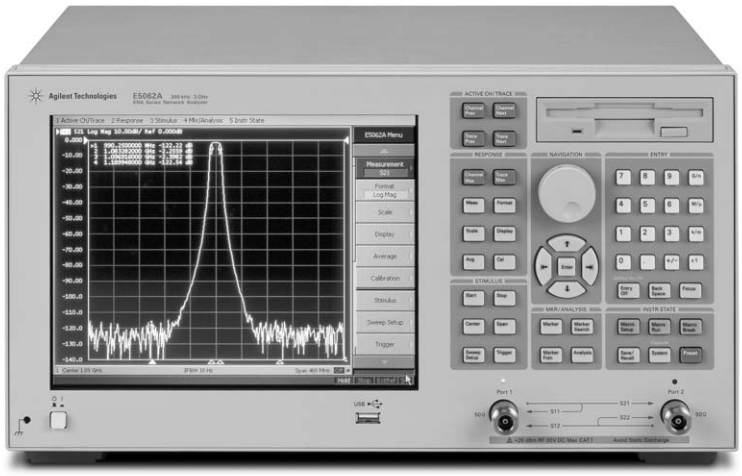
Agilent
ENA-L RF Network Analyzers

Configuration Guide

E5061A	300 kHz to 1.5 GHz
E5062A	300 kHz to 3 GHz



This configuration guide describes standard configurations, options, accessories and peripherals for the ENA-L RF network analyzers. For a complete description and technical specifications of the ENA-L RF network analyzers refer to the ENA-L Data Sheet available on our Web site: **www.agilent.com/find/ena**

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ENA-L Ordering guide

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

❍ = **Choose ONE and ONLY one**
❑ = **Choose any combination**

In step 2 through 9, to order options for the E5062A, replace E5061A with E5062A (e.g. E5062A-XXX)

Step 1: Choose a frequency range
- ❍ 300 kHz to 1.5 GHz, choose E5061A
- ❍ 300 kHz to 3 GHz, choose E5062A

Step 2: Choose the test set configuration
- ❍ T/R test set 50 ohm, choose Option E5061A-150
- ❍ T/R test set 75 ohm, choose Option E5061A-175
- ❍ S-parameter test set 50 ohm, with extended power range, choose Option E5061A-250
- ❍ S-parameter test set 75 ohm, with extended power range, choose Option E5061A-275

Step 3: If you chose T/R test set, would you like extended power range (-45 dBm to 10 dBm)?
- ❍ Yes, choose Option E5061A-1E1
- ❍ No

Step 4: Would you like to add fault location and structural return loss analysis?
- ❍ Yes, choose Option E5061A-100
- ❍ No

Step 5: Would you like a touch screen?
- ❍ Yes, choose Option E5061A-016
- ❍ No, choose Option E5061A-015

Step 6: Would you like any rack mount accessories?
- ❑ Rack mount kit only, choose Option E5061A-1CM
- ❑ Front handle kit only, choose Option E5061A-1CN
- ❑ Rack mount and front handle kit, choose Option E5061A-1CP

Step 7: Would you like to add any accessories?
- ❑ Add a keyboard, choose Option E5061A-810
- ❑ Add a mouse, choose Option E5061A-820

Step 8: Choose a language of manual set and specify quantity
- ❑ Add English manual set, choose Option E5061A-ABA and specify quantity
- ❑ Add Japanese manual set, choose Option E5061A-ABJ and specify quantity

Step 9: Would you like a commercial calibration certificate (ISO 17025 compliant) with test data?
- ❍ Yes, choose Option E5061A-1A7
- ❍ No

ENA-L RF Network Analyzer

The ENA-L is an integrated RF network analyzer with test set, synthesized RF source, 10.4-inch color LCD, floppy and hard disc drives.

