MaxTester 610

SMARTER COPPER TESTING FOR INSTALLATION TECHNICIANS

smartR™

SPEC SHEET

Smarter verification of copper pairs and location of faults during the installation and repair of voice and DSL circuits.

KEY FEATURES AND BENEFITS

- Focus on single-ended testing minimizes repair time and costs
- Full suite of digital multimeter measurements to quickly and effectively determine the electrical health of the network
- Optional TDR and RFL allow service providers to scale the product based on existing or new methods and procedures
- SmartR™ features allow users to quickly and accurately determine physical copper circuit quality and locate faults
- Designed to face the challenges of the outside plant environment with an IEC IP54 rating
- Configurable pass/fail results for automated testing

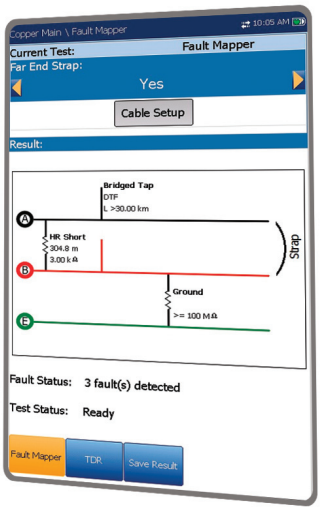
THE MAXTESTER 600 SERIES

MAX-630
xDSL and Multiplay Test Set

MAX-635
Copper, xDSL and Multiplay Test Set

EXFO | Assessing Next-Gen Networks

THE PERFECT TOOL FOR COPPER I&R TESTING



EXFO's MaxTester 610 is designed for the installation and repair (I&R) of voice and DSL circuits. Its small form factor, rugged design and easy-to-use menus make it the ideal tool for outside-plant I&R technicians. With the MaxTester 610, the testing process is highly automated, enabling technicians to close their jobs quickly and efficiently. In addition, the large display of the MaxTester 610 makes it even more user-friendly, and when it comes to saving results, it provides technicians with many connectivity options for uploading tests and compiling reports.

THE MAXTESTER 610 JOINS FORCES WITH SMARTR™

The MaxTester 610 allows technicians and engineers alike to work smarter—not harder. SmartR is a suite of intelligent and automated tests that enable any technician to quickly and easily gain an understanding of the condition of the line under test, as well as to identify and locate a variety of common circuit faults. The Pair Detective feature automatically runs the most common line tests and provides graphical, color-coded results and pass/fail indications to detect conditions, including shorts, grounds, opens, battery, splits and imbalances. FaultMapper utilizes time-domain reflectometry (TDR) and Resistive Fault Location (RFL) technology to provide the additional capability of identifying the location of the service affecting line faults, including bridged taps, shorts, grounds and opens. EXFO's unique SmartR presents results in an easy-to-understand, graphical format, making copper troubleshooting easier than ever before.

KEY COPPER APPLICATIONS

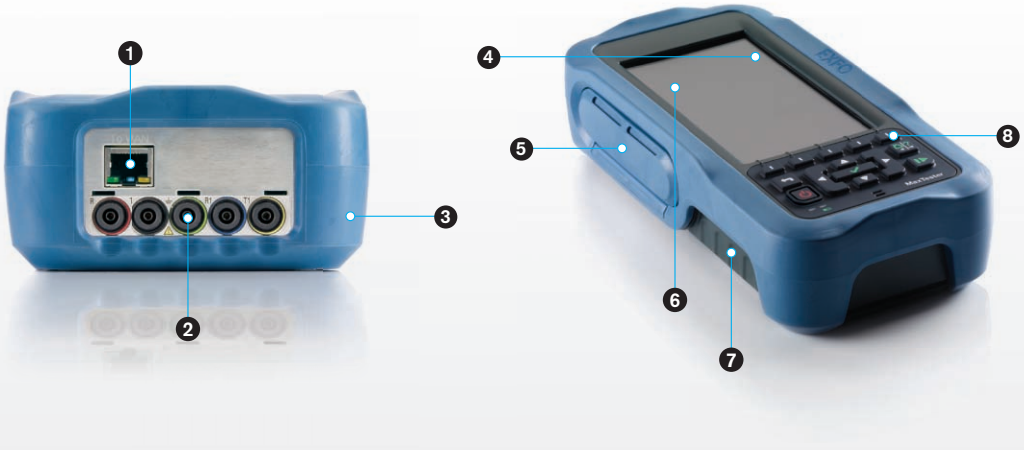
› Detection of potential bottlenecks on subscriber loops to ensure high-quality, consistent and error-free multiplay services

