Agilent
PNA Series
Microwave Network Analyzers

Configuration Guide

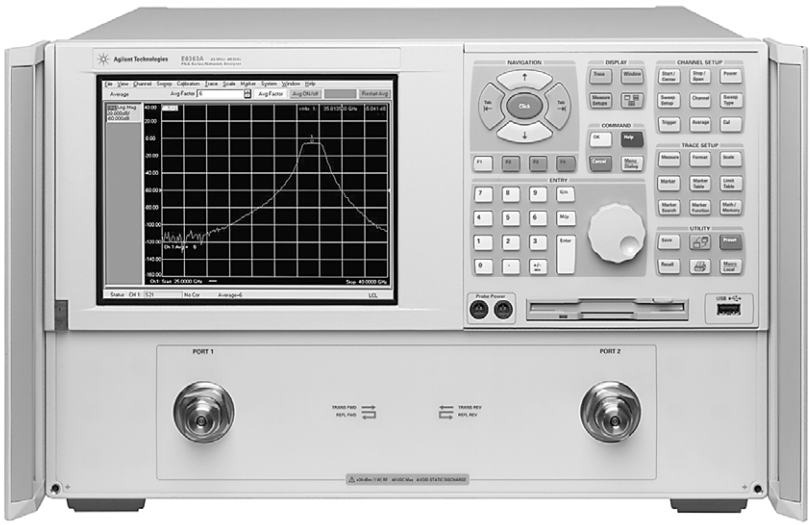
E8362B 10 MHz to 20 GHz
E8363B 10 MHz to 40 GHz
E8364B 10 MHz to 50 GHz
E8361A 10 MHz to 67 GHz

System configuration summary

This summary lists the main components required to form a basic measurement system. Options or peripherals may be added to provide enhanced measurement and data storage capability.

Full S-parameter measurements

- **Agilent PNA series microwave network analyzers**
- **Test port cables, 50 ohms**
- **Calibration kit for applicable connector type**



This configuration guide describes standard configurations, options, accessories, upgrade kits and compatible peripherals for the PNA series microwave network analyzers. This guide should be used with the *Agilent PNA Series Microwave Network Analyzers, Data Sheet* for a complete description of these analyzers.

Agilent Technologies

Ordering Guide For PNA Series Network Analyzers

This guide is intended to assist you in the ordering process. Additional information and products (such as calibration kits and cables) are described throughout this document.

PNA Series microwave network analyzers

E8362B	10MHz to 20GHz
E8363B	10MHz to 40GHz
E8364B	10MHz to 50GHz
E8361A	10MHz to 67GHz

Options

To add options to a product, order the corresponding item number.

	Description	For E8362/3/4B order item number[2]	For E8361A order item number	Additional information
Test Set				
Option 014	• Configurable test set	E836xB-014	E8361A-014	
Power Configuration				
Option UNL	• Extended power range and bias-tees	E836xB-UNL	Available soon	
CPU RAM				
Option 022	• Extended memory	E836xA-022	E8361A-022	
Non-linear Measurements				
Option 080	• Frequency offset	E836xA-080	E8361A-080	Requires 014
Option 081	• External reference switch	E836xA-081	Available soon	Requires 014
Option 083	• Frequency converter measurement application	E836xA-083	E8361A-083	Requires 014, 080, and 081 (Option 081 not required on E8361A)
Measurement Features				
Option 010	• Time domain capability	E836xA-010	E8361A-010	
Combination Options				
Option 016	• Add receiver attenuators	E836xA-016	Available soon	Requires UNL
Accessories				
Option 1CM	• Rack mount kit with handles	E836xA-1CM	E8361A-1CM	
Option 1CP	• Rack mount kit without handles	E836xA-1CP	E8361A-1CP	
N4688A	• USB CD R/W drive	N4688A	N4688A	
N4689A	• USB Hub	N4689A	N4689A	
Additional Documentation[1]				
Option AVK	• Printed English version of on-line Help	E836xA-AVK	E8361A-AVK	
Option ABD[3]	• Printed German version of on-line Help	E836xA-ABD	E8361A-ABD	
Option ABE[3]	• Printed Spanish version of on-line Help	E836xA-ABE	E8361A-ABE	
Option ABF[3]	• Printed French version of on-line Help	E836xA-ABF	E8361A-ABF	
Option ABJ[3]	• Printed Japanese version of on-line Help	E836xA-ABJ	E8361A-ABJ	
Calibration Documentation				
Option 1A7	• ISO 17025 compliant calibration	E836xB-1A7	E8361A-1A7	
Option UK6	• Commercial calibration certificate with test data	E836xA-UK6	E8361A-UK6	

Warranty and Service

For warranty and service of 5 years, please order 60 months of R-51B (quantity = 60). Standard warranty is 36 months.

R-51B	Return-to-Agilent warranty and service plan

Calibration[1]

For 3 years, order 36 months of the appropriate calibration plan shown below. For 5 years, specify 60 months.

R-50C-001	Standard calibration
R-50C-002	Standards compliant calibration

1. Options not available in all countries.
2. Insert the correct number for the 'x' in the item number. For instance, if you would like the E8362B with option 010, order item number E8362A-010.
3. Printed version of on-line help has translations up to firmware revision 1.0.

