SPEC SHEET

MaxTester 610

SMARTER COPPER TESTING FOR INSTALLATION TECHNICIANS

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

EXFO Sync

EXFO Connect compatible

smart R™

KEY FEATURES AND BENEFITS

Aligns with existing methods and procedures; perform single-ended testing or testing with a far-end device (FED) to minimize repair times and costs

Full suite of digital multimeter measurements to quickly and effectively determine the electrical health of the network

Optional TDR with variable gain and RFL/K-test allows 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, in addition to performing high-voltage balance testing on inactive pairs

Designed to face the challenges of the outside plant environment with an IEC IP54 rating

Configurable pass/fail results for automated closeout testing; upload the results to the cloud with ease

THE MAXTESTER 600 SERIES

xDSL and multiplay test set MaxTester 630G

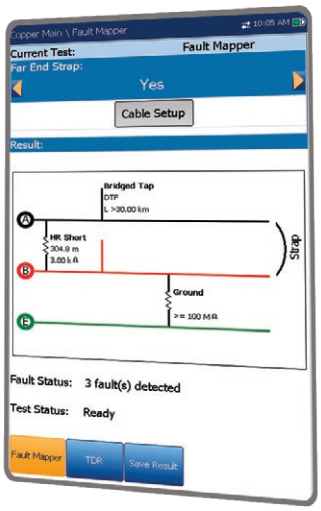
Copper, xDSL and multiplay test set MaxTester 635G

THE PERFECT TOOL FOR COPPER I&R TESTING

The 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.

WORK SMARTER—NOT HARDER

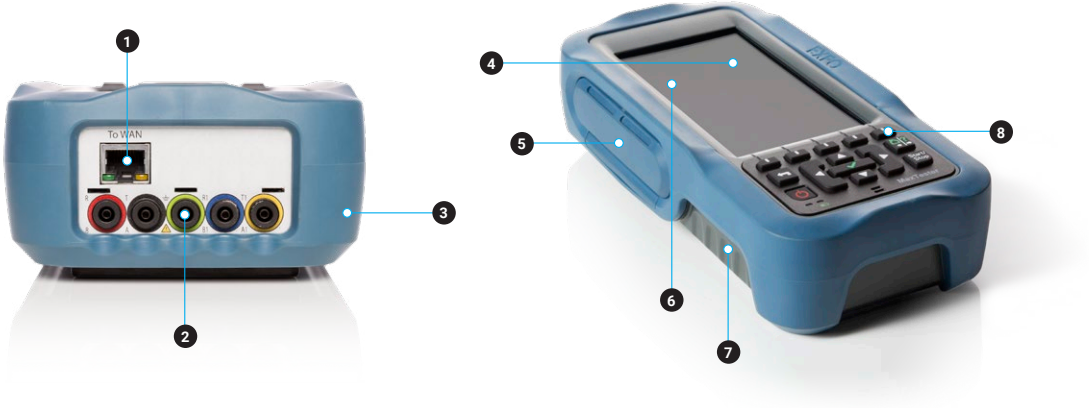
The MaxTester 610 allows technicians and engineers alike to work smarter—not harder. SmartR™ is a suite of intelligent and automated tests that enable any technician to quickly and easily gain an understanding of the condition of the line under test, as well as to identify and locate a variety of common circuit faults. SmartR™ comes with several interesting features. Its 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. Fault Mapper 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. SmartR™ presents results in an easy-to-understand, graphical format, with plain language feedback, making copper troubleshooting easier than ever before.



