Use and calibration of the SIGLENT TDR Probes with the SNA5000A

SIGLENT supplies 4 different models of TDR probes to simplify probing and connecting to on board RF networks where normal connectorization is not available. These are:

Model	Description
ADP-18	Adjustable Differential TDR probe DC~18 GHz
ADP-26	Adjustable Differential TDR probe DC~26.5 GHz
ASP-18	Adjustable Single-end TDR probe DC~18 GHz
ASP-26	Adjustable Single-end TDR probe DC~26.5 GHz

The single-ended probes have one SMA connector and the differential probes each have a pair. These SMAs connect to the SNA5000A or SHA850A ports for TDR measurements.

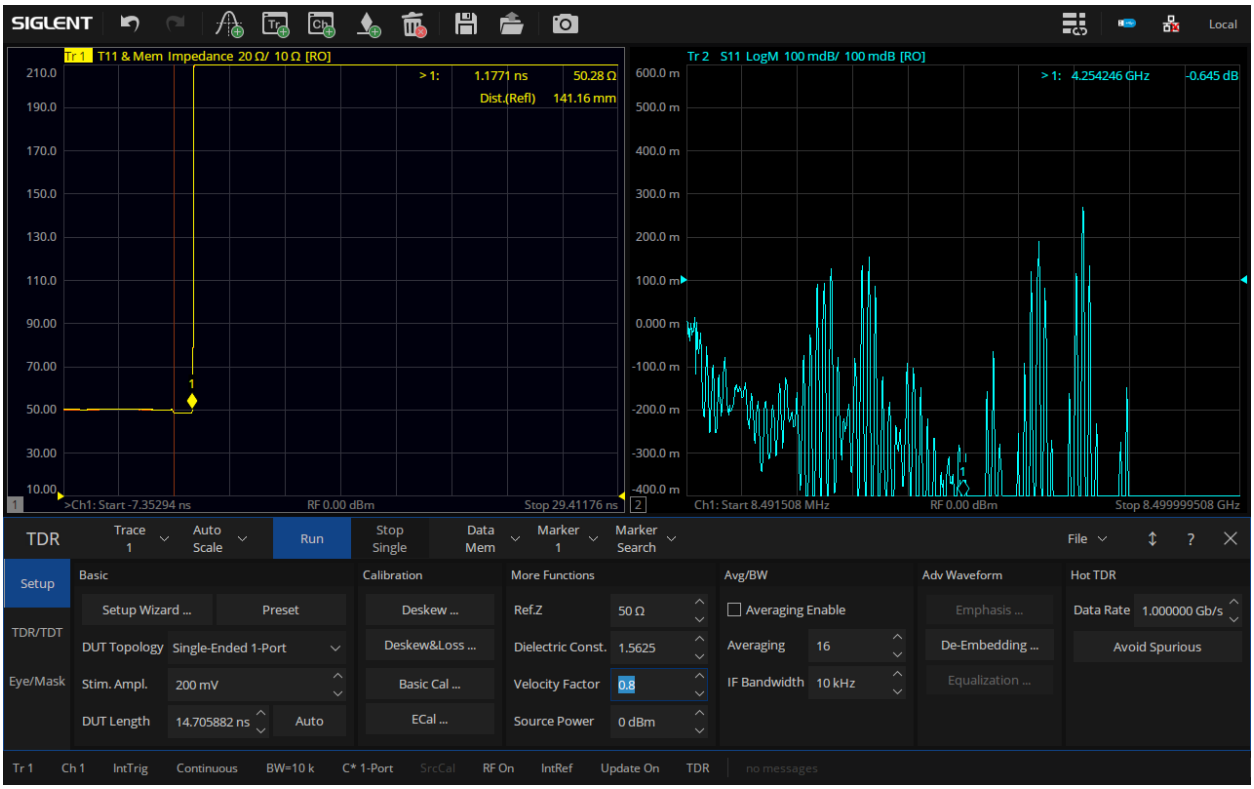
The user's guide for these adjustable probes describes the specifications and dimensions of these probes:

Adjustable Probe Datasheet

When using the adjustable TDR probes in measurements, there is a standard practice for calibrating out the electrical length and delay of the probe.

