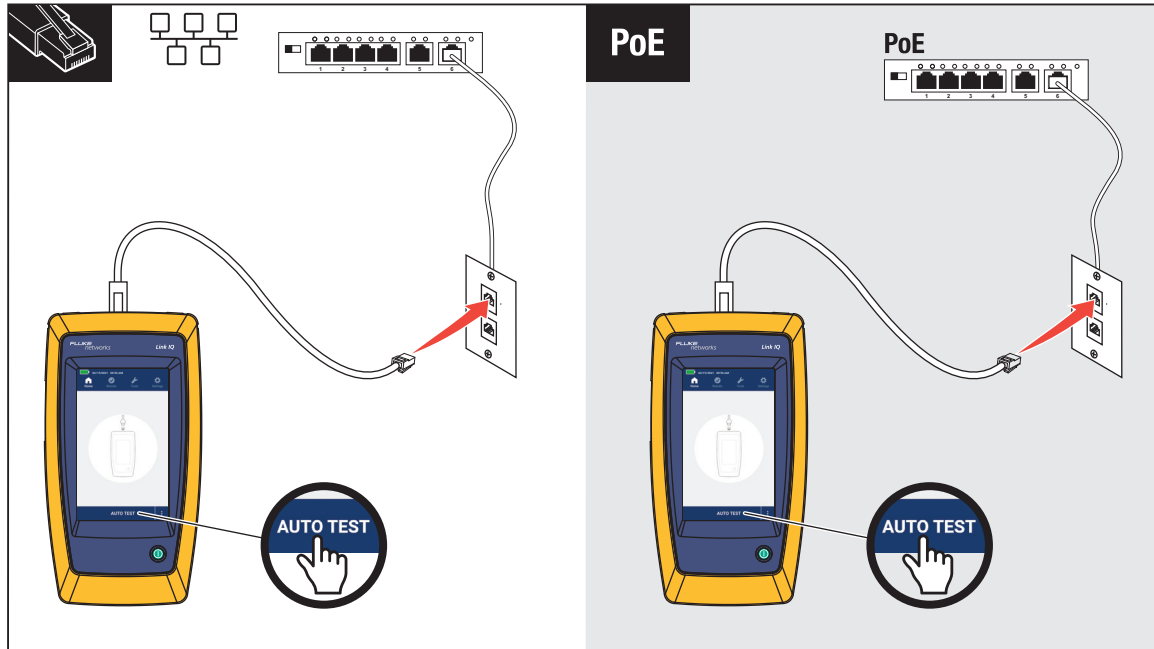
With PoE Test enabled, the Product automatically does a PoE test after the completion of a network switch test

Do a Switch Test

To do a switch test:

1. Turn on the Product.

2. If necessary, adjust the settings. See *Settings Menu*.

3. Connect one end of the CAT6A copper patch cable or other approved cable into the RJ45 jack on the Product. See Figure 6.

Figure 6. Switch Test Set Up

4. Connect the other end of the patch cable into an RJ45 jack in an outlet connected to a switch.

5. Tap **AUTO TEST** to do a test.

   The results show on the display. See *Network Test Results* and *PoE Test Results*.

6. To save the results. See *Save a Test Result*.

Network Test Results

Table 11 is a list of the results of a network switch test.

