MOHR™ CT100B Series TDR Cable Analyzers
High-Resolution Portable TDR with Frequency-Domain Analysis Tools
Ideal for testing all types of microwave/RF and digital cables and connectors

MOHR CT100B TDR Cable Analyzers provide state-of-the-art TDR measurements in a rugged portable package. These instruments are ideal for precision testing of all types of coaxial, twisted-pair, and multi-conductor cables in the field or the lab.

Features and Benefits
Industry's Best Cable Fault Sensitivity
- Detect subtle cable and connector faults with industry-leading 16-bit vertical sampling resolution.
- Resolve faults and interconnect and PCB features located less than 1 cm apart.
- Measure cable length and localize faults with 75 micron (0.003 in.) precision.

Industry's Only Portable TDR with S-Parameters
- Measure 1-port S-parameters and estimate frequency-specific return loss (S11) and cable loss (S21).*
- Measure return loss between cursors to de-embed features of interest (e.g. connector or cable fault).
- Visualize results using real-time frequency-domain plots, Smith charts, and normalized TDR traces with adjustable rise time.

High-Resolution Cable Waveforms and Scanning
- View or scan a cable at high resolution with cable records of up to 1.5 million points.
- Compare to other traces, either on the device itself or using the CT Viewer™ software package.

Key Specifications and Features
- Rugged portable TDR with S-parameter tools
- Resolves connector detail (<1 cm)
- 75 µm (0.003 in.) cursor resolution
- 16-bit digital sampling at up to 250 KSPS
- Stores thousands of TDR traces
- USB host/client, 10/100 Ethernet
- Lightweight, bright color screen
- Internet streaming and remote control

Capture Rapid Transient / Intermittent Faults
- Identify and localize intermittent faults that other instruments would miss.
- 250 KSPS sample rate with 2 ms full-waveform transient fault detection
- Capture faults using the CT100B Envelope mode.
- Record waveform movies with CT Viewer™

Versatile Connectivity Options
- Host/Client USB.
- 10/100 Mb Ethernet.
- Live network streaming and remote control of any CT100 Series TDR via CT Viewer™

Ergonomics for Easy Use
- Rugged, portable, lightweight (<5 lbs. / 2.2 kg)
- Long battery life with built-in charger
- Bright daylight-readable color screen

Applications
- Aerospace / Aviation
- Naval / Marine
- CATV, Power, Telephone
- Wireless Infrastructure
- PCB Controlled Impedance
- TDR Sensors (Soil Moisture, Geophysics)

* Availability of features and bandwidth may vary depending on application and on instrument configuration.

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TDR Analysis Features (1/2)

High-Resolution TDR Waveform Comparisons
- Industry-leading 16-bit vertical resolution and 760 fs cursor resolution lets you detect subtle soft faults of less than 0.1 Ω.
- Use the high resolution scan capability to track cable and connector performance and identify problems before they can seriously degrade system performance.
- Figure 1 shows difference between normal BNC and SMA connectors with approximately 0.8 Ω and 0.4 Ω excess impedance, respectively.

Rapid Digital Filtering and Smoothing
- The CT100B samples in real time at up to 250 KPS with waveforms up to 1.5 million points in length, letting you store comprehensive high-resolution cable records for future comparison / analysis.
- Subpixel sampling ensures every fault is visible at every horizontal scale.
- Figure 2 shows effect of subpixel sampling in a 820 ft. (250 m) cable. The highlighted 8 Ω fault is from a 3 cm connector (0.01% of the cable length).

Dual cursors Simplify Waveform Measurements
- Measure relative distance, time, impedance, reflection coefficient, VSWR, return loss, insertion loss between cursors.
- Scale and position the waveform at either cursor. Shift the waveform horizontally to align with comparison waveforms.
- Figure 3 shows relative distance measurement between two ~1 ohm soft faults (SMA connectors).

Accurate Distance-to-Fault with Multisegment Cables
- Designate regions of a compound cable assembly having segments of cable with different velocity of propagation (VoP, Vp).
- Directly measure distance-to-fault (DTF) at cursor and between cursor using the multisegment cable feature.
- Figure 4 shows distance-at-cursor measurement through two cable segments with different velocities of propagation (VoP, Vp).

Figure 1: Comparison of normal BNC (black) vs SMA (red) connectors.
Figure 2: Subpixel fault easily identified on a long cable.
Figure 3: Measurement of distance between ~0.7 ohm soft faults.
Figure 4: Multisegment cable with first segment VoP of 0.400.
TDR Analysis Features (2/2)

Capture Rapid Intermittent / Transient Faults
- Use the CT100B's Envelope Mode display to capture transient faults down to 2 ms temporal resolution.
- Use CT Viewer's waveform capture mode to record real time waveform movies with step-by-step playback of the impedance profile of the cable under test.
- Figure 5 shows intermittent fault detection using the probability density plot mode with the left cursor at the fault location.

Use S-Parameter Frequency Domain Measurements
- Measure 1-port S-parameters and estimate frequency-specific return loss (S11) and cable loss (S21) to 6 GHz.*
- Visualize results using frequency-domain plots, Smith charts, and normalized TDR traces with adjustable rise time. Use the CT100B as an all-in-one cable analyzer for a wide range of applications.
- Figure 6 shows TDR and return loss plots of 2.4 GHz WiFi patch antenna with average return loss of 21.5 dB from 2.3-2.7 GHz.

Smith Chart Display of Frequency-Domain Data
- Use Smith charts to simplify complex impedance matching tasks.
- Measure complex impedance at the cursor position along the Smith chart waveform.
- Figure 7 shows Smith chart of 200 ohm terminator with cursor at 0.0 MHz.

