

Agilent E5071C Network Analyzer

- 9 kHz to 4.5 GHz
- 100 kHz to 4.5 GHz (with bias tees)
- 9 kHz to 8.5 GHz
- 100 kHz to 8.5 GHz (with bias tees)
- 300 kHz to 20 GHz (with bias tees)

E5092A Configurable Multiport Test Set

Configuration Guide



This configuration guide describes standard configurations, options, accessories and peripherals for the E5071C ENA network analyzer. Refer to the ENA brochure for a complete description of the ENA network analyzer and the E5092A configurable multiport test set.

E5071C ENA Network Analyzer

The ENA is an integrated network analyzer with a two- or four-port S-parameter test set, a synthesized RF source, a 10.4-inch color LCD, and a hard disk drive. A 1-year return-to-Agilent service warranty is included with the each ENA Series network analyzer.

Step 1: Select frequency range, number of test ports, and with or without bias tees

Up to 4.5 GHz range

9 kHz to 4.5 GHz (without bias tees)

E5071C-240 2-port S-parameter test set

E5071C-440 4-port S-parameter test set

100 kHz to 4.5 GHz (with bias tees)

E5071C-245 2-port S-parameter test set

E5071C-445 4-port S-parameter test set

Up to 8.5 GHz range

9 kHz to 8.5 GHz (without bias tees)

E5071C-280 2-port S-parameter test set

E5071C-480 4-port S-parameter test set

100 kHz to 8.5 GHz (with bias tees)

E5071C-285 2-port S-parameter test set

E5071C-485 4-port S-parameter test set

Up to 20 GHz range

300 kHz to 20 GHz (with bias tees)

E5071C-2K5 2-port S-parameter test set

E5071C-4K5 4-port S-parameter test set

Step 2: Select time base

E5071C-1E5 High stability time base

E5071C-UNQ Standard stability time base

Step 3: Select hard disk drive

E5071C-017 Removable hard disk drive

E5071C-019 Standard hard disk drive

Step 4: Choose additional options (Optional)

E5071C-008¹ Frequency offset mode

E5071C-010 Time-domain analysis

E5071C-790 Measurement Wizard Assistant software

Step 5: Choose accessories (Optional)

E5071C-1CM Rack mount kit,

E5071C-1CN Front handle kit

E5071C-1CP Rack mount and front handle kit

E5071C-810 Adds a keyboard

E5071C-820 Adds a mouse

Step 6: Choose certification documentation (Optional)

E5071C-1A7 ISO 17025 compliant calibration

E5071C-A6J ANSI Z540 compliant calibration

Step 7: Choose your warranty service (Optional)

3 year return-to Agilent warranty and service

5 year return-to Agilent warranty and service

Documentation

The documentation for the E5071C is located in the Online Help system for the E5071C ENA network analyzer. The ENA Service Guide and Online Help system are also available on the Web site:

www.agilent.com/find/ena

Additional product information

For additional product information, refer to the ENA brochure available on the Web site:

www.agilent.com/find/ena

1. Order the 82357B USB/GPIB interface at the same time if you want to control power meters with the E5071C. This will allow you to conduct scalar mixer calibrations (SMC), power calibrations, or receiver calibrations after power calibrations.

E5071C ENA Network Analyzer

Options

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

Option ¹	Description	Additional information
Test set		
Option 240	2-port test set, 9 kHz to 4.5 GHz without bias tees	
Option 440	4-port test set, 9 kHz to 4.5 GHz without bias tees	
Option 245	2-port test set, 100 kHz to 4.5 GHz with bias tees	
Option 445	4-port test set, 100 kHz to 4.5 GHz with bias tees	
Option 280	2-port test set, 9 kHz to 8.5 GHz without bias tees	
Option 480	4-port test set, 9 kHz to 8.5 GHz without bias tees	
Option 285	2-port test set, 100 kHz to 8.5 GHz with bias tees	
Option 485	4-port test set, 100 kHz to 8.5 GHz with bias tees	
Option 2K5	2-port test set, 300 kHz to 20 GHz with bias tees	
Option 4K5	4-port test set, 300 kHz to 20 GHz with bias tees	
Time base		
Option UNQ	Standard stability time base	
Option 1E5	High stability time base	Adds a higher stability time base reference.
Hard disk drive		
Option 017	Removable hard disk drive	
Option 019	Standard hard disk drive	
Additional features		
Option 008 ²	Frequency offset mode	Adds frequency-offset sweep and harmonic measurement capabilities.
Option 010	Time domain analysis	Adds time domain transform and gating capabilities.
Option 790 ³	Measurement wizard assistant software	Adds Measurement Wizard Assistant (MWA) software to simplify your multipoint measurements.
Accessories		
Option 1CM	Rack mount kit	
Option 1CN	Front handle kit	
Option 1CP	Rack mount and front handle kit	
Option 810	Add keyboard	
Option 820	Add mouse	
Calibration documentation		
Option 1A7	ISO 17025 compliant calibration	
Option A6J	ANSI Z540 compliant calibration	