Table 11. Network Test Results
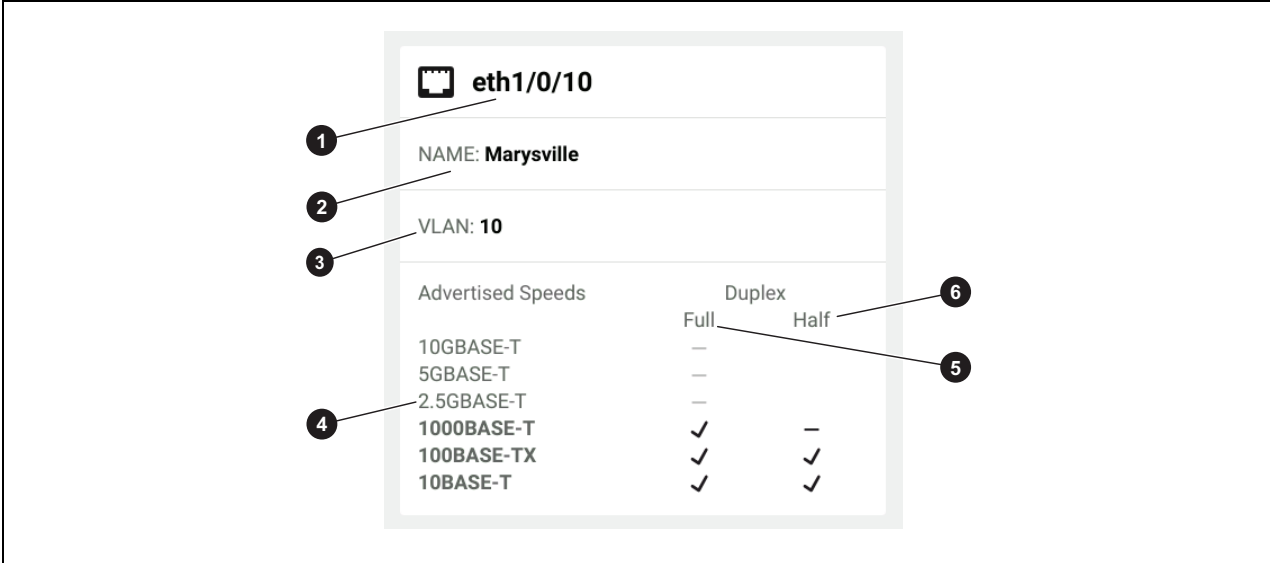
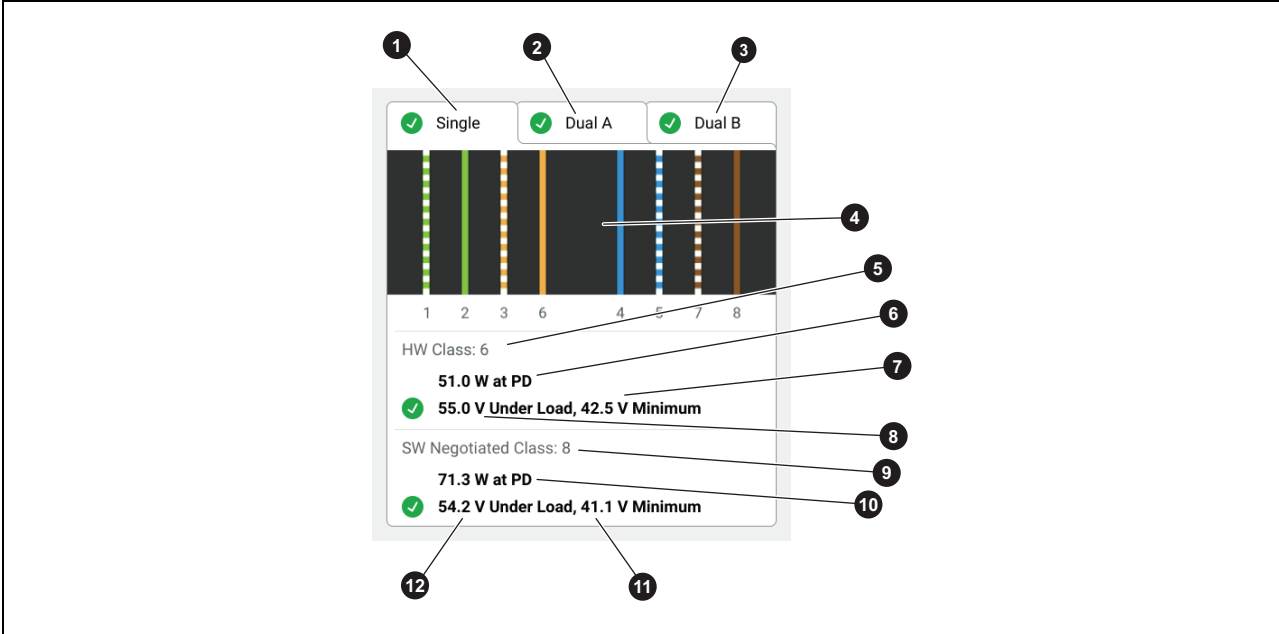| Item	Description	Function
1	🔲 **Port**	When the Product receives an LLDP or CDP packet from a device, the port number of the switch on the device shows.
2	**NAME**	When the Product receives an LLDP or CDP packet from a device, the name of the device shows.
3	**VLAN**	When the Product receives an LLDP or CDP packet from a device, the VLAN the device is assigned to shows.
4	**Advertised Speeds**	Shows the advertised speeds of the device. Speeds in black indicate the switch advertises that speed. Speeds in gray indicate the switch does not advertise that speed.

