Multiport Line Impedance Analyzer TDR 1500x8

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Key Features

- **Compact Instrument for TDR Measurement**
- **Integrated 8:1 Multiplexer**
- **Simple Measurement of Line Impedances and Reflections**
- **More than 1.5 GHz System Bandwidth**
- **Powered through USB-Port**

Brief Description

The multiport Line Impedance Analyzer TDR 1500x8 combines the Line Impedance Analyzer TDR 1500 with a 8:1 multiplexer. It is used for precise analysis of various lines:

- Transmission lines up to 1000 m length
- Microstrip- and striplines on printed-circuit boards
- 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.

The combination of a fast pulse generator and sampling scope leads to a system risetime of less than 200 ps. Thus measurements of transmission lines with a time resolution in the range of pico-seconds are possible.

The TDR 1500x8 uses a fully digital time-base that makes it unsusceptible to environmental changes.

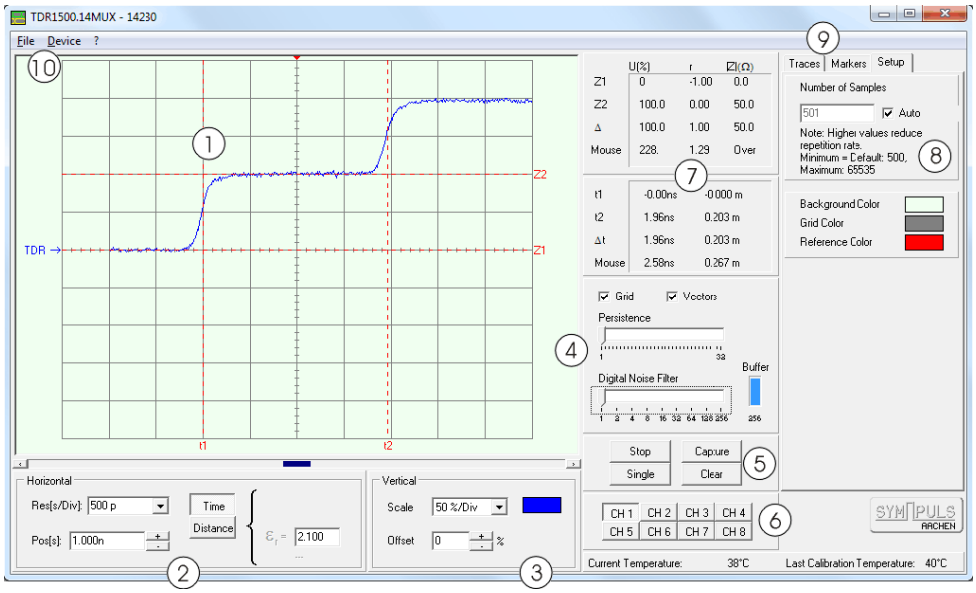
The pulse generator and the input of the sampling oscilloscope are connected internally via a special coupler. The device under test can be directly connected to one of the SMA inputs on the instrument's front panel.

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 stored and exported for further processing on the PC. All important characteristics like bandwidth or sensitivity only depend on the TDR 1500x8, not on the PC.

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

Additionally the instrument can be remotely controlled over the USB interface with user-programmed software.

Graphical User Interface



Graphical User Interface of the TDR 1500x8. The TDR port is open.

(1) Display: Here the oscillograms are displayed.

(2) Horizontal (Time Base): Horizontally scales and positions the waveform. Two display modes `Time` and `Distance` can be selected. The measured distance depends on the dielectric of the line under test. The blue bar underneath the display area can be used for quick adjustments with the mouse.

(3) Vertical (Scale): Use the buttons `Scale` and `Offset` to scale and vertically position the waveform on the display. The amplitude value of 100 % is related to the amplitude of the test impulse at a 50 Ω load resistance.

(4) Screen Settings: Different Display Modes and Digital Filters are selectable.

(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 Buttons to select the active test channel. After changing channels allow the instrument approximately one second settling time to reach a stable measurement.

⑦ Markers: The markers `t1, t2, Z1` and `Z2` can be positioned on the curve with the mouse. Measured values and value differences are displayed according to the markers' positions.