KEY COPPER APPLICATIONS

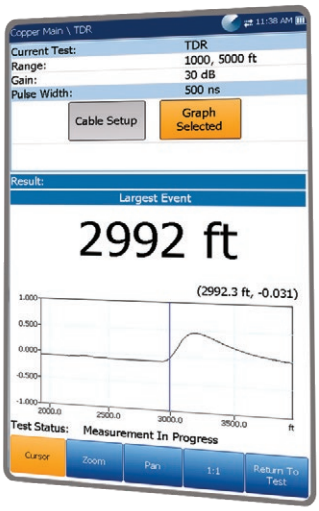
- Detection of potential bottlenecks on subscriber loops to ensure high-quality, consistent and error-free multiplay services
- 35 MHz spectrum analysis for circuit qualification in any VDSL2 band plan (8, 12, 17, 30 and 35 MHz)
- Loop and fault analysis, using proven TDR and RFL/K-test techniques for VDSL2 or ADSL2+ prequalification
- Measurement and reporting of suspect voltages, opens, shorts and balance issues from a single end, or utilizing an FED that can be remote controlled by the MaxTester to put the necessary opens and shorts at the end of the circuit under test
- Determine the maximum ADSL2+, VDSL2-17a and VDSL2-35b data rates that a copper loop could support, prior to connecting/provisioning the circuit and equipment, with the MaxTester's Data Rate Prediction (ADRP) pre-qualification report

KEY CHARACTERISTICS



1. Ethernet connector sealed against the environment
2. Copper connectors sealed against the environment
3. All-round rubber bumper
4. Touchscreen color LCD—daylight visible
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, balance and impulse noise, technicians obtain results that are graphically clear and concise with pass/fail indication. Technicians have the option of running single-ended tests, or running tests against an optional FED.

The MaxTester 610 also features a POTS dialer and an optional TDR with dual-trace comparison capability and resistive fault locator (2/4 wire RFL and K-test) for locating loop faults. The optional wideband testing suite allows the qualification of circuits at VDSL2 frequencies of up to 35 MHz and includes PSD, near-end crosstalk (NEXT), 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

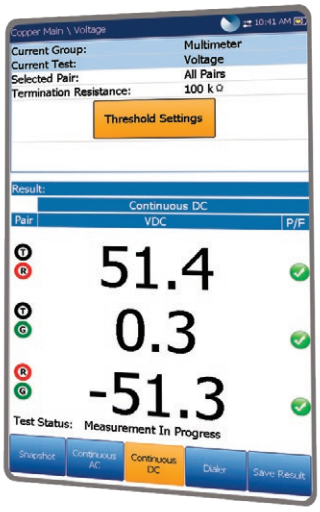
The next-generation user interface of the MaxTester 610 was designed with first-level technicians in mind. The large touchscreen display features colored icons and graphics for easy configuration and operation, and is simple to use for both experienced and novice users. Users can “capture” important GUI screens, whether menu’s or test results with the screen capture capability of the MaxTester 610. Users can save the data to a USB memory device or upload to EXFO Connect’s File Manager.

Asset and results management

In today’s highly competitive environment, quality of service delivered to subscribers is paramount for service providers. With solutions such as EXFO Connect and EXFO Sync coupled with the MaxTester 610, service providers can manage their fleet of MaxTester units and ensure that they have the most up-to-date software installed and properly configured. These solutions on the MaxTester 610 also make it possible for service providers to have test results in hand for data mining and post-visualization, thereby enabling them to proactively manage loop plants and ensure that they are of the highest quality.

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 VDC vehicle charger or the supplied AC adapter.



EXFO Connect

AUTOMATE ASSET MANAGEMENT. GET CONNECTED.

The EXFO Connect cloud-hosted solution provides an automated, secure environment that links your EXFO test instruments together and enables the management of your deployed inventory of test sets.

EXFO Connect enables automated downloads of latest software versions to all test sets in the field to ensure consistency of testing across the organization. Test profiles and threshold settings may also be deployed to all units, to mandate testing according to the latest procedures. Enable EXFO Connect on your fleet of MaxTester units to improve operational efficiency at all levels of your business.

KEY FEATURES

TEST EQUIPMENT MANAGER
Automated inventory tracking and software download

FILE MANAGER
Download/upload files, work orders, test configurations or procedure documents

CONTRACTOR MODE
Secure, segregated access for test-result upload, and automated file download

Visit **EXFO.com/EXFOConnect** for details and features compatibility with the MaxTester handheld series.

EXFO Sync

REAL-TIME COPPER TEST RESULTS UPLOAD– STRAIGHT FROM THE FIELD

Working in the field with an Android™ or iOS™ device? Download the EXFO Sync application for your smart device.*

EXFO Sync is an app (runs on Android and iOS) that operates together with the MaxTester 610 copper test set. It provides a fully automatic copper test script and WiFi transfer of the results files to a phone or tablet for upload to the customer's server.