Table 11. Network Test Results (cont.)

Item	Description	Function
❺	**Full Duplex**	A check mark (✓) indicates the device can send and receive communication simultaneously at the advertised speed. A dash (—) indicates the device does not have full-duplex capability at the advertised speed.
❻	**Half Duplex**	A check mark (✓) indicates the device can send and receive communication but not simultaneously at the advertised speed. A dash (—) indicates the device does not have half-duplex capability at the advertised speed. A blank space indicates that half-duplex capability is not available at the advertised speed.

PoE Test Results

shows the results of a PoE test.

Table 12. PoE Test Results

Item	Description	Function
1	**Single**	Tap to view single signature power results. ✅ : Indicates the switch can negotiate single signature power. The tab is gray if the switch cannot negotiate single signature power.
2	**Dual A**	Tap to view Dual A signature power results. ✅ : Indicates the switch can negotiate dual signature power on pairs 1,2 and 3,6. The tab is gray if the switch cannot negotiate dual signature power.

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Table 12. PoE Test Results (cont.)

Item	Description	Function
③	**Dual B**	Tap to view Dual B signature power results. ✅ : Indicates the switch can negotiate dual signature power on pairs 4,5 and 7,8. The tab is gray if the switch cannot negotiate dual signature power.
④	Powered pairs	Shows which pairs have power.
⑤	**HW: Class**	The hardware negotiated power class (Class 0 to Class 8) of the PSE device.
⑥	Watts at PD	The loaded power in watts provided by the PSE at the PD.
⑦	Volt minimum	The minimum required volts the device needs to meet under load per the IEEE 802.3 standard based on the HW negotiated power class (⑤).
⑧	Volts under load	Measured voltage under load at reported power draw. ✅ : Indicates the voltage meets the requirements for the HW negotiated power class (⑤).
⑨	**SW Negotiated Class:**	The software negotiated power class (Class 1 to Class 8) of the device.
⑩	Watts at PD	The loaded power in watts provided by the PSE at the PD.
⑪	Volt minimum	The minimum required volts the device needs to meet under load per the IEEE 802.3 standard based on the SW negotiated power class (⑨).
⑫	Volts under load	Measured voltage under load at reported power draw. ✅ : Indicates the voltage meets the requirements for the SW negotiated power class (⑨).

Figure 7 shows an example of test results of a single signature PoE device that passes.

Figure 7. PoE Test Pass Example

> **HW Class: 6**
>
>   **51.0 W at PD**
>
> ✅ **55.0 V Under Load, 42.5 V Minimum**
>
> **SW Negotiated Class: 8**
>
>   **71.3 W at PD**
>
> ✅ **54.2 V Under Load, 41.1 V Minimum**

The hardware class section passes because:

• The device identifies as a HW Class 6 capable of 51.0 W at PD.

• The Product applies a load to the device to validate if the available power from the PSE at the PD meets the standard of the negotiated class (in this example, a Class 6 device).

