

1.85mm TRL/LRL VNA CALIBRATION KITS

7860A SERIES

Features

- TRL/LRL Calibrations
- Specified DC to 67 GHz
(Operates DC to 70 GHz)
- Agilent VNAs

Description

These precision 1.85mm calibration kits are designed for use with a broad range of vector network analyzers (VNAs). The components in the kits are configured for use in making error-corrected TRM/TRL/LRL measurements of devices supplied with 1.85mm connectors, from DC to 67.0 GHz.

Each kit includes a full complement of calibration standards (shorts, opens, and fixed loads) and can be configured for any combination of VNA or test set/cable connectors. User-specified VNA software and a set of adapters are included. All kit components come housed in an attractive, foam-lined, wood instrument case.

TRM/TRL/LRL Calibration

The 7860A series kits are configured for three calibration methods (TRM/TRL/LRL). Source match can also be measured using the 3.00 cm air line with the short circuit. The table below shows the frequency ranges, calibration methods, and the standards used to perform a complete 2-port calibration to 67.0 GHz.

Frequency Range	Calibration Method	Calibration Standards
DC — 800 MHz	TRM	Fixed Termination
800 MHz — 4.0 GHz	TRL	3.00 cm air line
4.0 GHz — 13.0 GHz	TRL	0.96 cm air line
13.0 GHz — 67.0 GHz	LRL	0.96 cm & 1.15 cm air lines



7860A

Components Included in 7860A Kits

Model	Description	Quantity
7843S0.96	1.85mm female to male air line (0.96 cm)	1
7843S1.15	1.85mm female to male air line (1.15 cm)	1
7843S3.00	1.85mm female to male air line (3.00 cm)	1
7846A	1.85mm female fixed short circuit	1
7847A	1.85mm male fixed short circuit	1
7831A	1.85mm female fixed termination	1
7831B	1.85mm male fixed termination	1
8799A1	Torque wrench (8 in/lbs)	1
—	5/16-inch double end wrench	1
—	3/16-inch double end wrench	1
—	VNA software disk	1*
—	Operating instructions (manual)	1
—	Instrument case	1

NOTE: Each kit also includes a set of adapters that is user specified per the [Option Finder](#) (see page 2 for details).

* Anritsu kits do not contain software disk.

Recommended Accessories

A048A Digital connector gage kit (thread-on type).



Adapters & Adapter Set Options — Adapter Sets (7850Z1/Z2/Z3)

The adapter sets described on this page provide users with the ability to tailor their Maury calibration kits for use with specific VNAs. The NMD adapters in these sets are specifically designed to mate with the special ruggedized connectors used on most commercial VNA test sets. Adapters may be ordered in separately boxed sets, as options shipped with corresponding VNA calibration kits, or as individual adapters (by model number) to serve as replacement parts or spares. If ordering adapter sets for a cal kit, see the *Option Finder* below.

Adapters Included in 7850Z1 Sets

	Quantity	Description	Model
Test Port Adapter Option 1	1	NMD1.85mm female to 1.85mm female	7809A1
	1	NMD1.85mm female to 1.85mm male	7809A2
	1	1.85mm female to 1.85mm female	7821A
	1	1.85mm male to 1.85mm male	7821B
	1	1.85mm female to 1.85mm male	7821C

Adapters Included in 7850Z2 Sets

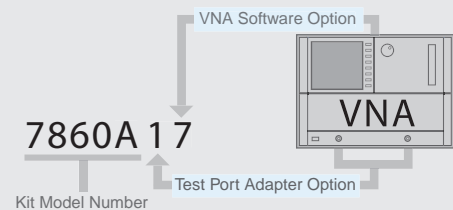
	Quantity	Description	Model
Test Port Adapter Option 2	1	1.85mm female to 1.85mm female	7821A
	1	1.85mm male to 1.85mm male	7821B
	1	1.85mm female to 1.85mm male	7821C

Adapters Included in 7850Z3 Sets

	Quantity	Description	Model
Test Port Adapter Option 3	1	1.85mm female to 2.92mm female	7826A
	1	1.85mm female to 2.92mm male	7826B
	1	1.85mm male to 2.92mm female	7826C
	1	1.85mm male to 2.92mm male	7826D

Ordering Options

To specify the test port adapter and VNA software options you need, simply add two digits to the end of the kit model number (as show in the diagram at right). The first digit is the test port adapter option number, and the second is the VNA software option number (as found in the *Option Finder* below). The example in the diagram shows the combination of digits needed to order a 7860A kit configured with the adapters and software for use with an Agilent PNA that has 1.85mm or 2.4mm test ports.



