FLUKE®

# 620
CableMeter

Users Manual

PN 938386 January 1994 Rev.2,12/94

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5/94

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# *620 CableMeter*

## *Introduction*

The Fluke 620 LAN CableMeter™ (hereafter the test tool) is a battery operated, handheld instrument that identifies cable failures, measures length, and checks the wiring of cables used for DeviceNet™, ControlNet™, and Ethernet Local Area Network (LAN) systems.

The test tool is designed around a “Test as You Go” philosophy. This reduces the time necessary to install and service LAN cables by allowing ONE PERSON to detect most cable failures from only one end of the cable.

The test tool tests for incorrect pairing (split pairs), miswires, shorted and open wires on all twisted pair cables, as well as shorts on coaxial cables.

The test tool comes with the following:

1 620 Softcase
1 RJ45-RJ45 Straight-Through Patch Cable (EIA/TIA 4 Pair Cat5)
1 RJ45-RJ45 Female Coupler
1 User Manual
1 Cable Identifier #1
1 Quick Reference Card
1 Warranty Registration Card

**Caution**

**To reduce wear on the test tool connector, leave the patch cable connected to the test tool and use the patch cable to connect to the cable under test.**

**Plugging a 4 or 6 position plug into the test tool’s UTP/FTP jack can cause permanent damage to the jack pins.**

## *Safety Information*

The international electrical symbols used on the instrument or in this manual are described in Table 1.

**Table 1. International Electrical Symbols**

| | |
|---|---|
| ⚠ | Warning or Caution: Risk of damage or destruction to equipment or software. See explanations in the manual. |
| ⧈ | Equipment is protected by double insulation or reinforced insulation to protect the user against electric shock. |
| ⊘ | Do not connect this terminal to public communications networks, such as telephone systems. |
| CE | Conforms to relevant European Union Directives. |

### ⚠Warning

**To avoid possible fire, electric shock, personal injury, or damage to the test tool.**

- **To avoid false test results, replace the batteries as soon as "LOW BATTERY" appears in the display.**
- **Never connect the test tool to any telephony inputs, systems, or equipment, including ISDN. Doing so is a misapplication of this product, which can result in damage to the instrument and create a potential shock hazard to the user.**
- **Never connect the test tool to active LAN inputs, systems, or equipment. Doing so is a misapplication of this product, which can result in damage to the instrument and create a potential shock hazard to the user.**
- **Always turn on the test tool before connecting it to a cable. Turning the test tool on activates the tool's input protection circuitry.**
- **When servicing the test tool, use only specified replacement parts.**
- **Do not use the test tool if it is damaged. Protection may be impaired.**
- **Do not use the test tool if it is damaged. Inspect the test tool before use.**

- **Never operate portable transmitting devices during a cable test. Doing so might cause erroneous test results.**

## *Getting Acquainted*

### *Display, Switches, and Connections*

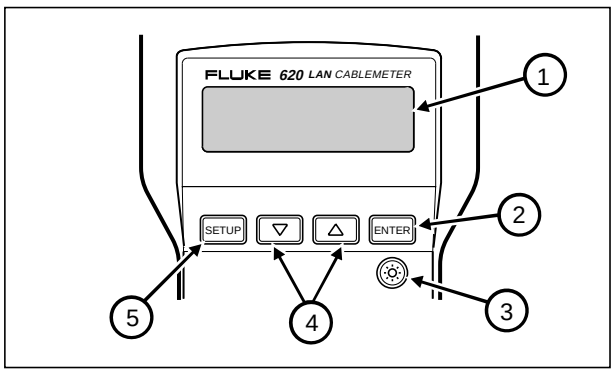


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**Figure 1. Cable Meter System**

**Table 2. Features**

| ITEM | FUNCTION |
|---|---|
| 1 | **LCD**<br>A 2-line by 16-character LCD display. When there is more information than can be displayed on two lines, and up arrow, down arrow, or bidirectional arrow appears in the left side of the display. Press the corresponding ▲ or ▼ key to display the additional information. |
| 2 | ENTER<br>Enters a selection into the test tool and moves to the next setup selection. Causes current cable selection to be displayed and a new measurement cycle initiated when not in Setup Mode. |
| 3 | ☼<br>Turns the display backlight on or off. Backlighting turns off automatically after 70 seconds. |
| 4 | ▼ ▲<br>Scrolls through a selection of choices or multiple displays |
| 5 | SETUP<br>Provides access to cable selection, calibration, and other test tool settings. |