• The device delivers 55.0 V under the load which is ≥42.5 V, the minimum amount required for a device to meet the Class 6 standard.

The software class section passes because:

• The device identifies as a SW Negotiated Class 8 capable of 71.3 W at PD.

• The Product applies a load to the device to validate the available power from the PSE at the PD meets the standard of the negotiated class (in this example, a Class 8 device).

• The device delivers 54.2 V under the load which is ≥41.1 V, the minimum amount required for a device to meet the Class 8 standard.

PoE devices fail a test if:

• The device identifies as capable of a negotiated hardware class greater than the power the device can deliver under the load required to meet the standard for the stated class.

• The device identifies as capable of a negotiated software class greater than the power the device can deliver under the load required to meet the standard for the stated class.

• The switch under test cannot deliver power to the device because the maximum power which the switch can deliver is already in use.
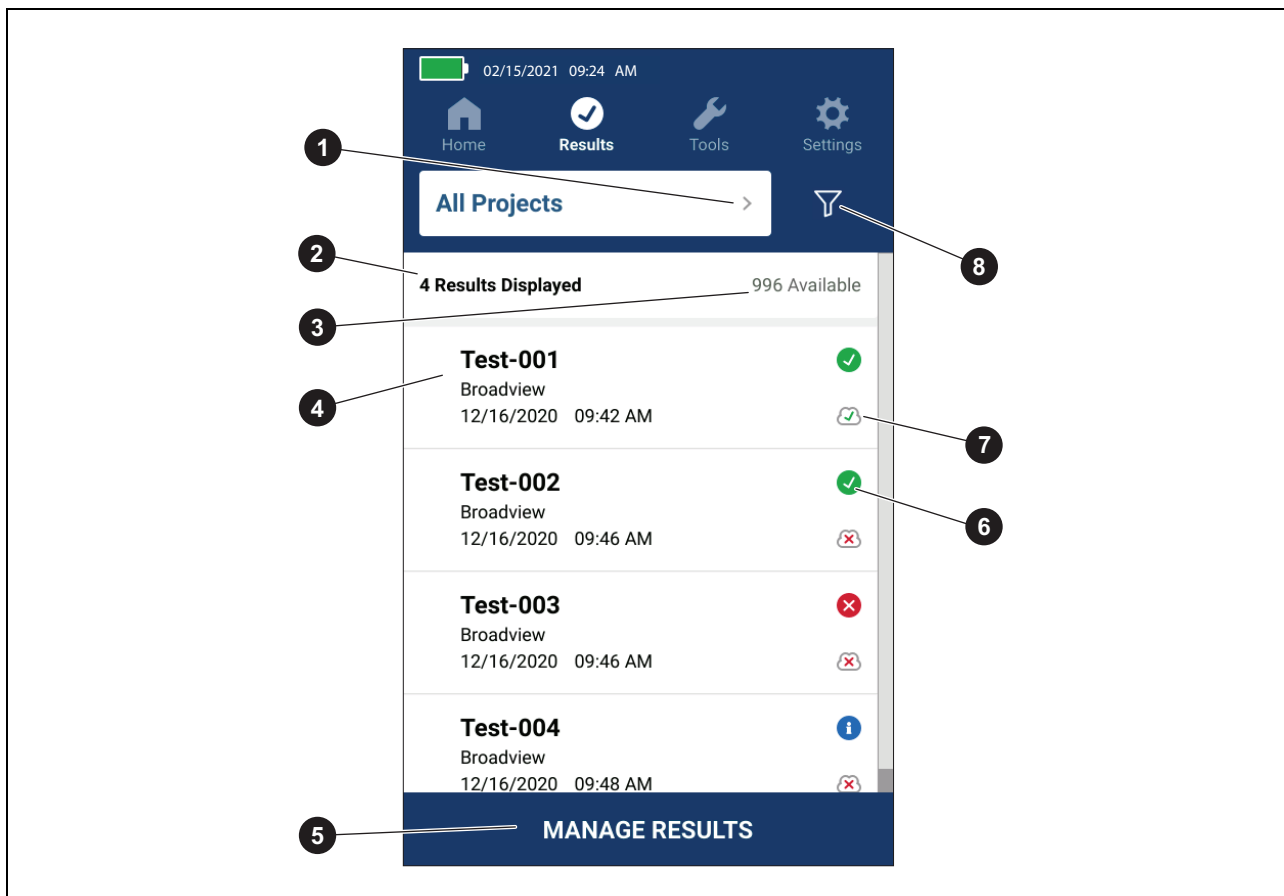
Save a Test Result

