FTB-610 Wideband Copper Test Module

ADVANCED COPPER CABLE TESTER WITH SMARTR™ FAULT ANALYSIS

EXFO Connect Compatible

smartR™

SPEC SHEET

The easiest and smartest tool for advanced wideband copper troubleshooting of FTTN circuits.

KEY FEATURES AND BENEFITS

SmartR technology automatically identifies and locates common circuit faults using intuitive graphical displays and plain language

High-voltage isolation tests for long wire pairs and power span circuits

Advanced wideband noise tests to clearly understand the triple-play noise environment

Advanced wideband copper test module and built-in optical power meter and VFL—the ideal tool for multiskilled engineers troubleshooting FTTN circuits

PART OF THE
FTB COPPER ACCESS SERIES

FTB-635
Wideband Copper and DSL Test Module

EXFO | Assessing Next-Gen Networks

THE PERFECT TOOL FOR WIDEBAND COPPER TESTING

EXFO's FTB-610 Wideband Copper Tester, housed in the handheld FTB-1 modular platform, makes wideband copper circuit testing easy for today's technicians through automatic analysis and location of broadband cable faults in a large, colorful, touchscreen graphical interface. This solution combines the optical options of the FTB-1 with an advanced copper test module to create a complete tool for troubleshooting FTTN circuits.

The FTB-610 delivers all the typical cable test tools for basic troubleshooting, such as a multimeter, balance, VF noise meter, locator and POTS dialer, TDR and RFL, as well as long-range fault finding and advanced signal and noise analysis. Featuring SmartR™ technology, it automatically analyzes test results, eliminating guesswork and enabling users to view, find and fix common cable faults. The FTB-1 platform's large, seven-inch color touchscreen presents an intuitive graphical depiction of cable faults. The Windows-based architecture provides many connectivity options to capture and upload test results and reports on the spot, as well as to manage the test set in the field with on-board EXFO Connect.

WORK SMARTER WITH THE FTB-610

Equipped with SmartR technology, the FTB-610 enables technicians and engineers alike to work smarter—not harder. It is the next generation of telco cable testing that automatically identifies and locates common circuit faults and presents results using intuitive graphical displays and plain language. The PairDetective™ feature automatically runs the most common line tests and provides graphical, color-coded, plain language results and pass/fail indications to detect conditions, including shorts, grounds, opens, battery, splits and imbalances. FaultMapper™ provides the additional capability of identifying the location of the service-affecting line faults, including bridged taps, shorts, grounds and opens. EXFO's unique SmartR draws an easy-to-understand graph of the wire pair, making copper troubleshooting easier than ever.

MORE POWER, EXTENDED RANGE

More reach means more revenue and more customers—and the FTB-610 has the power for insulation breakdown testing of the longest loops.

WIDEBAND NOISE ANALYSIS

The FTB-610 enables noise testing at up to 30 MHz and accurately identifies wideband cable noise issues. Both narrowband and wideband tests provide visibility into service-affecting noise issues.

