

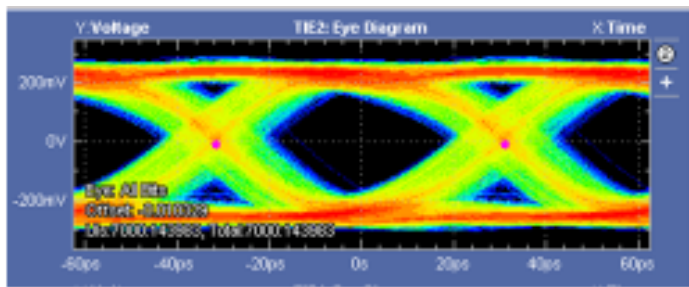
SignalCorrect™ Software and TCS70902 Calibration Source

Option SC SignalCorrect™ software

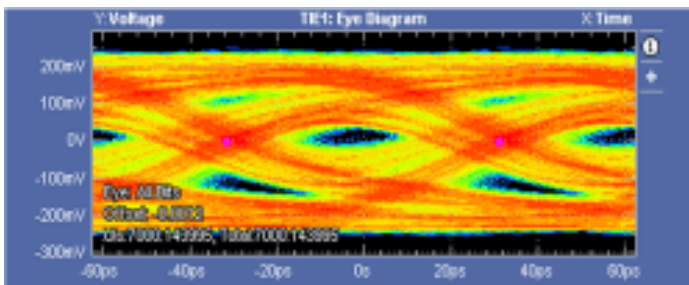


SignalCorrect™ allows quick characterization of cables, fixtures and other types of interconnects using the TCS70902 fast step source and the captured response on a DPO/MSO70000 series real-time oscilloscope.

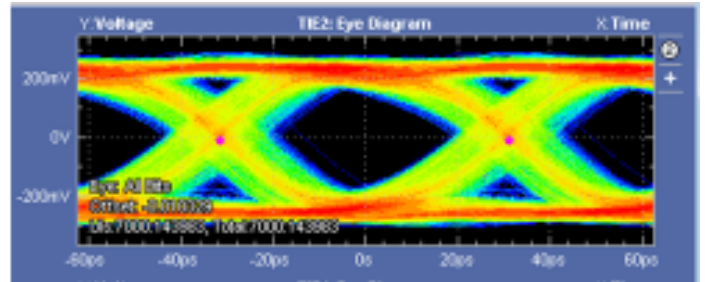
Based on this characterization, SignalCorrect can design a de-embed filter that compensates for the losses that occur in the interconnects, and offers a flat response, enabling signal margin recovery, leading to more accurate measurements.



Eye of original signal



Eye of signal through 9 inch cable



Eye of signal after de-embed using SignalCorrect

Features and benefits

- **Measurement and de-embed:** Characterize cables and fixtures and de-embed their effects to gain margin and reduce failures or costly over design.
- **Step-by-step characterization process:** Easily characterize cables and fixtures and get repeatable results making the solution approachable to novice users.
- **De-embed differential and common mode:** Enables de-embed of fixtures that may have significant differential coupling and non-ideal common mode behavior.

Two fast step outputs enables dual input measurements and full de-embed of single ended, differential and common mode cases.

- **Create and compare:** Create multiple filters based on single measurement.
Enables comparison of raw waveform with different filter designs.
- **≤9.4 ps step output:** Enables de-embed for greater than 50 GHz (also dependent on oscilloscope bandwidth) useful for next generation designs.
- **Small form factor of the step source:** Makes it easy to take the source close to the Interconnect Under Test (IUT) for more accurate measurements.
 - Stand alone source at lower cost.
 - Same performance across all oscilloscope models.
- **Reference sine wave output:** Enables deskew to < 1 ps to the ends of the cables or fixtures for more accurate measurements.
- **Output variation:** TCS70902 outputs are based on sampling TDR technology that is well characterized for minimal changes over temperature and time.
- **Generic API:** Enables integration of the TCS70902 Calibration Source for use in other applications.

- **Plot and save:** Data such as calibration data, s-parameter data, filters can be plotted making it easy for visualization and saving for later use.
- **Real-time scope based solution:** Characterize a cable/fixture, design, create and apply a filter all on a real-time scope, eliminating the need for other expensive instruments.

Use the same real-time scope to perform Jitter, Eye Diagram or standard specific measurements on the de-embedded waveform.

