



# TDR100

Time-Domain Reflectometer



## Overview

The TDR100 Time-Domain Reflectometer is the core of the Campbell Scientific time-domain reflectometry system. This system is used to accurately determine soil volumetric water content, soil bulk electrical conductivity, rock mass deformation,

or user-specific time-domain measurement. Up to 16 TDR100s can be controlled using a single Campbell Scientific datalogger. PC-TDR software is included with the TDR100, which is used during system setup and troubleshooting.

## Benefits and Features

- › Compact, low-cost reflectometer
- › Determines volumetric water content and electrical conductivity in soil and other porous media
- › Designed for use in remote applications
- › Compatible with Campbell Scientific's CR800, CR850, CR1000, and CR3000 dataloggers

## Technical Description

The TDR100 (1) generates a short rise time electromagnetic pulse that is applied to a coaxial system that includes a TDR probe for soil water measurements and (2) samples and digitizes the resulting reflection waveform for analysis or storage.

The elapsed travel time and pulse reflection amplitude contain information used by the on-board processor to quickly and accurately determine soil volumetric water content, soil bulk

electrical conductivity, rock mass deformation or user-specific, time-domain measurement.

The datalogger collects a 250-point waveform and analyzes it in approximately two seconds. Each waveform can have up to 2,048 data points for monitoring long cable lengths used in rock mass deformation or slope stability. Averaging up to 128 readings makes accurate measurements possible in noisy environments.



## Specifications

- Weight: 726 g (1.6 lb)
- Dimensions: 23.6 x 5.9 x 12.6 cm (9.3 x 2.3 x 5.0 in)
- Pulse generator output: 250 mV into 50  $\Omega$
- Output impedance: 50  $\Omega \pm 1\%$
- Time response of combined pulse generator and sampling circuit:  $\leq 300$  ps
- Pulse length: 14  $\mu$ s
- Timing resolution: 12.2 ps
- Waveform sampling: 20 to 2048 waveform values over chosen length

	distance ( $V_p=1$ )	time (1 way travel)
<b>range</b>	-2 to 2100 m	0 to 7 $\mu$ s
<b>resolution</b>	1.8 mm	6.1 ps

- Waveform averaging: 1 to 128
- Electrostatic discharge protection: Internal clamping
- Operating temperature range:  $-40^\circ$  to  $+55^\circ\text{C}$
- Power supply: Unregulated 12 Vdc (9.6 to 16 Vdc), 300 mA maximum

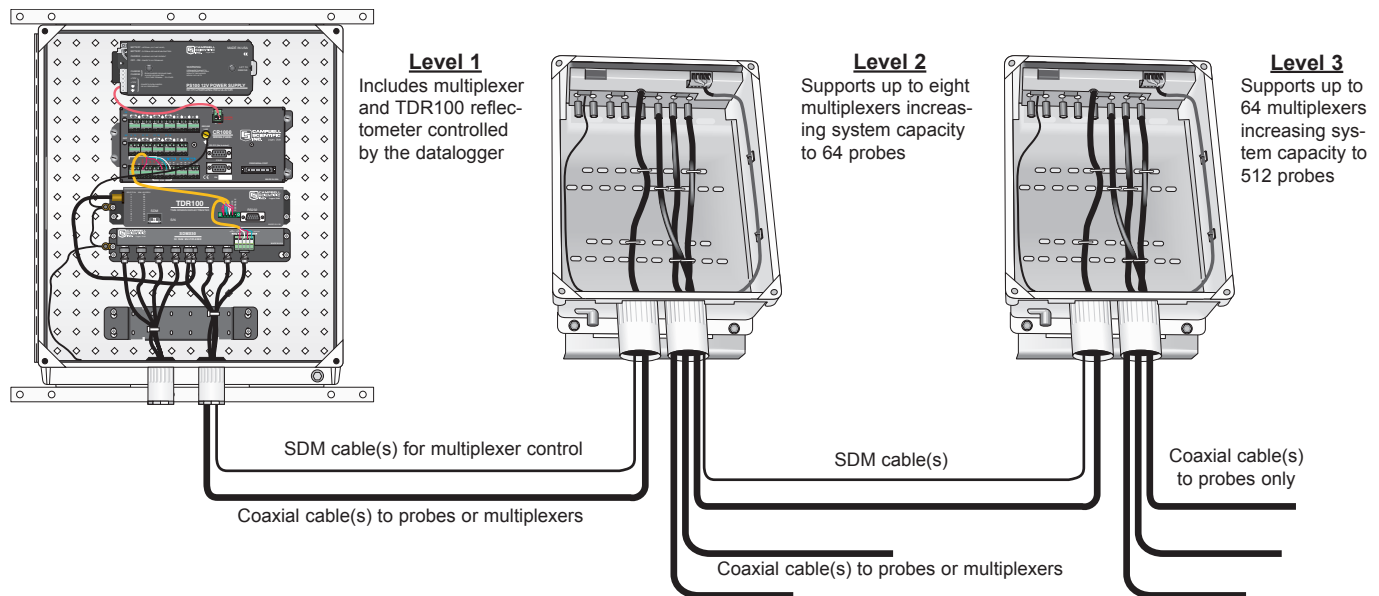
### Current drain

- During measurement: 270 mA
- Sleep mode: 20 mA
- Standby mode: 2 mA

### Pulse generator aberrations

- Within first 10 ns:  $\pm 5\%$
- After 10 ns:  $\pm 0.5\%$

## Example TDR100-Based System



A complete TDR100-based system includes the TDR100, SDM50-series multiplexers, dataloggers, power supplies, enclosures, and probes. Specifications and other information about the other components can be found in the *SDM50-series Multiplexer* component category brochure, *TDR Probes* component category brochure, and *TDR100-Based* system brochure. These brochures are available at: [www.campbellsci.com/product-literature](http://www.campbellsci.com/product-literature)