To save a test:

1. On a test result screen, tap **SAVE AS...**.

2. If necessary, use the onscreen keyboard to enter the **Test ID**, **Project Name**, and **Operator Name**.

3. Tap **OK**.

Results Menu

Table 13 is a list of the symbols in the Results menu.

Table 13. Results Menu

Item	Description	Function
1	Project selection box	Tap to select a project. You can select more than one project.
2	Number of results	Shows the number of results selected to view.

Table 13. Results Menu (cont.)

Item	Description	Function
❸	Available results	Shows the remainder of available results that can be saved in memory. The Product can save a maximum of 1000 results.
❹	Test information	Shows the Test ID, Project Name, and the date and time of the test.
❺	**MANAGE RESULTS**	Tap to select which results to delete. See *Delete Test Results*.
❻	Result symbol	✅ The result passed. ❌ The result failed. ℹ️ The result is for information only.
❼	Upload symbol	☁️✓ The result is uploaded to LinkWare PC. ☁️✗ The result is not uploaded to LinkWare PC.
❽	Sort button	Tap ▽ to select how to sort the results: **Oldest, Newest, Test ID (A-Z), Test ID (Z-A)**.

Delete Test Results

To delete a test result:

1. Tap **Results** > **MANAGE RESULTS**.

2. Tap the box to the left of each result to delete.

3. Tap **DELETE**.

4. Tap **OK**.

To delete all of the test results:

1. Tap **Results** > **MANAGE RESULTS** > **SELECT ALL**.

2. Tap **DELETE**.

3. Tap **OK**.

Upload Results to LinkWare PC

To upload results to LinkWare PC:

1. If necessary, tap on **Home**.

2. Connect the USB-C end of the USB cable into the USB port on the Product. See Figure 8.

3. Connect the USB-A end of the USB cable into a USB port on a PC.

4. On a PC, use LinkWare PC to upload results.

Figure 8. Product to PC Connection
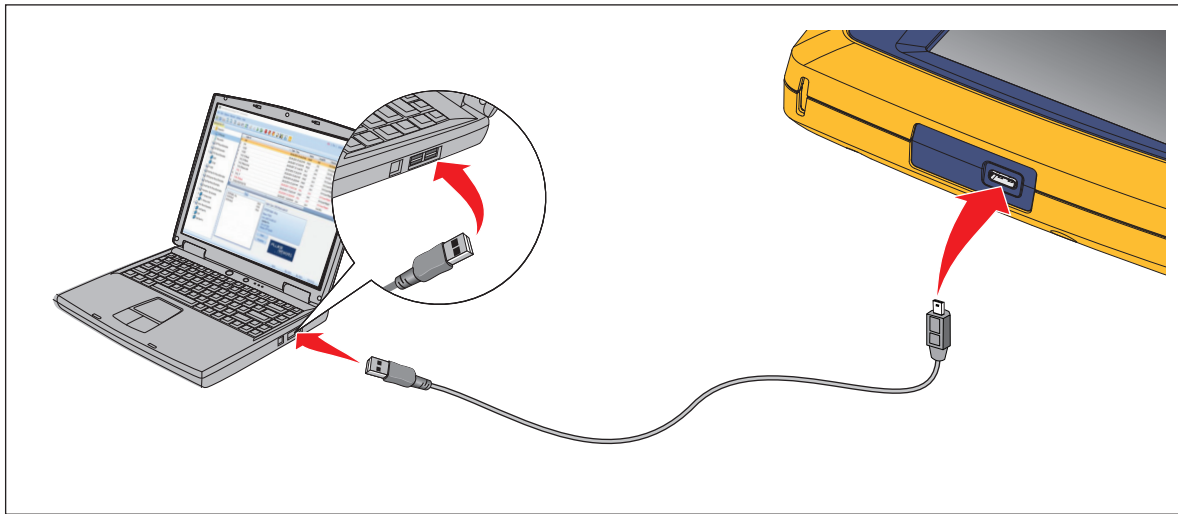
Tests with MS-IE-Adapter Set

