

# 2.92mm VNA Calibration Kits

DATA SHEET / 2Z-058B

Models:

8770CK10 – Fixed Load Kit

8770CK11 – Fixed Load Kit Plus Adapters

8770CK20 – Sliding Load Kit

8770CK21 – Sliding Load Kit Plus Adapters

8770CK30 – TRL Kit

8770CK31 – TRL Kit Plus Adapters



# 2.92mm VNA Calibration Kits

8770CK10/11 SERIES, 8770CK20/21 SERIES, AND 8770CK30/31 SERIES

## Features

- > 2.92mm Connectors
- > DC to 40 GHz
- > Keysight, Rhode & Schwarz and Anritsu VNAs Supported

## Calibration Methods Supported

- > 8770CK10/11 – Fixed Load SOLT (DC–40 GHz)
- > 8770CK20/21 – Sliding/Fixed Load SOLT (DC–40 GHz)
- > 8760CK30/31 – TRM/TRL/LRL (DC–40 GHz)

## The Importance of VNA Calibration

Imperfections exist in even the finest test equipment. If un-corrected these systematic imperfections cause the equipment to yield less accurate measurements. The basis of network analyzer error correction is referred to as “calibration” of which multiple methods exist.

## Calibration Methods

SOLT calibration, which uses Short, Open and Load standards, requires precise models of the standards’ electrical performance. Fixed load SOLT uses fixed terminations and is adequate for measuring devices with mid-range reflection coefficients. The lowest return loss is limited by the reflection coefficient of the fixed load standard (typically better than 20 dB return loss\*).

The sliding load SOLT kit can accurately measure lower reflection coefficients due to the improved termination performance provided by the sliding load (typically better than 30 dB return loss).

TRL calibration, using Thru, Reflect and Line standards, relies on the characteristic impedance of the air lines (Line). TRL calibration is the most accurate method of measuring devices at low (typically better than 40 dB return loss) and high reflection coefficients. \*Refer to specifications on page 3.

8770CK10/11/20/21 kits are configured for use in performing one-port SOL (Short-Open-Load) response calibrations (a method used for measuring VSWR/ Return Loss), and full two-port SOLT (Short-Open-Load-Thru) calibration (for performing forward and reverse transmission and reflections measurement).

8770CK30/31 TRL/LRL calibration kits contain the components needed to perform TRM, TRL and LRL calibrations. Source match can also be measured using the 15cm air line with the short circuit provided.

8770CK11/21/31 kits include three 2.92mm in-series adapters for applications that require female/female, male/male, or male/female connections. A wide range of between-series adapters in 2.92mm to other types are also available by separate order.

A050A



8799A1



8719A

8719B

7909F1

7909F2



## Recommended Accessories

### A050A Digital Connector Gage Kit:

Contains two “Thread-on” type, digital gages for measuring female and male contact pin location. They provide an easy and accurate way to measure critical linear interface dimensions of 2.92mm and 3.5mm coaxial connectors.

### 8799A1 5/16-inch Precision Torque Wrench (8.0 inch lbs):

For proper torquing of 1.85mm, 2.92mm, 2.92mm and 3.5mm connections. Factory preset to 8.0 inch lbs to ensure the precise torque needed for optimum repeatability. Employs a “break” design that makes it impossible to over-torque your connections. These torque wrenches are provided with 8770CK20/21 and 87700CK30/31 kits, and are highly recommended for use with 8770CK10/11 kits.

### 8719A & 8719B 2.92mm NMD test port adapters:

Precision 2.92mm to NMD2.92mm; DC–40.0 GHz. Saves unnecessary wear and tear on your VNA test port connectors.

### 7909F1 & 7909F2 2.4mm NMD test port adapters:

Precision NMD2.4mm to 2.92mm; DC–40.0 GHz. Saves unnecessary wear and tear on your VNA test port connectors.

Go to [www.maurymw.com/Precision/Adapters.php](http://www.maurymw.com/Precision/Adapters.php) to see all Maury 2.92mm in-series and between series adapters.

## Maury 2.92mm VNA Calibration Kits

Maury precision 2.92mm VNA calibration kits include each of the calibration standards and tools shown in the tables at the right. The 8770CK10/20/30 kits do not include adapters; the 8770CK11/21/31 kits include one each of the in-series adapters shown. Other in-series and between-series adapters are sold separately.

### Components Included in 8770CK10/11 Kits

QUANTITY	DESCRIPTION	MODEL
1	2.92mm female fixed short circuit	8771F2
1	2.92mm male fixed short circuit	8772F2
1	2.92mm female open circuit termination	8773A2
1	2.92mm male open circuit termination	8773B2
1	2.92mm female fixed termination	8775A3
1	2.92mm male fixed termination	8775B3
1*	2.92mm female to 2.92mm female adapter	8714A2
1*	2.92mm male to 2.92mm male adapter	8714B2
1*	2.92mm female to 2.92mm male adapter	8714C2
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8770CK11 kits, but are not included in the 8770CK10 kits.

