FLUKE networks

# ADSL Qualification Procedure Using CopperPro™ 990DSLWT

Using the Fluke Networks 990DSLWT CopperPro for qualifying a POTS telephone pair for ADSL service includes three basic components:

1. **Verify passive metallic properties of the pair to carry service.**
   - AC and DC voltage on pair within acceptable limits
   - No open shorted or grounded conductors
   - Longitudinal, capacitive and resistive balance within acceptable limits
   - Verify pair length within acceptable limits (<15000 ft.)
   - Verify no load coils or bridge taps are present
2. **Verify noise and other interference are within limits required to carry service. This includes:**
   - Immunity to power influence
   - Metallic noise
   - Wideband spectral noise
3. **Verify ADSL transmission characteristics.**
   - Insertion loss for each DMT bin frequency
   - Signal to noise ratio for each of DMT frequency
   - Bits encoded per tone for each bin frequency
   - Estimated upstream and downstream data rate

The procedure outlined in this paper is based on testing an out-of-service pair and can be performed segment-by-segment or end-to-end. If the pair is in service, the heat coil must be removed at the main distribution frame in the central office. This test does not verify performance of ADSL transmission equipment (DSLAM or subscriber modem), subscriber wiring, ATM or IP configuration.

## ADSL Qualification Procedure

Equipment required:

- Two 990DSLWT CopperPro Loop Testers
- Two sets of test leads for tip, ring and ground of each 990DSLWT
- One strapping cord (included with each 990DSLWT)
- 990DSL User Guide (for reference)

## Instrument Set-up

This procedure is based on the U.S. English set-ups (found in user options). For linear and gauge settings in metrics, use the UK English set-ups. For more information, consult the Users Guide, Section 3.

Before testing, zero test leads on both test sets (found in user options). For more information, see Section 3 of the Users Guide.

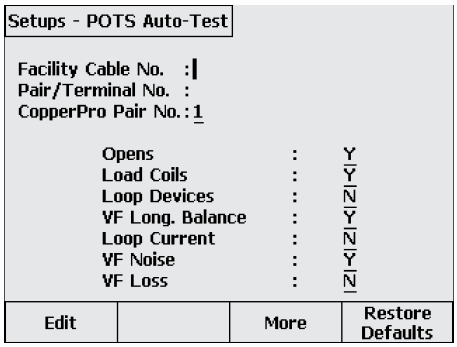
## POTS Auto-Test

Tests completed:

- Opens, capacitive balance and length
- Shorts and grounds
- Load coils
- Longitudinal balance
- Voice frequency noise (power influence and metallic noise)

### Set-Ups

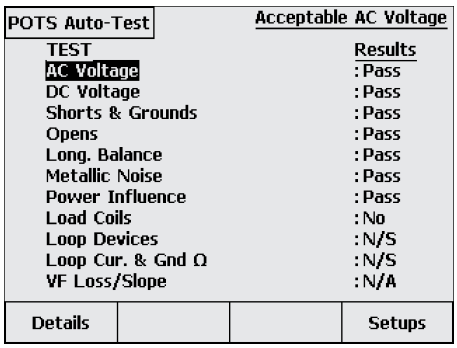
- Power up the test set, the POTS Auto-Test should be highlighted
- Press the blue soft key #4 to enter the set-up menu
- Configure the test as shown below - press the BACK key to return to the main menu




*If required, set the cable type and gauge. These settings are found in the individual set-ups for the Shorts and Grounds and Opens tests located in the POTS Tool box.*

- Connect the test leads to tip and ring conductors and ground sheath. Assure that POTS Auto-Test is highlighted and press the TEST key

When the test is complete, summary Pass/Fail results will be shown, similar to this example:




Any failures will be highlighted in flashing reverse video. To see more information about a test, highlight the test, and press the Details key. For capacitive length and balance results, highlight Opens test results and press Details soft key.

**Passing results:**

AC Voltage < 10V

DC Voltage < 3V

Resistive Faults > 150 kohms

Capacitive Balance > 95%

Capacitive Length < 15000 ft

Longitudinal Balance > 55 dB

Metallic Noise < 30 dBrn

Power Influence < 80 dBrn

Load Coils < 1

## Loop Resistance and Resistive Balance

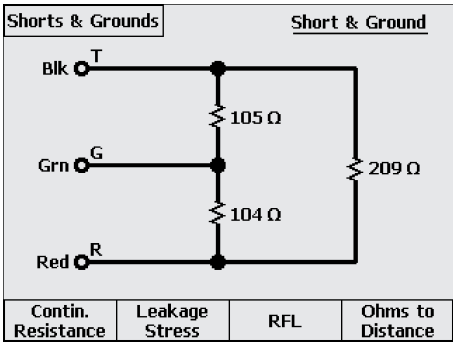
Tests completed:

- Measure loop resistance and balance
- Convert to loop length

**Set-Ups**

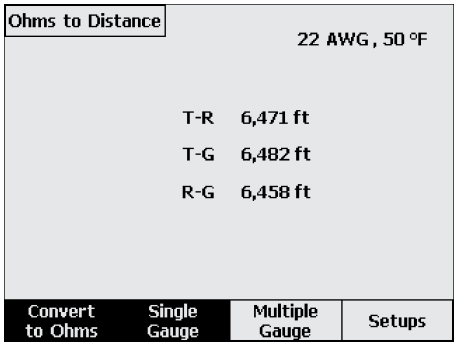
- Open POTS Toolbox
- Highlight Shorts and Grounds test
- Press Setups key
- Set cable gauge and estimated temperature
- Press the BACK key to return to the POTS Toolbox
- Using supplied strapping cord, short the far end of the pair to ground (tip and ring shorted together and to ground)
- At the near (test) end of the pair, connect the 990's tip, ring and ground leads
- Highlight the Shorts and Grounds test (in POTS Toolbox) and press the TEST key

When the test is complete, results similar to this example will be shown:




Verify that the tip ground and ring ground resistances are within three ohms of one another.

