TESCOM

CopperPro™ Series II

The complete test set for qualifying your local loop for ADSL, VDSL and special services.

Demand is growing rapidly for next generation broadband services such as video on demand, broadband Internet access, and VoIP. That presents tremendous potential for profitable new business.

But, it also puts pressure on your technicians and outside plant (OSP) to deliver the performance those new services require. To be ready to take advantage of new opportunities, your technicians need a test set that can help them:

- Quickly qualify the facilities for ADSL, VDSL, HDSL, T1, and other special services.

- Easily identify and locate possible problems to ensure reliable performance.

- Install new services efficiently with fewer call-backs.

- Verify connectivity and network performance to ensure that next generation services perform up to your customers' expectations.

In short, your technicians need the TesCom CopperPro Series II copper loop tester.

Make CopperPro Series II standard equipment

CopperPro Series II provides a full range of troubleshooting, fault locating, testing and qualification capabilities. That means top performance with fewer tools to carry. Plus, its rugged construction and easy-to-use features give your technicians the vision to build, repair, install, and maintain OSP systems more efficiently with fewer repeats.

Streamline trouble calls

Step-by-step instructions make CopperPro Series II a breeze to set up. Use the unique TDR Auto-Test to:

- Zero in on faults such as short bridge taps and shorted or open pairs.

- Count and locate load coils.

- Locate high resistance faults precisely, no matter the cable makeup.

- Easily identify the source of broadband interference and impulse noise, up to VDSL bandwidth.

Expedite installation and maintenance

CopperPro Series II makes fast work of installing and maintaining service. The one-button POTS Auto-Test quickly documents status before and after work is complete. The CopperPro also gives you a clear view of all the basic tests you need to ensure top performance, including:

- AC and DC voltage
- Loop current
- Circuit noise
- Balance and leakage
- CallerID/ANI

Plus, you can quickly run loss and slope tests with its automated dial-up testing, and use the built-in dial set with phone number storage. You can also verify xDSL connectivity, performance and capacity up to VDSL rates with optional xDSL golden modems

A comprehensive set of copper loop testing functions

The CopperPro Series II packs all the test, analysis, and troubleshooting capabilities an OSP technician needs into one integrated handheld tool that gives a clear vision of your local loop, including:

- DCV and ACV measurement (snapshot and continuous)
- Shorts, grounds, and loop resistance with distance conversion
- Resistive fault location (Wheatstone and K-Test)
- Load coil counter with estimated distance to fault and impedance versus frequency graph to distinguish real results from false positives
- Multimode TDR with Auto-Test: pair 1 test, compare pair 1 and 2, difference between pair 1 and 2, pair 1 monitor, pair 2 to pair 1 crosstalk, compare pair 1 to stored trace
- Broadband noise and level spectral analysis with interference masks (VDSL bandwidth)
- Broadband loss impulse noise reduction (VDSL bandwidth)
- ADSL, ADSL2+, VDSL2 and XDSL Auto-Test for pair qualification (varies by model)

- Optional ADSL1/2/2+ Modem (ATU-R)
- Optional VDSL Modem (ATU-R and ATU-C)
- Broadband terminated test macros (Terminator, SmartStrap, MyHelper, FED)
- Leakage stress test to 200V
- Loop device counter
- Tracing tone with four modes
- Voice frequency noise – metallic and power influence
- Voice frequency loss
- Voice frequency longitudinal balance
- Voice frequency tone generator
- Automated POTS Auto-Test
- Dial set and non-intrusive line monitor
- Voice frequency terminated and dial-up test macros (SmartStrap, MyHelper, FED, SASS, DATU, SmartPro)

for all your technicians

Multiple tools in one device

Building on the popularity of the original CopperPro, the Series II is a complete solution for testing, troubleshooting, and qualifying OSP copper cables and network services. The CopperPro Series II is easy to use and integrates multiple test tools into a single device that provides all the functions your technicians need, including:

- Metallic testing, including voltage, resistance, balance, and noise
- Fault locating using three terminal opens, RFL, or TDR
- Advanced broadband troubleshooting and qualification for next generation services, including ADSL2+ and VDSL
- Identifying voice and broadband noise and interference
- Collecting and reporting comprehensive results
- Integration with backoffice systems to update loop databases and maintain test results

## Seamlessly integrate field testing with backoffice systems

Not only does the CopperPro Series II collect and store comprehensive test data, it also integrates with NetDSL plant conditioning and EXP Technician Productivity solutions to automate job close out and database updates. By integrating with the NetDSL process, the CopperPro Series II eliminates duplicate tasks and paperwork and requires no additional servers, systems, or interfaces.

As part of the TesCom productivity solution, the CopperPro Series II dramatically improves technician effi ciency while signifi cantly reducing repeats. Automated close-out tests assure consistent, complete testing and centralized test results make it easy to track results and monitor technical productivity.

Advanced features to support next generation services

The CopperPro Series II offers several new features focused specifically on helping you install and maintain next generation services. These include:

- Bandwidth to 18 MHz to support ADSL2+ and VDSL technologies
- Identification of broadband noise for VDSL, including crosstalk and impulse noise
- Advanced TDR capabilities for locating short bridge taps and other hard-to-detect impair- ments to DSL performance
- Golden modem options for ADSL, ADSL2+, and VDSL
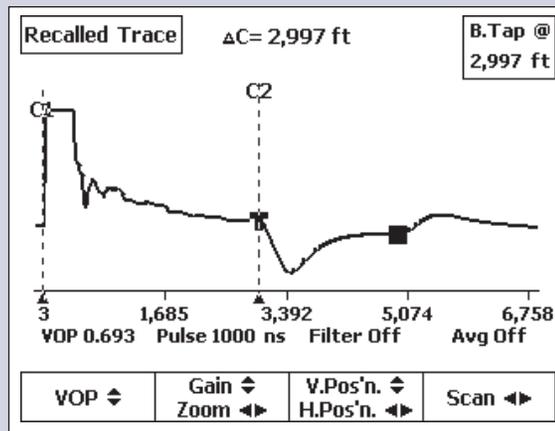
Quickly identify and locate a wide range of faults, including short bridge taps and other impairments that other sets have trouble finding.
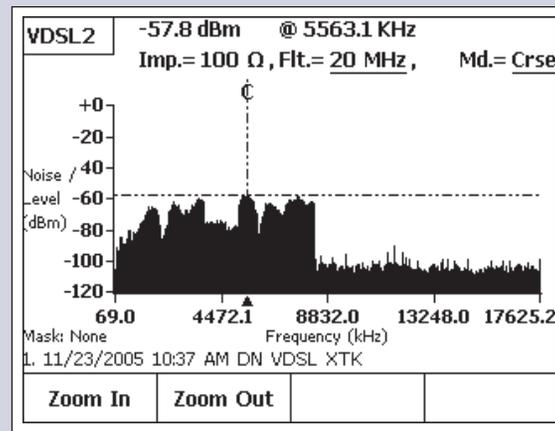
CopperPro Series II now has the bandwidth to test and troubleshoot the latest broadband technologies.

Golden modem options permit verification of ADSL1/2/2+ and VDSL connectivity and performance.

Test, troubleshoot, and qualify your copper loop for a profitable triple play with one, easy-to-use tool.