### Components Included in 8770CK20/21 Kits

QUANTITY	DESCRIPTION	MODEL
1	2.92mm female fixed short circuit	8771F2
1	2.92mm male fixed short circuit	8772F2
1	2.92mm female open circuit termination	8773A2
1	2.92mm male open circuit termination	8773B2
1	2.92mm female fixed termination	8775A3
1	2.92mm male fixed termination	8775B3
1*	2.92mm female to 2.92mm female adapter	8714A2
1*	2.92mm male to 2.92mm male adapter	8714B2
1*	2.92mm female to 2.92mm male adapter	8714C2
1	2.92mm female sliding termination	8777A2
1	2.92mm male sliding termination	8777B2
1	Pin depth adjusting tool	8777SO2
1	5/16-inch torque wrench — 8 in. lbs.	8799A1
1	5/16-inch double end wrench	8770Z6
1	7/16-inch double end wrench	8770Z7
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8770CK21 kits, but are not included in the 8770CK20 kits.

### Components Included in 8770CK30/31 Kits

QUANTITY	DESCRIPTION	MODEL
1	2.92mm female fixed short circuit	8771F3
1	2.92mm male fixed short circuit	8772F2
1	2.92mm female fixed termination	8775A3
1	2.92mm male fixed termination	8775B3
1*	2.92mm female to 2.92mm female adapter	8714A2
1*	2.92mm male to 2.92mm male adapter	8714B2
1*	2.92mm female to 2.92mm male adapter	8714C2
1	2.92mm female to male air line (5cm)	8774S5
1	2.92mm female to male air line (5.25cm)	8774S5.25
1	2.92mm female to male air line (6cm)	8774S6
1	2.92mm female to male air line (15cm)	8774S15
1	5/16-inch torque wrench — 8 in. lbs.	8799A1
1	5/16-inch double end wrench	8770Z6
1	7/16-inch double end wrench	8770Z7
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8770CK31 kits, but are not included in the 8770CK30 kits.

8770CK10



8770CK11



8770CK20



8770CK21



8770CK30



8770CK31



## COMPONENT SPECIFICATIONS



### Air Lines – Models 8774S15, 8774S6, 8774S5.25 & 8774S5

Frequency Range -- DC to 40.0 GHz

**Electrical Length:**

- 8774S15 -- 15cm
- 8774S5 -- 5cm
- 8774S6 -- 6cm
- 8774S5.25 -- 5.25cm

Electrical Length Accuracy --  $\pm 0.0025$ cm  
 Minimum Return Loss (excluding connector interface) -- 48 dB  
 Nominal Impedance -- 50 ohm



### Sliding Terminations – Models 8777A2 & 8777B2

Frequency Range -- 4.0 to 40.0 GHz

Air Line Accuracy -- 46 dB min, 4.0 to 40.0 GHz

(equivalent return loss of air line impedance)