Option Finder

VNA TEST PORT TYPE	TEST PORT ADAPTER OPTIONS	VNA SOFTWARE OPTIONS					
		KITS W/O SOFTWARE OPTION 0	ROHDE & SCHWARZ ZV SERIES OPTION 1	AGILENT 8510C OPTION 4	AGILENT 8719/20/22 OPTION 5	AGILENT PNA SERIES OPTION 7	ANRITSU 37000 OPTION 9
1.85mm or 2.4mm ¹	0	—	01	04	05	07	09
	1	10	11	14	15	17	19
	2	20	21	24	25	27	29
2.92mm or 3.5mm ¹	3	30	31	34	35	37	39

¹ 1.85mm and 2.4mm connectors are fully mateable, as are 3.5mm and 2.92mm (K) connectors. The resulting junction is calibrated out and is not critical.



Component Specifications

The Maury precision 1.85mm components included in these kits have the following specifications:

Air Lines — Models 7843S0.96, 7843S1.15 and 7843S3.00

Frequency Range	DC to 67.0 GHz
Electrical Length:	
7843S0.96	0.96 cm
7843S1.15	1.15 cm
7843S3.00	3.00 cm
Electrical Length Accuracy	0.0025 cm
Minimum Return Loss (excluding connector interface)	48 dB
Nominal Impedance	50 ohm

Fixed Shorts — Models 7846A and 7847A

Frequency Range	DC to 67.0 GHz
Minimum Reflection Coefficient	0.99
Nominal Impedance	50 ohm

Fixed Terminations — Low Band Models 7831A1/B1

Frequency Range	DC to 50.0 GHz
Maximum VSWR:	
DC to 1.0 GHz	1.02
1.0 to 10.0 GHz	1.07
10.0 to 26.5 GHz	1.10
26.5 to 50.0 GHz	1.20
Power Handling	1 watt CW
Nominal Impedance	50 ohm

Adapter Specifications

The Maury precision 1.85mm in-series adapters and the NMD1.85mm test port adapters included in these sets have the following specifications:

Ruggedized Test Port Adapters — Models 7809A1 and 7809A2

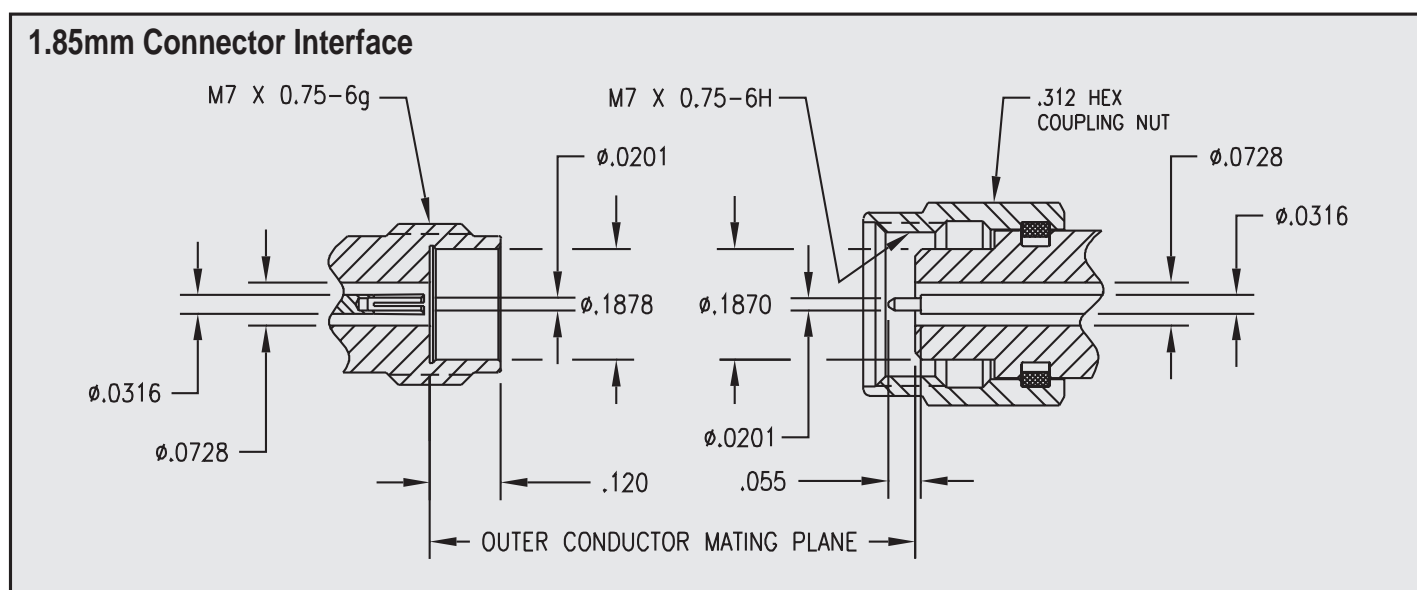
Frequency Range	DC to 67.0 GHz
Maximum VSWR:	
DC to 26.5 GHz	1.10
26.5 to 40.0 GHz	1.15
40.0 to 67.0 GHz	1.20
Nominal Impedance	50 ohm

Precision 1.85mm Adapters — Models 7821A/B/C

Frequency Range	DC to 67.0 GHz
Maximum VSWR:	
DC to 26.5 GHz	1.06
26.5 to 40.0 GHz	1.10
40.0 to 67.0 GHz	1.15
Nominal Impedance	50 ohm

Precision 1.85mm Adapters — Models 7826A/B/C/D

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





The Importance of VNA Calibration

Imperfections exist in even the finest test equipment and, if uncorrected, these imperfections will cause the equipment to yield less than ideal measurements. The basis of network analyzer error correction is the measurement of known electrical standards, such as a thru, open circuit, short circuit, and precision load impedance. By calibrating your network analyzer with these standards, you can compensate for its inherent imperfections.

Why Does Maury Manufacture 1.85mm Calibration Kits?

The trend within the RF and Microwave industry design community is increasingly toward the use of higher frequency ranges and applications that require higher degrees of precision and accuracy. With the introduction of the newest generation of VNAs (like Agilent's PNA series) the need for tools to calibrate systems with 1.85mm test ports has grown. Maury addresses that need with the model 7850A standard offset short kit series², the 7850B/M/F fixed termination kit³, and the 7860A TRL kit series.

Connector Description

The precision 1.85mm connectors on the components in this kit (see *the 1.85mm connector interface drawing on page 3*) are miniature, instrument grade, air-interface connectors that operate mode free up to 67 GHz, and comply with IEEE standard 287 general precision connector, instrument grade GPC1.85. For detailed interface specifications, please refer to Maury data sheet 5E-059.

² See Maury data sheet 2Z-054.

³ See Maury data sheet 2Z-055.

Calibration Methods Supported

- **7850A**
 - SOLT (DC to 26 GHz)
 - SSST (26 to 67 GHz)
- **7850B**
 - SOLT (Broad Band Calibration)
 - Low Band Fixed Load (DC to 26 GHz)
 - High Band Fixed Load (10 to 67 GHz)
- **7860A**
 - TRM/TRL/LRL

These 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). The 7860A TRL kits are configured for use under three calibration methods, TRM/TRL/LRL (Thru-Reflect-Match/Thru-Reflect-Line/Line-Reflect-Line) and can be used with the 3.00 cm air line and short circuit provided to measure source match.

For applications that only require all-female or all-male connections, Maury offers the 7850F/M single-sex fixed termination kits, at a lower price than the 7850B full fixed termination kits.