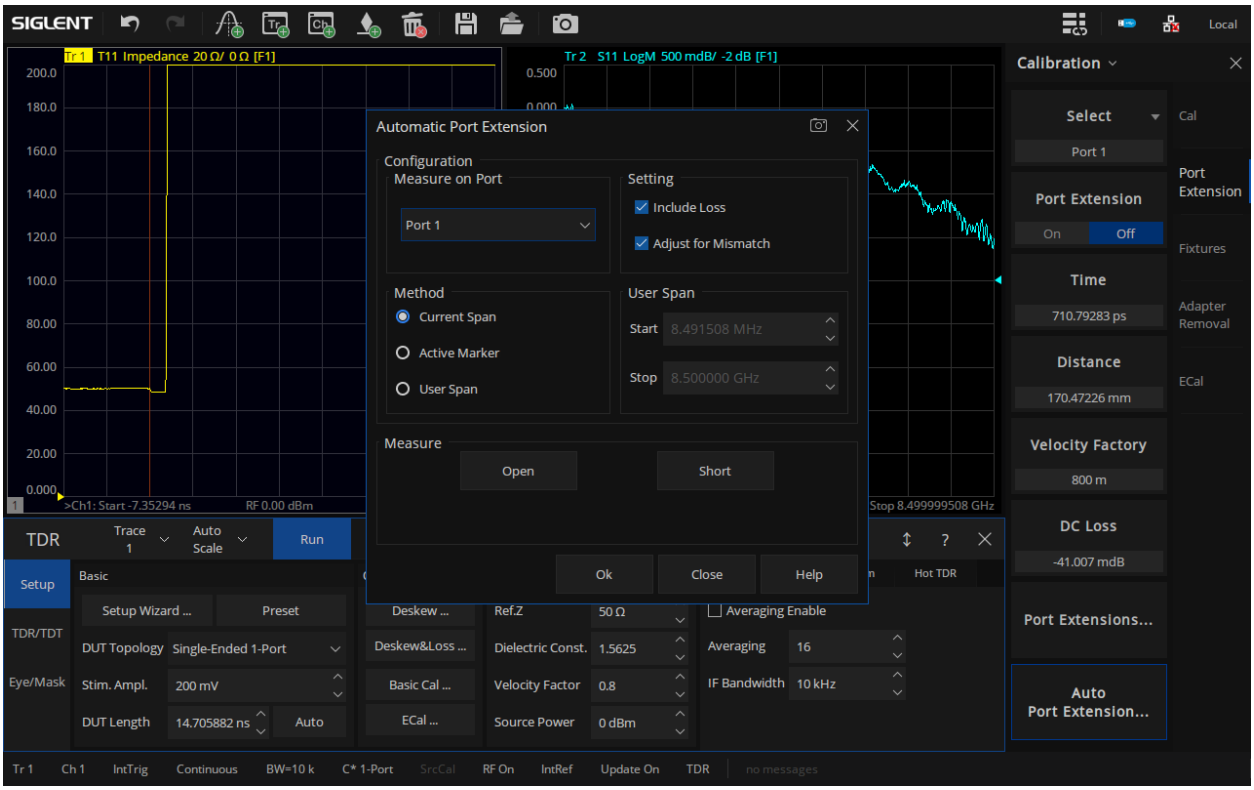
The best way to calibrate out these probes is to use the port extension tool within the SNA5000A. The SNA5000A includes an Auto Expansion Port capability. Use this with the probe attached as an Open measurement to approximate values for loss, distance, and velocity factor.