› 30 MHz spectrum analysis for circuit qualification in any VDSL2 band plan (8, 12, 17 and 30 MHz)

› Loop and fault analysis, using proven TDR and RFL techniques for VDSL2 or ADSL2+ prequalification

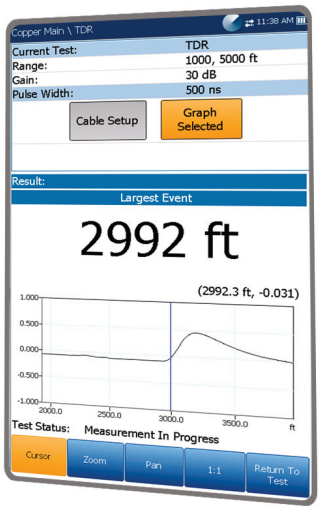
› Measurement and reporting of suspect voltages, opens and shorts

KEY CHARACTERISTICS



1. Ethernet connector sealed against the environment
2. Copper connectors sealed against the environment
3. All-round rubber bumper
4. Large 6 in daylight-visible color LCD
5. Interface connections—water and dirt protected
6. Innovative and icon-driven user interface
7. Handgrip area
8. Simple keypad

COMPREHENSIVE METALLIC TESTING



Verification of copper quality is a snap with the copper measurement capabilities of the MaxTester 610. Sporting industry standard AC and DC voltage measurements, resistance (shorts) and capacitance (opens) measurements, power influence and impulse noise, technicians obtain results that are graphically clear and concise with pass/fail indication.

The MaxTester 610 also features a POTS dialer and an optional TDR and resistive fault locator (RFL) for locating loop faults. The optional wideband testing suite allows the qualification of circuits at VDSL2 frequencies of up to 30 MHz and includes PSD, impulse noise and attenuation analysis.

ALL THE RIGHT FEATURES FOR INSTALLATION TECHNICIANS

With its small form factor, the MaxTester 610 can go anywhere technicians need to go. It is rugged and light, and all connectors are protected from the rain–just what is needed for the demanding outside-plant environment.

Automated Testing

Thresholds can be set and saved for key copper tests. When tests are run, users are given a clear graphical pass/fail result so they can quickly move on to the next job or investigate further. Test profiles can easily be transferred between units to ensure that all technicians from the same organization are testing to the same thresholds.

Easy-to-Use GUI

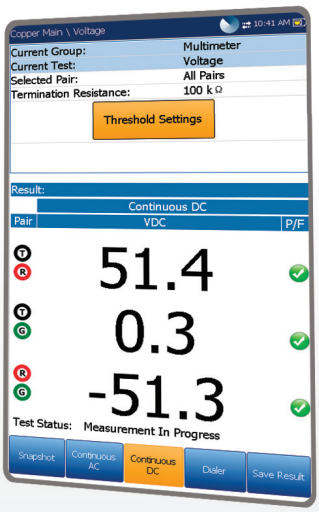
The next-generation user interface of the MaxTester 610 was designed with first-level technicians in mind. The large display features colored icons and graphics for easy configuration and operation, and is simple to use for both experienced and novice users.

