

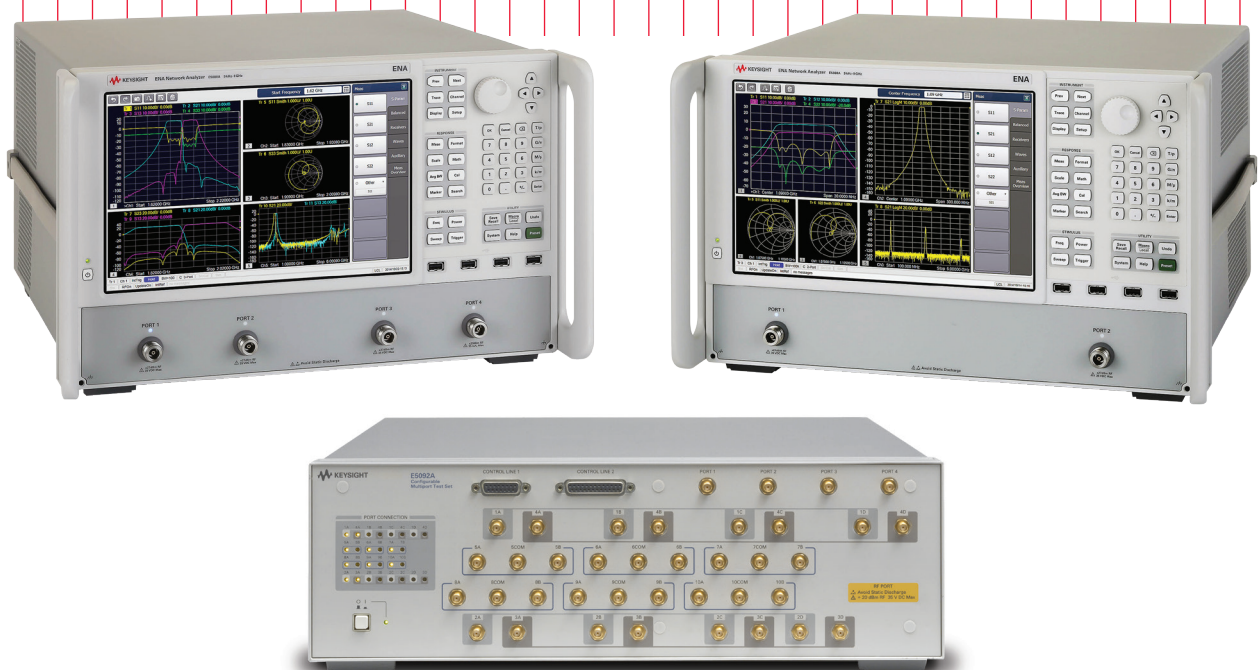
# Keysight Technologies

## E5080A Network Analyzer

– 9 kHz to 4.5/6.5/9 GHz

## E5092A Configurable Multiport Test Set

### Configuration Guide



This configuration guide describes standard configurations, options, accessories and peripherals for the E5080A ENA network analyzer. Refer to the E5080A brochure for a complete description of the E5080A network analyzer and the E5092A configurable multiport test set.

## E5080A ENA Network Analyzer

The E5080A is an integrated network analyzer with a two- or four-port S-parameter test set, a synthesized RF source, a 12.1-inch color LCD, and a solid state drive. A 3-year return-to-Keysight Technologies, Inc. service warranty is included with the each ENA network analyzer.

### Step 1: Select frequency range and number of test ports

#### Up to 4.5 GHz range

9 kHz to 4.5 GHz (with bias tees)

E5080A-245 2-port S-parameter test set

E5080A-445 4-port S-parameter test set

#### Up to 6.5 GHz range

9 kHz to 6.5 GHz (with bias tees)

E5080A-265 2-port S-parameter test set

E5080A-465 4-port S-parameter test set

#### Up to 9 GHz range

9 kHz to 9 GHz (with bias tees)

