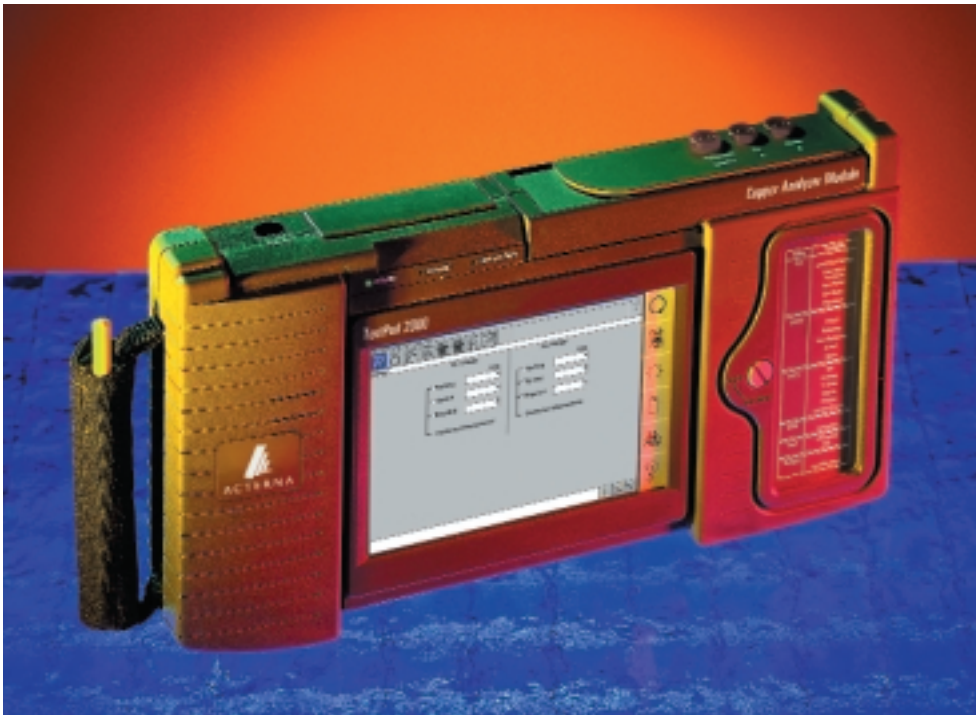# Acterna TestPad 2000™
Copper Analyzer Module

Product Highlights

- One-button testing for all copper services—completes tests in under one minute

- Dual-end analysis using Copperhead, a companion far-end device, for economical, single technician testing

- Easy-to-use touch screen and graphical user interface (GUI) simplify and expedite testing

- Modular TestPad 2000 architecture enables up-to-date support for established and emerging technologies in a single platform

- Field engineered, rugged construction, lightweight design, and battery-powered operation

- Dual PCMCIA slots support easy installation of future upgrades and bring added testing functionality and versatility

- Automated testing features minimize training costs and testing complexity

Application Highlights

- Qualify copper for xDSL, DDS, T1, and ISDN services

- Locate DSL disturbers such as AM radio interference using the built-in noise meter

- Identify frequency-specific faults such as bridged taps and wet sections

- Isolate opens and shorts between network equipment and CPE

- Combine with other TestPad 2000 modules to test the entire network

- Verify or troubleshoot BRI service quality

- Find any AC fault such as bridged taps or wet sections with spectral analysis

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The Acterna TestPad 2000 Copper Analyzer Module is a complete copper tester for the high-speed access network. When combined with other members of Acterna's TestPad 2000 family—the Acterna TestPad 2000 SONET Field Services Module, the Acterna TestPad 2000 SDH Field Services Module, and the Acterna TestPad 2000 DSL Broadband Services Module— the Copper Analyzer Module provides a complete solution for DSL prequalification through the DSLAM to the customer premises. Using its Good Pair Check, Opens Meter, and TDR, the Copper Analyzer Module quickly and easily locates cable faults that could disturb DSL service and checks for load coils that act as low-pass filters for wide-band services.

Adding to its comprehensive testing capabilities, the Copper Analyzer Module also can be optioned to test BRI service. Technicians can perform tests everywhere—from the CO to the CPE—to isolate trouble in the loop. And employing the Copper Analyzer Module's sophisticated technology, calls can be placed and received on both B channels and BER testing can be performed to verify voice and data service.

The easy-to-use touch screen display expedites testing.