❍ **E5061A** 300 kHz to 1.5 GHz
❍ **E5062A** 300 kHz to 3 GHz

Options for the E5061A are listed in this section. To order options for the E5062A, replace E5061A with E5062A (e.g. E5062A-XXX)

Options

Test set options

❍ **Option E5061A-150** T/R test set 50 ohm
❍ **Option E5061A-175** T/R test set 75 ohm
❍ **Option E5061A-250** S-parameter test set 50 ohm with extended power range
❍ **Option E5061A-275** S-parameter test set 75 ohm with extended power range

Source power range option

❑ **Option E5061A-1E1** extended power range
Adds 40 dB step attenuator to T/R test set options to extend the source power range down to -45 dBm

Additional feature option

❑ **Option E5061A-100** fault location analysis
Adds fault location and structural return loss analysis capabilities.

Display options

❍ **Option E5061A-015** standard color LCD
Add standard 10.4-inch color LCD without touch screen capability
❍ **Option E5061A-016** touch screen color LCD
Adds touch screen capability to the standard 10.4-inch color LCD.

Accessories options

❒ **Option E5061A-1CM** rack mount kit
Adds a rack mount kit (part number 5063-9216)
❒ **Option E5061A-1CN** front handle kit
Adds a front handle kit (part number 5063-9229)
❒ **Option E5061A-1CP** rack mount and front handle kit
Adds a rack mount kit (part number 5063-9223)
❒ **Option E5061A-810** adds a keyboard
❒ **Option E5061A-820** adds a mouse

Documentation options

❑ **Option E5061A-ABA** add specified quantities of English manual set
❑ **Option E5061A-ABJ** add specified quantities of Japanese manual set

Certification option

❒ **Option E5061A-1A7** ISO 17025 compliant calibration

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

Measurement Accessories

A complete line of RF test accessories can be found at the Agilent RF and Microwave Test Accessories Web site: **www.agilent.com/find/accessories**

Accessories are available in these connector types: 50 ohm Type-N, 3.5 mm, 7 mm, 7-16, 50 ohm Type-N , and Type-F. Test port cables and a calibration kit should be added for a complete measurement system.

50 ohm accessories

Test port cables

Test port cables are used to connect the network analyzer to the device under test.

- ❒ **8120-6469** economy 50 ohm Type-N cable. Includes one 610 mm (24 in) cable with male connectors
- ❒ **N6314A** 50 ohm Type-N RF cable, 300 kHz to 9 GHz
  Includes one 610 mm (24 in) cable with male connectors (part number 8120-8862)
- ❒ **N6315A** 50 ohm Type-N RF cable, 300 kHz to 9 GHz
  Includes one 610 mm (24 in) cable with both female and male connectors (part number 8121-0027)
- ❒ **11500E** cable, APC 3.5 mm (m), DC to 26.5 GHz
  - ❍ **Option 11500E-060** 60 cm cable, APC 3.5 mm (m)
    Includes one 610 mm (24 in) with male connectors. 3.5 mm (f) to 50 ohm Type-N (m) adapters (1250-1744) are recommended to connect to the network analyzer's test ports.
- ❒ **11500F** 150 cm cable, APC 3.5 mm (m), DC to 26.5 GHz
  Includes one 1520 mm (60 in) with male connectors. 3.5 mm (f) to 50 ohm Type-N (m) adapters (1250-1744) are recommended to connect to the network analyzer's test ports.

Calibration kits

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:
- connector tools

For devices with 50 ohm Type-N connectors

Mechanical calibration kits

- ❒ **85032E** economy: DC to 6 GHz. Includes:
  00909-60009 Type-N (m) fixed load
  85032-60011 Type-N (m) open/short
- ❒ **85032F** economy: 30 kHz to 9 GHz. Includes:
  85032-60017 Type-N (m) fixed load
  85032-60018 Type-N (f) fixed load
  85032-60013 Type-N (m) open
  85032-60014 Type-N (f) open
  85032-60016 Type-N (m) short
  85032-60015 Type-N (f) short
  - ❒ **Option 85032F-100** adds:
    85032-60021 Type-N (f) to Type-N (f) adapter
  - ❒ **Option 85032F-200** adds:
    85032-60019 Type-N (m) to Type-N (m) adapter
  - ❒ **Option 85032F-300** adds:
    85032-60020 Type-N (m) to Type-N (f) adapter
  - ❒ **Option 85032F-500** adds:
    85054-60001 Type-N (f) to 7 mm adapter (two included)
    85054-60009 Type-N (m) to 7 mm adapter (two included)