Agilent Microwave PNA Series

The microwave PNA Series instruments are integrated vector network analyzers equipped with a built-in S-parameter test set, synthesized source, hard and floppy disk drives, and LCD display. The E8362A analyzer has two 50 ohm, 3.5 mm (m) test ports. The E8363A and E8364A analyzers have two 50 ohm, 2.4 mm (m) test ports. The E8361A analyzer has two 50 ohm, 1.85 mm (m) test ports. Included with each instrument is a mouse, keyboard, CD-ROM containing a copy of online Help and programming documentation, and a 3-year return-to-Agilent service warranty.

- ❍ **E8362B** network analyzer, 10 MHz to 20 GHz
- ❍ **E8363B** network analyzer, 10 MHz to 40 GHz
- ❍ **E8364B** network analyzer, 10 MHz to 50 GHz
- ❍ **E8361A** network analyzer, 10 MHz to 67 GHz

Options

- ❑ **Option 010** time-domain capability – For viewing reflection and transmission responses in time or distance domain.
- ❑ **Option 014** configurable test set – Provides six front panel access loops. Three access loops are for port one and three for port two. The loops provide access to the signal path between (a) the source output and the reference receiver, (b) the source output and directional coupler thru arm and (c) the coupled arm of the directional coupler and the port receiver. This option provides the capability to improve instrument sensitivity for measuring low-level signals, to reverse the directional coupler to achieve even more dynamic range or to add components and other peripheral instruments for a variety of measurement applications. (see PNA Series Microwave Data Sheet lit. # 5988-3992EN for a basic block diagram)
- ❑ **Option UNL** Extended power range and bias tees – Adds two 70 dB step attenuators and two bias tees. A step attenuator and bias tee set is inserted between the source and test port one and another set between the source and test port two. (see PNA Series Microwave Data Sheet lit. # 5988-3992EN for a basic block diagram)
- ❑ **Option 080** Frequency offset - This option enables the PNA Series microwave network analyzers to set the source frequency independently from where the receivers are tuned. This ability is important for two general classes of devices: mixers (and converters) and amplifiers. Option 080 provides a very basic user interface.
- ❑ **Option 081** External reference switch – Option 081 adds a solid-state internal RF transfer switch in the R1 reference-receiver path (see PNA Series Microwave Data Sheet lit. # 5988-3992EN for a basic block diagram). The switch allows the instrument to easily switch between standard S-parameter (non-frequency-offset) measurements and frequency offset measurements such as relative phase or absolute group delay that require an external reference mixer. The user can set the switch manually or remotely, but it is best used with the frequency-converter application (Option 083), where it is controlled automatically during the vector-mixer calibration procedure and subsequent measurements.
- ❑ **Option 083** Frequency converter measurement application – The frequency converter application adds an intuitive and easy-to-use user interface, advanced calibration choices that provide exceptional amplitude and phase accuracy, and control of external signal sources for use as local oscillators (both fixed and swept-LO measurements are supported). Mixer calibration techniques include match-corrected power-meter calibration and vector-mixer calibration (requires option 081). Finally, the frequency-converter application supports all of Agilent's major signal source families. You can also write custom drivers for controlling other signal sources you may already have.
- ❑ **Option 016** Add receiver attenuators – A 35 dB attenuator is added between each test port and its corresponding receiver (see PNA Series Microwave Data Sheet lit. # 5988-3992EN for a basic block diagram).
- ❑ **Option 022** Extended memory – Adds more RAM for a total of 512 MB
- ❑ **Option 1CM** rack mount kit with handles Adds a rack mount (5063-9217) and rail kit (E3663AC) for use without handles
- ❑ **Option 1CP** rack mount kit without handles Adds a rack mount (5063-9237) and rail kit (E3663AC) for use with previously supplied handles

Documentation

❑ **Option 0BW** adds printed copy of assembly level service manual

Localization

The following options provide a translated, printed copy of the online Help and an English printed copy of programming documentation.

❑ **Option AVK**[1] English manual
❑ **Option ABD**[1] German manual
❑ **Option ABE**[1] Spanish manual
❑ **Option ABF**[1] French manual
❑ **Option ABJ**[1] Japanese manual

Certification options

❑ **Option UK6** Commercial calibration certificate with test data
Complete set of measurements which tests unit to manufacturer's published specifications. Includes calibration label, calibration certificate, and data report. Conforms to ISO 9001.

❑ **Option 1A7** ISO 17025 compliant calibration
Complete set of measurements which tests unit to manufacturer's published specifications. Includes calibration label, ISO 17025 calibration certificate, and data report, measurement uncertainties and quardbands on all customer specifications. Conforms to ISO 17025 and ISO 9001.

Warranty and service

For warranty and service of 5 years, please order 60 months of R-51B (quantity = 60). Standard warranty is 36 months.

❑ **Option R-51B** Return-to-Agilent warranty and service plan

Calibration[2]

For 3 years order 36 months of the appropriate calibration plan shown below. For 5 years, specify 60 months.