S11 Return Loss Between Cursors
- Leverage the power of time windowing by de-embedding S11 return loss for faults or connectors within a cable assembly.
- Compare with historical data to track changes in connector performance.
- Figure 8 shows return loss between cursors with time-windowing of an SMA connector between two cable segments.
Specifications

TDR System Characteristics
- Excitation Signal: Step-rise, 300 mV into 50 Ω load
- System Rise Time (20%-80%, typ.): 60 ps, 100 ps (CT100HF, CT100B)
- Timebase Resolution: 760 fs
- Timebase Random Jitter (typ.): < 1 ps rms
- Timebase Non-linearity (typ.): < 0.1%
- Sample Resolution: 16 bits
- Sequential Sample Rate: 2 - 250 kHz
- TDR Frame Rate: up to 500 waveforms/s

Horizontal System
- Range: 0 - 40,000 ft. (0 - 12.2 km) [Depending on cable properties]
- Scales: 0.003 - 400 ft./div (0 - 125 m/div)
- Cursor Resolution: 0.003 in. (75 μm) at VOP 0.66
- Accuracy (max, 0-50°C): < 1% of measured distance, typ. < 1 mm

Velocity of Propagation (VOP)
- Range: 0.250000 to 1.000000
- Resolution: 0.000001

Vertical System
- Range: < 1.0 Ω to > 1500.0 Ω
- Resolution: ≤ 0.1 Ω, depending on scale
- Accuracy (typ.): < 1% of measured value or < 1 Ω, 0 to 1000 Ω
- Accuracy (max, 0-50°C): < 10% of measured value, 0 to 1000 Ω

Measurements/Math
- Waveform Processing: smoothing, subtraction, 1st derivative, FFT, S11/S21 estimation, impedance, layer-peeling

Special Features
- Functions: AutoFit™, Envelope Mode, Vert. Ref. Mode
- Libraries: Waveform library, cable-type library, configuration library

Data Storage
- 2+ GB flash memory, thousands of high-resolution cable scans

Connectivity
- Standard Features: USB host (front panel) and client (rear panel), 10/100 Mb Ethernet, optional 802.11b/g wireless networking
- Special Features: Live streaming and remote control of any CT100 Series TDR over LAN/WAN/Internet using CT Viewer™

Display
- Color LED-BL 4.3 in. (10.9 cm) WQVGA TFT-LCD, > 600 cd/m²

Power System
- AC Power: 90-264 VAC, 50-60 Hz using AC adapter
- Battery Power: Internal 2500 mAh 14.4 VDC NiMH battery
- Battery Life: >6h (typical use), unlimited with external battery packs
- Battery Charging: <1 h low-battery, <4 h fully-discharged

Environmental and Mechanical
- Operating / Non-Operating Temp.: -10°C to +55°C / -20°C to +60°C
- Dimensions: 4.3(H) x 11.5(W) x 6.9(L) in. (10.9 x 29.2 x 17.5 cm)
- Weight: 5.1 lbs. (2.3 kg) with cover, 4.7 lbs. (2.2 kg) without cover

Regulatory
- Complies with all applicable EU directives, as specified by the instrument’s Declaration of Conformity.

EMC: MIL-PRF-28800F, MIL-STD-461F RE102, CE102. IEC 61000
- Shock/Vibration: MIL-PRF-28800F (Class 3)
- Temperature/Humidity: MIL-PRF-28800F (Class 3)
- Explosive Atm: MIL-STD-810G 511.5 Procedure 1 (+55°C, 0-4600 m)

Ordering Information

General Options
- CT100B -- BNC test port (self-grounding)
- CT100HF -- SMA test port
- CT100B-OPT-SMA -- CT100B SMA test port option

Standard Accessories (Included)
- One (1) License CT Viewer™ Software
- Standard Adapters
- Operator’s Manuals
- Rugged Soft-Sided Carrying Case
- External AC Power Adapter
- USB / Ethernet Cables
- NIST-Traceable Calibration / Certificate
- 12-Month Standard Limited Warranty

Optional Accessories

General
- Small Form-Factor Keyboard (CT100-AC-KBD)
- Hard Carrying Case (CT100-AC-CH)

Adapter Kits
- SMA Adapter Kit (CT100-AK-SMA)
- BNC Adapter Kit (CT100-AK-BNC)
- Impedance Matching Kit (CT100-IK-BNC)
- MIL-STD-1553B Data Bus Adapter Kit (1553-TRBKIT)

Impedance Matching Adapters
- 50 Ω to 75 Ω (CT100-AC-15075-BNC)
- 50 Ω to 93 Ω (CT100-AC-15093-BNC)
- 50 Ω to 125 Ω (CT100-AC-150125-BNC)

S-Parameter Test Accessories
- OSL Calibration Kit SMA (CT100-AC-CALSMA)
- OSL Calibration Kit BNC (CT100-AC-CALBNC)
- OSL Calibration Kit N (CT100-AC-CALN)
- SMA Torque Wrench 8 in-lbs / 0.9 Nm (CT100-AC-TWSMA)
- Phase-Stable Cable 2 ft. SMA(M-M) (CT100-AC-PSCSM24)
- Phase-Stable Cable 2 ft. SMA(M-F) (CT100-AC-PSCSMF24)
- Phase-Stable Cable 2 ft. BNC(M-M) (CT100-AC-PSCBMM24)
- Phase-Stable Cable 2 ft. BNC(M-F) (CT100-AC-PSCBMF24)

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