With EXFO Sync, your copper test results can be uploaded in real-time to a central location for access and further analysis to identify trouble patterns, assess technician performance or target customers for upsell to higher revenue services.

- Copper test result are uploaded, live from the site
- GPS tagging gives visibility of location of test for mapping of test history and network performance
- Ensure compliance to service provider workflow process
- Flexibility to upload test results to an FTP or HTTPS server
- Secure, password-protected connection to upload and access results

* Upload to smart devices is supported only over WiFi and only for the copper autotest.

Download from Google play

Available on the App Store

EXFO

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 10 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 (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 35 MHz	
	Frequency uncertainty range (accuracy)		±(50 ppm + 1 digit) for 20 kHz to 30 MHz	
	VF reception level range (dBm)		–90 to 15 at 600 Ω	
	VF level uncertainty (accuracy)		200 Hz to 20 kHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 15 dBm, uncertainty (accuracy) ±1 dB	
	WB reception level range (dBm)		–90 to 15 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 15 dBm, uncertainty (accuracy) ±1 dB 2.2 MHz to 30 MHz –90 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 15 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]
	Station ground	0 to 1 MΩ 0 to 999 Ω 1 kΩ to 1 MΩ	Up to three digits	± (1 % + 3 Ω) ± (2 % + 1 digit)

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)		
Isolation resistance (stress/leakage) (continued)	Source	50 to 500 VDC (current safely limited to 2 mA)
	Soak timer (s)	1 to 60
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 (Ω)	600
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 (Ω)	600
Time-domain reflectometer (TDR)	Modes	Automatic, Manual, Peak, Xtalk (Crosstalk), Differential
	Distance range (m)	0 to 6700 (0 ft up to 22 000 ft)
	Pulse width	15 ns to 20 µs
	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)
Near-end crosstalk (NEXT)	Frequency range	10 kHz to 30 MHz
	Level range (dB)	0 to 90
	Level resolution (dB)	0.1
	Level uncertainty (accuracy)	2.2 MHz: ±2.0 dB, from 0 to 90 dB 8 MHz: ±2.0 dB, from 0 to 80 dB 12 MHz: ±2.0 dB, from 0 to 75 dB 17.6 MHz: ±3.0 dB, from 0 to 75 dB 30 MHz: ±3.0 dB, from 0 to 68 dB
	Terminations (Ω)	100, 120, 135, 150
Return loss	Test type Frequency range Dynamic range (dB) Resolution (dB) Uncertainty (accuracy) (dB) Horizontal scale Vertical scale (dB)	Single, sweep 20 kHz to 2.2 MHz 0 to 40 0.1 ±0.5, for dynamic range 0 to 20 4.3125 kHz to 2.2 MHz , in 4.3125 kHz steps 0 to 50

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
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 Ω
	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 35 MHz, in 8.625 kHz steps
	Noise filters	None or E, F, G, ADSL2+, VDSL2-8, VDSL2-12, VDSL2-17, VDSL2-30 and VDSL2-35b
Wideband impulse noise	Threshold	−50 dBm (40 dBrn) to 0 dBm (90 dBrn) in 1 dB steps
	Termination	Bridging (Hi-Z), 100, 120, 135, 150 Ω
	Counter maximum	65 000 000
	Test duration (h)	Maximum 100
	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 scale (dB)	0 up to 100
	Level range uncertainty (accuracy)	2.2 MHz: ±2.0 dB, from 0 to 55 dB 8 MHz: ±2.0 dB, from 0 to 45 dB 12 MHz: ±3.0 dB, from 0 to 45 dB 17.6 MHz: ±3.0 dB, from 0 to 40 dB
	Level resolution (dB)	0.1
	Frequency scale	ADSL/2+: 8.6 kHz to 2.2 MHz, in 8.6 kHz steps VDSL2-8 : 17.25 kHz to 8 MHz, in 17.25 kHz steps VDSL2-12: 17.25 kHz to 12 MHz, in 17.25 kHz steps VDSL2-17: 34.5 kHz to 17.6 MHz, in 34.5 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit)
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 35 MHz
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit) for 20 kHz to 30 MHz
	Level uncertainty (accuracy)	±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, VDSL2-35 = 35
	Vertical scale (dB)	0 to +100
Resistive fault location (RFL)	Test type	Single pair (two wire), separate good pair (four wire) and Küpfmüller (K-test)
	Fault detection (MΩ)	0 to 20 for single faults; up to a total fault resistance of 30 for K-test double faults only
	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)
	Single fault uncertainty (accuracy)	±(0.1 Ω + 1% RTS)
	K-test uncertainty (accuracy) [e]	±(1 Ω + 1 % RTS)
Stressed balance	Level range (dBrnC)	0 to 82
	Resolution (dBrnC)	0.1
	Longitudinal excitation	135 VDC (0 dBm, ±1 dB reproducibility)