- Options are ordered using the combined model/option number, e.g. E5071C-240.
- Order the 82357B USB/GPIB interface at the same time if you want to control power meters with the E5071C. This will allow you to conduct scalar mixer calibrations (SMC), power calibrations, or receiver calibrations after power calibrations.
- When using an ECal module with the MWA calibration wizard, a 4-port ECal module (i.e. N4431B, N4433A) is required.

E5092A Configurable Multiport Test Set

This guide is intended to assist you in the ordering process of the E5092A configurable multiport test set for use with the 4-port ENA (E5070B, E5071B and E5071C). Multiple multiport measurement configurations, from 50 MHz to 20 GHz, can be made by connecting included semi-rigid cables to the E5092A's front panel which accesses its internal switches.

Step 1:¹ Select appropriate cable and adapter set for connection to the ENA (mandatory, chose only one)

E5092A-08C Cables and adapters for connection to E5071C Option 440/445/480/485

E5092A-20C Cables and adapters for connection to E5071C Option 4K5

Step 2: Choose accessories (Optional)

E5092A-1CM Rack mount kit only

E5092A-1CN Front handle kit only

E5092A-1CP Rack mount kit with handle kit

Step 3: Choose calibration certification documentation (Optional)

E5092A-1A7 ISO 17025 compliant calibration

E5092A-A6J ANSI Z540 compliant calibration

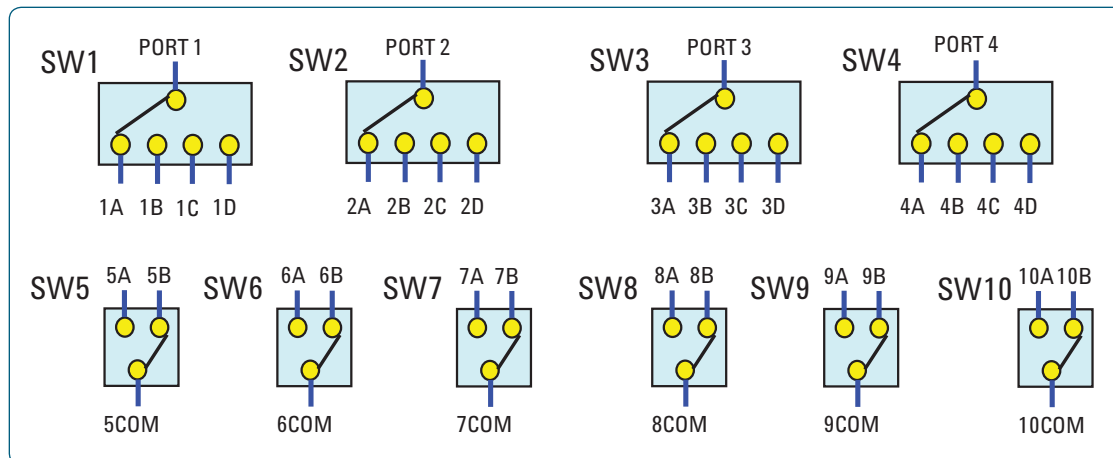
Step 4: Choose your warranty service (Optional)

3 year return-to-Agilent warranty and service

5 year return-to-Agilent warranty and service

Block diagram

E5092A (Option 020)



1. Semi-rigid cables are designed for connection to the E5071C and are not available for the E5070B, E5071B.

Documentation

The documentation for the E5092A is located in the Online Help system for the E5071C ENA network analyzer. The ENA Service Guide and Online Help system are also available on the Web site: www.agilent.com/find/ena

