

Lab 4.2.9e Fluke LinkRunner – Cable and NIC Tests – Instructor Version

LinkRunner™



Objective

- Become familiar with the capabilities of the Fluke LinkRunner
- Verify cable length and integrity
- Determine where a cable terminates
- Verify PC NIC functionality

Background / Preparation

In this lab, the student will work with Ethernet cables to determine their characteristics and identify potential problems. The student will use some of the key capabilities of the Fluke LinkRunner such as cable mapping and NIC Test.

As networks run faster and become more complex, infrastructure cabling and devices must operate to precise levels in a tighter performance window. As a result, nearly 80% of network problems stem from simple wiring and connection problems. The following resources will be required:

- Ethernet straight-through patch cables, which are good and bad
- Ethernet crossover cables
- Ethernet cable from wall plate RJ-45 jack through a patch panel
- Hub and/or switch
- Computer with NIC

The following URLs provide information on the Fluke LinkRunner. The first one is a virtual demo of LinkRunner capabilities, and the second is a link to the downloadable LinkRunner Quick Reference Guide in various languages.

http://www.flukenetworks.com/us/LAN/Handheld+Testers/LinkRunner/_see+it+live.htm

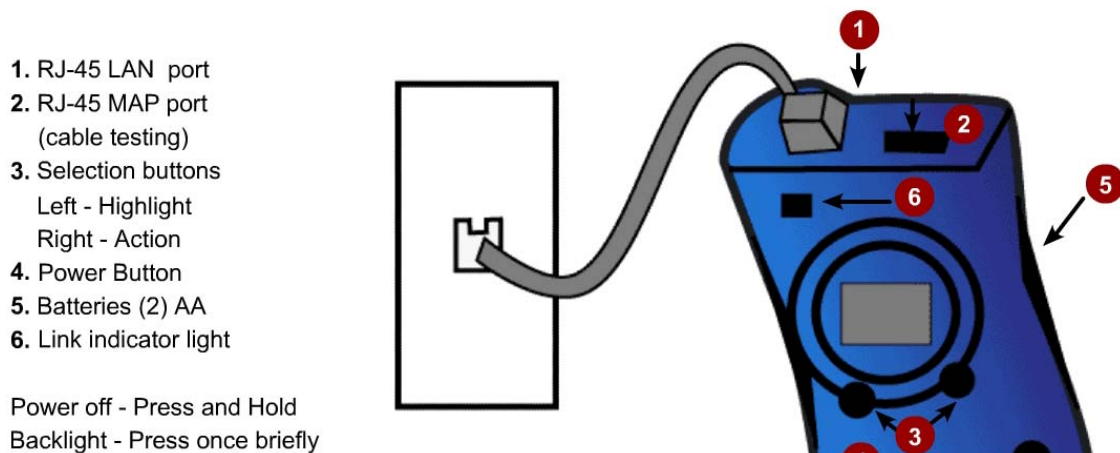
http://www.flukenetworks.com/us/LAN/Handheld+Testers/LinkRunner/_manuals.htm

Step 1 Become familiar with the capabilities of the Fluke LinkRunner

Access the virtual demo of the LinkRunner using the first URL listed above. Try different tests to become familiar with its capabilities.

Step 2 Obtain access to the LinkRunner Quick Reference Guide

The Quick Reference Guide may be accessed online directly or downloaded to a PC using the link provided above. The instructor may also have a copy of the Quick Reference Guide available. Selected pages of the Quick Reference Guide have been reproduced in this lab. The illustration below shows the connectors and buttons on the LinkRunner.



Step 3 Configure the LinkRunner

- From any screen, the main configuration can be accessed by pressing both buttons simultaneously. Now there is the option to configure LinkRunner or go into ping configuration
- Pressing the left button goes to LinkRunner configuration where there is the MAC address of the LinkRunner and the display can be toggled between feet and meters.

What is the layer 2 media access control (MAC) address?

00-C0-17-B4-08-F9 (The first six Hexadecimal characters represent the Fluke Organizational Unit Identifier (OUI), the last six hex characters are the device identifier and will vary)

- Pressing the right button goes to ping configuration, which was covered in the prior lab.