To do a test with an MS-IE Adapter Set, see the *MS-IE-Adapter Set QRG* on www.flukenetworks.com.

Maintenance

⚠⚠ **Warning**

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

- **Do not open the case. You cannot repair or replace parts in the case.**

- **Use only specified replacement parts.**

- **Have an approved technician repair the Product.**

Clean the Product

Clean the case and display with a soft cloth dampened with water and a mild soap solution. Do not use solvents, isopropyl alcohol, or abrasive cleansers.

To clean the ports, use a pressurized can of air or a dry nitrogen-ion gun, if available, to blow the particulates from the ports.

Battery

Note

The Product only operates on battery power. You cannot do a test while the battery charges.

⚠⚠ **Warning**

To prevent possible electrical shock, fire, personal injury, or damage to the Product:

- **Use only Fluke Networks approved power adapters to charge the battery.**

- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**

- **Do not disassemble the battery.**

- **Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.**

- **Do not disassemble or crush battery cells and battery packs.**

- **Do not short the battery terminals together.**

- **Use only the external mains power supply included with the Product.**

- **Disconnect the battery charger and move the Product or battery to a cool, non-flammable location if the rechargeable battery becomes hot (>50 °C) during the charge period.**

- **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.**

- **To replace the battery, send the product to an authorized Fluke Networks Service Center.**

To get the best performance from the lithium-ion battery:

- Do not charge the Product for more than 24 hours as a reduced battery life may result.

- Charge the Product for at least 1.5 hours every 6 months for maximum battery life. Without use, the battery will self-discharge in approximately 6 months.

Figure 9 shows how to charge the battery.

Figure 9. Charge the Battery
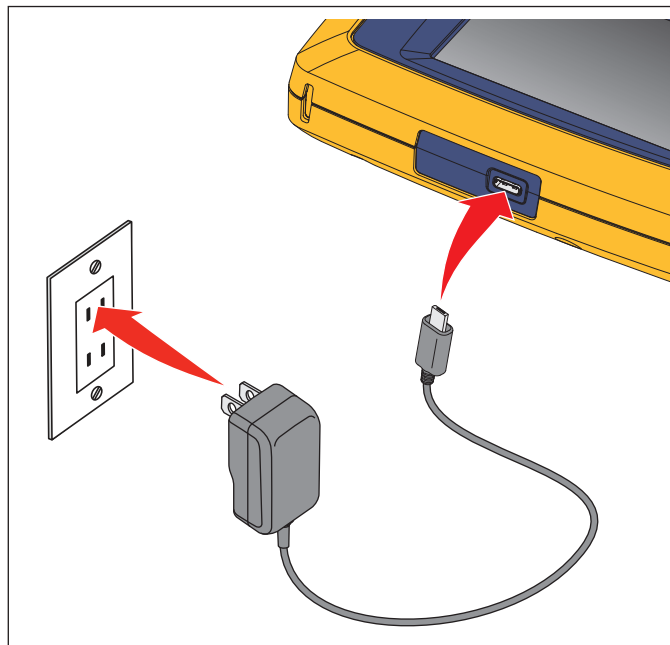
Product Specifications

For complete *Product Specifications* go to our website.