Additional product information

For additional product information, refer to the ENA brochure available on the Web site:

www.agilent.com/find/ena

www.agilent.com/find/multiport

E5092A Configurable Multiport Test Set

Options

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

Option ¹	Description	Additional information
Test set Option 020	20 GHz switching test set	Up to 22-port or 10-port full crossbar measurement.
Cable adapter set² Option 08C	Cable and adapter set for E5071C Option 440/445/480/485 (4.5 GHz/8.5 GHz)	Adds SMA semi-rigid cables and type-N-to-SMA adapters for connection to the E5071C.
Option 20C	Cable and adapter set for the E5071C Option 4K5 (20 GHz)	Adds SMA semi-rigid cables and 3.5 mm-to-3.5 mm adapters for connection to the E5071C.
Accessories Option 1CM	Rack mount kit	Adds a rack mount kit (part number: 5063-9214) for use without handles.
Option 1CN	Front handle kit	Adds a front handle kit (part number: 5063-9227).
Option 1CP	Rack mount and front handle kit	Adds a rack mount and front handle kit (part number: 5063-9221).
Calibration documentation Option 1A7	ISO 17025 compliant calibration	
Option A6J	ANSI Z540 compliant calibration	

1. Options are ordered using the combined model/option number, e.g. E5092A-020.

2. Mandatory, choose one only.

ENA Network Analyzer (E5071C)

Additional software options

Option 010 Time domain

Option 010 enables the ENA to view reflection and transmission responses in the time domain. Use time domain to tune filters, gate out the response of fixtures and cables, characterize the impedance of transmission lines, and more.

Option 008 Frequency offset mode

Option 008 enables the ENA to set the receiver frequencies independently from where the source frequency is tuned. This ability is important for harmonic distortion measurements and for measuring frequency converting devices such as mixers and converters. Advanced calibration techniques for the ENA, such as scalar mixer calibration (SMC) or vector mixer calibration (VMC), require this option.

Option 790 Measurement Wizard Assistant

Option 790 provides a simple measurement procedure setup for the 4-port ENA with a multiport test set such as the E5092A. The software delivers an easy-to-use measurement wizard programs including a calibration wizard setup¹, which reduces operation time for complicated, time-consuming multiport measurements.

Time base options

Option UNQ Standard stability time base

Option UNQ provides following stability:
CW accuracy: ± 5 ppm (specification)
Source stability: ± 5 ppm (5 °C to 40 °C typical)

Option 1E5 High stability time base

Option 1E5 provides the following stability:
CW accuracy: ± 1 ppm (specification)
Source stability: ± 0.05 ppm (5 °C to 40 °C typical),
 ± 0.5 ppm/year

Hard disk drive options

Option 019 Standard hard disk drive

Option 019 provides a fixed hard disk drive. The removable disk drive is not available.

Option 017 Removable hard disk drive

Option 017 provides a removable hard disk drive. You can remove or replace the hard disk drive for secure area operations. If a spare disk is needed, order E5071CU-018 hard disk drive kit.



Certification options

Option 1A7 ISO 17025 compliant calibration

Option 1A7 provides a complete set of measurements which test the unit to manufacturer's published specifications. Includes calibration label, ISO 17025 calibration certificate, and data report, and measurement uncertainties and guardbands on all customer specifications. Conforms to ISO 17025 and ISO 9001.

Option A6J ANSI Z540 compliant calibration

Option A6J provides a complete set of measurements which test the unit to manufacturer's published specifications. Includes pre- and post-adjustment data and measurement uncertainty information compliant with the ANSI/NCSL Z540 standard.

1. When using an ECal module with MWA calibration wizard, a 4-port ECal module (i.e. N4431B, N4433A) is required.

Measurement Accessories

A complete list of RF and microwave test accessories is available on our Web site:

www.agilent.com/find/accessories

Accessories are available with the following connector types: 50 ohm Type-N, 3.5 mm, 7 mm, 2.4 mm, 2.92 mm, 1.85 mm, 1.0 mm and waveguide.

Test port cables and a calibration kit/ECal module should be added for a complete measurement system.