❑ **Option R-50C-001** Standard calibration
❑ **Option R-50C-002** Standards-compliant calibration

1. Printed version of online help has translations up to firmware version 1.0.
2. Options not available in all countries.

Measurement Accessories

A complete line of RF and microwave test accessories can be found in the *Agilent RF and Microwave Test Accessories Catalog* (literature number 5968-4314EN) or by visiting **www.agilent.com/find/mta** or **www.agilent.com/find/accessories**

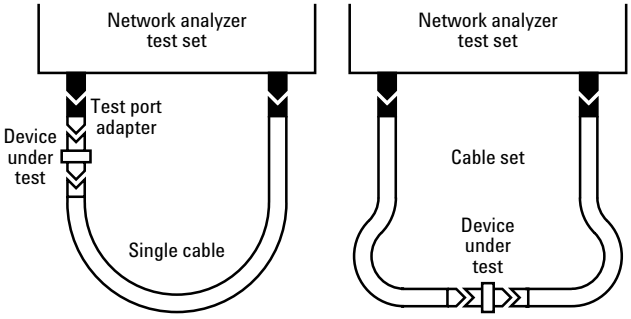
Accessories are available in these connector types: 50 ohm Type-N, 3.5 mm, 7 mm, 2.4 mm, 2.92 mm, 1.85 mm, and waveguide. Test port cables and a calibration kit should be added for a complete measurement system. A verification kit is used to verify corrected system performance.

Cables and adapter sets

Agilent offers cables in the following types:
- single cables in semi-rigid and flexible
- cable set in semi-rigid and flexible

There are also adapter sets available that protect the test port and convert the port to the desired connector interface. These kits contain:
- one male adapter
- one female adapter

To attain the best mechanical rigidity for device connection, use a single cable and the appropriate special adapter set. To attain the greatest flexibility for device connection, use a cable set.



Calibration kits

Coaxial measurements

Mechanical calibration kits include standards, such as opens, shorts and loads, which are measured by the network analyzer for increased measurement accuracy.

Electronic calibration (ECal) kits replace mechanical calibration standards with one solid-state calibration module that is controlled by the network analyzer to present many different impedances to the test ports. A full two-port calibration can be performed quickly with a single connection. This technique reduces operator errors and connector wear and abrasion.

Choose a calibration kit for each connector type to be used.

Economy, includes:
- open standards (male and female)
- short standards (male and female)
- fixed-termination standards (male and female)
- in-series adapters

Standard, includes the devices in the economy kit and adds:
- sliding load standards (male and female)

Precision, includes the devices in the economy kit and adds:
- 50 ohm airline(s) for TRL calibration
- TRL adapters

Waveguide measurements

For waveguide measurements, Agilent offers mechanical calibration kits that include:
- waveguide-to-coax adapters (X, P, K, R, Q, U, V)
- precision waveguide section
- flush short circuit
- fixed terminations
- straight section

For devices with 1.85 mm connectors

Mechanical calibration kits

❑ **85058B** standard: DC to 67 GHz.
Includes:
85058-60101 1.85 mm (m) short 5.4 mm
85058-60102 1.85 mm (m) short 6.3 mm
85058-60103 1.85 mm (m) short 7.12 mm
85058-60104 1.85 mm (m) short 7.6 mm
85058-60105 1.85 mm (f) short 5.4 mm
85058-60106 1.85 mm (f) short 6.3 mm
85058-60107 1.85 mm (f) short 7.12 mm
85058-60108 1.85 mm (f) short 7.6 mm
85058-60109 1.85 mm male open
85058-60110 1.85 mm female open
85058-60111 1.85 mm male load
85058-60112 1.85 mm female load
85058-60113 1.85 mm (m) to 1.85 mm (m) adapter
85058-60114 1.85 mm (f) to 1.85 mm (f) adapter
85058-60115 1.85 mm (m) to 1.85 mm (f) adapter

❑ **85058E** economy: DC to 67 GHz.
Includes:
85058-60101 1.85 mm (m) short 5.4 mm
85058-60105 1.85 mm (f) short 5.4 mm
85058-60109 1.85 mm male open
85058-60110 1.85 mm female open
85058-60111 1.85 mm male load
85058-60112 1.85 mm female load
85058-60113 1.85 mm (m) to 1.85 mm (m) adapter
85058-60114 1.85 mm (f) to 1.85 mm (f) adapter
85058-60115 1.85 mm (m) to 1.85 mm (f) adapter

Electronic calibration kits

❑ **N4694A** Microwave ECal: 10MHz to 67 GHz, 2 ports.
Includes:
Option M0F module with:
N4694-60001 1.85mm (f) to 1.85mm (m) ECal module
Option 00M module with:
N4694-60002 1.85mm (m) to 1.85mm (m) ECal module
Option 00F module with:
N4694-60003 1.85mm (f) to 1.85mm (f) ECal module
Option 00A adds:
85058-60113 1.85mm (m) to 1.85mm (m) adapter
85058-60114 1.85mm (f) to 1.85mm (f) adapter

Cables[1]