E5080A-295 2-port S-parameter test set

E5080A-495 4-port S-parameter test set

### Step 2: Select time base

E5080A-1E5 High stability time base

E5080A-UNQ Standard stability time base

### Step 3: Select solid state drive

E5080A-017 Removable solid state drive

E5080A-019 Standard solid state drive

### Step 4: Choose additional options (optional)

E5080A-009<sup>1</sup> Frequency offset mode

E5080A-010 Time domain analysis

E5080A-790 Measurement Wizard Assistant software

### Step 5: Choose accessories (optional)

E5080A-1CM Rack mount kit,

E5080A-1CP Rack mount and front handle kit

E5080A-810 Adds a keyboard

E5080A-820 Adds a mouse

1. Order the 82357B USB/GPIB interface at the same time if you want the E5080A to control external power meters or signal generators via their GPIB interfaces.

### Step 6: Choose certification documentation (optional)

E5080A-1A7      ISO 17025 compliant calibration  
E5080A-A6J      ANSI Z540 compliant calibration

### Step 7: Choose your warranty service (optional)

5-year return-to-Keysight warranty and service

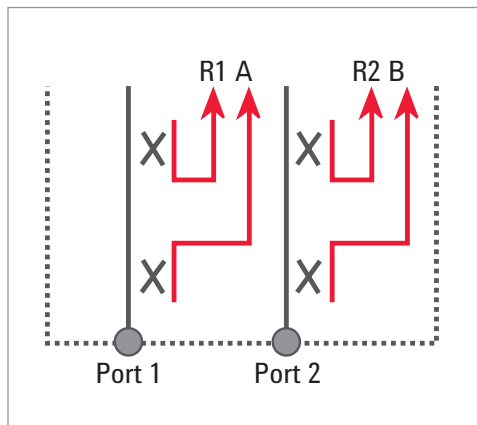
### Documentation

The documentation for the E5080A is located in the Online Help system for the E5080A ENA network analyzer. The Service Guide and Online Help system are also available on the Web site: [www.keysight.com/find/e5080a](http://www.keysight.com/find/e5080a)

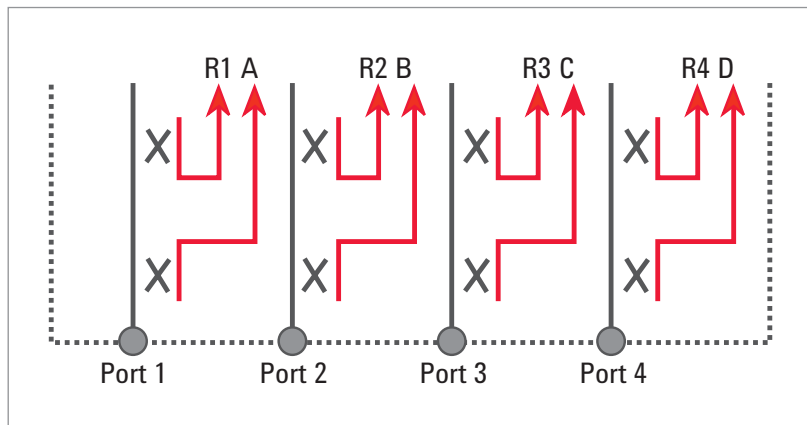
### Additional product information

For additional product information, refer to the E5080A brochure available on the Web site: [www.keysight.com/find/e5080a](http://www.keysight.com/find/e5080a)