Electronic calibration kits

- ❒ **85092C** RF ECal: 300 kHz to 9 GHz, 2 ports. Includes:
  - ❍ **Option 85092C-MOF** module with:
    85092-60008 Type-N (f) to Type-N (m) RF ECal module
  - ❍ **Option 85092C-00M** module with:
    85092-60009 Type-N (m) to Type-N (m) RF ECal module
  - ❍ **Option 85092C-00F** module with:
    85092-60010 Type-N (f) to Type-N (f) RF ECal module
  - ❒ **Option 85092C-00A** adds:
    85054-60037 Type-N (f) to Type-N (f) adapter
    85054-60038 Type-N (m) to Type-N (m) adapter
- ❒ **N4431A** RF ECal module: 300 kHz to 9 GHz, 4 ports.
  - ❍ **Option N4431A-020**
    Adds four Type-N (f) module port connectors
  - ❒ **Option N4431A-UK6**
    Commercial calibration certification with test data

For devices with 3.5 mm or SMA connectors

Mechanical calibration kits

❒ **85033E** economy: 30 kHz to 9 GHz. Includes:
85033-60016 3.5 mm (m) load
85033-60017 3.5 mm (f) load
85033-60018 3.5 mm (m) open
85033-60019 3.5 mm (f) open
85033-60020 3.5 mm (m) short
85033-60021 3.5 mm (f) short
8710-1761 torque wrench
- ❒ **Option 85033E-100** adds:
  85027-60005 3.5 mm (f) to 3.5 mm (f) adapter
- ❒ **Option 85033E-200** adds:
  85027-60007 3.5 mm (m) to 3.5 mm (m) adapter
- ❒ **Option 85033E-300** adds:
  85027-60006 3.5 mm (m) to 3.5 mm (f) adapter
- ❒ **Option 85033E-400** adds:
  1250-1744 3.5 mm (f) to 50 ohm Type- N (m) adapter
  1250-1743 3.5 mm (m) to 50 ohm Type- N (m) adapter
  1250-1745 3.5 mm (f) to 50 ohm Type- N (f) adapter
  1250-1750 3.5 mm (m) to 50 ohm Type- N (f) adapter
- ❒ **Option 85033E-500** adds:
  1250-1746 3.5 mm (m) to 7 mm adapter (two included)
  1250-1747 3.5 mm (f) to 7 mm adapter (two included)

Electronic calibration kits

❒ **85093C** RF ECal: 300 kHz to 9 GHz, 2 ports. Includes:
- ❍ **Option 85093C-MOF** module with:
  85093-60008 3.5 mm (f) to 3.5 mm (m) RF ECal module
- ❍ **Option 85093C-00M** module with:
  85093-60009 3.5 mm (m) to 3.5 mm (m) RF ECal module
- ❍ **Option 85093C-00F** module with:
  85093-60010 3.5 mm (f) to 3.5 mm (f) RF ECal module
- ❒ **Option 85093C-00A** adds:
  85052-60012 3.5 mm (f) to 3.5 mm (f) adapter
  85052-60014 3.5 mm (m) to 3.5 mm (m) adapter

❒ **N4431A** RF ECal module: 300 kHz to 9 GHz, 4 ports.
- ❍ **Option N4431A-010**
  Adds four 3.5 mm (f) module port connectors
- ❒ **Option N4431A-UK6**
  Commercial calibration certification with test data

For devices with 7-16 connectors

Mechanical calibration kits

❒ **85038A** standard: 30 kHz to 7.5 GHz. Includes:
85038-80002 7-16 (f) open
85038-80003 7-16 (m) open
85038-80004 7-16 (f) short
85038-80005 7-16 (m) short
85038-80006 7-16 (f) fixed load
85038-80007 7-16 (m) fixed load
8710-2175 torque wrench
8710-2174 open-end wrench

❒ **85038F** economy: 30 kHz to 7.5 GHz. Includes:
85038-80002 7-16 (f) open
85038-80004 7-16 (f) short
85038-80006 7-16 (f) fixed load
11906-80016 7-16 (f) to 7-16 (f) adapter