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 via USB. ECal kits provide many different impedances to the test ports which enables a full two-port calibration to 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)

Standard, includes the devices in the economy kit and adds:

- sliding load standards¹ (male and female) or a series of offset shorts

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, and V bands)
- precision waveguide section
- flush short circuit
- fixed terminations²
- straight section

Cables and adapter sets

Agilent offers the following types of cables:

- single cables: semi-rigid or flexible
- cable sets: semi-rigid or flexible

There are also adapter sets 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.

1. A sliding load is not supported by the ENA.

2. An offset load is not supported by the ENA.

For devices with 50 ohm Type-N connectors

Mechanical calibration kits

- **85032F** economy: DC 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)

- **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 7 mm adapter
 - 85054-60032 Type-N (m) to 7 mm 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

- **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 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

- **N4431B Microwave ECal: 300 kHz to 13.5 GHz, 4 ports**
 - Includes:
 - Option 020** module with:
 - N4431-60007 4 x Type-N (f) ECal module

N4431B-xxx mixed-connector options:

Connector type	Port A option	Port B option	Port C option	Port D Option
3.5 mm (f)	101	201	301	401
3.5 mm (m)	102	202	302	402
Type-N 50 ohm (f)	103	203	303	403
Type-N 50 ohm (m)	104	204	304	404
7-16 (f)	105	205	305	405
7-16 (m)	106	206	306	406

□ **N4432A Microwave ECal: 300 kHz to 18 GHz, 4 ports**

Includes:

Option 020 module with:

N4432-60003 4 x Type-N (f) ECal module

N4432A-xxx mixed-connector options:

Connector type	Port A option	Port B option	Port C option	Port D Option
3.5 mm (f)	101	201	301	401
3.5 mm (m)	102	202	302	402
Type-N 50 ohm (f)	103	203	303	403
Type-N 50 ohm (m)	104	204	304	404

□ **N4690B Microwave ECal: 300 kHz 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 (f) to Type-N (f) adapter

85054-60038 Type-N (m) to Type-N (m) adapter

Cables

□ **N6314A** 50 ohm Type-N RF cable, DC to 12.4 GHz includes 8120-8862 one 610 mm (24 in) cable with male connectors

□ **N6315A** 50 ohm Type-N RF cable, DC to 12.4 GHz includes 8121-0027 one 610 mm (24 in) cable with both female and male connectors

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

□ **11524A** 7 mm to Type-N (f) adapter

□ **11525A** 7 mm to Type-N (m) adapter

For devices with 3.5 mm or SMA connectors

Mechanical calibration kits

- **85033E** economy: DC 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)

- **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

Electronic calibration kits

- **85093C** RF ECal: 300 kHz to 9 GHz, 2 ports
 - Standard module includes:
 - Option M0F** with:
 - 85093-60008 3.5 mm (f) to 3.5 mm (m) ECal module
 - Option 00F** module with:
 - 85093-60010 3.5 mm (f) to 3.5 mm (f) ECal module
 - Option 00M** module with:
 - 85093-60009 3.5 mm (m) to 3.5 mm (m) ECal module
 - Option 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

85093C-xxx mixed-connector options:

Port A option			Port B option					
Type	(f)	(m)	Type	(f)	(m)	Type	(f)	(m)
3.5 mm	101	102	Type-N	203	204	7-16	205	206

- **N4431B** Microwave ECal: 300 kHz to 13.5 GHz, 4 ports
 - Includes:
 - Option 010** module with:
 - N4431-60006 4 x 3.5 mm (f) ECal module

N4431B-xxx mixed-connector options:

Connector type	Port A option	Port B option	Port C option	Port D option
3.5 mm		201	301	401
3.5 mm (m)	102	202	302	402
Type-N 50 ohm (f)	103	203	303	403
Type-N 50 ohm (m)	104	204	304	404
7-16 (f)	105	205	305	405
7-16 (m)	106	206	306	406

- **N4433A** Microwave ECal: 300 kHz to 20 GHz, 4 ports
 - Includes:
 - Option 010** module with:
 - N4433-60003 4 x 3.5 mm (f) ECal module

N4433A-xxx mixed-connector options:

Connector type	Port A option	Port B option	Port C option	Port D option
3.5 mm (f)	101	201	301	401
3.5 mm (m)	102	202	302	402

□ N4691B Microwave ECal: 300 kHz to 26.5 GHz, 2 ports.