### Receiver assignment



2-port test set option



4-port test set option

## E5080A ENA Network Analyzer

### Options

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

| Option <sup>1</sup>                                                                          | Description                                                                                                                                                                                                                                                                                                      | Additional information                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test set<br>Option 245<br>Option 445<br>Option 265<br>Option 465<br>Option 285<br>Option 485 | 2-port test set, 9 kHz to 4.5 GHz with bias tees<br>4-port test set, 9 kHz to 4.5 GHz with bias tees<br>2-port test set, 9 kHz to 6.5 GHz with bias tees<br>4-port test set, 9 kHz to 6.5 GHz with bias tees<br>2-port test set, 9 kHz to 9 GHz with bias tees<br>4-port test set, 9 kHz to 9 GHz with bias tees | Test port connector: Type-N (f)                                                                                                                                                                                                           |
| Time base<br>Option UNQ<br>Option 1E5                                                        | Standard stability time base<br>High stability time base                                                                                                                                                                                                                                                         | Adds a higher stability time base reference.                                                                                                                                                                                              |
| Hard disk drive<br>Option 017<br>Option 019                                                  | Removable solid state drive<br>Standard solid state drive                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                           |
| Additional features<br>Option 009 <sup>2</sup><br><br>Option 010<br>Option 790 <sup>3</sup>  | Frequency offset mode<br><br>Time domain analysis<br>Measurement wizard assistant software                                                                                                                                                                                                                       | Adds frequency-offset sweep and harmonic measurement capabilities.<br>Adds time domain transform and gating capabilities.<br>Adds Measurement wizard assistant (MWA) software to simplify your multiport measurements with the 4-port ENA |
| Accessories<br>Option 1CM<br>Option 1CP<br>Option 810<br>Option 820                          | Rack mount kit<br>Rack mount and front handle kit<br>Add keyboard<br>Add mouse                                                                                                                                                                                                                                   | Adds a rack mount kit (part number: 1CM042A and E3663AC)<br>Adds a rack mount and front handle kit (part number: 1CM020A, E3663AC and 5063-9237)                                                                                          |
| Calibration documentation<br>Option 1A7<br>Option A6J                                        | ISO 17025 compliant calibration<br>ANSI Z540 compliant calibration                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                           |

- Options are ordered using the combined model/option number, e.g. E5080A-240.
- Order the 82357B USB/GPIB interface at the same time if you want E5080A to control external power meters or signal generators via their GPIB interfaces.
- When using an ECal module with the MWA calibration wizard, a 4-port ECal module (i.e. N4431B) 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 (E5071C and E5080A). Multiple multiport measurement configurations, from 50 MHz to 20 GHz, can be made by connecting the included semi-rigid cables to the E5092A's front panel which accesses its internal switches.

### Step 1: Select appropriate cable and adapter set for connection to the ENA (Optional)<sup>1</sup>

|            |                                                                             |
|------------|-----------------------------------------------------------------------------|
| E5092A-08C | Cables and adapters for connection to E5071C Option 440/445/460/465/480/485 |
| E5092A-20C | Cables and adapters for connection to E5071C Option 4D5/4K5                 |
| E5092A-09A | Cable and adapters for connection to E5080A Option 445/465/495              |

### 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)

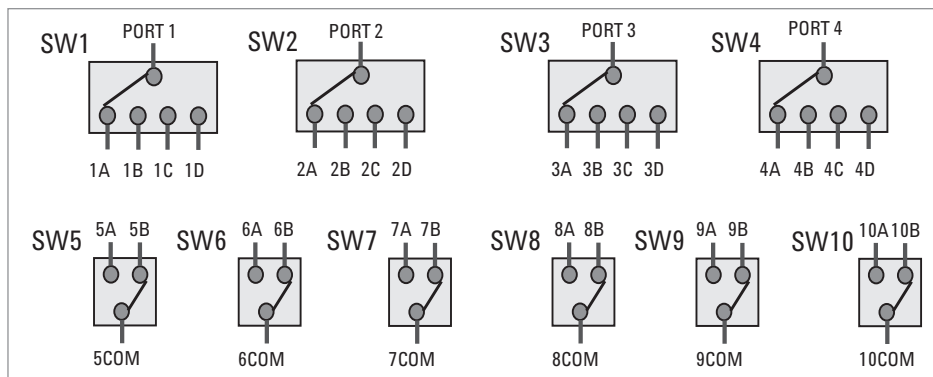
|            |                                 |
|------------|---------------------------------|
| E5092A-1A7 | ISO 17025 compliant calibration |
| E5092A-A6J | ANSI Z540 compliant calibration |

### Step 4: Choose your warranty service (optional)

5-year return-to-Keysight warranty and service

## Block diagram

E5092A (Option 020)



1. Semi-rigid cables are designed for connection to the E5071C and E5080A.

## Documentation

The documentation for the E5092A is located in the Online Help system for the E5071C and E5080A ENA network analyzer. The ENA Service Guide and Online Help system are also available on the Web site: [www.keysight.com/find/ena](http://www.keysight.com/find/ena)