Integrates today's top OSP testing and troubleshooting tasks into one tool; less to buy, maintain and train on

Built tough for rugged field use and low cost of ownership: sealed to resist moisture, drop tested 1 meter

ADSL, ADSL2/2+, VDSL2 Golden Modem modules support a broad range of vendor chip sets and can be updated via software in the field

State-of-the-art TDR can find bridge taps as short as 20 feet (7 meters), even with CPE attached

Large graphic interface is fast and easy to read – whether your frontline tech is up a telephone pole or down a manhole

Serial interface for downloading software and uploading or printing reports quickly and easily

Configurable one-button auto-test "toolboxes" support techs of all skill levels for higher productivity and consistency
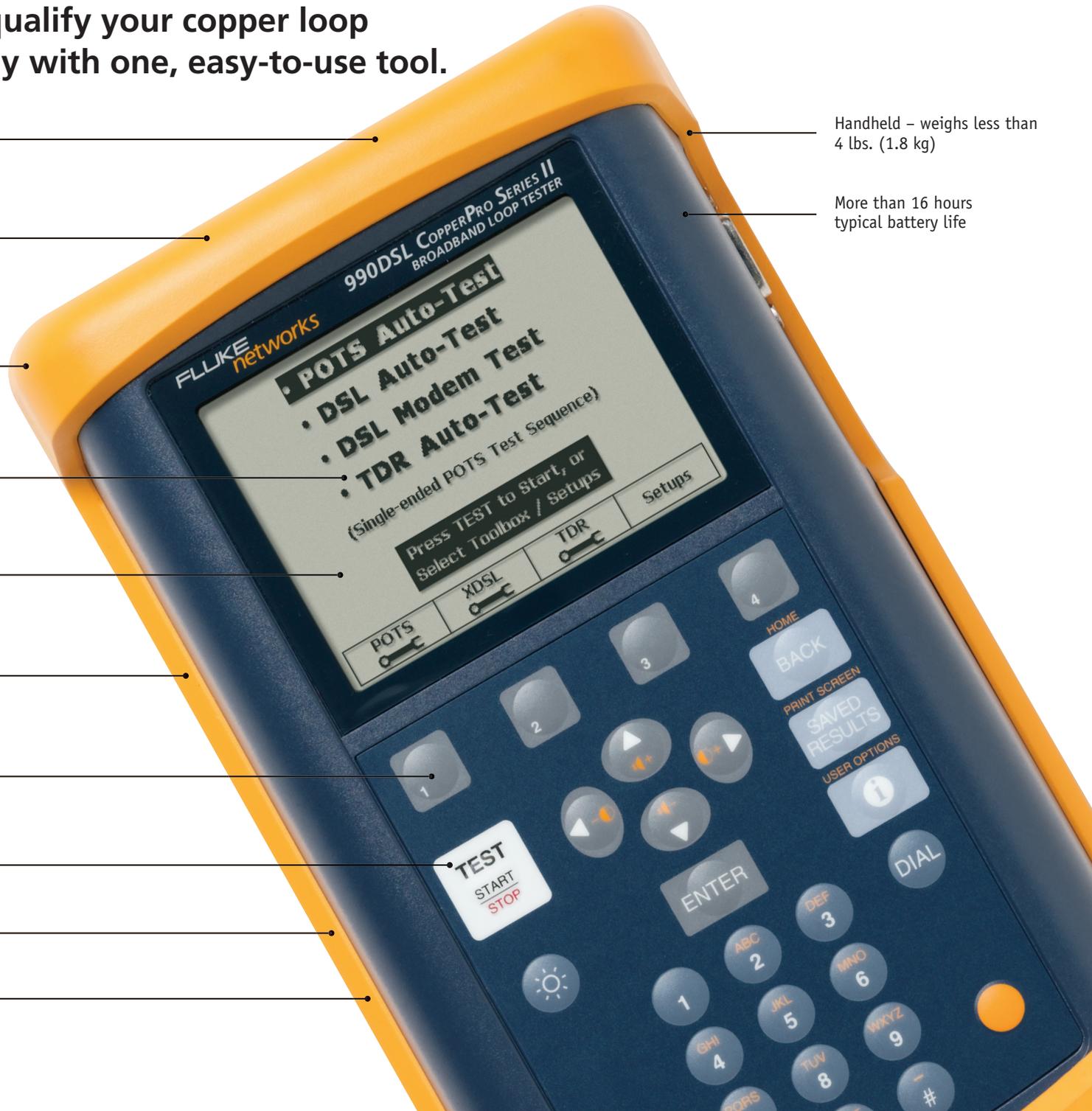
Single test modes support the needs of more expert technicians