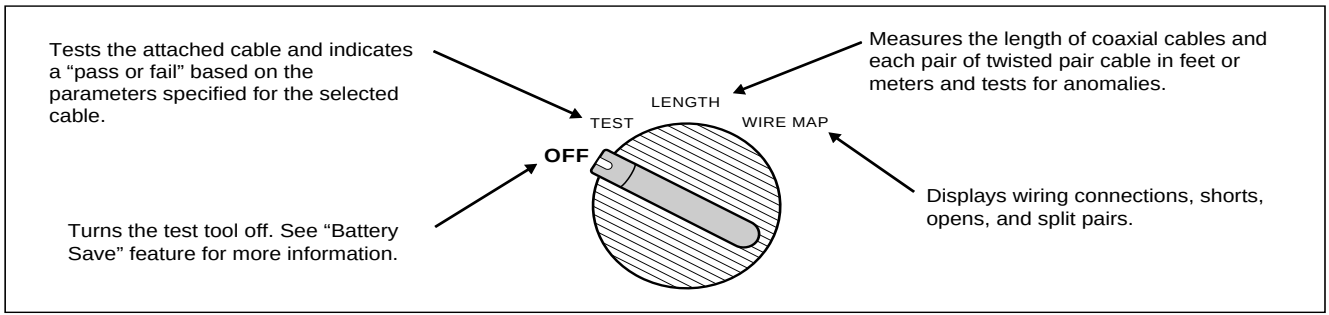


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**Figure 2. Rotary Switch**

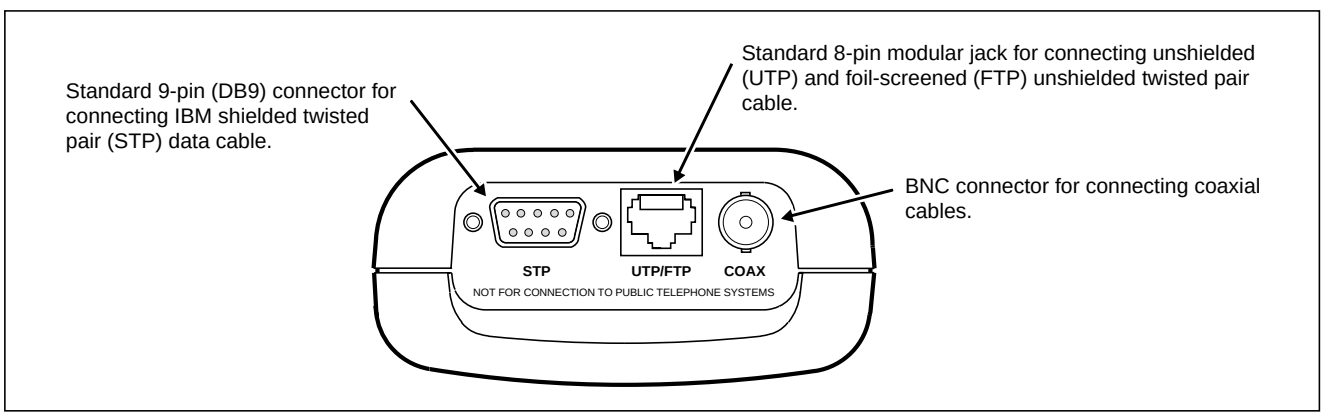


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**Figure 3. Connections**

### *Audible Signal (Beeper)*

The test tool uses an audible tone to signal different operational conditions. A single short tone indicates a pass condition withough a Cable ID detected. A two frequency tone signals a pass condition with a Cable ID detected. Three short tones signal a test failure. A long tone sounds whenever an invalid key is pressed. A continuous, varying-pitch tone signals the test tool is connected to an active cable and should be disconnected immediately. To disable the audible signal for the PASS and FAIL conditions, see “Setup Selection".

### *Low Battery Indication*

When the battery voltage is low bit it is OK to continue, the test tool displays “LOW BATTERY” once during a power-on session. When this message first appears there will be about 8 hours of use left. When the battery voltage is too low to continue, the unit displays “REPLACE BATTERY”. To continue using the test tool, you must replace the batteries. Refer to “Replacing Batteries” .

### *Battery Save Mode*

The test tool turns itself off when there is no switch or key activity for 10 minutes. To return the test tool to operation, you must turn the rotary switch to OFF and wait 5 seconds before turning the test tool back on. The Battery Save feature may be disabled by turning the rotary switch to OFF, then pressing and holding ENTER while turning the rotary switch to TEST.

### *Cable ID Unit*

The Cable ID Unit permits the detection of far end wiring failures and helps identify cables between a room and a wiring closet. For use with twisted pair cable only.

### *Selecting the Display Language*

The test tool displays messages in English, French, German, Spanish, and Italian. To change the display language, perform the following:

1. With the test tool off, press and hold SETUP while turning the rotary switch to TEST.
2. Press ▲ or ▼ until the desired languages is displayed, then press SETUP.

## *Preparing the Test Tool for Use*

*Note*

*The noise filter should be set to the frequency of the local power mains (50 Hz or 60 Hz). See “Setup Selections” for this and other customizing selections.*

After connecting the cable under test to the appropriate connector on top of the test tool, you must select proper cable type, category, and size before testing or measuring. It may also be necessary to calibrate the test tool to the cable under test.

**Caution**

**Having more than one cable connected to the test tool causes erroneous measurements**

*Note*

*If you think the test tool is not performing properly, refer to "When Something Goes Wrong".*

### *Selecting a Cable Type*

Characteristics for a variety of LAN cables are designed into the test too and can be accessed through SETUP. See Table 3.