❑ **N4697E** Single, flexible: 1.85 mm, 96.5 cm, 38 inches
❑ **N4697F** Set, flexible: 1.85 mm, 62.2 cm, 24.5 inches

For devices with 2.4 mm connectors

Mechanical calibration kits

❑ **85056A** standard: DC to 50 GHz.
Includes:
00901-60003 2.4 mm (m) fixed broadband load
00902-60004 2.4 mm (f) fixed broadband load
00915-60003 2.4 mm (m) sliding load
00915-60004 2.4 mm (f) sliding load
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open

❑ **85056D** economy: DC to 50 GHz.
Includes:
00901-60003 2.4 mm (m) fixed broadband load
00902-60004 2.4 mm (f) fixed broadband load
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open

Electronic calibration kits

❑ **N4693A** Microwave ECal: 10MHz to 50 GHz, 2 ports.
Includes:
Option M0F module with:
N4693-60001 2.4mm (f) to 2.4mm (m) ECal module
Option 00M module with:
N4693-60002 2.4mm (m) to 2.4mm (m) ECal module
Option 00F module with:
N4693-60003 2.4mm (f) to 2.4mm (f) ECal module
Option 00A adds:
85056-60005 2.4mm (m) to 2.4mm (m) adapter
85056-60007 2.4mm (f) to 2.4mm (f) adapter

Cables[1]

❑ **85133C** single, semi-rigid: 2.4 mm, 81 cm, 32 inches
❑ **85133D** set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
❑ **85133E** single, flexible: 2.4 mm, 81 cm, 32 inches
❑ **85133F** set, flexible: 2.4 mm, 53 cm each, 21 inches

Adapter set

❑ **85130G** 2.4 mm[1] to 2.4 mm

1. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.

For devices with K connectors (2.92mm)

Mechanical calibration kits

❑ **85056K** 2.92/2.4 economy: DC to 40/50 GHz.
Includes:
00901-60003 2.4 mm (m) fixed broadband load
00902-60004 2.4 mm (f) fixed broadband load
00915-60003 2.4 mm (m) sliding load (Option 001)
00915-60004 2.4 mm (f) sliding load (Option 001)
11904-60001 2.4 mm (m) to 2.92 mm (m) adapter
11904-60002 2.4 mm (f) to 2.92 mm (f) adapter
11904-60003 2.4 mm (m) to 2.92 mm (f) adapter
11904-60004 2.4 mm (f) to 2.92 mm (m) adapter
85056-60005 2.4 mm (m) to 2.4 mm (m) adapter
85056-60006 2.4 mm (f) to 2.4 mm (f) adapter
85056-60007 2.4 mm (m) to 2.4 mm (f) adapter
85056-60020 2.4 mm (m) short
85056-60021 2.4 mm (f) short
85056-60022 2.4 mm (m) open
85056-60023 2.4 mm (f) open

Electronic calibration kits

❑ **N4692A** Microwave ECal: 10MHz to 40 GHz, 2 ports.
Includes:
Option M0F module with:
N4692-60001 2.92mm (f) to 2.92mm (m) ECal module
Option 00M module with:
N4692-60002 2.92mm (m) to 2.92mm (m) ECal module
Option 00F module with:
N4692-60003 2.92mm (f) to 2.92mm (f) ECal module
Option 00A adds:
N4692-60010 2.92mm (m) to 2.92mm (m) adapter
N4692-60011 2.92mm (f) to 2.92mm (f) adapter

Cables[1, 2]

❑ **85133C** single, semi-rigid: 2.4 mm, 81 cm, 32 inches
❑ **85133D** set, semi-rigid: 2.4 mm, 53 cm each, 21 inches
❑ **85133E** single, flexible: 2.4 mm, 81 cm, 32 inches
❑ **85133F** set, flexible: 2.4 mm, 53 cm each, 21 inches

Adapters

❑ **11904A** 2.4 mm (m) to K (m)
❑ **11904B** 2.4 mm (f) to K (f)
❑ **11904C** 2.4 mm (m) to K (f)
❑ **11904D** 2.4 mm (f) to K (m)
❑ **11904S** 2.4 mm to K adapter set

For devices with 3.5 mm or SMA connectors

Mechanical calibration kits

❑ **85052B** standard: DC to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
00911-60019 3.5 mm (m) sliding load
00911-60020 3.5 mm (f) sliding load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

❑ **85052C** precision TRL: DC to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60032 3.5 mm (f) to 3.5 mm (f) adapter
85052-60033 3.5 mm (m) to 3.5 mm (m) adapter
85052-60034 3.5 mm (f) to 3.5 mm (m) adapter
85052-60035 3.5 mm short TRL line
85052-60036 3.5 mm long TRL line

❑ **85052D** economy: DC to 26.5 GHz. Includes:
00902-60003 3.5 mm (m) fixed load
00902-60004 3.5 mm (f) fixed load
85052-60006 3.5 mm (m) short
85052-60007 3.5 mm (f) short
85052-60008 3.5 mm (m) open
85052-60009 3.5 mm (f) open
85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
85052-60013 3.5 mm (f) to 3.5 mm (m) adapter
85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

1. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.
2. For use with E8362A.