Includes:

Option MOF module with:

N4691-60001 3.5 mm (f) to 3.5 mm (m) ECal module

Option OOM module with:

N4691-60002 3.5 mm (m) to 3.5 mm (m) ECal module

Option OOF module with:

N4691-60003 3.5 mm (f) to 3.5 mm (f) ECal module

Option OOA 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

Cables

- **11500E^{2,3}** cable, APC 3.5 mm (m), DC to 26.5 GHz
Includes: one 610 mm (24 in) with male connectors.
- **11500F^{2,3}** 150 cm cable, APC 3.5 mm (m), DC to 26.5 GHz
Includes: one 1520 mm (60 in) with male connectors.
- **85131C¹** single, semi-rigid: 3.5 mm (f) to PSC-3.5 mm (f), 81 cm, 32 inches
- **85131D¹** set, semi-rigid:
85131-60009 one 3.5 mm (f) to 3.5 mm (m), 53 cm, 21 inches,
85131-60010 one 3.5 mm (f) to PSC-3.5 mm (f), 53 cm, 21 inches
- **85131E¹** single, flexible: 3.5 mm (f) to PSC-3.5 mm (f), 96.5 cm, 38 inches
- **85131F¹** set, flexible:
85131-60012 one 3.5 mm (f) to 3.5 mm (m), 62.2 cm, 24.5 inches
85131-60013 one 3.5 mm (f) to PSC-3.5 mm (f), 62.2 cm, 24.5 inches
- **85131G¹** single, semi-rigid: 3.5 mm (f) to 3.5 mm (m), 53 cm, 21 inches
- **85131H¹** single, flexible: 3.5 mm (f) to 3.5 mm (m), 62.2 cm, 24.5 inches
- **85134C¹** single, semi-rigid: PSC-3.5 mm (f) to 2.4 mm (f), 81 cm, 32 inches

- **85134D¹** set, semi-rigid:
85134-60002 one 2.4 mm (f) to PSC-3.5 mm (f), 53 cm, 21 inches
85134-60001 one 2.4 mm (f) to PSC-3.5 mm (m), 53 cm, 21 inches
- **85134E¹** single, flexible: PSC-3.5 mm (f) to 2.4 mm (f), 96 cm, 38 inches
- **85134F¹** set, flexible:
85134-60004 one 2.4 mm (f) to PSC-3.5 mm (f), 61 cm, 24 inches
85134-60003 one 2.4 mm (f) to PSC-3.5 mm (m), 61 cm, 24 inches
- **85134G¹** single, semi-rigid: 2.4 mm (f) to PSC-3.5 mm (m), 53 cm, 21 inches
- **85134H¹** single, flexible: 2.4 mm (f) to PSC-3.5 mm (m), 61 cm, 24 inches
- **N4419A-B20** set of 4, flexible: 3.5 mm (m) to 3.5 mm (f), 91.4 cm, 36 inches
- **Z5623A-B20** set of 4, flexible: 3.5 mm (m) to 3.5 mm (m), 91.4 cm, 36 inches (phase-matched)

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)
85032-60009 Type-N (f) short
85032-60008 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
- **11524A** 7 mm to Type-N (f) adapter
- **11525A** 7 mm to Type-N (m) adapter
- **85130C¹** 3.5 mm to Type-N
- **85130D¹** 3.5 mm to 3.5 mm
Includes:
85130-60005 NMD-3.5 mm to PSC-3.5 mm (f)
85130-60006 NMD-3.5 mm to PSC-3.5 mm (m)
- **85130F¹** 2.4 mm to 3.5 mm

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

2. 1250-1744 3.5 mm (f) to 50 ohm Type-N (m) adapters are recommended to connect to the E5071C Option x4x, and x8x test ports, which have Type-N (f) connectors.

3. NMD-3.5 mm (f) to 3.5 mm (f), or 3.5 mm (f) to 3.5 mm (f) adapters are recommended to connect to the E5071C Option xK5, which have NMD-3.5 mm (m) connectors.

For devices with 75 ohm Type-N connectors

Mechanical calibration kits

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

Adapters

- **11852B** Minimum-loss pad
Option 11852B-004 Type-N connectors, 50 ohm (m) to 75 ohm (f)

Calibration must be done with a 75 ohm calibration kit using an 11852B minimum-loss pad, and impedance conversion to 75 ohm using the ENA's fixture simulator function is required.