Results Capture and Connectivity

In today's highly competitive environment, quality of service is paramount for service providers. The MaxTester 610 allows reports of all tests to be saved and uploaded. Therefore, service providers can keep all the results on file for future reference and confirm that all the required tests have been completed by the technician.

Battery-Powered

The MaxTester 610 is equipped with a battery using the latest technology in rechargeable cells. When charging is required, technicians can either use the optional 12 V vehicle charger or the supplied AC adapter.



COPPER SPECIFICATIONS [a, b, c]

Transmitter characteristics				
Frequency range (200 Hz to 20 kHz)	Frequency resolution		1-Hz steps	
	Frequency uncertainty (accuracy)		±(50 ppm + 1 Hz)	
	Level range (dBm)		–20 to 20 at 600 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		600	
Frequency range (20 kHz to 2.2 MHz)	Frequency resolution		1-kHz steps	
	Frequency uncertainty (accuracy)		±(50 ppm + 100 Hz)	
	Level range (dBm)		–20 to 10 at 100 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		100, 120, 135, 150	
Frequency range (2.2 MHz to 30 MHz)	Frequency resolution		1-kHz steps	
	Frequency uncertainty range (accuracy)		±(50 ppm + 100 Hz)	
	Level range (dBm)		–20 to 0 at 100 Ω	
	Level resolution		0.1 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance (Ω)		100, 120, 135, 150	
Receiver characteristics	Reception frequency range		200 Hz to 20 kHz 20 kHz to 30 MHz	
	Frequency uncertainty range (accuracy)		±(50 ppm + 1 digit)	
	VF reception level range (dBm)		–90 to 20 at 600 Ω	
	VF level uncertainty (accuracy)		200 Hz to 20 kHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 20 dBm, uncertainty (accuracy) ±1 dB	
	WB reception level range (dBm)		–90 to 20 at 100 Ω and 135 Ω	
	WB level uncertainty (accuracy)		20 kHz to 2.2 MHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 20 dBm, uncertainty (accuracy) ±1 dB 2.2 MHz to 30 MHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 20 dBm, uncertainty (accuracy) ±1 dB	
	Impedance (Ω)		100, 120, 135, 150, 600	
POTS dialer	DTMF		0 – 9, #, *	
	Phonebook		25 entries	
Digital multimeter (DMM)	Test type		Snapshot and continuous	
	Impedance selection (for voltage measurement)		100 kΩ, 1 MΩ	
	Measurement	**Range**	**Resolution**	**Uncertainty (accuracy)**
	DC voltage	0 to 400 V	0.1 V for 0 to 99.9 V 1 V for 100 V to 400 V	±(|1 %| + 0.5 VDC)
	AC voltage	0 to 280 Vrms	0.1 V for 0 to 99.9 V 1 V for 100 V to 280 V	±(1 % + 0.5 VAC)
	Isolation resistance (stress/leakage)	0 to 1 GΩ, auto-ranging 1 kΩ to 99 MΩ 100 MΩ to 999 MΩ	Three digits	 ±(2 % + 1 digit) ±(5 % + 1 digit)
	Resistance	0 to 100 MΩ 0 to 999 Ω 1 kΩ to 100 MΩ	Three digits	 ±(1 % + 5 Ω) ±(2 % + 1 digit)
	Capacitance	0.1 nF to 2 µF	Four digits	±(2 % + 50 pF)
	DC current	0 to 110 mA	0.1 mA	±(|2 %| + 1 mA)
	AC current	0 to 110 mA	0.1 mA	±(|2 %|+ 1 mA) [d]
Isolation resistance (stress/leakage) (continued)	Source		50 to 125 VDC (current safely limited to 0.5 mA)	
	Soak timer (s)		1 to 60	

NOTES

a. Subject to change without notice.
b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.
c. Specifications based on 24 AWG (PE 0.5 mm) cabling.
d. From 10 mA to 110 mA.