Electronic calibration kits

❑ **N4691A** Microwave ECal: 10MHz to 26.5 GHz, 2 ports. Includes:
Option M0F module with:
N4691-60001 3.5mm (f) to 3.5mm (m) ECal module
Option 00M module with:
N4691-60002 3.5mm (m) to 3.5mm (m) ECal module
Option 00F module with:
N4691-60003 3.5mm (f) to 3.5mm (f) ECal module
Option 00A adds:
85052-60012 3.5mm (m) to 3.5mm (m) adapter
85052-60014 3.5mm (f) to 3.5mm (f) adapter

Cables [1]

❑ **85131C** single, semi-rigid: 3.5 mm to 3.5 mm, 81 cm, 32 inches[2]
❑ **85131D** set, semi-rigid: 3.5 mm to 3.5 mm, 53 cm each, 21 inches each[2]
❑ **85131E** single, flexible: 3.5 mm to 3.5 mm, 96.5 cm, 38 inches[2]
❑ **85131F** set, flexible: 3.5 mm to 3.5 mm, 62.2 cm each, 24.5 inches each[2]
❑ **85134C** single, semi-rigid: 3.5 mm to 2.4 mm, 81 cm, 32 inches
❑ **85134D** set, semi-rigid: 3.5 mm to 2.4 mm, 53 cm each, 21 inches each
❑ **85134E** single, flexible: 3.5 mm to 2.4 mm, 96 cm, 38 inches
❑ **85134F** set, flexible: 3.5 mm to 2.4 mm, 53 cm each, 21 inches each

Adapter sets

❑ **85130F** 2.4 mm[1] to 3.5 mm

For devices with Type-N connectors

Mechanical calibration kits

❑ **85054B** standard: DC to 18 GHz. Includes:
00909-60011 Type-N (m) fixed lowband load
00909-60012 Type-N (f) fixed lowband load
85054-60025 Type-N (m) short
85054-60026 Type-N (f) short
85054-60027 Type-N (m) open
85054-60028 Type-N (f) open
85054-60031 Type-N (f) to 7mm adapter
85054-60032 Type-N (m) to 7mm adapter
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter
85054-80010 Type-N (f) sliding load
85054-80009 Type-N (m) sliding load
85054-60050 Type-N (f) connector gage
85054-60052 Type-N (f) gage master
85054-60051 Type-N (m) connector gage
85054-60053 Type-N (m) gage master

❑ **85054D** economy: DC to 18 GHz. Includes:
85054-60025 Type-N (m) short
85054-60026 Type-N (f) short
85054-60027 Type-N (m) open
85054-60028 Type-N (f) open
85054-60031 Type-N (f) to 7mm adapter
85054-60032 Type-N (m) to 7mm adapter
85054-60037 Type-N (f) to Type-N (f) adapter
85054-60038 Type-N (m) to Type-N (m) adapter
85054-60046 Type-N (m) fixed load
85054-60047 Type-N (f) fixed load

Electronic calibration kits

❑ **N4690A** Microwave ECal: 10 MHz to 18 GHz, 2 ports. Includes:
Option M0F module with:
N4690-60001 Type-N (f) to Type-N (m) ECal module
Option 00M module with:
N4690-60002 Type-N (m) to Type-N (m) ECal module
Option 00F module with:
N4690-60003 Type-N (f) to Type-N (f) ECal module
Option 00A adds:
85054-60037 Type-N (m) to Type-N (m) adapter
85054-60038 Type-N (f) to Type-N (f) adapter

Cables [1]

Use the test port cables recommended for devices with 7 mm connectors, and 7 mm to Type-N adapters that are from the 85054B/D Type-N calibration kit (see 7 mm connector section).

1. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.
2. For use with E8362A.

For devices with 7 mm connectors

Mechanical calibration kits

❑ **85050B** standard: DC to 18 GHz. Includes:
00909-60008 7 mm coax termination
85050-60006 7 mm fixed broadband load
85050-80007 7 mm short
85050-80010 7 mm open
85050-80011 7 mm sliding load

❑ **85050C** precision TRL: DC to 18 GHz.
Includes:
00909-60008 7 mm coax termination
85050-60003 7 mm to 7 mm airline
85050-60005 7 mm to 7 mm TRL adapter
85050-60006 7 mm fixed broadband load
85050-80008 7 mm short
85050-80009 7 mm short collet
85050-80010 7 mm open

❑ **85050D** economy: DC to 18 GHz. Includes:
85050-60006 7 mm fixed broadband load
85050-80007 7 mm short
85050-80010 7 mm open

Electronic calibration kits

❑ **N4696A** Microwave ECal: 10 MHz to 18 GHz, 2 ports, 7mm to 7mm Microwave module

Cables[1]

