

# Type N VNA Calibration Kits

DATA SHEET / 2Z-061

Models:

8850CK10 – Fixed Load Kit

8850CK11 – Fixed Load Kit Plus Adapters

8850CK20 – Sliding Load Kit

8850CK21 – Sliding Load Kit Plus Adapters

8850CK30 – TRL Kit

8850CK31 – TRL Kit Plus Adapters



# Type N VNA Calibration Kits

8850CK10/11 SERIES, 8850CK20/21 SERIES AND 8850CK30/31 SERIES

## Features

- > Type N Connectors
- > DC to 18 GHz
- > Keysight, Rhode & Schwarz and Anritsu VNAs Supported

## Calibration Methods Supported

- > 8850CK10/11 – Fixed Load SOLT (DC–18.0 GHz)
- > 8850CK20/21 – Fixed/Sliding Load SOLT (DC–18.0 GHz)
- > 8850CK30/31 – TRM/TRL/LRL (DC–18.0 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 4.

8850CK10/11/20/21 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).

8850CK30/31 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.

8850CK11/21/31 kits include three Type N in-series adapters for applications that require female/female, male/male, or male/female connections. A wide range of between-series adapters in Type N to other types are also available by separate order.

A020K



## Recommended Accessories

### A020K 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 Type N coaxial connectors.

2698C2



### 2698C2 3/4-inch Precision Torque Wrench (12.0 inch lbs):

For proper torquing of 7mm, LPC7, Type N, NMD3.5, NMD2.92, NMD2.4 connections. Factory preset to 12.0 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 8850CK20/21 and 8850CK30/31 kits, and are highly recommended for use with 8850CK10/11 kits.

7909D1

7909D2

8829A

8829B



### 8829A & 8829B Type N to 3.5mm NMD test port adapters:

Precision Type N to NMD3.5mm; DC–18.0 GHz. Saves unnecessary wear and tear on your VNA test ports.

### 7909D1 & 7909D2 Type N to 2.4mm NMD test port adapters:

Precision Type N to NMD2.4mm; DC–18.0 GHz. Saves unnecessary wear and tear on your VNA test ports.

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

## Maury Type N VNA Calibration Kits

Maury precision Type N VNA calibration kits include each of the calibration standards and tools shown in the tables at the right. The 8850CK10/20/30 kits do not include adapters; the 8850CK11/21/31 kits include one each of the in-series adapters shown. Other in-series and between-series adapters are sold separately.

### Components Included in 8850CK10/11 Kits

QUANTITY	DESCRIPTION	MODEL
1	Type N female fixed short circuit	8806C
1	Type N male fixed short circuit	8807C
1	Type N female open circuit termination	8809B1
1	Type N male open circuit termination	8810B1
1	Type N female fixed termination	2510A6
1	Type N male fixed termination	2510B6
1*	Type N female to Type N female adapter	8828A
1*	Type N male to Type N male adapter	8828B
1*	Type N female to Type N male adapter	8828C
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8850CK11 kits, but are not included in the 8850CK10 kits.

### Components Included in 8850CK20/21 Kits

QUANTITY	DESCRIPTION	MODEL
1	Type N female fixed short circuit	8806C
1	Type N male fixed short circuit	8807C
1	Type N female open circuit termination	8809B1
1	Type N male open circuit termination	8810B1
1	Type N female fixed termination	2510A6
1	Type N male fixed termination	2510B6
1*	Type N female to Type N female adapter	8828A
1*	Type N male to Type N male adapter	8828B
1*	Type N female to Type N male adapter	8828C
1	Type N female sliding termination	8834A
1	Type N male sliding termination	8834B
1	3/4-inch torque wrench — 12.0 in. lbs.	2698C2
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8850CK21 kits, but are not included in the 8850CK20 kits.