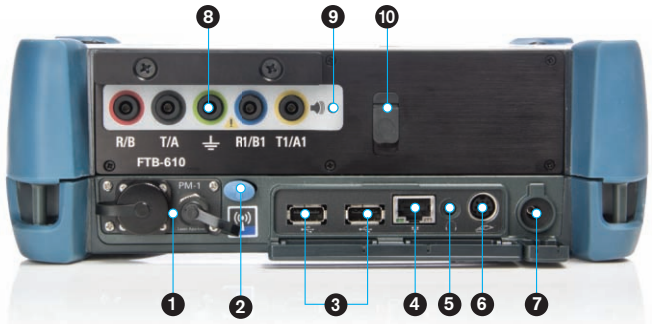
FTTN MULTITECHNOLOGY PLATFORM: OPTICAL AND COPPER ALL-IN-ONE

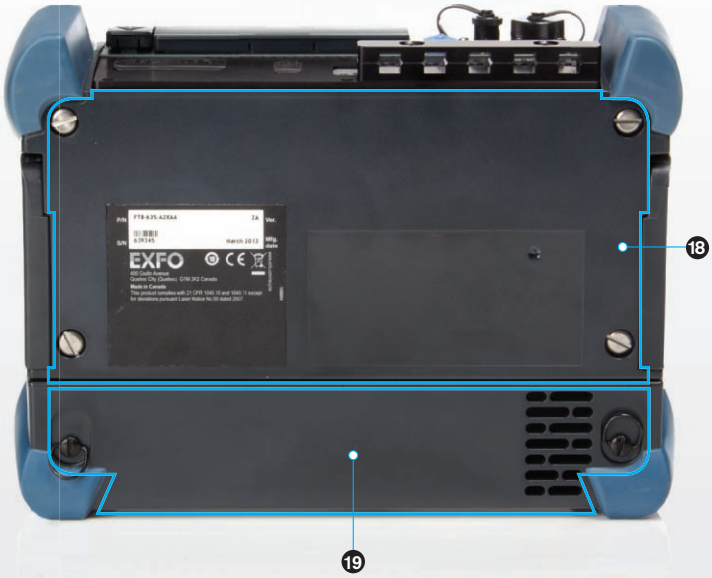
The FTB-1 Platform comes with optional built-in optical test tools, including a power meter and visual fault locator. When combined with the FTB-610 module, it creates the perfect platform for hybrid and FTTN networks. With interfaces and tests for wideband copper circuits, fiber-optic links, Ethernet and Wi-Fi, it's the perfect tool to maintain FTTN circuits and services–all with one technician.

KEY COPPER APPLICATIONS
Perfect for troubleshooting fiber-to-the-node service
Simultaneously combines optical power meter, visual fault locator (VFL), fiber probe and wideband copper
Complete suite of manual and automated advanced metallic tests, from multimeter to TDR to wideband impulse noise
30 MHz wideband spectrum analysis for analyzing any circuit cable qualification, up to VDSL2 band plan (8, 12, 17, 30 MHz)
High-power isolation for finding resistive faults and insulation failures
Leverage FTB-1 platform connectivity to capture, upload and analyze cable measurements

DESIGNED FOR EFFICIENCY

1. Power meter and VFL
2. Stylus
3. Two USB 2.0 ports
4. 1 GigE port
5. Head set
6. Fiber inspection probe video port
7. AC adapter
8. Copper connectors
9. POTS speaker
10. Headset jack
11. Back stand
12. Speaker out
13. Brightness
14. Keyboard/screen capture
15. Switch application
16. Power on/off
17. Battery LED
18. Module compartment
19. Battery





ALL THE RIGHT FEATURES

Ease of Use

The next-generation interface of the FTB-610 is more like modern tablets than your previous field testers. The large seven-inch color touchscreen display makes use of colored icons and graphics for easy configuration and operation to present findings in plain language, for an enjoyable user experience.

Customizable Automatic Testing

Besides SmartR™ automatic analysis, users and managers can customize their FTB-610 to create custom tests and pass/fail indications for repeated troubleshooting or closeout testing. Work smarter, and just the way you like.

Results Capture and Connectivity

In today's highly competitive market, quality of service is paramount for service providers. The FTB-610 allows test reports to be uploaded in a variety of formats. Therefore, service providers can keep all the results on file for future reference and confirm that the required tests have been completed by the technician. The USB connectors accept memory sticks, mouse, keyboard and other approved accessories. What's more, the FTB-610 enables connectivity through Wi-Fi, Bluetooth as well as optional mobile WAN adapters, plus third-part applications.

Battery Power Options

The FTB-610 can be fitted with a normal- or high-capacity modern technology battery to meet your needs, using the latest technology in rechargeable cells. It provides the maximum testing time between charges, even when using the high power demands of VDSL2. When charging is required, technicians can either use the optional 12 volt vehicle charger or the supplied AC adapter.

Features

The features of the FTB-610 Advances Wideband Copper Tester include: color touch-screen multimeter, POTS, locator, VF transmitter/receiver, power influence with harmonics, VF noise, loadcoils, balance, spare pair locator, series resistance detection, TDR, RFL, SmartR™ Pair Detective and Fault Mapper, wideband signal transmitter/receiver, wideband noise, single-ended attenuation, pre-defined and flexible auto tests.