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 of 2, flexible 7 mm to 3.5 mm, 62.9 cm each, 24.75 inches each)
- **85135F** cable set (set of 2, 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 of 2, flexible, 7 mm to 3.5 mm, 62.9 cm each, 24.75 inches each)
- **85135F** cable set (set of 2, 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 of 2, 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 012¹ WR-42 to 3.5 mm (m)

1. For this option order K281C-012.

Additional Accessories

Power limiters

- **N9355B** power limiter, 10 dBm limiting threshold, 10 MHz to 18 GHz, Type-N
- **N9356B** power limiter, 25 dBm limiting threshold, 10 MHz to 18 GHz, Type-N
- **N9355C** power limiter, 10 dBm limiting threshold, 10 MHz to 26.5 GHz, 3.5 mm
- **N9356C** power limiter, 25 dBm limiting threshold, 10 MHz to 26.5 GHz, 3.5 mm

DC blocks

- **N9398C** DC block, 16 V maximum working voltage, 50 kHz to 26.5 GHz, 3.5 mm
- **N9399C** DC block, 50 V maximum working voltage, 700 kHz to 26.5 GHz, 3.5 mm
- **11742A**, 50 V maximum working voltage, 45 MHz to 26.5 GHz, 3.5 mm

Amplifiers

- **87405B** pre-amplifier, 22 dB gain, 10 MHz to 4 GHz
- **87405C** pre-amplifier, 25 dB gain, 100 MHz to 18 GHz
- **87415A** amplifier, 25 dB gain, 2 to 8 GHz
- **83006A** amplifier, 20 dB gain, 10 MHz to 26.5 GHz

Attenuators

- **8491A** fixed attenuator, DC to 12.4 GHz, Type-N
- **8493A** fixed attenuator, DC to 12.4 GHz, SMA

RF & microwave switches

- **N1810TL** SPDT switch, terminated, DC to 26.5 GHz
- **N1810UL** SPDT switch, unterminated, DC to 26.5 GHz
- **87104B** SP4T switch, terminated, DC to 20 GHz
- **87106B** SP6T switch, terminated, DC to 20 GHz
- **87222C** transfer switch, DC to 26.5 GHz
- **L7104B** SP4T switch, terminated, DC to 20 GHz
- **L7106B** SP6T Switch, terminated, DC to 20 GHz
- **L7222C** transfer switch, DC to 26.5 GHz
- **P9400C** solid state PIN diode transfer switch, 100 MHz to 18 GHz
- **P9402C** SPDT solid state PIN diode switch, 100 MHz to 18 GHz
- **P9404C** SP4T solid state PIN diode switch, 100 MHz to 18 GHz
- **U9397C** SPDT solid state FET hybrid switch, 300 kHz to 18 GHz
- **U9400C** solid state FET hybrid transfer switch, 300 KHz to 18 GHz

Power meters and sensors¹

Recommended for source output power calibration.

- **E4416A** single-channel EPM-P series power meter
- **E4417A** dual-channel EPM-P series power meter
- **E4418B** single-channel EPM series power meter
- **E4419B** dual-channel EPM series power meter
- **N1911A** single-channel P-series power meter
- **N1912A** dual-channel P-series power meter
- **8482A** power sensor, 100 kHz to 4.2 GHz, Type-N (m), 100 mW
- **E9304A-H18** power sensor, 9 kHz to 18 GHz, Type-N (m), 100 mW
- **E4412A** CW power sensor, 10 MHz to 18 GHz, Type-N (m), 200 mW
- **E4413A** CW power sensor, 50 MHz to 26.5 GHz, 3.5 mm (m), 200 mW
- **N1921A** power sensor 50 MHz to 18 GHz, Type-N (m)
- **N1922A** power sensor 50 MHz to 40 GHz, 2.4 mm (m)

Probe

- **85024A** high-frequency probe, 300 kHz to 3 GHz

General accessories

System racks and cases

- **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
- **5188-4430** 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 5188-4430
- **9211-2658** transit case

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, 4.0 m (13.1 ft)
- **10833D** GPIB cable, 0.5 m (1.6 ft)
- **82357B** GPIB to USB interface, necessary to control a power meter or signal generator with the E5071C.