**Table 3. Predefined Cable List**

| UTP | STP | FTP | COAX |
|---|---|---|---|
| EIA/TIA 4PR | IBM TYPE 1 | EIA/TIA 4PR | 10BASE2 (Thin) |
| 10BASE-T 2PR | IBM TYPE 6 | 10BASE-T 2PR | 10BASE5 (Thick) |
| TOKEN RG 2PR | | TOKEN RG 2PR | RG-58 |
| TP-PMD2PR | | TP-PMD 2PR | RG-58F (Foam) |
| USOC 4PR | | | RG 59 |
| USOC 3 PR | | | RG-59F (Foam) |
| USOC 2PR | | | RG-62 |
| DEC/MMJ 3PR | | | |
| Note: Refer to Table 11 later in this manual to identify actual wires tested. | | | |

*Note*

*Cables not wired according to the predefined cable list cause the test tool to detect failures. However, the test tool will determine the cable's length and display the actual cable wiring with the wire map function. It may be possible to use the test function by making an adapter that causes the cable to appear to be properly wired to the test tool.*

To set up the test tool for the desired cable, perform the following:

*Note*

*The number of steps necessary to select a cable definition will depend on the type of cable selected.*

1. Turn the test tool on by selecting TEST, LENGTH, or WIRE MAP.
2. Press SETUP.
3. Press ▲ or ▼ until the desired cable type is displayed, then press ENTER.
4. Press ▲ or ▼ until the desired wiring standard is displayed, then press ENTER.
5. Press ▲ or ▼ until the desired category is displayed, then press ENTER.
6. Press ▲ or ▼ until the desired wire size is displayed.

*Note*

*You can check the cable selection at any time other than during the setup mode by pressing the ENTER key.*

The cable characteristics are now defined by the factory settings for the cable selected. However, cables coming from different batches or manufacturers can have characteristic variances of up to 20 %, causing deviations in length measurements. To obtain more accurate measurements, calibrate the test tool to the specific cable under test.

### *Calibrating the Test Tool to the Cable*

When calibrating the test tool to a specific cable, the cable should be at least 100 feet (30 m) long and of the same type and category as the cable under test. Calibrating with cables longer than 100 feet (30 m) will improve length measurement accuracy. During the calibration process, if the cable is found to be defective or if the cable is less than 50 feet (15 m), "BAD CABLE" is displayed and the calibration process is terminated.

**Caution**

**For proper calibration, connect the cable under test directly to the test tool, not through a patch cable.**

**Caution**

**To ensure accurate measurements, make sure conductive objects, including fingers, do not come in contact with any of the connectors while the test tool is measuring the cable under test.**

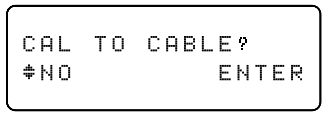
To calibrate the test tool to the currently selected cable, perform the following:

1. Connect a good cable of known length, 100 feet (30 m) or longer, to the appropriate test tool conenctor and turn the rotary switch to TEST, LENGTH, or WIRE MAP.

*Note*

*If you have just completed the cable selection process, the test tool should already be i the calibration setup selection.*

2. Press SETUP and then ENTER until the following display appears.

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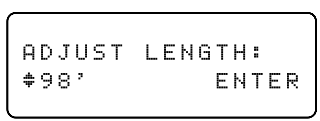
*Note*

*When you select a cable type for which the test tool has already been calibration, "CAL" will appear in the second line of the display. To erase this calibration and use the factory settings, remove all cables from the test tool, press ▼ ▼ until "YES" is displayed, and press ENTER.*

3. Press ▲ ▼ until YES is displayed, and then press ENTER. The test tool takes a few measurements on the attached cable and displays the measured length.

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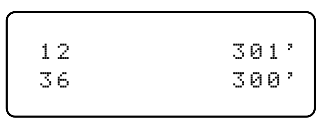
4. Press [▲] [▼] until the known cable length is displayed, and then press [ENTER]. These cable parameters are stored and will remain in memory even if the test tool is turned off. All future measurements for this cable type are compared to these new parameters until another cable is selected or another calibration is performed.

## *Making Tests and Measurements*

The test tool displays test results in relation to individual pin numbers. For example, in the LENGTH mode, the following display indicates the twisted pari connected to pins 1 and 2 is 301 feet long whilc the pair connected to pins 3 and 6 is 300 feet long.

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When you are testing STP cabling, the pin number displayed always corresponds to the pins at the STP (DB-9) connector. Table 4 shows the connections for the active pins.

**Table 4. Active Pin Connections**

| DB-9 | Line Name | Data Connector Color | 8-Pin RJ45 |
|---|---|---|---|
| 1 | RX+ | Red | 4 |
| 6 | RX- | Green | 5 |
| 5 | TX- | Black | 3 |
| 9 | TX+ | Orange | 6 |

*Note*

*When you test STP cables, the IBM Data Connector in the STP Adapter Kit or AMP part number 555414-2 must be used with the Cable ID Unit.*

### *Testing Cables*

The TEST function teststhe attached cable and indicates PASS or FAIL based on hte cable's compliance with the parameters stored in the test tool for the selected cable. The tests that are performed (Table 5) depend on whether or not a Cable ID unit is connected to the far end of the cable.

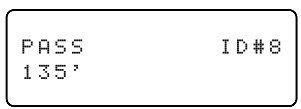
**Table 5. Twisted Pair Tests**

| Failures Detected | No Cable ID | With Cable ID |
|---|---|---|
| Short | X | X |
| Open (near end) | X | X |
| Open (far end) | | X |
| Length | X | X |
| Split Pair | X | X |
| Miswire | | X |
| Faults | X | X |

To test a cable, do the following:

1. Connect the cable under test to the appropriate connector on the test tool.
2. Turn the rotary switch to TEST.
3. This step can be omitted if you know the cable selection is correct for the cable under test. Press ENTER to check the cable selection. The test tool displays the cable selection for a few seconds, the starts the test. “CAL” appears in the second line of the display if a cable calibration has been performed for the selected cable type. If the test tool is not set up for the cable under test, refer to “Preparing the Test Tool for Use”.