Use the Ohms to Distance function to calculate pair length, shown here:




## Bridgetap Detection

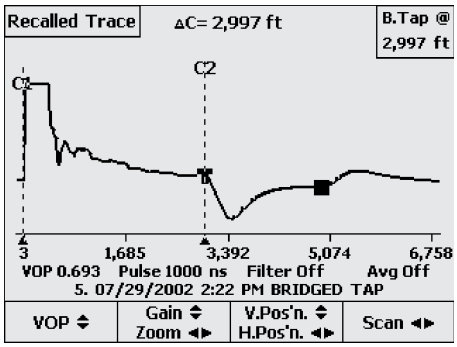
Tests completed:

- Identify bridge taps
- Determine number, length and distance from subscriber

**Set-Ups**

- Turn on set
- Highlight TDR Auto-Test and press Setups soft key
- Set cable gauge and type being tested
- Adjust VOP (Velocity of Propagation) as needed. For more information, see Section 6 of the Users Guide
- Press BACK key to return to the main menu
- Connect tip, ring and ground test leads to the pair
- Highlight TDR Auto-Test and press TEST

When the test is complete, results similar to this example will be shown.




If bridge taps are detected, use Cursor 1 and Cursor to determine length and location.

**Pass/fail limits:**

Total bridge taps <3

Max length of longest < 2000 ft

Max length of all bridge taps < 2500 ft

Min distance from subscriber > 1000 ft

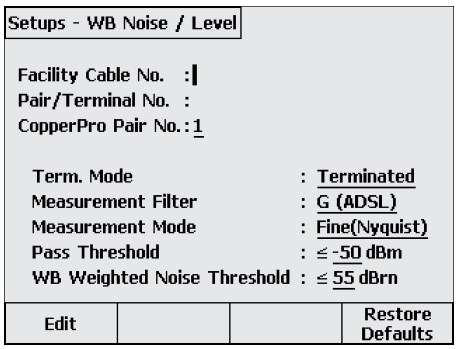
## Wideband Noise

Identify any high frequency interference that may disturb service.

### Set-Ups

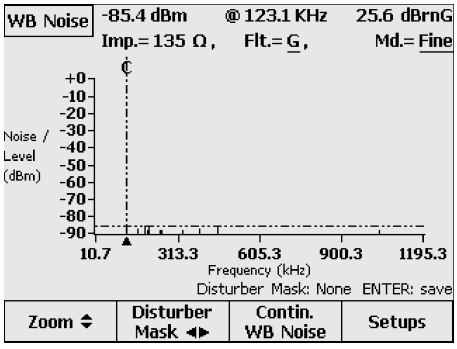
- Open the XDSL Toolbox
- Highlight WB Noise/Level and press the Setups key

Verify the settings are the same as below:




- Press the BACK key to return to the previous menu
- Highlight WB Noise/Level test
- Connect tip, ring and ground terminals and press TEST

When the test is complete, results similar to this example will be shown:




Verify that there are no disturbing signals greater than -50 dBm, and that total noise (upper right hand corner) is less than 50 dBrnG.

## Pair Qualification with ADSL Auto-Test

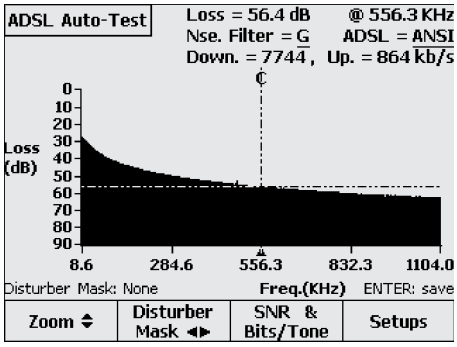
Tests completed:

- Simulate service
- Measure loss and noise ratio for each DMT bin
- Estimate bits per tone and upstream and downstream data rate

### Set-Ups

- Place one CopperPro at the far end of the pair
- Connect its tip, ring and ground leads to the pair and sheath ground
- Turn on the unit
- Select ADSL Auto-Test and press ENTER
- Set this unit up as the Sending unit by pressing the Sending Unit soft key
- Press TEST to activate the unit
- Connect the other CopperPro at the near (test) end of the pair
- Select ADSL Auto-Test and press ENTER
- Set this unit as the Receiving Unit by pressing the Receiving Unit key
- Press test

When the test is complete, results will be similar to this example will be shown:




Verify that calculated upstream and downstream speeds are within guidelines for the service being installed, usually >128 kbs upstream and >256 kbs downstream.

Press the SNR & Bits/Tone soft key to view data in signal-to-noise ratio and bits-per-tone format, if desired.

If testers do not exchange tones and display a communications error, verify that you have continuity over the pair between the sending and receiving units.

## Support

Fluke Networks offers a variety of support options to help you get the most from your CopperPro. If you require technical support, for application or operation assistance, or for more information about the CopperPro tester, you can email:
fluke-assist@flukenetworks.com
or call 1-800-283-5853.

## Fluke Networks working for you

CopperPro is part of our Network SuperVision Solutions™ – a complete family of leading-edge tools, services and training from Fluke Networks. Our loop recovery, troubleshooting and record management solutions are the choice of local exchange carriers who want to reduce held orders. Increase revenue. Lower OSP operating expenses. Improve workforce efficiency. Reduce OSP defects rates. And increase customer satisfaction. That's Network SuperVision™. And it's yours only from Fluke Networks.

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**Fluke Networks**
P.O. Box 777, Everett, WA USA 98206-0777

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