Monitors

- XGA-compatible monitor

Printers

- USB printers with Microsoft® Windows printer driver

1. Order the 82357B USB/GPIB interface to control a power meter by the E5071C.

Upgrade kits

Upgrade kits for the E5071C

Protecting your hardware investment

The E5071C ENA network analyzer is a safe investment because of its flexibility. Easily upgrade any ENA software or hardware feature whenever you need that feature.

Software option upgrades (Customer installable)

- a) Add Frequency-offset mode option:
Order the E5003A with E5003A-1FP
Frequency-offset mode for the E5071C.
- b) Add Time-domain analysis option:
Order the E5004A with E5004A-1FP Time domain
analysis for E5071C.
- c) Add Measurement Wizard Assistant software:
Order the E5005A with E5005A-1FP Measurement
wizard assistant software for the E5071C.

Hardware option upgrades

(Installed by the Agilent service center)

Please refer to “E5071C Test set option table” below and the “E5071C Hardware upgrade option matrix” on page 14 of this document for help selecting the proper upgrade options.

E5071C Upgrade option list

a) Maximum frequency upgrade

- E5071CU-280** from 4.5 GHz to 8.5 GHz for E5071C-240
- E5071CU-285** from 4.5 GHz to 8.5 GHz for E5071C-245
- E5071CU-480** from 4.5 GHz to 8.5 GHz for E5071C-440
- E5071CU-485** from 4.5 GHz to 8.5 GHz for E5071C-445
- E5071CU-2K5** from 8.5 GHz to 20 GHz for E5071C-280/285
- E5071CU-4K5** from 8.5 GHz to 20 GHz for E5071C-480/485

b) Add bias tees¹

- E5071CU-100** Add bias tees for E5071C-240
- E5071CU-101** Add bias tees for E5071C-280
- E5071CU-102** Add bias tees for E5071C-440
- E5071CU-103** Add bias tees for E5071C-480

c) Lower frequency limit upgrade²

- E5071CU-200** Lower limit upgrade from 100 kHz to 9 k Hz for E5071C-245
- E5071CU-201** Lower limit upgrade from 100 kHz to 9 k Hz for E5071C-285
- E5071CU-202** Lower limit upgrade from 100 kHz to 9 k Hz for E5071C-445
- E5071CU-203** Lower limit upgrade from 100 kHz to 9 k Hz for E5071C-485

d) Measurement port upgrade

- E5071CU-300** Port up from 2 ports to 4 ports for E5071C-240
- E5071CU-301** Port up from 2 ports to 4 ports for E5071C-245
- E5071CU-302** Port up from 2 ports to 4 ports for E5071C-280
- E5071CU-303** Port up from 2 ports to 4 ports for E5071C-285
- E5071CU-304** Port up from 2 ports to 4 ports for E5071C-2K5

e) Add high stability time base option

- E5071CU-1E5** Add high stability time base

f) Add removable hard disk drive feature

- E5071CU-017** Upgrade to removable hard disk drive
- E5071CU-018³** Hard disk drive kit (spare hard disk, customer installable)

E5071C Test set option table

Frequency range & bias tees	Number of test ports	
	2-port	4-port
9 kHz to 4.5 GHz without bias tees	240	440
100 kHz to 4.5 GHz with bias tees	245	445
9 kHz to 8.5 GHz without bias tees	280	480
100 kHz to 8.5 GHz with bias tees	285	485
300 kHz to 20 GHz with bias tees	2K5	4K5

- When upgrading the maximum frequency, number of ports, bias-tees or lower frequency limit, please be aware that the upgrade options listed in the “E5071C Hardware upgrade option matrix” need to be ordered as well (e.g. To upgrade the unit from Opt. 240 to Opt. 480, order “E5071CU-300” and “E5071CU-480” respectively).
- “Add high stability time base” and “Upgrade to removable HDD” can be ordered at the same time as the upgrade options for frequency, number of ports, bias-tees or lower frequency limit.

1. Minimum frequency changes from 9 kHz to 100 kHz.
2. Bias tees are removed.
3. E5071C-017 is required to use E5071CU-018.