## Additional product information

For additional product information, refer to the ENA brochure available on the Web site: [www.keysight.com/find/ena](http://www.keysight.com/find/ena), [www.keysight.com/find/multiport](http://www.keysight.com/find/multiport)

## E5092A Configurable Multiport Test Set

### Options

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

| Option <sup>1</sup>                                                   | Description                                                                                     | Additional information                                                                 |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Test set</b>                                                       |                                                                                                 |                                                                                        |
| Option 020                                                            | 20 GHz switching test set                                                                       | Up to 22-port or 10-port full crossbar measurement.                                    |
| <b>Cable adapter set</b>                                              |                                                                                                 |                                                                                        |
| Option 08C                                                            | Cable and adapter set for E5071C<br>Option 440/445/460/465/480/485<br>(4.5 GHz/6.5 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<br>Option 4D5/4K5 (14 GHz/20 GHz)                          | Adds SMA semi-rigid cables and 3.5 mm-to-3.5 mm adapters for connection to the E5071C. |
| Option 09A                                                            | Cable and adapter set for E5080A<br>Option 445/465/495 (4.5 GHz/6.5 GHz/9 GHz)                  | Adds SMA semi-rigid cables and type-N-to-SMA adapters for connection to the E5080A.    |
| <b>Accessories</b>                                                    |                                                                                                 |                                                                                        |
| Option 1CM                                                            | Rack mount kit                                                                                  | Adds a rack mount kit (part number: 1CM015A) for use without handles.                  |
| Option 1CN                                                            | Front handle kit                                                                                | Adds a front handle kit (part number: 1CN007A).                                        |
| Option 1CP                                                            | Rack mount and front handle kit                                                                 | Adds a rack mount and front handle kit (part number: 1CP008A).                         |
| <b>Calibration documentation</b>                                      |                                                                                                 |                                                                                        |
| Option 1A7                                                            | ISO 17025 compliant calibration                                                                 |                                                                                        |
| Option A6J                                                            | ANSI Z540 compliant calibration                                                                 |                                                                                        |
| <b>RF semi-rigid cables and docking plate for two stacked E5092As</b> |                                                                                                 |                                                                                        |
| E5092-61671                                                           | RF semi rigid cable, port-1                                                                     |                                                                                        |
| E5092-61672                                                           | RF semi rigid cable, port-2                                                                     |                                                                                        |
| E5092-61673                                                           | RF semi rigid cable, port-3                                                                     |                                                                                        |
| E5092-61674                                                           | RF semi rigid cable, port-4                                                                     |                                                                                        |
| E5092-60103                                                           | Docking plate                                                                                   |                                                                                        |
| <b>RF semi-rigid cables for two stacked E5092As in rack mount</b>     |                                                                                                 |                                                                                        |
| E5092-61633                                                           | RF semi rigid cable, port-1, rack mount                                                         |                                                                                        |
| E5092-61638                                                           | RF semi rigid cable, port-2, rack mount                                                         |                                                                                        |
| E5092-61639                                                           | RF semi rigid cable, port-3, rack mount                                                         |                                                                                        |
| E5092-61632                                                           | RF semi rigid cable, port-4, rack mount                                                         |                                                                                        |

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

## ENA Network Analyzer (E5080A)

### Additional software options

#### Option 010 Time domain analysis

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 009 Frequency offset mode

Option 009 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. Option 009 provides the basic frequency offset capabilities, the Scalar Mixer/Converter measurement (SMC), and the Vector Mixer Characterization (VMC) applications.

#### 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 provides an easy-to-use measurement wizard that includes a calibration wizard setup, which reduces operation time for complicated, time-consuming multiport measurements.