❑ **85132C** single, semi-rigid: 7 mm to 3.5 mm, 81 cm, 32 inches[2]
❑ **85132D** set, semi-rigid: 7 mm to 3.5 mm, 53 cm each, 21 inches each[2]
❑ **85132E** single, flexible: 7 mm to 3.5 mm, 97.2 cm, 38.25 inches[2]
❑ **85132F** set, flexible: 7 mm to 3.5 mm, 62.9 cm each, 24.75 inches each[2]
❑ **85135C** single, semi-rigid: 7 mm to 2.4 mm, 81 cm, 32 inches
❑ **85135D** set, semi-rigid: 7 mm to 2.4 mm, 53 cm each, 21 inches each
❑ **85135E** single, flexible: 7 mm to 2.4 mm, 96 cm, 38 inches
❑ **85135F** set, flexible: 7 mm to 2.4 mm, 53 cm each, 21 inches each

Adapter sets

❑ **85130E** 2.4 mm[1] to 7 mm

For devices with waveguide

Mechanical calibration kits

X Band

❑ **X11644A** standard, WR-90: 8.2 to 12.4 GHz.
Includes:
00896-60008 X-band standard section
00910-60003 X-band termination
11644-20018 X-band short
11644-20021 X-band shim
❑ **85132F** cable set (set, flexible 7 mm to 3.5 mm, 62.9 cm each, 24.75 inches each[2])
❑ **85135F** cable set (set, flexible, 7 mm to 2.4 mm, 53 cm each, 21 inches each)
❑ **X281C** adapter (included in calibration kit): WR-90 to 7 mm

P Band

❑ **P11644A** standard, WR-62: 12.4 to 18 GHz.
Includes:
00896-60007 P-band standard section
00910-60002 P-band termination
11644-20017 P-band short
11644-20020 P-band shim
❑ **85132F** cable set (set, flexible 7 mm to 3.5 mm, 62.9 cm each, 24.75 inches each[2])
❑ **85135F** cable set (flexible, 7 mm to 2.4 mm, 53 cm each, 21 inches each)
❑ **P281C** adapter (included in calibration kit): WR-62 to 7 mm

K Band

❑ **K11644A** standard, WR-42: 18 to 26.5 GHz.
Includes:
00896-60006 K-band standard section
00910-60001 K-band termination
11644-20016 K-band short
11644-20019 K-band shim
❑ **85134F** cable set (set, flexible, 3.5 mm to 2.4 mm, 53 cm each, 21 inches each)
❑ **K281C** adapter (included in calibration kit): WR-42 to 3.5 mm (f)
Option 012 WR-42 to 3.5 mm (m)

1. Special rugged female connector specifically for connecting to the network analyzer test port, but does not mate with a standard male connector.
2. For use with E8362A.

R Band

❑ **R11644A** standard, WR-28: 26.5 to 40 GHz.
Includes:
00914-20028 R-band termination
11644-20005 R-band short
11644-20003 R-band shim
11644-60001 R-band 10 cm straight waveguide
11644-60016 R-band 5 cm straight waveguide

❑ **85133F** cable set (set, flexible, 2.4 mm, 53 cm each, 21 inches each)

❑ **R281A** adapter (2.4 mm (f) to WR-28 waveguide adapter)

❑ **R281B** adapter (2.4 mm (m) to WR-28 waveguide adapter)

Q Band

❑ **Q11644A** standard, WR-22: 33 to 50 GHz.
Includes:
11644-60005 Q-band termination
11644-20004 Q-band short
11644-20001 Q-band shim
11644-60002 Q-band 10 cm straight waveguide
11644-60017 Q-band 5 cm straight waveguide

❑ **85133F** cable set (set, flexible, 2.4 mm, 53 cm each, 21 inches each)

❑ **Q281A** adapter (2.4 mm (f) to WR-22 waveguide adapter)

❑ **Q281B** adapter (2.4 mm (m) to WR-22 waveguide adapter)

U Band

❑ **U11644A** standard, WR-19: 40 to 60 GHz.
Includes:
11644-60006 U-band termination
11644-20004 U-band short
11644-20002 U-band shim
11644-60003 U-band 10 cm straight waveguide
11644-60018 U-band 5 cm straight waveguide

V Band

❑ **V11644A** standard, WR-15: 50 to 75 GHz.
Includes:
11644-60025 V-band termination
11644-20015 V-band short
11644-20013 V-band shim
11644-60012 V-band standard section

Verification kits

All Agilent verification kits include:
- precision Zo airline
- mismatched airline
- fixed attenuators
- traceable measured data and uncertainties

❑ **85057B** 45 MHz to 50 GHz 2.4 mm kit
Includes attenuators, airline and mismatch airline with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **85055A** 300 kHz to 18 GHz Type-N kit
Includes attenuators, airline and mismatch airline with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **85053B** 300 kHz to 26.5 GHz 3.5 mm kit
Includes attenuators, airline and mismatch airline with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **85051B** 300 kHz to 18 GHz 7 mm kit
Includes attenuators, airline and mismatch airline with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **R11645A** 26.5 to 40 GHz R-Band WR-28 kit
Includes attenuators and mismatch attenuator with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **Q11645A** 33 to 50 GHz Q-Band WR-22 kit
Includes attenuators and mismatch attenuator with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **U11645A** 40 to 60 GHz U-Band WR-19 kit
Includes attenuators and mismatch attenuator with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

❑ **V11645A** 50 to 75 GHz V-Band WR-15 kit
Includes attenuators and mismatch attenuator with data on a 3.5-inch disk for use in confirming accuracy enhanced system measurement performance, traceable to national standards. Test procedure is provided in the service manual.