Function Highlights

- The Copper Analyzer Module with Spectral Analysis prequalifies and troubleshoots copper loops more thoroughly and effectively than traditional WB TIMS.
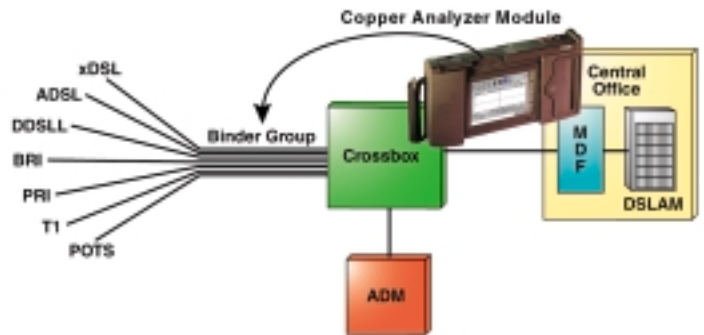

Find bridged taps, detect shorts and grounds, find load coils and wet sections, and locate disturbers such as AM radio and crosstalk.

- No-dead-zone TDR makes finding nearby faults easier.
- Load coil counter graph makes it easy to verify that there are no loads on the span.

Applications

Since the majority of copper pair problems are located close to the customer premises, technicians typically need to test the loop from the customer's 66 punch down block or network interface unit.
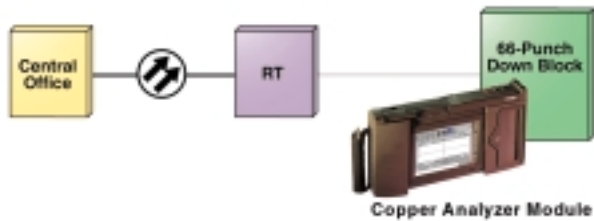

Troubleshoot wideband services from the 66 punch down block.

To effectively test the loop, technicians need a TDR to measure the distance to faults, a load coil counter to ensure there are no loads on the span, a resistance meter to find shorts and grounds, and a spectral noise meter to identify potential disturbances such as crosstalk or AM radio. The Copper Analyzer Module combines all these resources into a single, user-friendly tool.

Find and Remove Bridged Taps

The most pervasive problem during DSL service rollout is finding and removing bridged taps—additional sections of cable attached to the loop under test that do not lead to the customer. Traditionally designed into the loop for cable pair redundancy, impedance matching, or party line support, bridged taps can add to the total loop length of the circuit and increase the attenuation of the span. If located within 1,000 feet of the network equipment, they can act as high-pass filters. To measure the length of the tap along with the distance to the fault, technicians use a TDR. The Copper Analyzer Module's TDR, which has a no-dead-zone feature, makes it easy to find faults close to the testing point.
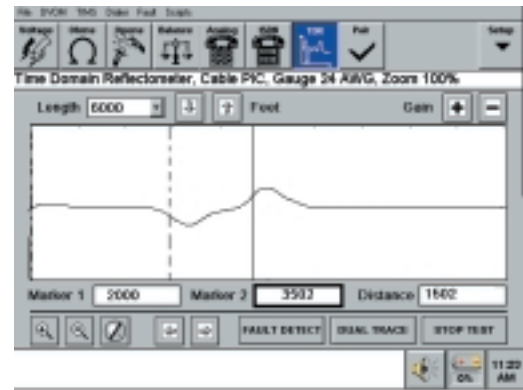
With the Copper Analyzer Module's no-dead-zone TDR, this bridged tap is much easier to find.

Locate Load Coils

Load coils are passive devices designed into POTS facilities to match impedance and provide filtering for unwanted noise above the voiceband. Since all wideband signals run above the voiceband, load coils frequently cause problems and must be removed to provide service. The Copper Analyzer Module's Load Coil Counter quickly displays the number of load coils in a graph. After the loads are removed, technicians can use the Load Coil Counter to ensure that no loads remain on the span.
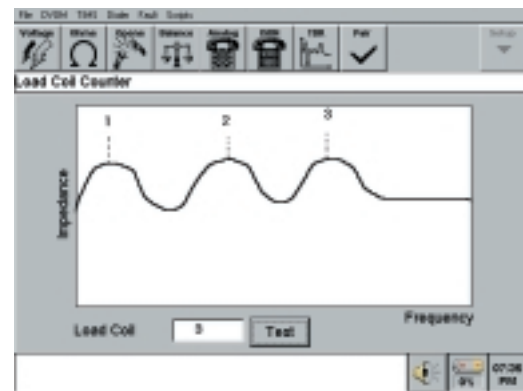

Use the Load Coil Counter to easily determine the number of load coils on the span.