SignalCorrect™ overview

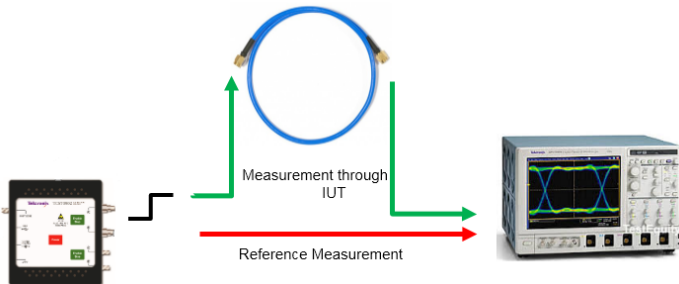
The SignalCorrect software application runs on the Tektronix performance oscilloscopes. The application quickly characterizes fixtures, cables, and interconnects for accurate measurement and analysis. Using filter files produced by the application, you can de-embed probes or fixtures and embed a channel model.

The output of the TCS70902 is measured to establish a baseline.

A second measurement is taken after inserting the interconnect under test between the TCS70902 and the oscilloscope.

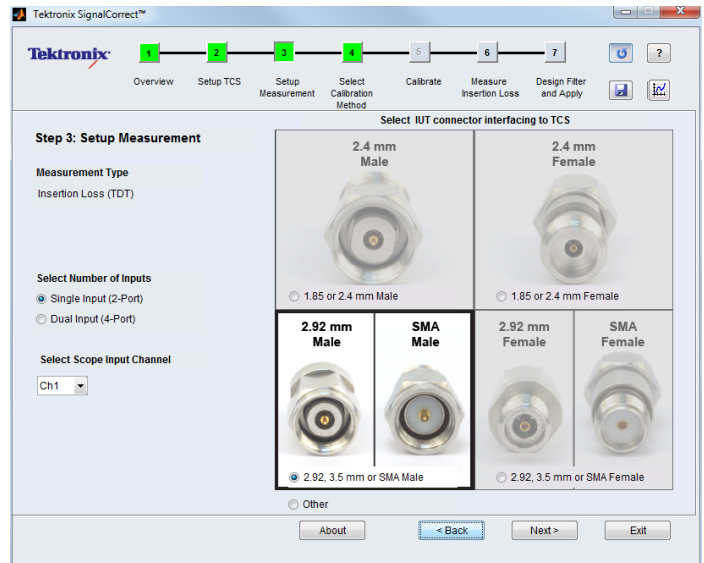
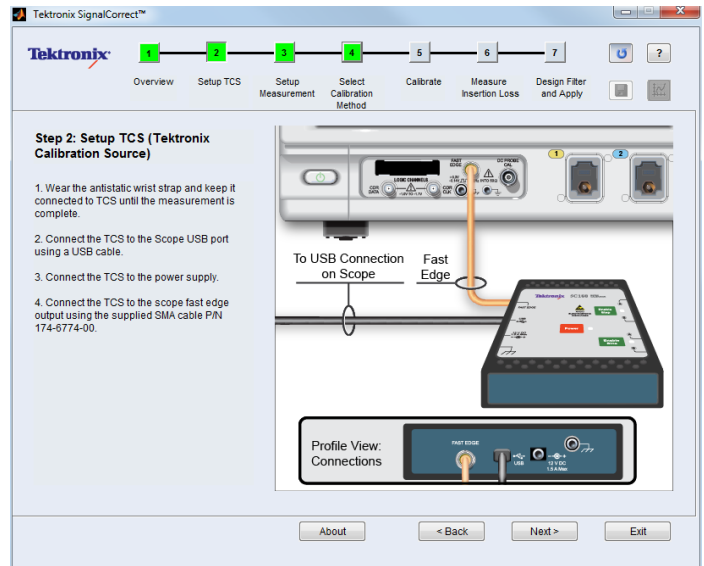
The two measurements are compared to get the insertion loss of the interconnect under test.

A filter is designed to compensate of for the losses in the interconnect under test and provide a flat response so that signal margin can be recovered to make more accurate measurements.



Setup

SignalCorrect provides a step-by-step setup process with connection diagrams to guide you in making the measurements required to characterize the interconnects under test.



