Differential Line Impedance Analyzer D-TDR 3000

Differential Line Impedance Analyzer TDR 3000

Key Features

- Compact Instrument for Differential TDR Measurement

- Simple Measurement of Line Impedances and Reflections of Single and Symmetric Lines

- Internal Push-Pull Pulse Generator with less than 100 ps Rise Time and more than 3 GHz System Bandwidth

- Powered by USB-Port

- For Applications in Workshops and Laboratories and for Educational Purposes

Brief Description

The Line Impedance Analyzer TDR 3000 is used for precise analysis of various lines:

- Transmission lines up to 1000 m length

- Microstrip- and striplines on printed-circuit boards

- Symmetric lines

- Line terminations, line transitions, connectors

TDR analysis (Time Domain Reflectometry) shows directly the line impedance as a function of the propagation time or the distance.

The variation of the impedance as a function of the length of a given line is shown in form of an oscillogram directly on the personal computer. Reflections and transitions are displayed directly and can be analyzed with accuracy to a millimeter.

Unlike the asymmetrical line impedance analyzer TDR 3000 the differential D-TDR 3000 allows to directly measure the line impedance of a symmetric line.

The combination of a fast push-pull pulse generator with a rise time less than 100 ps and a sampling scope of 5 GHz bandwidth leads to a system-bandwidth of more than 3 GHz. Thus measurements of transmission lines with a time resolution in the range of pico-seconds are possible.

The push-pull pulse generator and the inputs of the sampling oscilloscope are connected internally via a special coupler. The device under test can be directly connected to the SMA inputs on the instruments front panel. By changing the generator settings the differential line impedance can be measured in even- and odd-mode.

The small-sized instrument is connected via USB to a personal computer (PC). The power is supplied over the USB-port. All instrument settings are changed over the easy-to-use graphical user interface. Measuring results are displayed on the PC-monitor and can be processed directly on the PC. All important characteristics like bandwidth or sensitivity only depend on the TDR 3000, not on the PC.

Adjustable cursors in vertical and horizontal direction allow precise measurements of propagation time or line length and reflection factor or line impedance.

Graphical User Interface
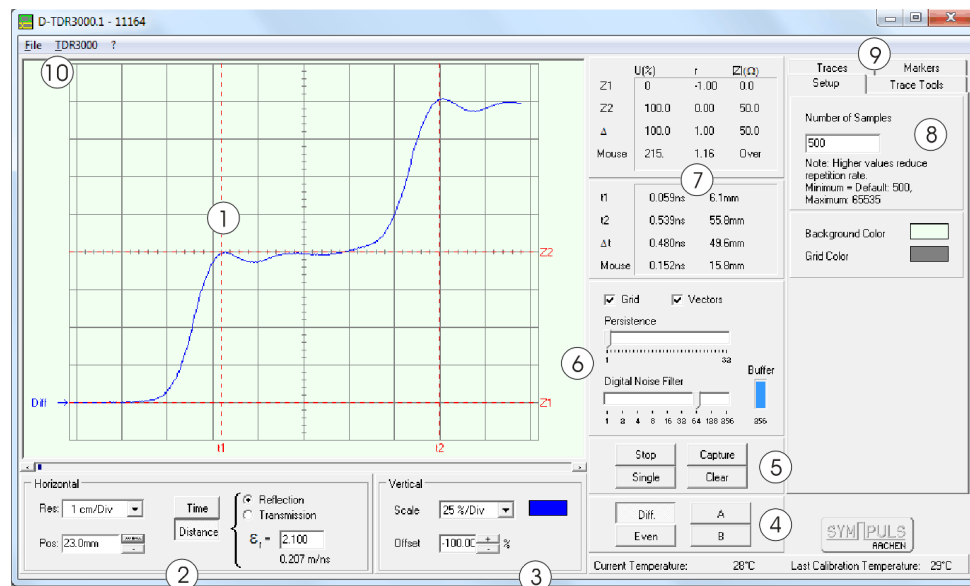
Graphical User Interface of the TDR 3000. The TDR port is open.

① Screen: Displays the oscillograms.

② Horizontal (Time Base): Horizontally scales and positions the waveform. Two different scales for time and distance measurements are selctable.

③ Vertical (Scale): Vertically scales and positions the waveform on the screen.

④ Test Impulse Generator: Selection of odd- or even-mode measurement or single channel operation.

⑤ The buttons Run/Stop and Single allow to stop the acquisition while retaining the displayed curve. Capture stores a measured curve for further processing.

⑥ Screen Settings: Different Display Modes and Digital Filters are selectable.

⑦ Marker: Markers `t1, t2, Z1` and `Z2` can be activated and positioned. Values and value differences are displayed according to the markers' positions.

⑧ `Number of samples` taken for each measurement.

⑨ The three tabs `Traces`, `Markers` and `Setup` allow to change properties of stored measured curves, generate new markers and change the number of samples.

⑩ Two Pull-down menus provide additional functionality.

Technical Specifications

TDR 3000	
Vertical System	
Input	50 Ω, SMA-Connector
Rise Time (10-90%)	80 ps
Bandwidth (3 dB)	5 GHz
Deflection Factors (/div)	500 %, 250 %, 100 %, 50 %, 25 %, 10 %, 5 %, 2.5 %, 1 %
Range of Line Impedance	0 ... 1000 Ω
Offset Range	± 200 %
Reference Value	Test Pulse Amplitude = 100 %
Resolution	0.01 %
Display Resolution	40 dots/div, 400 dots/screen
Horizontal System	
Two Different Scales for Time and Distance Measurements are Selectable	
Time Scale (/div)	100 ps, 200 ps, 500 ps, 1 ns, 2 ns, 5 ns, 10 ns, 20 ns, 50 ns, 100 ns, 200 ns, 500 ns, 1 μs
Position (Time)	100 ps/div - 10 ns/div: 125-times, 20 ns/div: 100-times, 50 ns/div: 40-times, 100 ns/div: 20-times, 200 ns/div: 10-times, 500 ns/div: 4-times, 1 μs/div: 2-times
Time Resolution	1 ps
Display Resolution	50 dots/div, 500 dots/screen
Distance Scale (/div)	5 mm, 1 cm, 2 cm, 5 cm ... 100 m
Range of Cable Measurement ($\varepsilon_{reff} = 2$)	0 ... 1000 m
Range of Dielectric Constant	$\varepsilon_{reff} = 1.0 ... 10.0$
Internal Pulse Generator for TDR-Measurement	
Pulse Shape	Rectangular 24.4 kHz, app. 0.5 V into 50 Ω
Rise Time	< 80 ps
Mode	Push-Pull (odd) or Common Mode Signal (even)
PC-Interface	
Interface	USB-port, max. data transfer rate 1 MByte/s
Software	GUI for configuration of instrument settings on PC Display oscillograms on PC-monitor Export oscillograms as bitmaps to file or clipboard

Miscellaneous	
Power Supply	4.5 V ... 5.5 V / 0.5 A
	Powered over USB-port
Mechanical Dimensions	Aluminium Case,
	W x H x D = 115 mm x 55 mm x 175 mm

Ordering Information

Included in delivery:

D-TDR 3000

- Mainframe with SMA-Connectors

- User Manual

- USB Cable Set for PC connection

- CD-ROM with Device Driver and Operating Software

The instrument is produced by SYMPULS in Germany.
We offer a reliable service and 24 month warranty.