When you are testing twisted pair cables, the test tool checks for a Cable ID Unit at the other end of the cable and displays one of the following when a pass condition exists:

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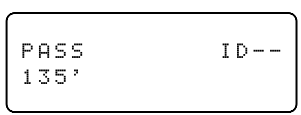
Good cable, Cable ID#8 detected.




abm08f.eps

Good cable, No cable ID detected.

*Note*

*The test tool may not sense the Cable ID Unit under some open and short conditions. The test tool will alternately display a ? and a number when the Cable ID is detected but its number can not be dertmined with certainty.*

When testing coaxial cables with a termination, the test tool displays the totatl resistance of the termination and cable wires.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Coaxial cables must be unterminated for the test tool to display the cable's length. An open in a coaxial cable looks just like an unterminated cable. A length measurement that is less than the known cable length would indicate a possible open in the cable.

The test tool sounds three short tones and displays FAIL if a failure is detected. Additional information about the failure is printed on the second line of the display and if the ☞ symbol is displayed, additional information can be viewed with the ▼ ▲ keys.

*Note*

*The failure messages refer to individual wires rather than pairs of wires.*

Failure messages for the TEST mode are described in Tables 6 and 7.

**Table 6. Test Failures (without Cable ID Unit)**

| Failure | Display | Description |
|---|---|---|
| Short*<br>(UTP/FTP/STP) |  <br>abm10f.eps | Displays shorted wires and the most likely distance to the short. |
| Short*<br>COAX |  <br>abm11f.eps | Displays the most likely distance to the short. |
| Open |  <br>abm12f.eps | Displays open wires and whether the open is at the near or far end of the cable. |
| Split Pair |  <br>abm13f.eps | Display wire pairings that are incorrect based on the cable selected. |
| * A short greater than zero ohms causes the test tool to display a legth greater than the actual distance to the short. See Figure 4. The test tool uses ohms/foot to calculate distance to a short. | | |

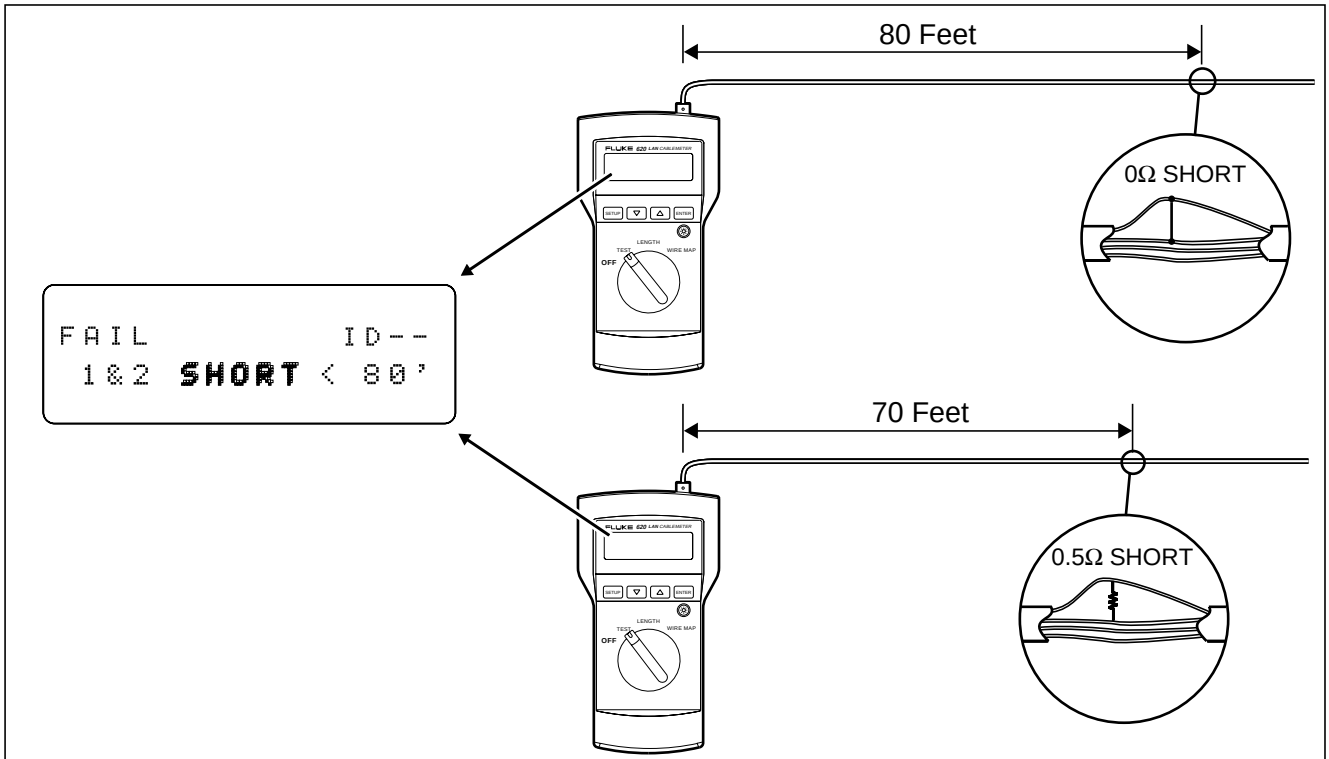


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**Figure 4. Testing for Shorts**