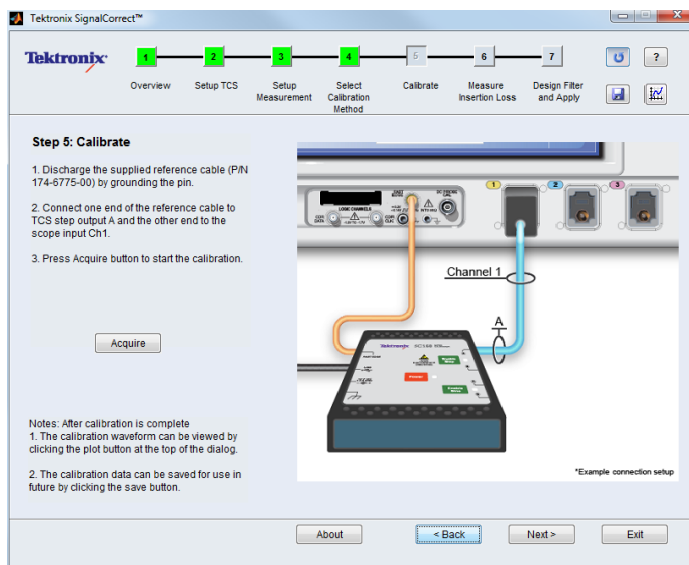
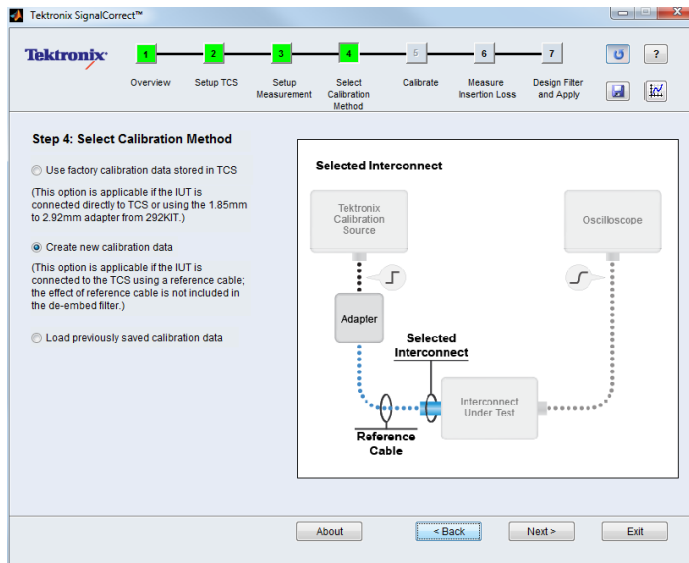
Calibration

SignalCorrect guides you through selecting the calibration data to use or acquiring new calibration data.

During the calibration process a reference measurement is taken to establish a baseline.

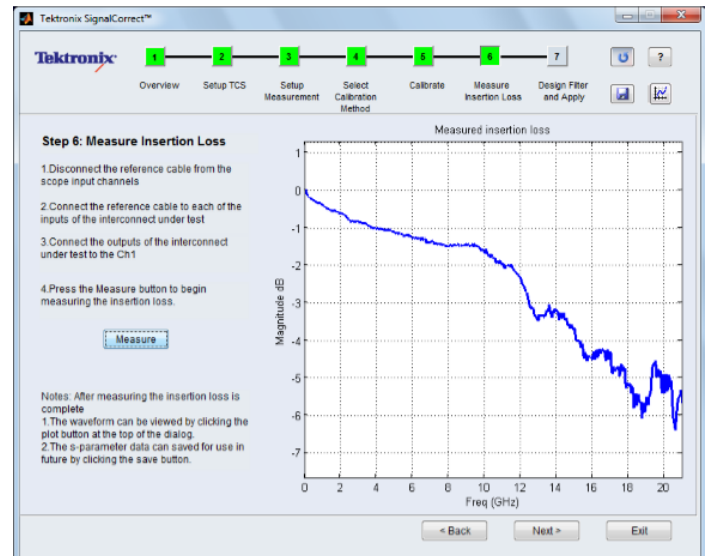
During the calibration step:

- Factory calibration data stored on the source can be used if the Interconnect under test can be directly connected to the source.
- New calibration can be used in all other cases.
- Saved calibration data from previous calibration runs can be used to reduce time for characterization.