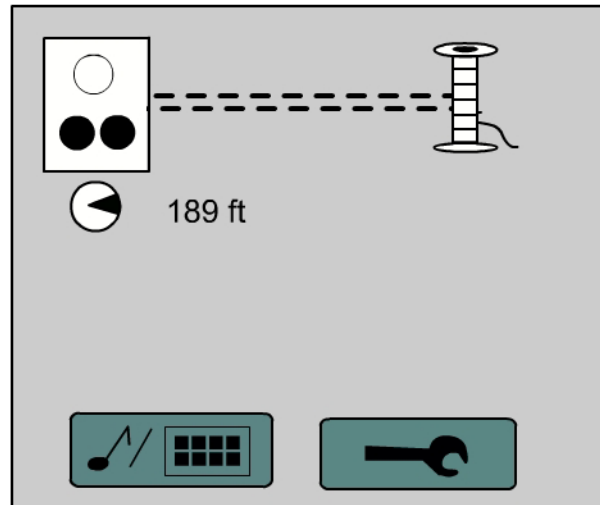
Step 4 Test length and continuity for a long cable run

The LinkRunner Cable Test function helps to determine whether the cable length is within specification. This is a basic test of a long cable to determine that all four pairs of wires are intact and have the same length. The diagram below shows a good cable test.

Turn on the LinkRunner by pressing the small button in the lower right corner. What does the display look like now?

Shows LinkRunner icon with disconnected twisted pair cable

- a. Use a long straight-through cable drop which is not connected to a patch panel, hub, or switch at the other end. Plug one end of the cable into the RJ-45 LAN port on the LinkRunner. What does the display look like now? Displays twisted pair cable connected to a spool of wire and the length of the cable
- b. What is the length of the cable being tested? Answers will vary.



Step 5 Test length and wire map for good and bad patch cables

The Cable Test function helps to determine whether the cable length is within specification, if it is a straight or crossover, and whether it has any faults. These tests work for both structured and patch cables. This will test cable integrity for excessive length, opens, shorts, crossed wires, and split pairs.

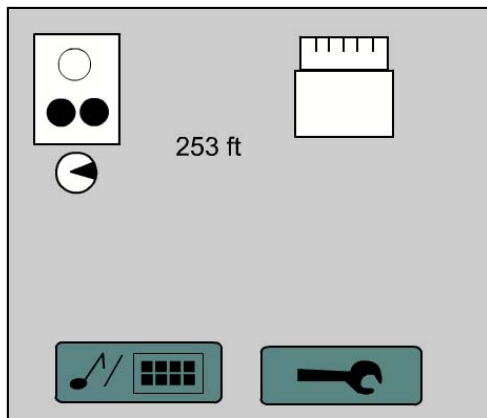
- a. Turn on the LinkRunner by pressing the small button in the lower right corner.
- b. Use a good straight through patch cable. Plug one end of the cable into the RJ-45 LAN port on the LinkRunner and the other end into the LinkRunner RJ-45 MAP port. The diagram below shows the result of testing a good straight through cable. What is the length of the cable?

Answers will vary.

Explain how to tell if this is a straight through or crossover cable. The two wires displayed are parallel if it is a straight-through cable.