### Components Included in 8850CK30/31 Kits

QUANTITY	DESCRIPTION	MODEL
1	Type N female fixed short circuit	8806G
1	Type N male offset short circuit	8807C
1	Type N female fixed termination	2510A6
1	Type N male fixed termination	2510B6
1*	Type N female to Type N female adapter	8828A
1*	Type N male to Type N male adapter	8828B
1*	Type N female to Type N male adapter	8828C
1	Type N female to Type N male air line (3.12cm)	2553T3.12
1	Type N female to Type N male air line (3.82cm)	2553T3.82
1	Type N female to Type N male air line (15cm)	2553T15
1	3/4-inch torque wrench — 12.0 in. lbs.	2698C2
1	Foam-lined wood Instrument case	—

\* These adapters are provided in the 8850CK31 kits, but are not included in the 8850CK30 kits.

8850CK10



8850CK11



8850CK20



8850CK21



8850CK30



8850CK31



## COMPONENT SPECIFICATIONS



### Air Lines -- Models 2553T3.12, 2553T3.82 & 2553T15

Frequency Range -- DC to 18.0 GHz

Electrical Length:

2553T3.12 -- 3.12cm

2553T3.82 -- 3.816cm

2553T15 -- 14.983cm

Electrical Length Accuracy --  $\pm 0.01$ cm

Minimum Return Loss (excluding connector interfaces) -- 52 dB

Characteristic Impedance (where skin depth is negligible) -- 50 ohm + 0.2 ohm



### Sliding Termination -- Model 8834A/B

Frequency Range -- 1.8 to 18.0 GHz

Maximum VSWR of Terminating Element -- 1.05

Air Line Accuracy -- 54 dB min return loss (equivalent return loss of air line impedance)

Nominal Impedance -- 50 ohm

Power Handling -- 1.0 watt CW, 1.0 kW peak

Travel -- Greater than 1/2 wavelength at 1.8 GHz

GHz



### Fixed Terminations -- Model 2510A6 & 2510B6

Frequency Range -- DC to 18.0 GHz

Maximum VSWR:

DC to 2.0 GHz -- 1.02

2.0 to 4.0 GHz -- 1.04

4.0 to 18.0 GHz -- 1.06

Nominal Impedance -- 50 ohm

Power Handling -- 1 watt CW, 1 kW peak



### Open Circuits -- Models 8809B1 & 8810B1

Frequency Range -- DC to 18.0 GHz

Minimum Reflection Coefficient -- 0.99

Phase Accuracy --  $\pm 2.0^\circ$

Nominal Impedance -- 50 ohm



### Fixed Shorts -- Models 8806G, 8806C & 8807C

Frequency Range -- DC to 18.0 GHz

Minimum Reflection Coefficient -- 0.98

Nominal Impedance -- 50 ohm

Phase Accuracy --  $\pm 2.0^\circ$



### Precision Type N Adapters -- Models 8828A/B/C

Frequency Range -- DC to 18.0 GHz

Maximum VSWR:

DC to 4.0 GHz -- 1.03

4.0 to 10.0 GHz -- 1.05

10.0 to 18.0 GHz -- 1.09

Nominal Impedance -- 50 ohm

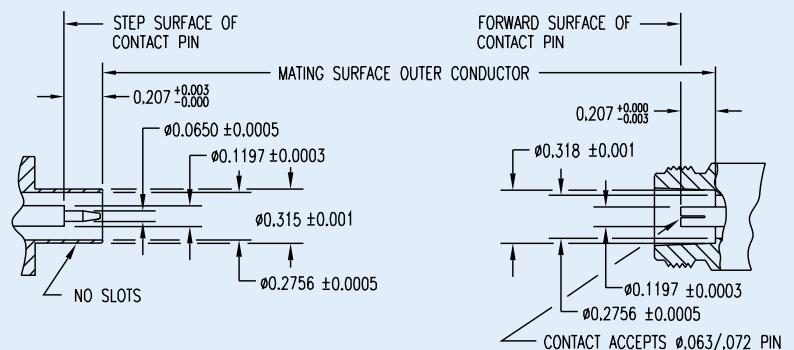
*(Note: These adapters are included in the 8850CK11/21/31 kits, but are not included in the 8850CK10/20/30 kits.)*