General Accessories

USB

❑ **N4688A** CD-ROM drive
Provides an external read/write CD-ROM drive with a USB cable.

❑ **N4689A** USB hub
Provides a USB hub for connecting additional USB peripherals.

Probe

❑ **85024A** high-frequency probe
Provides high-impedance in-circuit test capability from 300 kHz to 3 GHz.

Power meters and sensors

Recommended for self support, adjustments and performance tests to verify proper instrument operation.

❑ **E4418B** single-channel power meter
❑ **E4419B** dual-channel power meter
❑ **8481B** power sensor, 10 MHz to 18 GHz, Type-N (m),25 W
❑ **8481A** power sensor, 10 MHz to 18 GHz, Type-N (m), 100 mW
❑ **8485A** power sensor, 50 MHz to 26.5 GHz, APC-3.5 mm (m), 100 mW
❑ **8487A** power sensor, 50 MHz to 50 GHz, 2.4 mm, 300 mW
❑ **8487D** power sensor, 50 MHz to 50 GHz, 2.4 mm, 100 mW
❑ **R8486A** power sensor, 26 GHz to 40 GHz, waveguide flange UG-599/U, 100 mW
❑ **Q8486A** power sensor, 33 GHz to 50 GHz, waveguide flange UG-383/U, 100 mW
❑ **U8486A** power sensor, 50 GHz to 75 GHz, waveguide flange UG-385/U, 200 mW avg
❑ **E4412A** CW power sensor, 10 MHz to 18 GHz, Type-N (m), 200 mW
❑ **E4413A** CW power sensor, 50 MHz to 265 GHz, 3.5 mm, 200 mW

Amplifiers

❑ **83006A** power amplifier, 10 MHz to 26.5 GHz, 20 dB gain, power out: +18 dBm to 10 GHz or +16 dBm to 20 GHz or +14 dBm to 26.5 GHz
❑ **83017A** power amplifier, 50 MHz to 26.5 GHz, 25 dB gain, power out: +20 dBm to 20 GHz, or +15 dBm to 26.5 GHz
❑ **83018A** power amplifier, 2 to 26.5 GHz, 27 dB gain to 20 GHz or 23 dB to 26.5 GHz, power out: +24 dBm to 20 GHz or +21 dBm to 26.5 GHz
❑ **83020A** power amplifier, 2 to 26.5 GHz, 30 dB gain to 20 GHz or 27 dB to 26.5 GHz, power out: +30 dBm to 20 GHz or +26 dBm to 26.5 GHz
❑ **83050A** power amplifier, 2 to 50 GHz, 23 dB gain, power out: +20 dBm to 40 GHz or +17 dBm to 50 GHz
❑ **83051A** power amplifier, 45 MHz to 50 GHz, 23 dB gain power out: +12 dBm to 45 GHz or +10 dBm to 50 GHz

Couplers

❑ **87300B** coaxial coupler, 1 to 20 GHz, SMA (f), 10 dB coupling
❑ **87300C** coaxial coupler, 1 to 26.5 GHz, 3.5 mm (f), 10 dB coupling
❑ **87301B** coaxial coupler, 10 to 46 GHz, 2.9 mm (f), 10 dB coupling
❑ **87301D** coaxial coupler, 1 to 40 GHz, 2.4 mm (f) or optional 2.92 mm (f), 13 dB coupling
❑ **87310B** 90º coaxial coupler, 1 to 18 GHz, SMA (f), 3 dB coupling
❑ **87301E** coaxial coupler, 2 to 50 GHz, 2.4 mm (f), 10 dB coupling

Equipment racks and case

❑ **E3663AC** Rack mount flange kit, for use with handles; includes handles[1]
❑ **5063-9237** Rack mount kit, for use without handles; may be ordered as option 1CM
❑ **5063-9217** Rack mount kit, for use with previously supplied handles; may be ordered as option 1CP
❑ **5063-9224** Rail kit, included with option 1CM and 1CP

1. The PNA Series analyzer is supplied with handles.

Applications

Material measurement

❑ **85070D** High-Temperature Dielectric Probe Kit
The 85070D allows the measurement of the dielectric properties of materials quickly and conveniently. Measurements made with this probe are nondestructive and require no sample preparation. The dielectric probe is well suited for measurements of liquid, semisolid and flat solid materials. Measurement results can be viewed in a variety of formats (ε'_r, ε''_r, tan δ or Cole-Cole). The supplied software can be run in the PNA analyzer or on a PC.

❑ **85071D** Materials Measurement Software
The material software calculates the permittivity and permeability of material samples placed in a coaxial airline or a rectangular waveguide. The measurement technique works well for solid materials that can be machined to fit precisely inside a transmission line. Measurement results can be viewed in a variety of formats (ε'_r, ε''_r, μ'_r, μ''_r, tan δ, or Cole-Cole μ). The software can be run in the PNA analyzer or on a PC.