COPPER SPECIFICATIONS [a, b, c] (continued)

VF noise measurement	Frequency range	200 Hz to 20 kHz
	Level range (dBm)	–90 to 20
	Resolution (dB)	0.1
	Uncertainty (accuracy)	–90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to +20 dBm, uncertainty (accuracy) ±1 dB
	Filters	ITU: none, psophometric, P-notched, 3.4 kHz, D-filter, 15 kHz ANSI: none, C-message, C-notched, 3.4 kHz, D-filter, 15 kHz
	Impedance	600 Ω
VF impulse noise	Low threshold (dBm)	–40 to 0, in 1 dB steps
	Mid threshold	Low threshold plus separation
	High threshold	Mid threshold plus separation
	Separation (dB)	1 to 6, in 1 dB steps
	Dead time (ms)	125
	Filters	None, 3 kHz flat, C-message, psophometric, notched and D filter (IEEE 743-1995)
	Counter	Maximum 999 for each threshold
	Timer	Maximum 100 hours
Power influence (noise to ground)	Noise range (dBm)	–60 to 10
	Uncertainty (accuracy)	–60 dBm to –50 dBm ± 2 dB –50 dBm to 10 dBm ± 1 dB
VF longitudinal balance	Frequency (Hz)	1004
	Level range (dB)	0 to 100
	Level uncertainty (accuracy) (dB)	±1
	Impedance	600 Ω
Time-domain reflectometer (TDR)	Modes	Fully automatic operation with location of most significant event(s)
	Distance range (m)	0 to 6700 (0 ft up to 22 000 ft)
	Pulse width	15 ns to 20 µs
	Test signals	Sine wave, compensated sine wave, half-sine wave and square wave
	Amplitude	7.5 V p-p on cable, 9 V p-p open circuit
	Velocity of propagation (VOP)	0.400 to 0.999
	Distance uncertainty (accuracy) [d] (m)	±(0.5 m + 1 % x distance)
	Units	Meters and feet
Load coil detection	Count	Up to 5
	Plot (kHz)	Up to 10
	Distance range (m)	Up to 8000 (up to 27 000 ft)

NOTES

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.

c. Specifications based on 24 AWG (PE 0.5 mm) cabling.

d. Qualified up to 300 m (1000 ft) and does not include the uncertainty due to VOP.

COPPER SPECIFICATIONS [a, b, c] (continued)

Power spectral density (PSD)	Test type	Continuous with peak-hold
	Vertical scale	15 dBm/Hz to –140 dBm/Hz or 20 dBm to –90 dBm
	Horizontal scale	4.3125 kHz to 17 MHz, in 4.3125 kHz steps or 8.625 kHz to 30 MHz, in 8.625 kHz steps
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
Wideband impulse noise	Threshold	–50 dBm (40 dBrn) to 0 dBm (90 dBrn) in 1 dB steps
	Counter maximum	65 000 000
	Test duration	Maximum 100 hours
	Uncertainty (accuracy) (dB)	±2
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
Wideband longitudinal balance	Level range (dB)	0 to 50 up to 2.2 MHz 0 to 40 up to 12 MHz
	Level resolution (dB)	0.1
	Level uncertainty (accuracy) (dB)	±2 (up to 2.2 MHz)
	Frequency uncertainty (accuracy) (ppm)	±(50 ppm + 1 digit)
	Frequency scale	ADSL/2+: 20 kHz to 2.2 MHz VDSL/VDSL2-12: 20 kHz to 12 MHz
Single-ended frequency response (attenuation) [d]	Distance range (m)	100 m to 5000 m (300 ft to 16000 ft)
	Frequency range (Hz)	4.3 kHz to 30 MHz
	Frequency uncertainty (accuracy)	± (50 ppm + 1 digit)
	Level uncertainty (accuracy) (dB)	± 2.0 dB typical for 2.2 MHz and 8 MHz ranges ± 3.0 dB for VDSL2-12 and VDSL2-17 ± 4.0 dB for VDSL2-30 ranges
	Resolution (dB)	0.1
	Horizontal scale (MHz)	ADSL2+ = 2.208, VDSL2-8, VDSL2-12 = 12, VDSL2-17 = 17.66, VDSL2-30 = 30
	Vertical scale (dB)	0 to +100
Resistive fault location (RFL)	Test type	Single pair (two wire) and separate good pair (four wire)
	Fault detection (MΩ)	0 to 20
	Resolution	Three digits
	Loop resistance (kΩ)	10 maximum
	Multiple cable sections	Five (includes gauge and temperature setting)
	Fault location	Total resistance, near-end to fault resistance, fault to strap resistance (three significant digits, least significant digit 0.1 Ω). Total length, distance to fault, distance from fault to strap (three significant digits, least significant digit 1 m)
	Uncertainty (accuracy)	±(0.1 Ω + 1 % x RTS)