**Table 7. Test Failures (with Cable ID Unit)**

| Failure | Display | Description |
|---|---|---|
| Miswire | FAIL ID#8<br>▾**MISWIRE**<br><br>▴12 **63** 45 78<br>12 **36** 45 78 | Displays the incorrect wiring of the end connectors.* |
| Open | FAIL ID#8<br>3 **OPEN** @150' | Displays the broken wire(s) and the distance to the break. |
| Pair Length | FAIL ID#8<br>**PAIR LENGTH** | Indicates that the length of the pairs within a cable are abnormally different. Use LENGTH to check pair lengths. |
| Split Pair | FAIL ID#8<br>▾13 **SPLIT PR** | A portion of the cable assembly has split pairs or a poor quality cable such as telephone wire was used instead of LAN type cabling which may cause excessive crosstalk. |
| Fault | STP **FAULT** | Detects anomalies that do not fit a specific category or failure.** |

*Flashes the number of the wires incorrectly connected.
**These non-specific faults are as follows:

- A cable with a resistive path between the wires. Displays measured resistance.
- Shield connected with UTP cable selected.
- UTP cable connected with STP or COAX selected.

### *Measuring Cable Length*

The test tool measures the length of both twisted-pair and coaxial cables. If the test tool is not calibrated to the cable under test, then factory default characteristics are sued to compute hte length. If a more accurate length measurement is desired, refer to “Calibrating the Test Tool to the Cable”.

Before a length measurement is made, the test tool performs diagnostic tests to prevent any cable failures from corrupting the length measurement. All failures are described in the “Testing Cables”.

To measure the length of a cable, do the following:

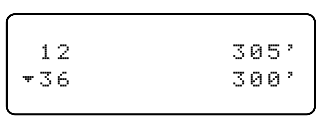
1. Connect the cable under test to the appropriate connector on the test tool.
2. Turn the rotary switch to LENGTH.
3. This step can be omitted if you know the cable selection is correct for the cable under test. Press ENTER to check the cable selection. The test tool displays the cable selection for a few seconds and then starts the test. “CAL” appears in the second line of the display if a cable calibration has been performed for the selected cable type. If the test tool is not set up for the cable under test, refere to “Preparing the Test Tool for Use" to select a new cable setting.

*Note*

*When the display flashes 999’ (350 m) during a length measurement, the length of the cable exceeds the tst tool’s range of measurement.*

The information that is displayed depends on the type of cable selected. For twisted pair cables, each pair has its corresponding length measurement. A 5 percent difference in length between pairs is not uncommon.

For EIA/TIA 4PR cable with no failures, the display shows the following:

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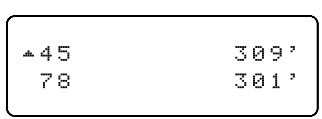
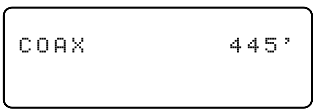



abm22f.eps

Length of a coaxial cable terminated in a resistance cannot be determined by the test tool. Only the total resistance of the wire and termination is displayed. An unterminated coaxial cable 445 feet long will display the following:

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## Checking the Wire Map

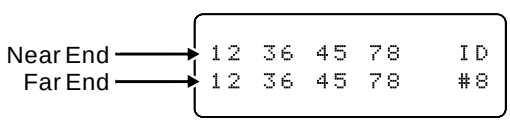
Using the test tool's Wire Map function and a Cable ID Unit, you can determine the wiring of both the near and far end of the cable. To test the Wire Map, perform the following:

1. Connect the cable under test to the appropriate connector on the test tool.
2. Turn the rotary switch to WIRE MAP.
3. This step can be omitted if you know the cable selection is correct for the cable under test. Press ENTER to check the cable selection. The test tool displays the cable selection for a few seconds and then starts the test. "CAL" appears in the second line of the display if a cable calibration has been performed for the selected cable type. If the test tool is not set up for the cable under test, refere to "Preparing the Test Tool for Use" to select a new cable setting.

*Note*

*If you select the COAX wire type while in the WIRE MAP mode, the test tool will perform the LENGTH function on the cable.*

Assuming the cable attached to the test tool is a EIA/TIA 4 pair cable with no failures, the following display indicates a good cable:

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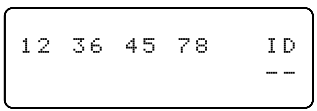
The top line always displays the near end of the cable; the second line always displays the far end.

When the test tool detects a Cable ID Unit but cannot determine the ID number, #? Is displayed for the ID number. The test tool will alternately display a ? and a

numbe when the Cable ID is detected but the Cable ID number cannot be detemined with certainty.

Without a Cable ID Unit connected to the far end of the cable, the test tool displays “—“ for the ID number.

The following display indicates the near end wiring of a cable without a Cable ID Unit connected.

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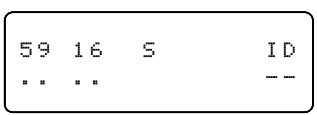
The IBM data connector contains self-shorting connections between pins 5 and 6 (TX- and RX-) and 1 and 9 )RX+ and TX+) on the STP connector. Since this is a normal connection for the IBM data connector, the tst tool does not display a failure. In the wire map function, the presence of these shorts are displayed as shown below:

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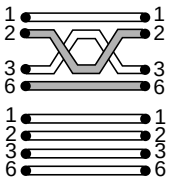
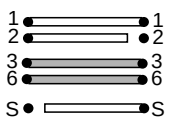
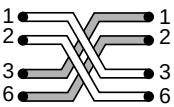
Pins connected to wires comprising twisted pairs are grouped together in the display.