### Time base options

#### Option UNQ Standard stability time base

Option UNQ provides the following stability:

CW accuracy:  $\pm 7$  ppm (specification)

Source stability:  $\pm 7$  ppm (0 °C to 40 °C typical)

#### Option 1E5 High stability time base

Option 1E5 provides the following stability:

CW accuracy:  $\pm 0.45$  ppm (specification)

Source stability:  $\pm 0.05$  ppm (0 °C to 40 °C typical),  
 $\pm 0.5$  ppm/year

## Solid state drive options<sup>2</sup>

### Option 019 Standard solid state drive

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

### Option 017 Removable solid state drive

Option 017 provides a removable solid state drive. You can remove or replace the hard disk drive for secure area operations. If a spare disk is needed, order E5080AU-018 Solid state 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.keysight.com/find/accessories](http://www.keysight.com/find/accessories)

Accessories are available with the following connector types:

50  $\Omega$  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 standards (male and female) or a series of offset shorts

**Precision**, includes the devices in the economy kit and adds:

- 50  $\Omega$  airline(s) for TRL calibration
- TRL adapters

#### Cables and adapter sets

Keysight 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.

## For devices with 50 $\Omega$ 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: 9 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 $\Omega$ (f) | 103           | 203           | 303           | 403           |
| Type-N 50 $\Omega$ (m) | 104           | 204           | 304           | 404           |
| 7-16 (f)               | 105           | 205           | 305           | 405           |
| 7-16 (m)               | 106           | 206           | 306           | 406           |

- N4432A<sup>1</sup> 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 $\Omega$ (f) | 103           | 203           | 303           | 403           |
| Type-N 50 $\Omega$ (m) | 104           | 204           | 304           | 404           |

- N4433A<sup>1</sup> Microwave ECal: 300 kHz to 20 GHz, 3.5 mm, 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           |

- N4690B Microwave ECal: 300 kHz to 18 GHz, 2 ports  
Includes:  
**Option MOF 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  $\Omega$  Type-N RF cable, DC to 12.4 GHz  
Includes 8120-8862 one 610 mm (24 in) cable with male connectors
- N6315A 50  $\Omega$  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  $\Omega$  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  $\Omega$  Type-N (m) adapter  
1250-1743 3.5 mm (m) to 50  $\Omega$  Type-N (m) adapter  
1250-1745 3.5 mm (f) to 50  $\Omega$  Type-N (f) adapter  
1250-1750 3.5 mm (m) to 50  $\Omega$  Type-N (f) adapter
- 11524A 7 mm to Type-N (f) adapter
- 11525A 7 mm to Type-N (m) adapter
- 85130C<sup>2</sup> 3.5 mm to Type-N Includes:  
85054-60029 NMD-3.5 mm to Type-N (f)  
85054-60030 NMD-3.5 mm to Type-N (m)

1. The N4432/33A with serial numbers of 01520 and above are supported by the E5080A.
2. 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 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  $\Omega$  Type-N (m) adapter
  - 1250-1743 3.5 mm (m) to 50  $\Omega$  Type-N (m) adapter
  - 1250-1745 3.5 mm (f) to 50  $\Omega$  Type-N (f) adapter
  - 1250-1750 3.5 mm (m) to 50  $\Omega$  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: 9 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<br>50 $\Omega$ (f) | 103           | 203           | 303           | 403           |
| Type-N<br>50 $\Omega$ (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 M0F module with:**

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

**Option 00M module with:**

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

**Option 00F module with:**

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

## Cables

- 11500E<sup>2,3</sup> cable, APC 3.5 mm (m), DC to 26.5 GHz  
Includes: one 610 mm (24 in) with male connectors.
- 11500F<sup>2,3</sup> 150 cm cable, APC 3.5 mm (m), DC to 26.5 GHz  
Includes: one 1520 mm (60 in) with male connectors.
- 85134C<sup>1</sup> single, semi-rigid: PSC-3.5 mm (f) to 2.4 mm (f), 81 cm, 32 inches
- 85134D<sup>1</sup> 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
- 85134E<sup>1</sup> single, flexible: PSC-3.5 mm (f) to 2.4 mm (f), 96 cm, 38 inches
- 85134F<sup>1</sup> 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
- 85134G<sup>1</sup> single, semi-rigid: 2.4 mm (f) to PSC-3.5 mm (m), 53 cm, 21 inches
- 85134H<sup>1</sup> single, flexible: 2.4 mm (f) to PSC-3.5 mm (m), 61 cm, 24 inches
- N4419AK20 single, flexible: 3.5 mm (m) to 3.5 mm (f), 91.4 cm, 36 inches
- Z5623A-K20 single, flexible: 3.5 mm (m) to 3.5 mm (m), 91.4 cm, 36 inches