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	–20 dBm to 20 dBm at 600 Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
Frequency range (20 kHz to 2.2 MHz)	Frequency resolution	1 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 100 Hz)
	Level range	–20 dBm to 10 dBm at 100 Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
Frequency range (2.2 MHz to 17 MHz)	Frequency resolution	1 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 100 Hz)
	Level range	–20 dBm to 0 dBm at 100 Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
Frequency range (17 MHz to 30 MHz)	Frequency resolution	1 kHz steps
	Frequency uncertainty (accuracy)	±(50 ppm + 100 Hz)
	Level range	–20 dBm to 0 dBm at 100 Ω
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±1 dB
	Impedance	100 Ω, 120 Ω, 135 Ω, 150 Ω, 600 Ω
Receiver characteristics	Reception frequency range	200 Hz to 20 kHz 20 kHz to 30 MHz
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit)
	VF reception level range	–90 dBm to 20 dBm 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	–80 dBm to 20 dBm at 100 Ω, 120 Ω, 135 Ω, 150 Ω
	WB level uncertainty (accuracy)	20 kHz to 2.2 MHz –80 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 20 dBm, uncertainty (accuracy) ±1 dB 2.2 MHz to 30 MHz –80 dBm to –50 dBm, uncertainty (accuracy) ±2 dB –50 dBm to 20 dBm, uncertainty (accuracy) ±1 dB
	Impedance	100 Ω, 120 Ω, 135 Ω, 150 Ω, 600 Ω
POTS dialer	DTMF	0 – 9, #, *
	Phonebook	25 entries

NOTES

a. Subject to change without notice.

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

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

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

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 to 400 V	±(|1 %| + 0.5 VDC)
	AC voltage	0 to 280 Vrms	0.1 VAC for 0 to 99.9 VAC 1 VAC for 100 to 280 VAC	±(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 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 V to 300 V (current safely limited to 0.5 mA)	
	Soak timer		1 s to 59.9 min	
VF noise measurement	Frequency range		200 Hz to 20 kHz	
	Level range		–90 dBm to 20 dBm	
	Resolution		0.1 dB	
	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		–40 dBm to 0 dBm, in 1 dB steps	
	Mid threshold		Low threshold plus separation	
	High threshold		Mid threshold plus separation	
	Test duration		Minutes: 1, 5, 10, 15, 30, 60 Hours: 4, 8, 12, 24, 100	
	Separation		1 dB to 6 dB, in 1 dB steps	
	Dead time		125 ms	
	Filters		None, 3 kHz flat, C-message, psophometric, notched and D-filter (IEEE 743-1995)	
	Counter		Maximum 999 for each threshold	
	Timer		1 min to 24 h, default is 15 min	
Power influence (noise to ground)	Noise range		–60 dBm to 10 dBm	
	Uncertainty (accuracy)		–60 dBm to –50 dBm ± 2 dB –50 dBm to 10 dBm ± 1 dB	
	Graphical display		Third triplet harmonics to 20 kHz	
VF longitudinal balance	Frequency		1004 Hz	
	Level range		0 dB to 100 dB	
	Level uncertainty (accuracy)		±1 dB	
	Impedance		600 Ω	

NOTES

a. Subject to change without notice.

b. Typical, at 23 °C ± 3 °C, on batteries, with no 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)

Time-domain reflectometer (TDR)	Modes	Fully automatic operation with location of most significant event(s)
	Distance range	0 m to 6700 m (0 ft up to 22 000 ft)
	Pulse width	15 ns to 20 µs (automatic control)
	Amplitude	7.5 V p-p on cable, 9 V p-p open circuit
	Velocity of propagation (VOP)	0.40 to 0.99
	Distance uncertainty (accuracy) [d]	±(0.5 m + 1 % x distance)
	Units	Meters and feet
Load coil detection	Count	Up to 5
	Plot	Up to 10 kHz
	Distance range	Up to 8000 m (up to 27 000 ft)
Power spectral density (PSD)	Test type	Continuous with peak-hold
	Vertical scale	15 dBm/Hz to −140 dBm/Hz or 20 dBm to −100 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, ADSL, ADSL2+, VDSL, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
Wideband impulse noise	Threshold	−50 dBm (40 dBm) to 0 dBm (90 dBm) in 1 dB steps
	Counter maximum	65 000 000
	Test duration	Minutes: 1, 5, 10, 15, 30 and 60 Hours: 4, 8, 12, 24 and 100
	Uncertainty (accuracy)	±2 dB
	Noise filters	None or E, F, G, VDSL2-8, VDSL2-12, VDSL2-17 and VDSL2-30
Wideband longitudinal balance	Level range	0 dB to 55 dB up to 2.2 MHz 0 dB to 45 dB up to 12 MHz
	Level resolution	0.1 dB
	Level uncertainty (accuracy)	±2 dB (up to 2.2 MHz)
	Frequency uncertainty (accuracy)	±(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) [e]	Distance range	100 m to 5000 m (300 ft to 16000 ft)
	Frequency range	4.3 kHz to 30 MHz
	Frequency uncertainty (accuracy)	±(50 ppm + 1 digit)
	Level uncertainty (accuracy)	±2 dB typical for 2.2 MHz and 8 MHz ranges ±3 dB for VDSL2-12 and VDSL2-17 ±4 dB for VDSL2-30 ranges
	Resolution	0.1 dB
	Horizontal scale	ADSL2+ = 2.208 MHz, VDSL2-8 = 8 MHz, VDSL2-12 = 12 MHz, VDSL2-17 = 17.66 MHz, VDSL2-30 = 30 MHz
	Vertical scale	0 dB to 100 dB
Resistive fault location (RFL)	Test type	Single pair (two wire) and separate good pair (four wire)
	Fault detection	0 to 20 MΩ
	Resolution	Three digits
	Loop resistance	10 kΩ 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 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.
e. Specification based on 1 kft 24 AWG cabling. Range depends on cable type and condition.