❒ **85038M** economy: 30 kHz to 7.5 GHz. Includes:
85038-80003 7-16 (m) open
85038-80005 7-16 (m) short
85038-80007 7-16 (m) fixed load
11906-80015 7-16 (m) to 7-16 (m) adapter

Electronic calibration kits

❒ **85098C** RF ECal: 300 kHz to 7.5 GHz, 2 ports. Includes:
- ❍ **Option MOF** module with:
  85098-60007 7-16 (m) to 7-16 (f) RF ECal module
- ❍ **Option 00F** module with:
  85098-60009 7-16 (f) to 7-16 (f) RF ECal module
- ❍ **Option 00M** module with:
  85098-60008 7-16 (m) to 7-16 (m) RF ECal module
- ❍ **Option 00A** adds:
  11906-80015 7-16 (m) to 7-16 (m) adapter
  11906-80016 7-16 (f) to 7-16 (f) adapter

Adapters

❒ **11853A** 50 ohm Type-N accessory kit. Includes:
1250-1472 Type-N (f) to Type-N (f) adapter (two included)
1250-1475 Type-N (m) to Type-N (m) adapter (two included)
11511A Type-N (f) short
11512A Type-N (m) short

❒ **11878A** Type-N to 3.5 mm adapter kit. Includes:
1250-1744 3.5 mm (f) to 50 ohm Type- N (m) adapter
1250-1743 3.5 mm (m) to 50 ohm Type- N (m) adapter
1250-1745 3.5 mm (f) to 50 ohm Type- N (f) adapter
1250-1750 3.5 mm (m) to 50 ohm Type- N (f) adapter

❒ **11906A** 7-16 to 7-16. Includes:
7-16 (m) to 7-16 (m) adapter
7-16 (f) to 7-16 (f) adapter
7-16 (m) to 7-16 (f) adapter (two included)

❒ **11906B** 7-16 to Type-N. Includes:
Type-N (m) to 7-16 (m) adapter
Type-N (f) to 7-16 (f) adapter
Type-N (f) to 7-16 (m) adapter
Type-N (m) to 7-16 (f) adapter

❒ **11854A** 50 ohm BNC accessory kit. Includes:
1250-0929 BNC (m) short
1250-1473 BNC (m) to Type-N (m) adapter (two included)
1250-1474 BNC (f) to Type-N (f) adapter (two included)
1250-1476 BNC (f) to Type-N (m) adapter (two included)
1250-1477 BNC (m) to Type-N (f) adapter (two included)

75 ohm Accessories

Test port cables

Test port cables are used to connect the network analyzer to the device under test.

❒ **8120-6468** economy 75 ohm Type-N cable. Includes one 610 mm (24 in) cable with male connectors

❒ **11857B** precision 75 ohm Type-N cable set. Includes Type-N (m-m) and Type-N (m-f) cables

❒ **11857F** 75 ohm Type-N to Type-F cable set

- ❍ **Option M0F** includes:
  Type-N (m) to Type-F (m) cable
  Type-N (m) to Type-F (f) cable
- ❍ **Option 00F** includes:
  Type-N (m) to Type-F (f) cable
- ❍ **Option 00M** includes:
  Type-N (m) to Type-F (m) cable

Calibration kits

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:

- connector tools

For devices with 75 ohm Type-N connectors

Mechanical calibration kits

❒ **85036B** 300 kHz to 3 GHz, includes:
00909-60019 75 ohm Type-N (m) broadband load
00909-60020 75 ohm Type-N (f) broadband load
85036-60012 75 ohm Type-N (m) short
85036-60011 75 ohm Type-N (f) short
85032-60007 75 ohm Type-N (m) open
85032-20001 75 ohm Type-N (f) open body
85036-60010 75 ohm Type-N (f) open center conductor extender
85036-60013 75 ohm Type-N (m) to (m) adapter
85036-60014 75 ohm Type-N (f) to (f) adapter
85036-60015 75 ohm Type-N (m) to (f) adapter

❒ **85036E** 300 kHz to 3 GHz, includes:
00909-60019 75 ohm Type-N (m) broadband load
85036-60016 75 ohm Type N (m) combined open/short

Electronic calibration kits

❒ **85096C** RF ECal: 300 kHz to 3 GHz, 2 ports. Includes:

- ❍ **Option 85096C-M0F** module with:
  85096-60007 Type-N (m) to Type-N (f) RF ECal module
- ❍ **Option 85096C-00F** module with:
  85096-60009 Type-N (f) to Type-N (f) RF ECal module
- ❍ **Option 85096C-00M** module with:
  85096-60008 Type-N (m) to Type-N (m) RF ECal module
- ❍ **Option 85096C-00A** adds:
  85036-60013 Type-N (m) to Type-N (m) adapter
  85036-60014 Type-N (f) to Type-N (f) adapter

For devices with 75 ohm Type-F connectors

Mechanical calibration kits

❒ **85039B** Standard: DC to 3 GHz, includes:

- ❍ **Option 85039B-M0F** includes:
  85039-60007 Type-F (m) load
  85039-60008 Type-F (m) short
  85039-60009 Type-F (m) open
  85039-60004 Type-F (f) load
  85039-60003 Type-F (f) short
  85039-60005 Type-F (f) open
  85039-60006 Type-F (m) to Type-F (m) adapter
  85039-60002 Type-F (f) to Type-F (f) adapter
  85039-60013 Type-F (f) to Type-N (m) adapter
  85039-60011 Type-F (m) to Type-N (f) adapter
- ❍ **Option 85039B-00F** includes:
  85039-60004 Type-F (f) load
  85039-60003 Type-F (f) short
  85039-60005 Type-F (f) open
  85039-60002 Type-F (f) to Type-F (f) adapter
- ❍ **Option 85039B-00M** includes:
  85039-60007 Type-F (m) load
  85039-60008 Type-F (m) short
  85039-60009 Type-F (m) open
  85039-60006 Type-F (m) to Type-F (m) adapter

Electronic calibration kits

❒ **85099C** RF ECal: 300 kHz to 3 GHz, 2 ports, includes:

- ❍ **Option 85099C-M0F** module with:
  85099-60009 Type-F (m) to Type-F (f) RF ECal module
- ❍ **Option 85099C-00F** module with:
  85099-60011 Type-F (f) to Type-F (f) RF ECal module
- ❍ **Option 85099C-00M** module with:
  85099-60010 Type-F (m) to Type-F (m) RF ECal module
- ❍ **Option 85096C-00A** adds:
  85039-60002 Type-F (f) to Type-F (f) adapter
  85039-60006 Type-F (m) to Type-F (m) adapter

Adapters

❒ **11852B** Minimum-loss pad

- ❍ **Option 11852B-004** Type-N connectors, 50 ohm (m) to 75 ohm (f)
- ❍ **Option 11852B-401** Type-N connectors, 50 ohm (f) to 75 ohm (m)

General Accessories

System racks

- ❑ **5063-9229** handle kit, may be ordered as option 1CN (two included)
- ❑ **5063-9216** rack mount kit, for use without handles: may be ordered as option 1CM
- ❑ **5063-9223** rack mount kit, for use with previously supplied handles; may be ordered as option 1CP
- ❑ **E3663AC** rack mount rail kit, for use with 5063-9216 or 5063-9223

Interface cables

The following GPIB cables can be used to connect the network analyzer with an external device such as a computer

- ❑ **10833A GPIB** cable, 1.0 m (3.3 ft)
- ❑ **10833B GPIB** cable, 2.0 m (6.6 ft)
- ❑ **10833C GPIB** cable, 3.0 m (9.9 ft)
- ❑ **10833D GPIB** cable, 0.5 m (1.6 ft)

Monitors

- ❑ VGA-compatible monitor

Additional Information

ENA-L Brochure
Literature number 5989-0167EN
ENA-L Technical Specifications
Literature number 5989-0018EN

Key Web Resources

For additional ENA-L product information and literature, visit: **www.agilent.com/find/ena**

For electronic calibration (ECal) modules, visit: **www.agilent.com/find/ecal**

For Agilent RF and Microwave Test accessories, visit: **www.agilent.com/find/accessories**

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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. 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 receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

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.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office.

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www.agilent.com/find/contactus

Product specifications and descriptions in this document subject to change without notice.

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