NOTES

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no type B USB connection.

c. Specifications based on 24 AWG (PE 0.5 mm) cabling.

d. Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.

GENERAL SPECIFICATIONS

Display	TFT LCD with backlight 152 mm (6 in) diagonal 800 x 480 resolution, WVGA
Test connections	Five-color banana connector for T/B, R/A, G, T1/B1, R1/A1
Results storage	1.2 GB internal memory
Temperature range operating storage	 0 °C to 40 °C (32 °F to 104 °F) –40 °C to 70 °C (–40 °F to 158 °F)
Humidity	5 % to 95 % relative, non-condensing
Shock	1 m (39 in) drop per GR-196-CORE
Altitude	3000 m (9842 ft)
Input power	9-24 VDC, 2A, 18 W via 90-220 VAC adapter or 12 V vehicle adapter
Battery	Internal rechargeable lithium polymer, with battery-state and level indications, ajustable auto-power down
Safety	CE and CSA marked
Size (H x W x D)	254 mm x 124 mm x 62 mm (10 in x 4 $^{7}/_{8}$ in x 2 $^{7}/_{16}$ in)
Weight (with battery)	1.5 kg (3.3 lb)
Water/dust ingress	Designed to comply with IP54
Differential voltage protection	354 Vrms or 1000 VDC max
Common mode voltage protection	354 Vrms or 1000 VDC
Voltage detection	>20 V will trigger alarm message
Self-test	Routine on power-up
Connectivity	Two USB 2.0 client ports One USB Type B host port
Languages	English, French, Spanish

STANDARD ACCESSORIES

Test cable: Three-color (black, red, green) 4 mm banana plugs terminated with telco clips (ACC-M3COLR), or
Three-color (black, red, green) 4 mm banana plugs terminated with 4 mm plugs with crocodile clips (ACC-M4MM)
RFL strap (ACC-STRP)

Certificate of compliance

AC adapter (GP-2146)

Soft carrying case (GP-10-061)

OPTIONAL ACCESSORIES

Copper test cables: Yellow/blue banana connectors to telco clips (ACC-MTCYB) or
Yellow/blue banana connectors to 4 mm plugs/croc clips (ACC-M4MMYB)

USB host/client cable (GP-2053)

16 GB USB memory stick (GP-2144)

12 V vehicle charger (CL4-CAR)

Form fitting, protective soft glove with shoulder strap (ACC-LGLOVE)

Headset (GP-1002)

ORDERING INFORMATION

MAX-610-XX

Model
MAX-610 = Copper I&R test set

Copper Software Options
00 = Without software options
TDR = Time-domain reflectometry option
RFL = Resistive fault location option
WBAND = Extend frequency testing to 30 MHz
SMARTR = Pair Detective and FaultMapper option [a]

Example: MAX-610-TDR-SMARTR

Note

a. Includes TDR option.

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SPMAXTESTER610.4AN Printed in Canada 13/04

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