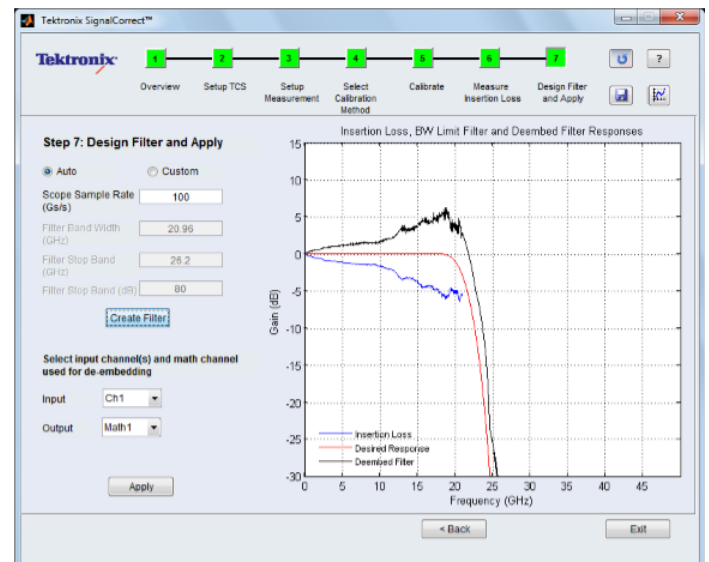
Insertion loss

SignalCorrect extracts the insertion loss of the interconnect under test. A plot of the insertion loss is also shown.



Filter design

SignalCorrect creates a filter that you can apply to your oscilloscope inputs to de-embed your device or interconnect under test.

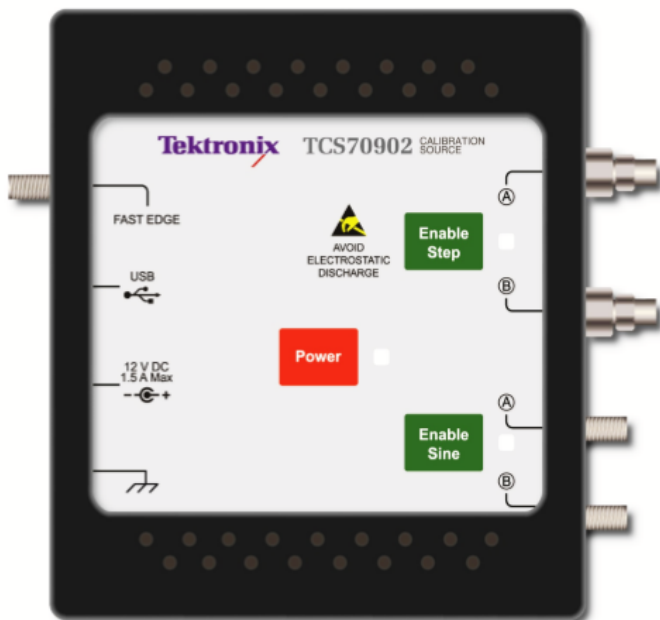


TCS70902 signal source

Combined with SignalCorrect™ software the TCS70902 provides an easy to use solution that enables you to quickly characterize and de-embed interconnects under test for more accurate measurement and analysis.

The TCS70902 Differential Calibration Source provides:

- Dual ≤ 9.4 ps step outputs on 1.85 mm female connectors
- Dual 5 GHz sine wave outputs phase matched to less than 1 ps on 2.92 mm female connectors
- Small form factor enables placement closer to IUT
- Can be used as a generic source for other applications such as deskewing oscilloscope inputs
- Programmatic interface to
 - Turn the sine and the step outputs on/off
 - Control the polarity of the step outputs
 - Check the status of the outputs
 - Control the output parameters like the delay, offset and level



Connector kits

Connector kits provide adapters and matched cables to connect your interconnects (cables and fixtures) under test to the calibration source and oscilloscope.

292 Kit

- Phase matched 2.92 mm male to male short cables
- 1.85 mm male to 2.92 mm female adapters



240 Kit

- Phase matched 2.4 mm male to male short cables



Specifications

All specifications are guaranteed unless noted otherwise.