Find Shorts and Grounds

When troubleshooting a loop for wideband services, measuring loop resistance ensures that no shorts or grounds are present between the 66 punch down block and CO. The Copper Analyzer Module includes a precision digital volt ohm meter (DVOM) with a resistance meter that excels at finding shorts and grounds by measuring resistance across all three conductors—tip to ring, tip to ground, ring to ground. If a short is detected, a pop-up message appears, indicating the distance to the fault.

Measure Noise Levels

Another common problem for high-speed services is interference caused by disturbers such as AM radio signals, T1s, or other DSLs in the same binder group. To locate these interferers, the technician needs to measure noise levels with a spectral noise meter. Although the majority of spectral noise meters attempt to display the type of interference, most interferers' signal strength fluctuates over time, which means that an appropriately tuned sampling rate is needed to accurately identify and locate DSL disturbances. The Copper Analyzer Module's Spectral Noise Meter has a sampling rate that keeps up with these signal changes, allowing technicians to properly identify any potential disturbers on the line.
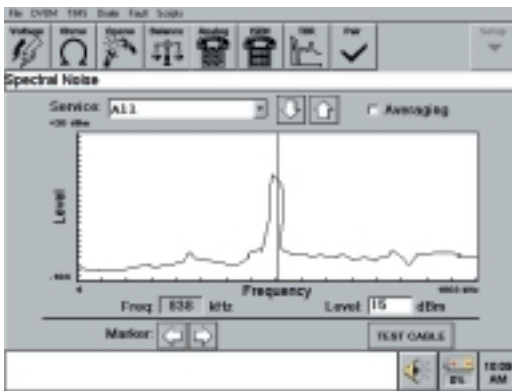
Use the Spectral Noise Meter to look for interference from other wideband services.

Qualify Copper from the Main Distribution Frame (MDF)
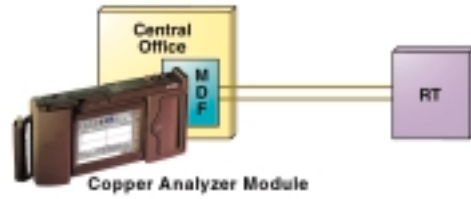
Perform tests from the CO's MDF.

To qualify multiple loops for wideband services, technicians must perform tests from the CO's MDF because it provides access to all the loops that are being analyzed. The key qualification testing parameters—resistance, TDR, opens, and loss—are identical to those for POTS service.

The Copper Analyzer Module's Good Pair Check automatically runs through a comprehensive suite of tests to identify whether a copper loop passes or fails. If it fails, the Copper Analyzer Module informs the user which test failed and displays the actual and expected results based on IEEE standards.

The Good Pair Check returns either a pass, marginal, or failed result to remove the guesswork from testing.

The easy-to-read Summary Report clearly shows actual results as compared to expected results.

The Copper Analyzer Module's Spectral Loss measurement improves on traditional WB TIMS by measuring the signal's attenuation over the entire frequency spectrum and ensuring that there are no problems with the signal's performance. For unbundled loops, loss is a critical parameter because it is interactively measured between providers.

For example, to verify that loss on the loop is within agreed parameters, an incumbent local exchange carrier (ILEC) sends a tone to a competitive local exchange carrier (CLEC).
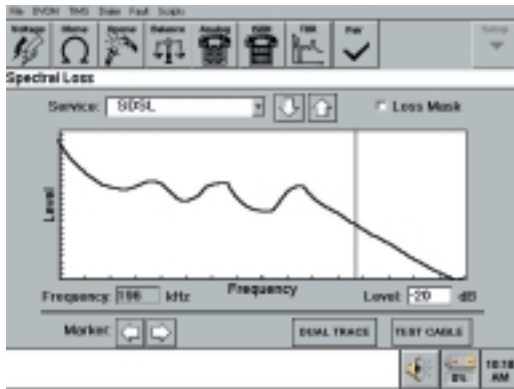
Bridged taps and wet sections are easy to find with the Copper Analyzer Module's Spectral Analysis functionality.

Test Basic Rate ISDN from the Line Termination
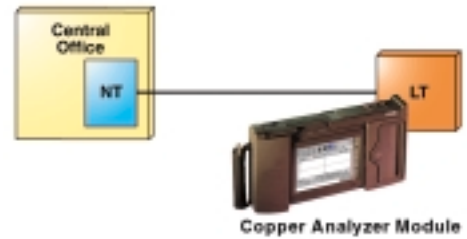
Place and receive data and voice calls.