Peripherals

The following peripherals may be used with the Microwave PNA Series. Other peripherals not listed here may also be compatible with these instruments.

Monitors

VGA-compatible monitor

Printers

USB, LAN, parallel or serial printers with Microsoft® Windows® 2000 printer driver

Interface cables

Choose the appropriate cables to connect each peripheral to the network analyzer.
❑ **10833A** GPIB cable, 1.0 m (3.3 ft)
❑ **10833B** GPIB cable, 2.0 m (6.6 ft)
❑ **10833D** GPIB cable, 0.5 m (1.6 ft)
❑ **82357A** GPIB to USB cable

Upgrade Kits

Upgrade kits for the Microwave PNA Series

Upgrade kits are available to add options after initial purchase. To order an upgrade kit for the Microwave PNA series, order the analyzer's model number followed by a "U", then indicate the option to be added:

- ❑ **Option 010** Time-domain upgrade kit
  The serial number of the instrument to be retrofitted must be specified when ordering this kit. User installable.
- ❑ **Option 014** Configurable test set upgrade kit
  Includes installation at an Agilent service center.
- ❑ **Option 080** Frequency offset
  Includes installation at an Agilent service center.
- ❑ **Option 081** External reference switch (Currently unavailable for the E8361A)
  Includes installation at an Agilent service center.
- ❑ **Option 083** Frequency converter measurement application
  Provides the application software for the PNA Series on CD-ROM. The software is user-installable. Installation requires USB CD-ROM drive or external computer connected via LAN.
- ❑ **Option 016** Add receiver attenuators (Currently unavailable for the E8361A)
  Includes installation at an Agilent service center.
- ❑ **Option 022** Extended memory
  Includes installation at an Agilent service center.
- ❑ **Option 040** Upgrades frequency range to an E8363A (40 GHz) PNA
  Available only for the E8362AU.
  Includes installation at an Agilent service center.
- ❑ **Option 050** Upgrade frequency range to an E8364A (50 GHz) PNA
  Available only for the E8362AU and E8363AU.
  Includes installation at an Agilent service center.
- ❑ **Option 067** Upgrade frequency range to an E8361A (67 GHz) PNA
  Available only for the E8364AU.
  Includes installation at an Agilent service center.
- ❑ **Option UNL** Extended power range (Currently unavailable on E8361A)
  Adds a step attenuator and a bias tee between source and each test port. Includes installation at an Agilent service center.
- ❑ **Option 099** firmware upgrade
  Provides the latest revision of firmware for the PNA Series on CD-ROM. Firmware is user-installable. Installation requires USB CD-ROM drive or external computer connected via LAN. The latest firmware is also available from our web site or by using AgileUpdate on the analyzer. Visit our web page at: **www.agilent.com/find/pna**

Literature and Information

PNA Series Brochure
literature number 5968-8472E

Microwave PNA Series Data Sheet
literature number 5988-3992EN

Application and product notes

Application Development with the Agilent PNA Series of Network Analyzers
literature number 5980-2666ENUS

Understanding and Improving Network Analyzer Dynamic Range Application Note 1363-1
literature number 5980-2778EN

The "Need for Speed" in Component Manufacturing Test
literature number 5980-2783EN

Connectivity Advances in a LAN-enabled Instrument
literature number 5980-2782EN

De-embedding and Embedding S-parameter Networks Using the PNA Series Network Analyzer Application Note 1364-1
literature number 5980-2784EN

Understanding the Fundamental Principles of Vector Network Analysis Application Note 1287-1
literature number 5965-7707E

Exploring the Architectures of Network Analyzers Application Note 1287-2
literature number 5965-7708E

Applying Error Correction to Network Analyzer Measurements Application Note 1287-3
literature number 5965-7709E

Network Analyzer Measurements: Filter and Amplifier Examples Application Note 1287-4
literature number 5965-7710E

Improving Throughput in Network Analyzer Applications Application Note 1287-5
literature number 5966-3317E

Using a Network Analyzer to Characterize High-Power Components Application Note 1287-6
literature number 5966-3319E

Simplified Filter Tuning Using Time-Domain Analysis Application Note 1287-8
literature number 5968-5328E

In-Fixture Measurements Using Vector Network Analyzers Application Note 1287-9
literature number 5968-5329E

Advanced Filter Tuning Using Time Domain Application Note 1287-10
literature number 5980-2785EN

10 Hints for Making Better Network Analyzer Measurements Application Note 1291-1
literature number 5965-8166E

Key web resources

Visit Application Central:
www.agilent.com/find/test

Visit the PNA Series home page for additional literature and product information:
www.agilent.com/find/pna

Most application and product notes may be downloaded from our web site:
www.agilent.com/find/tmappnotes/apps

For online information about Agilent's service and support products visit:
www.agilent.com/find/tm_services

Agilent Email Updates

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Get the latest information on the products and applications you select.

Agilent Technologies' Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Agilent T&M Software and Connectivity
Agilent's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections. Visit
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By internet, phone, or fax, get assistance with all your test & measurement needs

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