⑧ The `Setup` tab contains a text field `Number of Samples` that contains the number of sample values 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 the following functions:

`File`	Save Screen to Bitmap
	Save Screen to Clipboard
`Device`	Calibration
	Reconnect (Establish a new connection to the device)

TDR Port

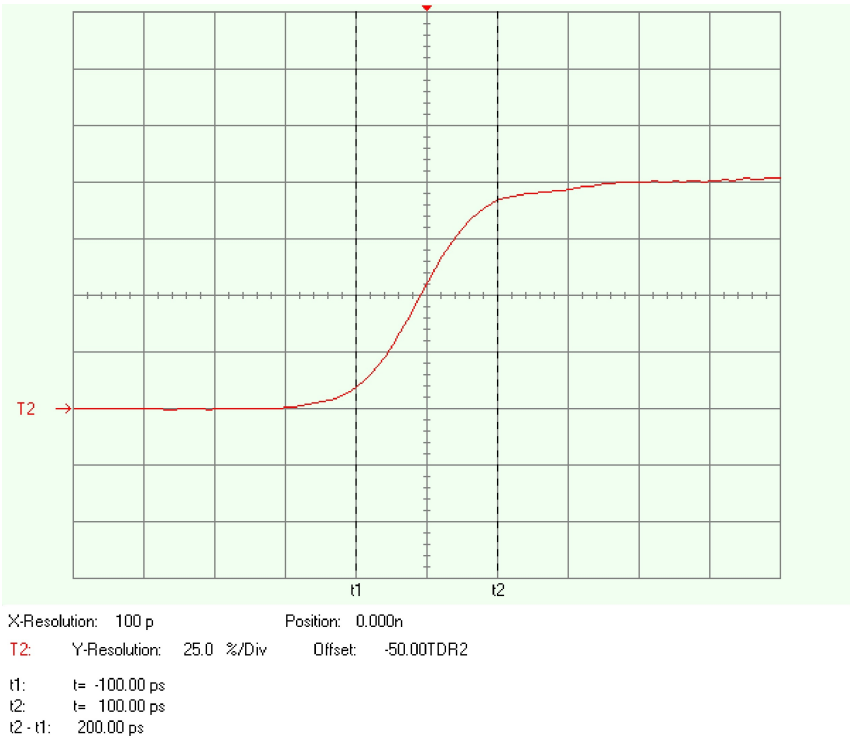


Abbildung 1: Rising edge of the test generator pulse at output 1

Technical Specifications

TDR 1500x8	
Input	8 TDR Ports 50 Ω, SMA-Connectors, Damage Level ± 2 V Channel-to-Channel Skew < 50 ps
System Rise Time (10-90%)	<200 ps
System Bandwidth (3 dB)	>1.5 GHz
Vertical System	
Deflection Factors	500 %/div, 250 %/div, 100 %/div, 50 %/div, 25 %/div, 10 %/div, 5 %/div, 2,5 %/div, 1 %/div
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	
Scale (Time)	50 ps/div, 100 ps/div, 200 ps/div, 500 ps/div, 1 ns/div, 2 ns/div, 5 ns/div, 10 ns/div, 20 ns/div, 50 ns/div, 100 ns/div, 200 ns/div, 500 ns/div, 1 µs/div
Position (Time)	-50 ps ... 20 µs
Time Resolution	10 ps
Display Resolution	50 dots/div, 500 dots/screen
Scale (Distance)	5mm/div, 1 cm/div, 2 cm/div, 5 cm/div ... 100 m/div
Range of Cable Measurement (ε_{reff} = 2)	0 ... 2500 m
Range of Dielectric Constant	ε_{reff} = 1.0 ... 10.0
Internal Pulse Generator for TDR-Measurement	
Pulse Shape	Rectangular 19.99 kHz, app. 0.5 V into 50 Ω
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 = 131 mm x 53.5 mm x 134 mm Splash-Water Protected IP 54 (Not For Direct Outside Use)

Ordering Information

Included in delivery:

TDR 1500x8

- 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.