To turn up BRI service, providers must qualify the loop and test the service. Technicians can use the Copper Analyzer Module with the CO equipment, such as an Acterna TPI 550B+ ISDN Test Set or a SONET Field Services Module, to place and receive data and voice calls. With its Dual Call mode, the Copper Analyzer Module places a call on B1 and receives it on B2, verifying both channels at once. The Copper Analyzer Module checks for data service quality and shows results for FEBE errors, BER errors, Err seconds, and CRC errors. Call Status reports provide cause codes to make troubleshooting easier.

Technicians can easily step through the BRI setup.

5

Technical Specifications

PHYSICAL CHARACTERISTICS

Overall dimensions . . . . 7.5 x 13.6 x 2.5 in

Overall weight . . . . 3.4 lb, with battery

Module dimensions . . . . 7.25 x 7.5 x 2.2 in

Module weight . . . . 2 lb

ENVIRONMENT
Temperature Range

Operating . . . . 32° to 122° F (0° to 50° C)

Storage . . . . -40° to 167° F (-40° to 75° C)

Humidity . . . . 10 to 95% relative humidity, non-condensing

POWER REQUIREMENTS

AC Adapter . . . . 100 to 220 at 60 Hz or 200 to 240 at 50 Hz VAC to 19 VDC, 2.37 AMPS

Charging Time . . . . Maximum of 2 hours from full discharge

Battery Type . . . . 10.8 V NiMH

Operating Time . . . . Typically 2 hours on full charge

DISPLAY

. . . . 6-inch diagonal graphic LCD color display

TDR

Max distance . . . . 18,000 ft

. . . . Automated setup

. . . . Pulse amplification

DVOM

DC . . . . 0 to 120 VDC

AC . . . . 0 to 120 VAC

Resistance . . . . 0 to 10 MΩ

Opens . . . . 0 to 40,000 ft

Ground current . . . . 0 to 100 mA

Loop current . . . . 0 to 100 mA

TRANSMISSION TESTING

Balance . . . . 20 to 80 dB

Power Influence . . . . 50 to 120 dBrnC

Noise . . . . 0 to 60 dBrnC

LOAD COIL COUNTER

. . . . 0 to 5 loads

ANALOG VOICE FEATURES

. . . . DTMF

. . . . Pulse dial

. . . . Analog speaker

BASIC RATE ISDN FEATURES

. . . . "U" Interface 2B1Q

. . . . FEBE

. . . . CRC

. . . . Err Seconds

. . . . BER

CALL CONTROLS

. . . . AT&T

. . . . NT1 Custom

. . . . National

VOICE CAPABILITY

. . . . DTMF dialing

. . . . B-channel selection

. . . . Selectable call appearance

. . . . Audio speaker

DATA CAPABILITY

. . . . Circuit switched data calls (56k/64k)

. . . . Dual call feature

. . . . BERT

RESISTIVE FAULT ANALYSIS

Battery cross up to 18,000 ft . . . . 0 to 450Ω

Shorts up to 18,000 ft . . . . 0 to 450Ω

Grounds up to 18,000 ft . . . . 0 to 450Ω

TIMS

TX and RX tones . . . . -40 to 10 dBm

Spectral noise . . . . -104 to 10 dBm

Spectral loss . . . . 10 to 1600 kHz

Ordering Information

User Interface Module

TestPad 2000 with color display (includes kickstand, AC
adapter/changer, hanging strap, and printer cable) 2000-V3

Application Module

Description	Part Number
Copper Analyzer Module	2109

Additional TestPad 2000 Application Modules Available

Optical Modules

Description	Part Number
SONET Field Services Module	2310
SDH Field Services Module	2416
10-Gig Field Services Module	2510

Access Modules

Description	Part Number
T1/T3 Wireless Field Services Module	2207
T1/T3 Field Services Module	2209
DSL Broadband Services Module	2357
E1/Data Communications Analyzer	2230

Analyzer Options

Description	Part Number
Basic Rate ISDN	2109-BRI
Resistive Fault Analyzer	2109-RFA
Spectral Software Option	2109-SPE
Copperhead (far-end device)	2109-FED
Hardware Upgrade with Spectral Option	2109-SPE-U2

Optional Accessories

Description	Part Number
External Battery Charger	AC-31705
Hanging Strap	AC-31891
Cigarette Lighter Adapter/Charger	AC-31905
Replacement Battery	BA-014081
Replacement Alligator leads	CB-45117
Carrying Case, large soft	CC-44605
Carrying Case Multi-Module Case (soft)	CC-45158

Packages

Includes 2109 and 2109-SPE	2109-P1
Includes 2109, 2109-SPE, 2109-RFA, and 2109-FED	2109-P2
Includes 2109, 2109-SPE, 2109-RFA, 2109-FED, and 2109-BRI	2109-P3

2109CAM/B/DS/ILL/GER/09-01

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