**Table 8. Wire Map Failures (using Cable ID Unit)**

| Failure | Display | Wiring | Description |
|---|---|---|---|
| Short (near end) | 23 1 6 ID #1<br>?? 1 6 ID #? |  | Alternately displays an "s" with the actual wire number of each wire shorted. Because pins 2 and 3 are shorted, pins 1 and 6 do not appear to be paired. |
| Short (far end)* | 23 1 6 ID 1<br>23 1 6 ID #?<br>?? |  | Flashes an "s" below the wire number of each wire shorted. Because pins 2 and 3 are shorted, pins 1 and 6 do not appear to be paired.* |
| Split Pair | 13 26 ID #1<br>13 26<br>12 36 ID #1<br>12 36 |  | Flashes the Wire numbers involved in the split.<br>Flashes wire pairs that are either poor quality, such as using telephone wire instead of LAN type cabling or a portion of the assembly has split pairs which may cause excessive crosstalk. |
| Open | 12 36 S ID #4<br>12 36<br>12 36 O ID #4<br>1O 36 |  | Alternately displays "o" with the number of each open wire. |
| Miswire | 36 12 ID #5<br>12 36 |  | Displays the wiring detected by the test tool and flashes the wire numbers involved in the anomaly. |

* The test tool will alternately display a ? and a number when the Cable ID is detected, but the Cable ID number cannot be determined with certainty.

## *Setup Selections*

The setup mode allows you to select cable characteristics and customize the test tool's operation. Once changed, these settings are stored and remain in the test tool even when it is turned off. Setup selections that rarely need changing are under a special "Power-up" menu.

Setup allows you to:

Select cable type (UTP, STP, FTP, or COAX)
Select a wiring standard
Select a cable category
Select a wire size
Calibrate the test too to a specific cable
Enable or display the Beeper for PASS and FAIL
Adjust the display contrast
* Select the display language
* Select length measurement units between feet (') and meters (m)
* Select wire size units between AWG and millimeters (mm)
* Set the noise filter for 50 Hz or 60 Hz

* "Power-up" setup selections.

To make a SETUP selection, do the following"

1. Press SETUP.
2. Press SETUP to step through the selections.
3. Press ▲ or ▼ to select the desired setup condition.
4. Press SETUP to exit the setup mode, or press ENTER to move to the next setup selection.

To make a "Power-up" setup selection, do the follwoing:

1. With the test tool OFF, press and hold SETUP while turning the rotary switch to TEST.
2. Press ENTER to step through the selections.
3. Press ▲ or ▼ to select the desired setup condition.
4. Press SETUP to exit the setup mode, or press ENTER to move to the next setup selection.

# *Maintenance*

## *General*

Periodically wipe the case with a damp cloth and detergent; do not use abrasives or solvents. Clean and dry as required. If the test tool will remain unused for an extended period, remove the batteries to prevent damage from leakage.

## *Replacing Batteries*

Two 1.5 V AA alkaline batteries power the test tool and typically provide 50 hours of operation. Using the backlight may significantly reduce battery life. The battery compartment is located at the bottom of the test tool. To remove the battery cover, push the lip in and lift the cover off (see Figure 5).

## *When Something Goes Wrong*

If it appears that the test tool is not working properly, perform the checks in Table 9 before returning the test tool to Fluke for repair. Repairs or servicing not covered in this manual should be performed only at an authorized Fluke Service Center.

To contact Fluke, call one of the following telephone numbers:

USA and Canada: 1-888-99-FLUKE (1-888-993-5853)
Europe: +31 402-678-200
Japan: +81-3-3434-0181
Singapore: +65-738-5655
Anywhere in the world: +1-425-356-5500

Or, visit Fluke's Web site at www.fluke.com.

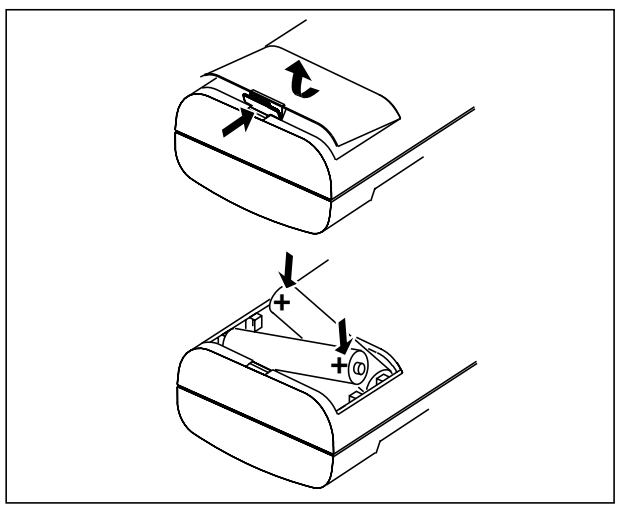


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**Figure 5. Battery Compartment**