## Connector Description

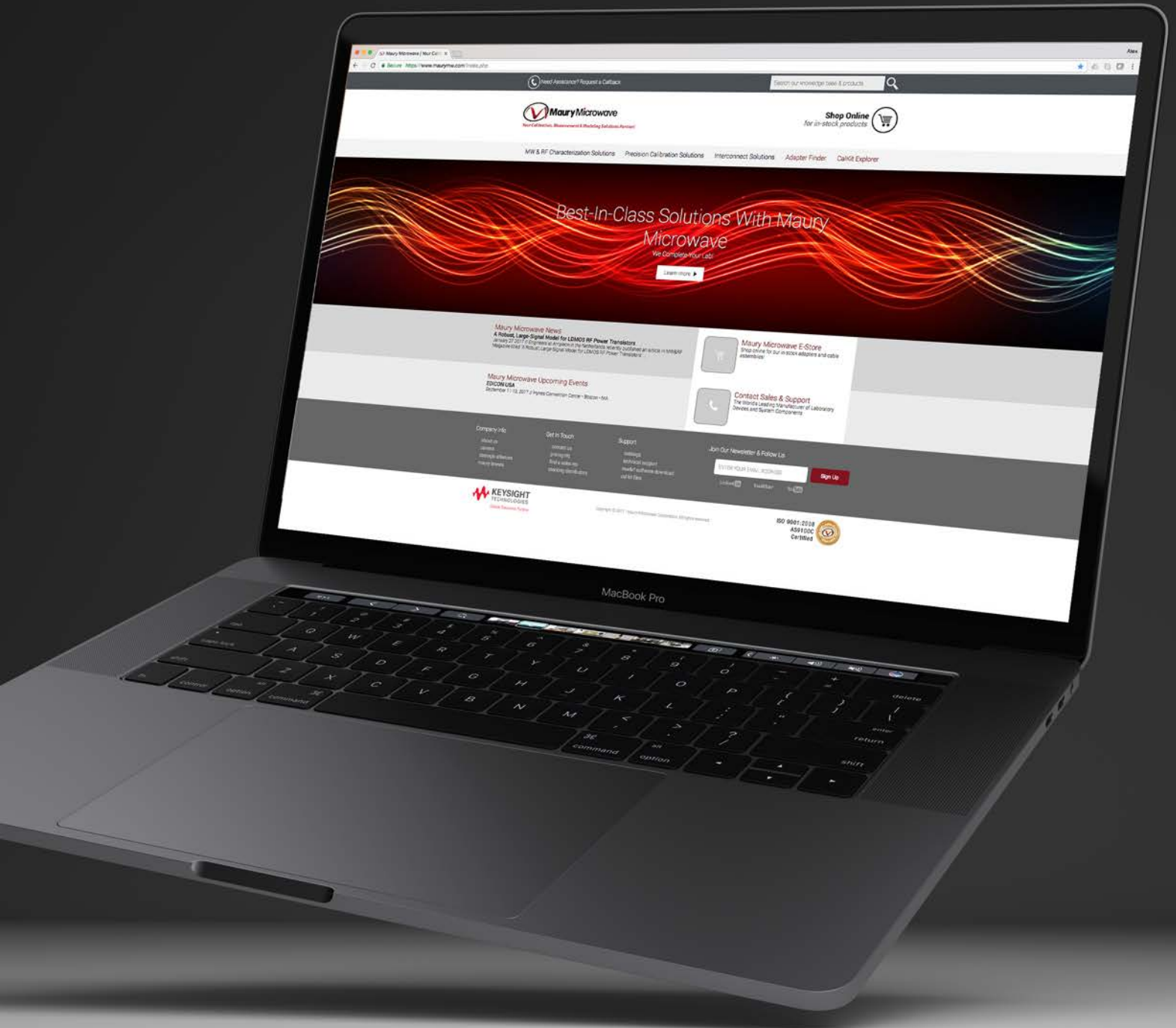
The precision Type N connectors on the components in these kits are instrument grade, air-interface connectors that are rated for operation from DC to 18.0 GHz, and comply with IEEE standard 287 for instrument grade general precision connectors (GPC Type N).

The connectors are normally made with stainless steel bodies with heat-treated gold-plated beryllium copper contacts. For detailed interface specifications please refer to Maury data sheet 5E-049.

### Type N Connector Interface



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OUR PRODUCTS



www.maurymw.com



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