This shows the TDR measurement utility setup for a single ended 1 port measurement using an ASP-26 probe:

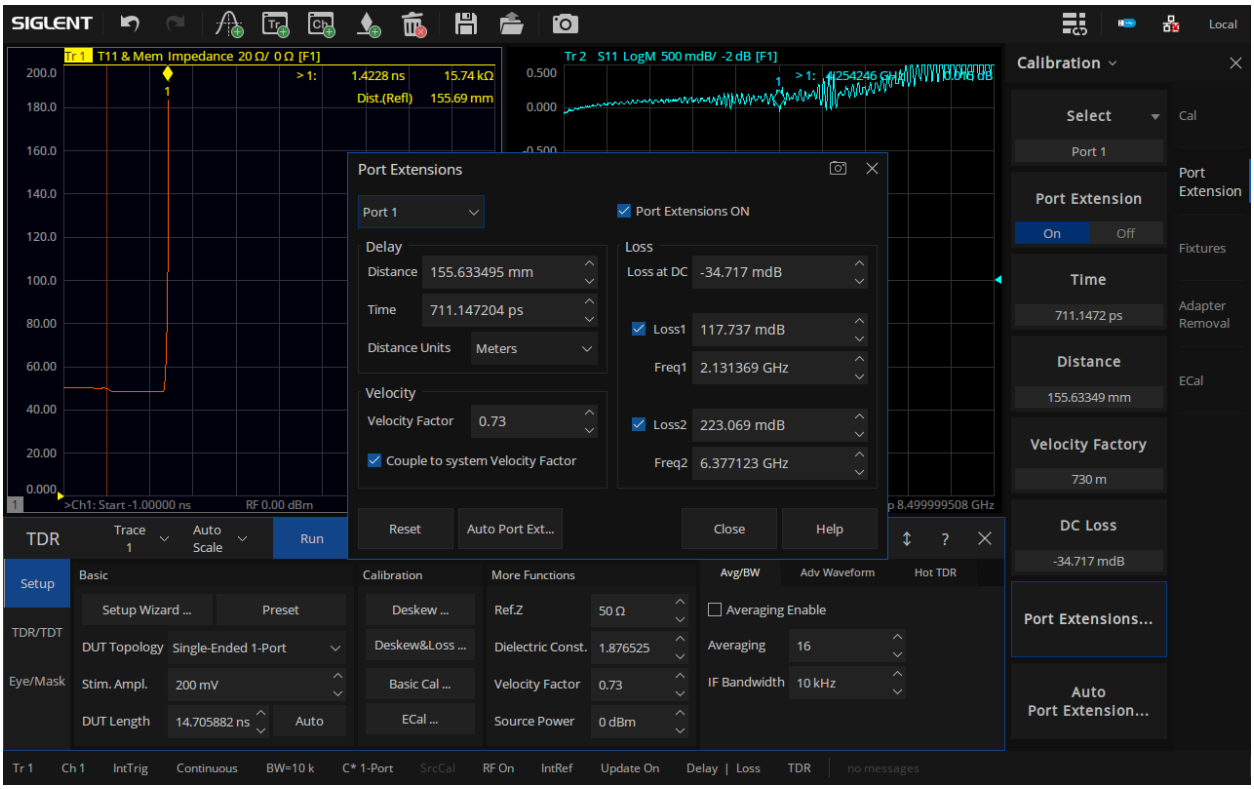


A 1 port calibration has already been done to the cable end without the probe.

Now, we can take the next step in the calibration menu to turn on the port extension and conduct an auto port extension. With the probe disconnected, measure as an Open:

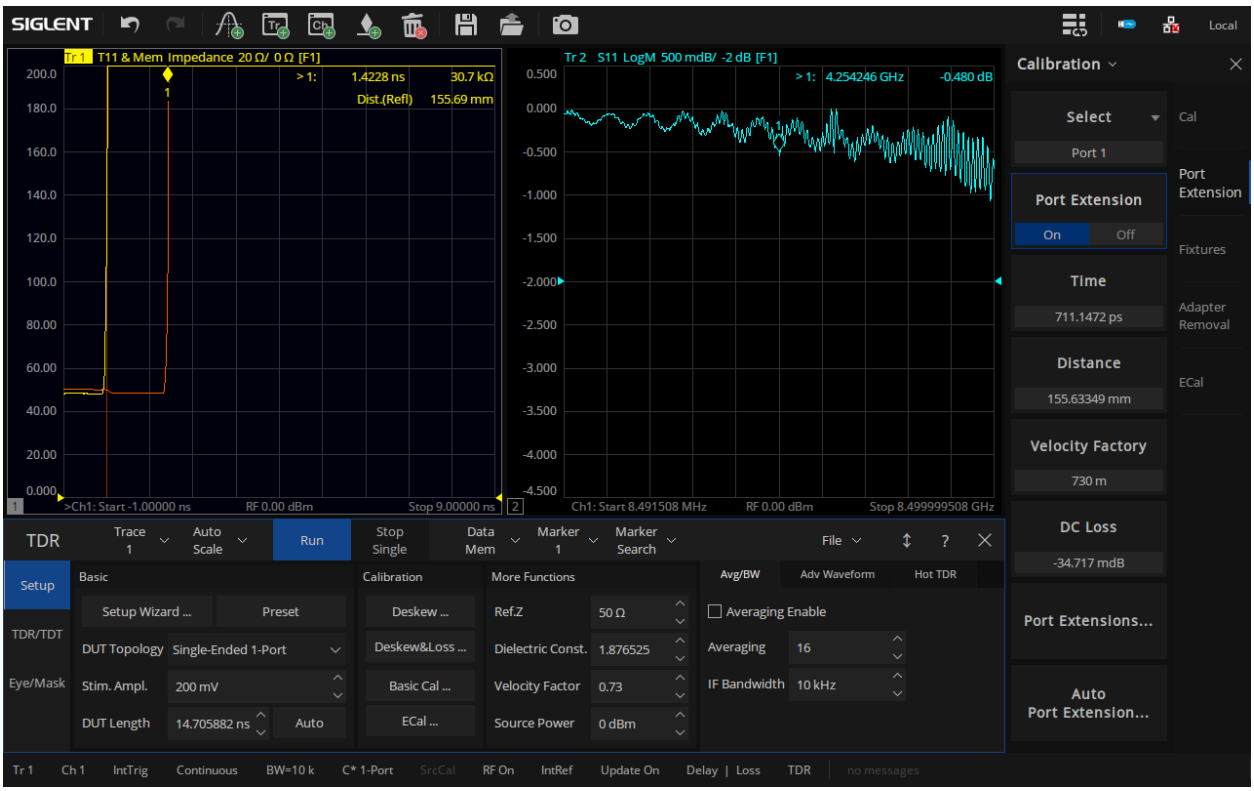


Once the auto port extension is completed, we have new values for loss, distance, and velocity factor that now compensate for the probe:



This ASP-18 probe measured at 155.6 mm with a velocity factor of 0.73.

Now, you can see how the time to the impedance change in T11 changes to compensate for the probe:



With proper calibration and use of the port extension feature, precision measurements of impedance changes and distances within the device under test can be made using the SIGLENT SNA5000A TDR measurement utility. The full TDR package (SNA5000-TDR) also enables statistical analysis of data transmission through a device under test. Learn more about how the TDR package works here:

Download the Enhanced TDR Application Note

The Port Extension and Auto Port Extension utility improves accuracy with a simple calibration step to remove additional probes, cables, or connections beyond where connecting a calibration kit is convenient. Additional calibration steps including fixtures and adaptor removal can help to compensate for more complex devices in the RF path. Learn more about these in the complete VNA Measurements Guide.

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

Headquarters:
SIGLENT Technologies Co., Ltd
Add: Bldg No.4 & No.5, Antongda Industrial Zone,
3rd Liuxian Road, Bao'an District, Shenzhen,
518101, China
Tel: + 86 755 3688 7876
Fax: + 86 755 3359 1582
Email: sales@siglent.com
Website: int.siglent.com

North America:
SIGLENT Technologies America, Inc
6557 Cochran Rd Solon, Ohio 44139
Tel: 440-398-5800
Toll Free: 877-515-5551
Fax: 440-399-1211
Email: info@siglentna.com
Website: www.siglentna.com

Europe:
SIGLENT Technologies Germany GmbH
Add: Staetzlinger Str. 70
86165 Augsburg, Germany
Tel: +49(0)-821-666 0 111 0
Fax: +49(0)-821-666 0 111 22
Email: info-eu@siglent.com
Website: www.siglenteu.com