TECHNICAL SPECIFICATIONS

Display	Color touchscreen, 800 x 480 TFT, 178 mm (7 in)
Interfaces	Two USB 2.0 ports RJ45 LAN 10/100/1000 Mbit/s Fiber inspection probe connector port (video) Built-in Bluetooth and Wi-Fi (hardware option) Five-color coded 2 mm analog safety shrouded line interfaces
Storage	8 GB internal memory (flash) 16 GB internal memory (flash), optional
Batteries	Rechargeable lithium-ion batteries Operating time: 4.75 h (typical with extended battery)

GENERAL SPECIFICATIONS (MODULE ONLY)

Size (H x W x D)	130 mm x 252 mm x 56 mm (5 1/8 in x 9 15/16 in x 2 3/16 in)
Weight	0.93 kg (2 lb)
Temperature	
operating	0 °C to 40 °C (32 °F to 104 °F) [a]
storage	–40 °C to 70 °C (–40 °F to 158 °F)

PM-1 BUILT-IN POWER METER SPECIFICATIONS [b]

Calibrated wavelengths (nm)	850, 1300, 1310, 1490, 1550, 1625, 1650
Optional CWDM calibrated wavelengths (nm)	1270, 1290, 1310, 1330, 1350, 1370, 1390, 1410, 1430, 1450, 1470, 1490, 1510, 1530, 1550, 1570, 1590, 1610, 1383, 1625
Power range (dBm)	10 to –86 (InGaAs) 26 to –64 (GeX)
Uncertainty (%) [c]	±5 % ± 3 pW (InGaAs) ±5 % ± 0.4 nW (GeX)
Display resolution (dB)	
InGaAs	0.01 = max to –76 dBm 0.1 = –76 dBm to –86 dBm 1 = –86 dBm to min
GeX	0.01 = max to –54 dBm 0.1 = –50 dBm to –60 dBm 1 = –60 dBm to min
Automatic offset nulling range [d]	Max power to –63 dBm for InGaAs Max power to –40 dBm for GeX
Tone detection (Hz)	270/1000/2000

Notes

a. DC voltage, isolation resistance, VF and WB receiver = 0 °C to 45 °C (32 °F to 113 °F).

b. At 23 °C ± 1 °C, 1550 nm and FC connector. With modules in Idle mode. Battery-operated.

c. Up to 5 dBm.

d. For ±0.05 dB, from 18 °C to 28 °C.

ORDERING INFORMATION

FTB-610-XX

Model
FTB-610 = Wideband Copper Test Set Module

Example: FTB-610-WBAND

Copper Software Options
00 = Without software options
TDR = Time-domain reflectometry
RFL = Resistive fault location
WBAND = Extends frequency testing to 30 MHz
SMARTR = Pair Detective and FaultMapper option [a]
HIVOLT = Extends isolation resistance testing output from 125 VDC to 300 V

Note

a. Includes TDR option.

EXFO Headquarters > Tel.: +1 418 683-0211 | Toll-free: +1 800 663-3936 (USA and Canada) | Fax: +1 418 683-2170 | info@EXFO.com | www.EXFO.com

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

SPFTB610.2AN

Printed in Canada 12/11

EXFO Assessing Next-Gen Networks