**Maximum VSWR of Terminating Element:**

- 4.0 to 10.0 GHz -- 1.10
- 10.0 to 40.0 GHz -- 1.05

Nominal Impedance -- 50 ohm

Power Handling -- 0.5 watt CW, 0.5 kW peak

Travel -- Greater than 1/2 wavelength at 4 GHz



### Fixed Terminations – Models 8775A3 & 8775B3

Frequency Range -- DC to 40.0 GHz

**Maximum VSWR:**

- DC to 4.0 GHz -- 1.016
- 4.0 to 40.0 GHz -- 1.12

Power Handling -- 0.5 watt CW, 0.25 kW peak

Nominal Impedance -- 50 ohm



### Open Circuits – Models 8773A2 & 8773B2

Frequency Range -- DC to 40.0 GHz

Minimum Reflection Coefficient -- 0.98

Phase Accuracy --  $\pm 1.5$  degrees

Nominal Impedance -- 50 ohm



### Fixed Shorts – Models 8771F2 & 8772F2

Frequency Range -- DC to 40.0 GHz

Minimum Reflection Coefficient -- 0.98

Phase Accuracy --  $\pm 2.0$  degrees

Nominal Impedance -- 50 ohm



### Precision 2.92mm Adapters – Models 8714A2/B2/C2

Frequency Range -- DC to 40.0 GHz

**Maximum VSWR:**

- DC to 4.0 GHz -- 1.05
- 4.0 to 20.0 GHz -- 1.08
- 20.0 to 40.0 GHz -- 1.12

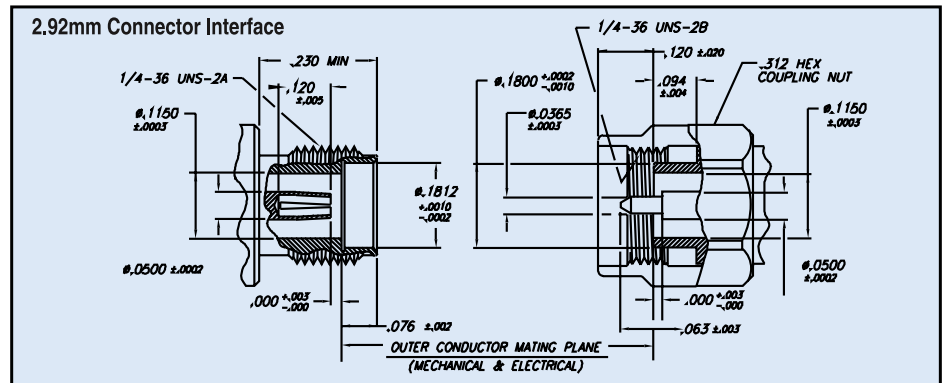
Nominal Impedance -- 50 ohm

*(Note: These adapters are included in the 877050CK11/21/31 kits, but are not included in the 8770CK10/20/30 kits.)*

## Connector Description

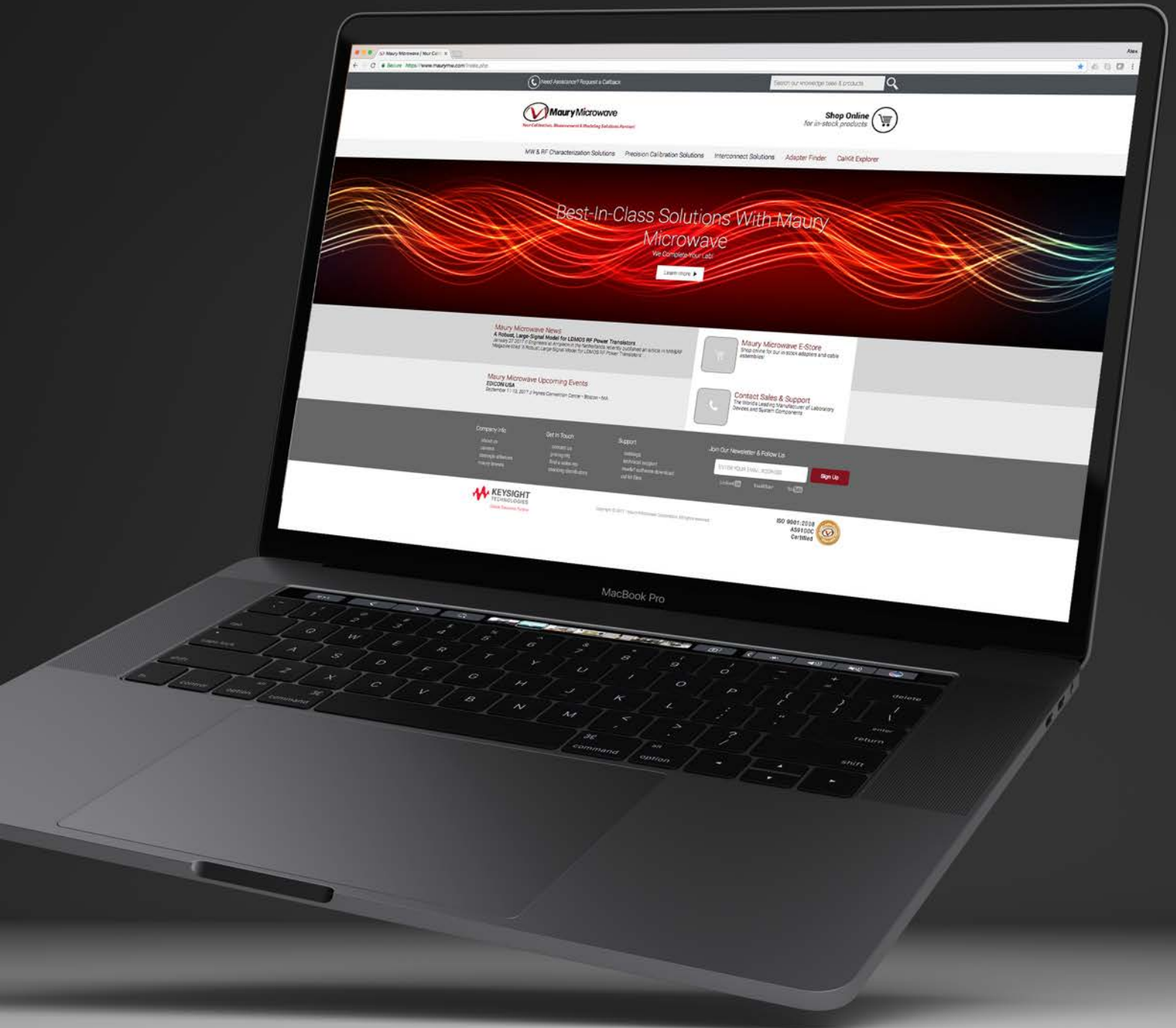
The precision 2.92mm connectors on the components in these kits are miniature, instrument grade, air-interface connectors that operate mode free up to 40 GHz, and comply with IEEE standard 287 general precision connector, instrument grade GPC2.92.

For detailed interface specifications please refer to Maury data sheet 5E-063.





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