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.
e. For double faults only.

GENERAL SPECIFICATIONS

Display	Touchscreen TFT LCD with backlight 152 mm (6 in) diagonal 800 x 480 resolution, WVGA
Test connections	Five-color banana connector for T/A, R/B, G, T1/A1, R1/B1
Results management	> 2 GB internal memory Single and bulk file export to USB memory devices FTP upload
Temperature Operating Storage	0 °C to 40 °C (32 °F to 104 °F) –20 °C to 60 °C (–4 °F to 140 °F)
Relative humidity	5 % to 95 %, non-condensing
Shock	1 m (39 in) drop per GR-196-CORE
Altitude	3000 m (9842 ft)
Input power	12 VDC, 4.16 A, 48 W via 90-264 VAC adapter or 12 V vehicle adapter
Battery	Internal rechargeable lithium polymer, with battery-state and level indications, adjustable 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	USB 2.0 client ports (2) USB type B host port (1) Optional WiFi support
Languages	English, French, German, Italian, Polish and Spanish

ACCESSORIES

Standard	ACC-M3COLR or ACC-M4MM	Test cable, three-color (black, red, green) 4 mm banana plugs terminated with telco clips, or Test cable, three-color (black, red, green) 4 mm banana plugs terminated with 4 mm plugs with crocodile clips
	Certificate of compliance	
	ACC-48WPS	AC adapter
	GP-10-061	Soft carrying case
Optional	ACC-MTCYB or ACC-M4MMYB	Copper test cable, yellow/blue banana connectors to telco clips or Copper test cable, yellow/blue banana connectors to 4 mm plugs/croc clips
	GP-2053	USB host/client cable
	GP-2144	16 GB USB memory stick
	ACC-12VLGB	12 V vehicle charger
	ACC-LGLOVE	Form fitting, protective soft glove with shoulder strap
	GP-1002	Headset
	GP-2223	2.4 GHz WiFi pico adapter
	TS125	Teletech TS125 far-end device
	GP-2260	Bluetooth nano USB dongle V4.0 + EDR
	ACC-STRP	RFL strap
	ACC-HIZ	High impedance (Hi-Z) test cable. Requires WBAND software option.
	GP-2272	MaxTester 600 screen protector film (Pkg 2)

ORDERING INFORMATION

MAX-610-XX-XX

Platform options
00 = Without software options
FTPUPLD = Result upload via FTP over WiFi and Ethernet

Example: MAX-610-FTPUPLD-TDR-SMARTR

Copper software options
00 = Without software options
FED = Support for Teletech TS125 far-end device [a]
NEXT = Near-end crosstalk [b]
RFL = Resistive fault location/K-test option
SBAL = Stressed balance
SMARTR = Pair Detective and Fault Mapper option [c]
TDR = Time-domain reflectometry option
WBAND = Extend frequency range from 20 kHz to 35 MHz
HIVOLT = Enables 500V isolation resistance
RLOSS = Return loss to 2.2 MHz option [b]
ADRP = ADSL2+ and VDSL2-17a data rate prediction option [d]
V35DRP = VDSL2-35b data rate prediction [e]

a. Teletech TS125 Far-End Device sold separately.
b. Requires the WBAND option.
c. Includes TDR option.
d. Requires WBAND and TDR option, or WBAND and SmartR™ option.
e. Requires ADRP option

EXFO headquarters **T** +1 418 683-0211 **Toll-free** +1 800 663-3936 (USA and Canada)

EXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to www.EXFO.com/contact.

  Printed in Canada 20/06