On-line help

Power or charge from mains (100-240V) or 12V auto lighter (cable included)

Handheld – weighs less than 4 lbs. (1.8 kg)

More than 16 hours typical battery life

CopperPro Series II

Physical	
Size (H x W x D)	approximately 9.8" x 5.3" x 3.2" (25 cm x 13.5 cm x 8.1 cm) (does not include the softcase and test leads)
Weight	4.0 lbs. (1.8 kg) (does not include the softcase and test leads)
Display	320 x 240 pixel graphic LCD with backlight and adjustable contrast
LED Indicator	charging status indicator (located on the side connector panel)
Communication Port	RS-232 PC and printer port (DB-9)

Power	
AC Operation	operates from an external AC adapter/charger
Battery Type	operates from an internal removable NiMH rechargeable battery pack (installed)
Battery Life	a fully charged battery provides approximately 16 hours of normal testing usage and approximately 4 hours of continuous TDR or broadband testing usage
Battery Recharge Time	2 to 3 hours (in the tester) for a fully discharged battery pack

Environmental	
Operating Temperature	-4° F to +140° F (unless otherwise specified) (-20° C to +60° C)
Storage Temperature	-40° F to +158° F (-40° C to +70° C)
Battery Charging Temperature	50° F to 104° F (10° C to 40° C)
Humidity Tolerance (operation without condensation)	95%
Rain Resistance	IEC60529 IP02, Ingress Protection: water dripping
Vibration	Random, 2 g, 5 Hz to 500 Hz
Shock	1 Meter Drop Test
Altitude	4500 m (15,000 ft)

Standards Compliance	
Analog Transmission Parameter Measurement	IEEE 743-1995
ADSLx / VDSLx Metallic Interface	ANSI T1.413 Issue 2; ITU G.992.1a,b; G.992.2ab; G.992.3a,b,l,m; G.992.5a,b; G.993.1; G.993.2

Regulatory Compliance	
Safety	CAN / CSA-C22.2 No 61010-1
CE	EN 61326 Class A Emissions and Immunity EN 61010-1

990-GM2 ADSL2+ Golden Modem *(optional)*

General Specifications	
Size	4.2" x 6.6" x 1.3" (11 cm x 17 cm x3.3 cm)
Weight	12.8 oz. (364 g)
Operating Temperature	-4° F to +140° F (-20° C to +60° C)
Storage Temperature	-40° F to +158° F (-40° C to +70° C)
DC Input Voltage	+6 to +15 VDC
DC Input Current (Standby Mode)	210 mA@ 8VDC (typical)
DC Input Current (Active Mode)	420 mA @ 8VDC (typical)
990 Battery Operating Time (Active Mode)	4 hours continuous (typical)
ADSL Standards Compliance (ATU-R) ADSL ANSI ADSL G.DMT ADSL G.Lite ADSL2 ADSL2+	 ANSI T1.413 Issue 2 ITU G.992.1a, b ITU G.992.2ab ITU G.992.3a, b, l, m ITU G.992.5a, b
Regulatory Compliance	CSA: C22.2 No 1010.1 CE: EN 61326 Class A CE: EN61010-1
DSL Connector Pinout Pin 3, 4 Pins 1, 2, 5, 6	 DSL Tip, Ring Not used
ENET Connector Pinout Pin 1, 2 Pin 3, 4 Pins 4, 5, 7, 8	 Ethernet Rx+, Rx- Ethernet Tx+, Tx- Not used
990 Software Version Required	3.21.16 (or later)