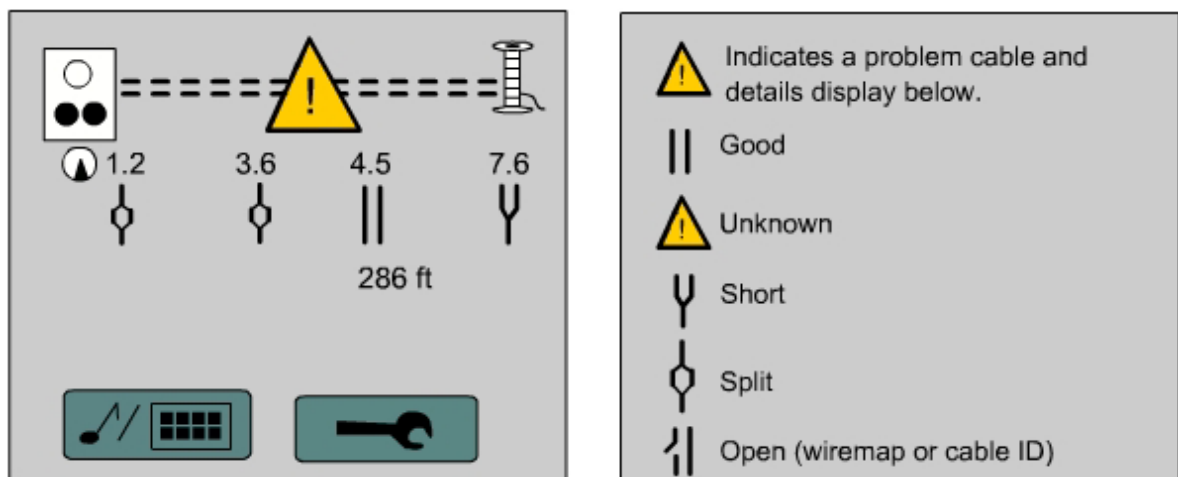
- c. Use a good crossover cable. Plug one end of the cable into the RJ-45 LAN port on the LinkRunner and the other end into the LinkRunner RJ-45 MAP port. What is the length of the cable? Answers will vary.

Explain how to tell if this is a straight through or crossover cable. The two wires displayed are crossed if it is a crossover.



- d. Use a bad straight through patch cable that is improperly wired or has some faults in the wires. Plug one end of the cable into the RJ-45 LAN port on the LinkRunner and the other end into the RJ-45 MAP port. The diagram below shows a problem cable with symbols indicating the type of problems that may be encountered. What problem was encountered?

Answers will vary. Note that unequal length pairs can be identified by inserting into the LAN port alone.



Step 6 Test length and wire map for long cable runs

- Turn on the LinkRunner by pressing the small button in the lower right corner.
- Use a good workstation patch cable drop to a wall plate, which is connected to a patch panel at the other end but not to a hub or switch. Plug the cable into the RJ-45 LAN port on the LinkRunner. Plug the wire map adapter into the associated patch panel port on the opposite end. This will test the cable run from the patch cable in the work area through all horizontal cabling to the patch panel in the wiring closet.
- What is the length of the cable? Answers will vary.
- Does the cable test OK? It should.
- If not, indicate problems encountered.

Answers will vary but may include any of the problems listed in the diagram above if the cable is bad.

Step 7 Use Link Pulse to test the connection to a hub/switch and identify the cable location

Link Pulse blinks the hub or switch port link light while simultaneously sending a tone on the wire to aid in cable location. Use the optional Microprobe Tone Receiver to pick up a tone and audibly locate cables. The optional Cable ID kit can be used to identify unmarked segments.

- a. Obtain a good patch cable of any length. Plug one end directly into an active regular hub or switch port. Plug the other end into the LinkRunner LAN port.
- b. Press the left SoftKey (musical note and hub symbol). What does this cause the link light on the hub or switch port to do? Blinks on and off.
- c. What does this test do and how could it be useful in locating or identifying where cables terminate? This test helps to identify which port on a switch a particular cable is attached to. The LinkRunner could be connected to a work area wall plate and, using the link pulse, can determine which patch panel and switch port are associated with that drop. This test can identify a problem switch port. It can also be used to identify which workstation in a work area is attached to a particular switch port by disconnecting the cable at the switch port and connecting the LinkRunner to pulse the NIC on the PC. The PC NIC in the work area with the flashing link light is the one associated with this switch port.

Step 8 Test PC NIC functionality

- a. Turn on the LinkRunner by pressing the small button in the lower right corner.
- b. Plug one end of a patch cable into the RJ-45 LAN port on the LinkRunner and the other end into the PC NIC. If the PC NIC link light comes on, then the NIC is good. Did the NIC test OK?
It should.

Step 9 Disconnect the equipment and store the cabling and devices