**Table 9. Basic Troubleshooting**

| Action | Result | Explanation |
|---|---|---|
| **Symptom 1: Display goes blank.** | | |
| 1. Turn the rotary switch to off, wait 5 seconds and turn the switch to TEST. | Display is active | The Battery Save feature turned the test tool off.* |
| | Display still blank | Go to step 2. |
| 2. Replace the batteries. | Display is active | Batteries were too low to run the test tool. |
| | Display still blank | Go to step 3. |
| 3. Return the test tool for repair. | | Problem appears to be a test tool malfunction. |
| **Symptom 2: The test tool doesn't appear to be measuring correctly.** | | |
| 1. Perform a self-test on the test tool. | Self-test fails | Internal circuitry is defective. Go to step 3. |
| | Self-test passes | Go to step 2. |
| 2. Perform the steps under "Verifying Proper Operation". | Verification Fails | Test tool defective. Go to step 3. |
| | Verification Passes | Problem was an operational problem. Check your procedure and setup. |
| 3. Return the test tool for repair. | | Problem appears to be a test tool malfunction. |
| * The Battery Save feature may be disabled by turning the rotary switch to OFF, then press and hold ENTER while turning the rotary switch to TEST. | | |

### *Performing a Self-Test*

The test tool periodically performs an internal self-test. When the internal self-test detects a problem, the test tool displays the following message:


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A more thorough self-test can be performed by using the following self-test procedure:

1. With the test tool off, press and hold SETUP while turning the rotary switch to TEST.
2. Press ENTER until "SELF-TEST?" is displayed.
3. Press ▲ or ▼ to select YES.

   *Note*

   *To exit without performing a self-test, either press SETUP or ensure that the second line is displaying "NO" and press ENTER to move to the next setup selection.*

4. Press ENTER to activate the self-test program.

   You will be prompted to install the Cable ID Unit on the UTP/FTP connector. (NOT on the end of the cable.)

5. After installing the Cable ID Unit, press ENTER to continue the self-test program.

The test tool displays PASS or FAIL. The self-test continually repeats until SETUP is pressed or the test tool turns itself off (Battery Save Mode). If any failure is detected, return the unit to a service center for repair.

### *Verifying Proper Operation*

1. Connect the provided patch cable to the UTP/FTP connector.
2. Set up the test tool for the patch cable's type, wiring, category, and wire size.
3. Connect a Cable ID Unit to the end of the patch cable.
4. Verify that the Cable ID Unit is properly identified by the test tool and the cable length is within ±1.0 m (±2 ft) of the patch cable length.

### *Returning the Test Tool for Repair*

If after performing the previous tests you believe the test tool is not performing properly, you can send it to your

local service center for repair. Pack the test tool and its Cable ID Unit in the original shipping container. Forward Them, postage paid and insured, to the nearest Service Center. Fluke assumes NO responsibility for damage in transit.

A 620 LAN CableMeter™ covered by the limited warranty will be promptly repaired or replaced (at Fluke's option) and returned to you at no charge. See the registration card for the warranty terms. If the warranty has lapsed, the test tool will be repaired and returned for a fixed fee. Contact the nearest Service Center for information and prices.

## *Parts and Accessories*

**Table 10. Parts and Accessories**

| Description | PN |
|---|---|
| N6201 Cable ID Kit (2 through 4) | 946801 |
| N6202 Cable ID Kit (5 through 8) | 946806 |
| N5620 Cable Kit: | 935957 |
| 2 ea. RJ45 Straight through patch cables<br>2 ea. RJ45 – 8 Clip lead<br>2 ea. RJ 45 In-line Couplers<br>1 ea. 50 ohm BNC Coaxial Patch Cable | |
| N6203 STP Cable Kit: | |
| 1 ea. IBM Type 1 Adapter cable (DB9 to Data Connector)<br>1 ea. RJ45 to IBM Data Connector Adapter | 946970 |

**Table 10. Parts and Accessories (cont)**

| Description | PN |
|---|---|
| Users Manual | 938386 |
| Main PCA | 936570 |
| LCD Module, 32 Character | 949107 |
| Cable Identifier #1 | 946830 |
| Cable Identifier #2 | 946835 |
| Cable Identifier #3 | 946843 |
| Cable Identifier #4 | 946855 |
| Cable Identifier #5 | 946897 |
| Cable Identifier #6 | 946921 |
| Cable Identifier #7 | 942926 |
| Cable Identifier #8 | 946934 |
| Case, Top | 949102 |
| Case, Bottom | 938449 |
| Battery Door | 938451 |
| 620 Shaft extender | 938456 |
| Knob | 880815 |
| Softcase | 454389 |
| Lens | 946868 |
| Battery, AA, Alkaline | 376756 |
| RJ45 Straight through patch cable | 927868 |
| RJ45 – 8 Clip Lead | 938394 |
| RJ45 In-Line Coupler | 927884 |
| BNC Coaxial Patch Cable | 927876 |
| Type 1 Adapter Cable (DB9 to Data Conn) | 928499 |
| RJ45 to IBM Data Connector Adapter | 929435 |

## *Specifications*

Assumes test tool was calibrated using 100 foot (or longer) cable of the type and batch of the cable being measured. Accuracy is specified for a period of two years after calibration.