990-GM2 ADSL+ Golden Modem

Operational Specifications

Function	Range	Accuracy
AC Voltage	0 V to 220 V, 60Hz	1% ±0.5 V
DC Voltage (RIN = 100 kV default; VMV or 10 MV optional)	0 V to 150 V 150 V to 240 V 240 to 300 V	1% ±0.5 V 2% 3%
DC Loop Current (430 W)	0 mA to 120 ma	2% ±0.3 mA
Resistance (Shorts and Grounds)	0 Ω to 100 Ω 100 Ω to 4 kΩ 4 kΩto ΩM	0.1% ±0.10 0.3% ±0.10 3%
Leakage Stress	2 kΩ to 999 MΩ	3%
Opens	0 ft to 3000 ft 3 kft to 50 k ft 50 kft to 80 k ft	1% ±5 ft 3% 5%
Splits	0 kft to 50 k ft	10% DTE ±50 ft1
RFL Fault Resistance (Rf) Loop resistance Resistance to Fault (@ Rf = 100 kΩ) K-Test Resistance to Fault	0 M Ω to 30 M Ω 0 Ω to 4000 Ω 0 Ω to 100 Ω 100 Ω to 4 k Ω 0 Ω to 4 k Ω	- - 0.1 % RTS2 ±0.10 Ω 0.3 % RTS2 ±0.10 Ω 1 % RTS2 ± 1 Ω
Load Coils Count Distance to First	0 to 6 0 to 12,000 ft	±1 10 % ± 500 ft
Tracing Tone Frequency Level	577.5 Hz >3.5 V peak-to-peak	0.1 % 10 %
VF Noise Impedance Filters Metallic Noise Power Influence Power Harmonics	600 Ω, 900 Ω, Bridged3 C, C-Notched, 3 k Flat, 15 k Flat, Psopho 0 dBrn to 10 dBrn 10 dBrn to 100 dBrn 40 dBrn to 120 dBrn -60 dBm to +20 dBm (50 Hz to 3 kHz)	1 % - ±2 dB ±1 dB ±2 dB ±2 dB ±2 dB
VF Loss Signal Level Frequency	-40 dBm to +10 dBm 100 Hz to 20 kHz	Single Tone: ± 1 dB SmartTone: ± 2 dB 0.1 % ±2 Hz

Function	Range	Accuracy
VF Longitudinal Balance Disturbing Frequency Impedance	0 dB to 70 dB 200 Hz to 2000 Hz 600 Ω, 900 Ω	±2 dB 0.1 % 1 %
Send VF Tone Frequency Amplitude (settable) Impedance	100 Hz to 20 kHz -20 dBm to +3 dBm 600 Ω, 900 Ω	0.1 % ±0.5 dB (1 dB steps) 1 %
WB/BB Noise/Level Impedance Filters Frequency	100 Ω, 135 Ω, Bridged4 E, F, G, 1.3 MHz, 20 MHz 10 kHz to 1.2 MHz5 25 kHz to 18 MHz6	1 % - 0.1%, 508.63 Hz multiples 0.1%, 4312.5 Hz multiples
Amplitude	+3 dBm to -50 dBm -50 dBm to -90 dBm -90 dBm to -105 dBm	±1 dB7 (Bridged = ±3 dB typical) ±3 dB7 (Bridged = ±3 dB typical) ±3 dB typical7
Noise Floor	-140 dBm/Hz typical	-
WB/BB Loss Impedance Frequency Magnitude HDSL2/4 Loop Attenuation WB/BB Longitudinal Balance Disturbing Frequency (Single Tone) (70 Tone Multi-Tone) Impedance Filter	100 Ω, 135 Ω 10 kHz to 1.2 MHz5 25 kHz to 18 MHz6 0 dB to 50 dB 50 dB to 90 dB 0 dB to 70 dB 0 dB to 20 dB 20 dB to 40 dB 40 dB to 50 dB 50 dB to 55 dB 25 kHz to 18 MHz 0.25 MHz to 18 MHz 135 Ω, < 1.2 MHz 100 Ω, > 1.2 MHz 1.3 MHz, < 1.2 MHz 20 MHz, > 1.2 MHz	1 % 0.1%, 508.63 Hz multiples 0.1%, 4312.5 Hz multiples ±1 dB7 ±3 dB7 ±2 dB ±3 dB7,9 ±2 dB7,9 ±3 dB7,9 ±3 dB typical7,9 0.1%, 4312.5 Hz multiples 0.1%, 4312.5 Hz multiples 1 % -

