

FTB-610 Wideband Copper Test Module

ADVANCED COPPER CABLE TESTER
WITH SMARTR™ FAULT ANALYSIS



 EXFO Connect
Compatible

 smartR™

The easiest and smartest tool for advanced wideband copper troubleshooting of FTN 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 FTN 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

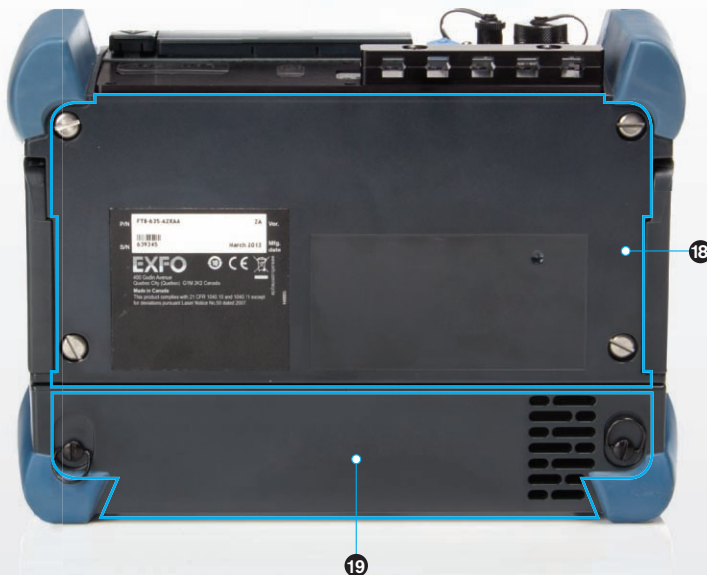
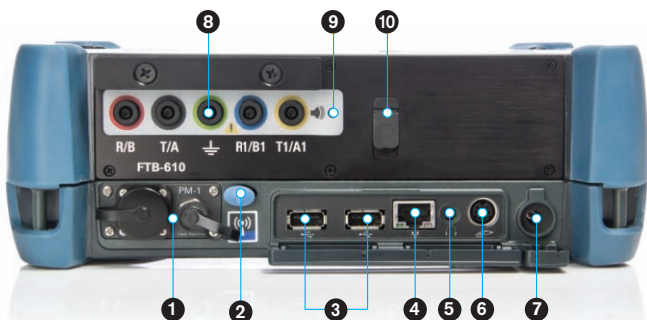
The FTB-1 Platform comes with optional built-in optical test tools, including a power meter and visual fault locator. When combined with the FTB-610 module, it creates the perfect platform for hybrid and FTTN networks. With interfaces and tests for wideband copper circuits, fiber-optic links, Ethernet 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

- | | | |
|--|---|--|
| <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 7 AC adapter 8 Copper connectors 9 POTS speaker 10 Headset jack 11 Back stand 12 Speaker out | <ul style="list-style-type: none"> 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.

EXFO Connect

EXFO | Connect

AUTOMATE ASSET MANAGEMENT. PUSH TEST DATA IN THE CLOUD. GET CONNECTED.

EXFO Connect stores and pushes test equipment and test data content automatically in the cloud, allowing you to streamline test operations from build-out to maintenance.

| 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 |
| | DC voltage | 0 to 400 V | 0.1 V for 0 to 99.9 V 1 V for 100 to 400 V |
| | AC voltage | 0 to 280 Vrms | 0.1 VAC for 0 to 99.9 VAC 1 VAC for 100 to 280 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 μ s (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 | $\pm(0.5 \text{ m} + 1 \% \times \text{distance})$ |
| | 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) | $\pm(50 \text{ ppm} + 1 \text{ digit})$ |
| | 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) | $\pm(50 \text{ ppm} + 1 \text{ digit})$ |
| | 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 M Ω |
| | Resolution | Three digits |
| | Loop resistance | 10 k Ω 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) | $\pm(0.1 \Omega + 1 \% \times \text{RTS})$ |

NOTES

- a. Subject to change without notice.
- b. Typical, at 23 °C \pm 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 storage | 0 °C to 40 °C (32 °F to 104 °F) ^a -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 | 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 |
| Example: FTB-610-WBAND | |

- Note**
- a. Includes TDR option.

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

EXFO is certified ISO 9001 and attests to the quality of these products. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit www.EXFO.com/recycle. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

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