### *Cable Length Measurements*

Range : 1.0 to 350 m (2 ft to 999 ft)

Accuracy: 5 % +0.5 m (7 % + 2 ft)

Resolution:

Measurement Units in Feet: 1 ft
Measurement Units in Meters

Cables < 100 meters: 0.5 m
Cables > 100 meters: 1 m

### *Failures Detected*

*Shorts*

Range of short detection: 0 m to 350 m (1 ft to 999 ft)

Accuracy of distance to a short (Assumes short is 0 Ω):

UTP/FTP/STP: 7 % + 3 m (7 % + 10 ft)
Coaxial Cables 10 % + 10 m (10 % + 30 ft)

Resolution of distance to a short:

UTP/FTP/STP: 0.5 m (1 ft)
Coaxial Cables: 1 m (5 ft)

*Opens*

Range of open detection: 0 m to 350 m ( 0 ft to 99 ft)

Accuracy of distance to an open:

UTP/FTP/FTP: 10 % + 1 m (10 % + 3 ft)

Resolution of distance to an open:

Cables < 100 meters: 0.5 m (1 ft)
Cables > 100 meters: 1 m (3 ft)

*Split Pairs*

Range of detection: 2 m to 350 m (6 ft to 999 ft)

Split pair part of the cable must be at least 2 meters (6 ft) in length and greater than 10 % of the total cable length.

### *Coax Termination Measurements*

Any loop resistance value between 5 ohms and 350 ohms is interpreted as a termination resistance. Resistance values below 5 ohms are considered shorts and resistance values greater than 350 ohms are not displayed.

### *LAN Input Connectors*

RJ45, DB-9, and BNC

### *Input Protection*

56 V dc continuously through a balanced source impedance of 400 Ω. 175 V peak, 20 Hz to 60 Hz through 100 Ω, superimposed on 56 V dc through 400 Ω.

“ACTIVE CABLE” is displayed and an audible signal sounds when the test tool is connected to a cable with voltage present.

The test too is not intended to be connected to a public telephone network.

**Table 11. Cable Test Characteristics**

| Cable | Wiring | PASS/FAIL Pins |
|---|---|---|
| UTP/FTP* (RJ45) | EIA/TIA 4 PR | Pins 12 36 45 78 |
| | 10BASE-T 2 PR | Pins 12 36 |
| | TOKEN RING 2 PR | Pins 36 45 |
| | TP-PMD 2 PR | Pins 12 78 |
| | USOC 4 PR | Pins 18 27 36 45 |
| | USOC 3 PR | Pins 16 25 34** |
| | USOC 2 PR | Pins 25 34*** |
| | DEC/MMJ 3 PR | Pins 16 23 45** |
| STP* (DB-9) | IBM Type 1 | Pins 15 69 |
| | IBM Type 6 | Pins 15 69 |

* Tests for open or shorted Shield on FTP and STP cables.
** RJ25 PINS
***RJ11 PINS

**Table 12. Coax Cable Characteristics**

| 620 Coax Setup | Impedance | Resistance (Center Conductor + Shield) | Capacitance | Example |
|---|---|---|---|---|
| 10 BASE2 | 50Ω | 14.6Ω/1000 ft<br>47.9Ω/km | 25.4 pF/ft<br>83.3 pF/m | Trade No. 9907 |
| 10BASE5 | 50Ω | 2.94Ω/1000 ft<br>9.66Ω/km | 26.0 pF/ft<br>85 pF/m | Trade No. 9880 |
| RF58 | 50Ω | 14.9Ω/1000 ft<br>48.8Ω/km | 30.8 pF/ft<br>101 pF/m | Trade No. 9203<br>RF-58/U |
| RG-58F | 50Ω | 12.9Ω/1000 ft<br>42.3Ω/km | 26.0 pF/ft<br>85.3 pF/m | Trade No. 8219 |
| RG-59 | 75Ω | 49.6Ω/1000 ft<br>160.9Ω/km | 20.5 pF/ft<br>67.2 pF/m | Trade No. 9204<br>RG-59/U |
| RG-59F | 75Ω | 17.6Ω/1000 ft<br>57.7Ω/km | 17.3 pF/ft<br>56.8 pF/m | Trade No. 9259 |
| RG-62 | 93Ω | 44.1Ω/1000 ft<br>144.6Ω/km | 13.5 pF/ft<br>44.3 pF/m | Trad No. 9862<br>RG-62-U |

### *Power*

Two AA size 1.5 V alkaline batteries
Battery Type: ANSI/NEDA-15A or IEC-LR6
Low Battery indicated in the display
Typical Battery Life: 50 hours
Timed Power-Off Function

### *Dimensions*

18.4 cm x 9.8 cm x 4.6 cm
(7.25 in x 3.875 in x 1.8 in)

### *Weight*

354.4 g (12.5 oz)

### *Environmental Conditions*

*Temperature:*

Non Operating (storage): -20 °C to +60 °C
Operating: 0 °C to +45 °C

*Operating Humidity:*

10 °C to 30 °C: 95 % ±5 % RH (without condensation)
30 °C to 40 °C: 75 % ±5 % RH (without condensation)
40 °C to 45 °C: 45 % ±5 % RH (without condensation)

*Altitude:*

Non Operating: 0 km to 12 km (40,000 ft)
Operating: 0 km to 4.57 km (15,000 ft)

*Electromagnetic Compatibility:*

Meets FCC part 15-b
Meets EN 50081-1
Meets EN 50082-1
Meets vfg 243/1991

### *Display*

2 lines of 16 characters LCD with backlight.

### *Controls*

Four position rotary switch plus 5 tactile-feedback momentary switches.

### *Warranty*

One year from date of purchase

### *Calibration Period*

Two years