E5071C Hardware upgrade options matrix

From	To	Upgrade options to order
240	245	E5071CU-100
	280	E5071CU-280
	285	E5071CU-100 + E5071CU-285
	440	E5071CU-300
	445	E5071CU-100 + E5071CU-301
	480	E5071CU-300 + E5071CU-480
	485	E5071CU-100 + E5071CU-301+ E5071CU-485
	2K5	E5071CU-280 + E5071CU-2K5
	4K5	E5071CU-300 + E5071CU-480 + E5071CU-4K5
245	240	E5071CU-200
	280	E5071CU-200 + E5071CU-280
	285	E5071CU-285
	440	E5071CU-200 + E5071CU-300
	445	E5071CU-301
	480	E5071CU-200 + E5071CU-300 + E5071CU-480
	485	E5071CU-301 + E5071CU-485
	2K5	E5071CU-285 + E5071CU-2K5
	4K5	E5071CU-301 + E5071CU-485 + E5071CU-4K5
280	285	E5071CU-101
	480	E5071CU-302
	485	E5071CU-101 + E5071CU-303
	2K5	E5071CU-2K5
	4K5	E5071CU-302 + E5071CU-4K5
285	280	E5071CU-201
	480	E5071CU-201 + E5071CU-302
	485	E5071CU-303
	2K5	E5071CU-2K5
	4K5	E5071CU-303 + E5071CU-4K5
440	445	E5071CU-102
	480	E5071CU-480
	485	E5071CU-102 + E5071CU-485
	4K5	E5071CU-480 + E5071CU-4K5
445	440	E5071CU-202
	480	E5071CU-202 + E5071CU-480
	485	E5071CU-485
	4K5	E5071CU-485 + E5071CU-4K5
480	485	E5071CU-103
	4K5	E5071CU-4K5
485	480	E5071CU-203
	4K5	E5071CU-4K5
2K5	4K5	E5071CU-304
UNQ	1E5	E5071CU-1E5
019	017	E5071CU-017

Application and product notes

Introduction to the Fixture Simulator Function of the ENA Series RF Network Analyzers: Network De-embedding/Embedding and Balanced Measurement, Product Note E5070/71-1 Literature number 5988-4923EN

Evolution of Test Automation Using Built-in VBA with the ENA Series RF Network Analyzers, Product Note E5070/71-2 Literature number 5988-6192EN

On-wafer Multiport Calibration Using the ENA Series RF Network Analyzer with the Cascade Microtech Probing System, Product Note E5070/71-3 Literature number 5988-5886EN

In-Fixture Characterization Using the ENA Series RF Network Analyzer with Cascade Microtech Probing System, Product Note E5070/71-4 Literature number 5988-6522EN

Improve the Circuit Evaluation Efficiency of Wireless LAN Chip Set Design, Application Note 1463-2 Literature number 5988-9803EN

Impedance Characteristic Evaluation of SMD by Using the ENA with Inter-Continental Microwave (ICM) Application Note 1463-5 Literature number 5989-0547EN

Accurate Mixer Measurements Using the Frequency-Offset Mode, Application Note 1463-6 Literature number 5989-1420EN

7 Reasons to Migrate from Your 8753 to an ENA Network Analyzer Application Note 1478 Literature number 5989-0206EN

Multiport Solutions for E5071C ENA RF Network Analyzers Using External Switches Literature number 5989-7916EN

Advanced Measurement Techniques for RF Amplifiers Using Unique Functions of the Agilent E5071C ENA Literature number 5989-6522EN

Measurement Wizard Assistant software for ENA/E5091A Literature number 5989-4855EN

Literature and information

ENA Network Analyzers Brochure
Literature number 5989-5478EN

ENA Network Analyzers Data Sheet
Literature number 5989-5479EN

Agilent Network Analyzer Selection Guide
Literature number 5989-7603EN

ENA-L RF Network Analyzers Brochure
Literature number 5989-0167EN

ENA-L RF Network Analyzers Data Sheet
Literature number 5989-0018EN

Test Solutions for Multiport and Balanced Devices Selection Guide
Literature number 5988-2461EN

Key web resources for additional information on the ENA Series, visit:

www.agilent.com/find/ena



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Revised: October 1, 2008

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Printed in USA, October 8, 2008
5989-5480EN