Operational Specifications *(continued)*

Function	Range	Accuracy
Send WB/BB Tone		
Frequency	10 kHz to 1.2 MHz[5]	0.1%, 508.63 Hz multiples
	25 kHz to 18 MHz[6]	0.1%, 4312.5 Hz multiples
Amplitude	0.0 dBm (fixed)	±1 dB
Impedance	100 Ω, 135 Ω	1%
WB/BB Impulse Noise		
Impedance	100 Ω, 135 Ω, Bridged[4]	1%
Filters	E, F, G, 1.3 MHz, 20 MHz	-
Test Time	1 to 1440 minutes (24 hrs.)	1%
Impulse Counter	0 to 9999	-
Counter Threshold	0 dBm to -40 dBm	±1 dB[8]
	-40 dBm to -50 dBm	±3 dB[8] (Typical)
Count Interval	8 / second	-
DSL Auto-Test		
Data Rate estimation		
ADSL/2 (1.104 MHz)	0 – 8 Mb/s	±0.1 Mb/s (typical)
ADSL2+ (2.208 MHz)	0 - 16 Mb/s	±0.2 Mb/s (typical)
VDSL (17.664 MHz)	0 - 55 Mb/s	± 2 Mb/s (typical)
TDR Specifications		
Launch Pulse		
Impedance	100 Ω	1%
Pulse-width	20 ns, 100 ns, 500 ns, 1000 ns, 2500 ns, 5000 ns	10 % ±5 ns
VOP Selection	0.300 to 0.999	-
Range (VOP = 0.64, 19 Ga.)	30,000 ft	-
Range Selection	10 ft to 48 kft (Auto.)	-
Horizontal Resolution	0.5 ft to 156 ft	-
Distance to Reflection	0 ft to 30,000 ft	1% ±VOP uncertainty
Vertical Gain	80 dB	2 dB
Power Filter	5 kHz Highpass	-
Averaging Filter	4 waveform average	-
Input Protection	±400 V peak	-

Notes
[1] Dist. to End; Dist. to Split >50 ft; Split pairs must be same length ±5 %.
[2] RTS = Resistance to Strap
[3] Bridged = >100 k Ω
[4] Bridged = >5 k Ω
[5] Nyquist (Fine) resolution
[6] DMT (Coarse) resolution
[7] @ 25° C ± 25° C; battery-powered
[8] Accuracies specified with E, F, G, and 1.3 MHz filters @ center frequencies, with 100 Ω or 135 Ω terminations.
  Additional +/- 2 dB (typ.) tolerance required for 20MHz filter
[9] 0.25 MHz to 12 MHz. Additional ±1 dB tolerance required from 12 MHz to 17.5 MHz.

Ordering Information

Model	Description
990DSL2+	CopperPro Next Gen Copper Loop Analyzer with TDR and wideband spectral analysis for ADSL2+
990VDSL	CopperPro Next Gen Copper Loop Analyzer with TDR and wideband spectral analysis for VDSL
990TL-N/RF	RF Test lead set for 990DSL2+ or 990VDSL with non-piercing clips (plain)
990TL-SB/RF	RF Test lead set for 990DSL2+ or 990VDSL with spike+bed-of-nails piercing clips
990-GM/2	ADSL/ADSL2/2+ Golden Modem Option for CopperPro Loop Testers/Analyzers