Communication

USB 2.0 host communication	USB2.0 Compliant Mini USB B Device Port
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Fast edge in

Fast edge in rise time (typical)	30 to 800 ps 10-90% rise time Supports the fast edge output of all DPO/MSO70000 series real-time oscilloscopes.
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Fast edge in levels (typical)	-600 mV to 0 mV -150 mV to 300 mV Supports the fast edge output of all MSO/DPO70000 series real-time oscilloscopes.
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Step output

Fast edge output connector	1.85 mm female connectors
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Fast edge rise time	Rise (away from 0 V) time \leq 10 ps, 10-90%
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Fast edge fall time	Fall (toward 0 V) time \leq 9.4 ps, 10-90%
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Primary fast edge amplitude (typical)	200 mV step into 50 Ω
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Secondary fast edge amplitude (typical)	300 mV step into 50 Ω
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Fast edge maximum repetition rate	10 MHz
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Sine output

Sine wave output amplitude, peak-to-peak (typical)	250 mV into 50 Ω
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Sine wave frequency (typical)	5 GHz
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Sine wave skew between outputs (typical)	\leq 1 ps
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Power

Power consumption < 8.6 VA

Atmospherics

Temperature

Operating 5 °C to +45 °C, with 15 °C/hour maximum gradient, non-condensing, derated 1.0 °C per 300 meters above 1,500 meters altitude.

Non-Operating -20 °C to +60 °C, with 30 °C/hour maximum gradient.

Humidity

Operating 5% to 95% relative humidity (% RH) at up to +30 °C, 5% to 45% RH above +30 °C up to +45 °C, non-condensing

Non-Operating 5% to 95% RH (Relative Humidity) at up to +30 °C, 5% to 45% RH above +30 °C up to +60 °C

Altitude

Operating Up to 3,000 meters, derate maximum operating temperature by 1 °C per 300 meters above 1,500 meters altitude.

Non-Operating Up to 12,000 meters.

Physical characteristics

Dimensions

Does not include connectors, chains, connector savers, connector covers, pushbuttons, cables, strain reliefs, rubber boot, or lock down hardware protruding from front or rear panels.

Height 31.2 mm (1.23 in.)

Width 116.8 mm (4.6 in.)

Depth 105.7 mm (4.16 in.)

Weight

0.48 kg (1.06 lbs.)

Construction material

Main chassis parts constructed of aluminum; front panels constructed of plastic laminate; circuit boards constructed of glass-laminate.

Ordering information

Models

Ordering nomenclature

Product	Description
TCS70902	Calibration source ≤ 9.4 ps step output. Includes: calibration source, USB cable, power adapter, and ESD strap.
292 Kit option	Adapter kit for DUTs with 2.92 mm, 3.5 mm and SMA adapters. Includes: 2 Male to Female 1.85 mm to 2.92 mm adapters and 1 phase matched pair of 2.92 mm male to male cables.
240 Kit option	Adapter kit for DUTs with 1.85 mm adapters. Includes: 2.4 mm adapters.
065099900 – 240KIT	Adapter kit for DUTs with 2.92 mm, 3.5 mm and SMA adapters. Includes: 2 Male to Female 1.85 mm to 2.92 mm adapter and 1 phase matched pair 2.92 mm male to male cables.
065100000 – 292KIT	Adapter kit for DUTs with 1.85 mm adapters. Includes: 2.4 mm adapters.

MSO/DPO70000C/DX

Product	Description
Option SC	SignalCorrect™ - Cable and channel characterization software.
DPO-UP SC	SignalCorrect™ - Cable and channel characterization software upgrade.
DPOFL-SC	SignalCorrect™ - Cable and channel characterization software floating license.

Certifications



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

ASEAN / Australasia (65) 6356 3900
Belgium 00800 2255 4835*
Central East Europe and the Baltics +41 52 675 3777
Finland +41 52 675 3777
Hong Kong 400 820 5835
Japan 81 (3) 6714 3010
Middle East, Asia, and North Africa +41 52 675 3777
People's Republic of China 400 820 5835
Republic of Korea +822 6917 5084, 822 6917 5080
Spain 00800 2255 4835*
Taiwan 886 (2) 2656 6688

Austria 00800 2255 4835*
Brazil +55 (11) 3759 7627
Central Europe & Greece +41 52 675 3777
France 00800 2255 4835*
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The Netherlands 00800 2255 4835*
Poland +41 52 675 3777
Russia & CIS +7 (495) 6647564
Sweden 00800 2255 4835*
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Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Canada 1 800 833 9200
Denmark +45 80 88 1401
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Norway 800 16098
Portugal 80 08 12370
South Africa +41 52 675 3777
Switzerland 00800 2255 4835*
USA 1 800 833 9200

* European toll-free number. If not accessible, call: +41 52 675 3777

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