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  $\Omega$  Type-N (m) adapters are recommended to connect to the E5080A Option x45, x65, and x95 test ports, which have Type-N (f) connectors.
3. Consider purchasing Keysight 20 mm TORQUE WRENCH 8710-1764

## Adapters

- 11853A 50  $\Omega$  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  $\Omega$  Type-N (m) adapter  
1250-1743 3.5 mm (m) to 50  $\Omega$  Type-N (m) adapter  
1250-1745 3.5 mm (f) to 50  $\Omega$  Type-N (f) adapter  
1250-1750 3.5 mm (m) to 50  $\Omega$  Type-N (f) adapter
- 11524A 7 mm to Type-N (f) adapter
- 11525A 7 mm to Type-N (m) adapter
- 85130C<sup>1</sup> 3.5 mm to Type-N  
Includes:  
85054-60029 NMD-3.5 mm to Type-N (f)  
85054-60030 NMD-3.5 mm to Type-N (m)
- 85130D<sup>1</sup> 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)
- 85130F<sup>1</sup> 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.

## For devices with 75 $\Omega$ Type-N connectors

### Mechanical calibration kits

- 85036B DC to 3 GHz, includes:  
00909-60019 75  $\Omega$  Type-N (m) broadband load  
00909-60020 75  $\Omega$  Type-N (f) broadband load  
85036-60012 75  $\Omega$  Type-N (m) short  
85036-60011 75  $\Omega$  Type-N (f) short  
85032-60007 75  $\Omega$  Type-N (m) open  
85032-20001 75  $\Omega$  Type-N (f) open body  
85036-60010 75  $\Omega$  Type-N (f) open center conductor extender  
85036-60013 75  $\Omega$  Type-N (m) to (m) adapter  
85036-60014 75  $\Omega$  Type-N (f) to (f) adapter  
85036-60015 75  $\Omega$  Type-N (m) to (f) adapter
- 85036E DC to 3 GHz, includes:  
00909-60019 75  $\Omega$  Type-N (m) broadband load  
85036-60016 75  $\Omega$  Type N (m) combined open/short

## Adapters

- 11852B Minimum-loss pad  
Option 11852B-004 Type-N connectors, 50  $\Omega$  (m) to 75  $\Omega$  (f)

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

## 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 sensors<sup>1</sup>

Recommended for source output power calibration.

- E4416A<sup>1</sup> single-channel EPM-P series power meter
- E4417A<sup>1</sup> dual-channel EPM-P series power meter
- E4418B<sup>1</sup> single-channel EPM series power meter
- E4419B<sup>1</sup> dual-channel EPM series power meter
- N1911A<sup>1</sup> single-channel P-series power meter
- N1912A<sup>1</sup> 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)
- U2000A/B/H USB power sensor, 10 MHz to 18 GHz, Type-N (m)
- U2001A/B/H USB power sensor, 10 MHz to 6 GHz, Type-N (m)
- U2002A/H USB power sensor, 50 MHz to 24 GHz, 3.5 mm (m)
- U2004A USB power sensor, 9 kHz to 6 GHz, Type-N (m)

### Probes

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

1. Order the 82357B USB/GPIB interface to let the E5080A control a power meter via its GPIB interface.

## General Accessories

### 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 E5080A.

### Monitors

- WXGA-compatible monitor

### Printers

- USB printers with Microsoft Windows printer driver

### Other

- 8710-1764 Torque wrench, 8 in/lb, 20 mm open end

## Upgrade Kits

### Upgrade kits for the E5080A

#### Protecting your hardware investment

The E5080A ENA network analyzer is a safe investment because of its flexibility. Easily upgrade any ENA software or hardware feature whenever you need that feature.

#### Ordering instructions

To upgrade an existing E5080A, order the corresponding upgrade kit model. For further information, visit: [http://www.keysight.com/find/ena\\_support](http://www.keysight.com/find/ena_support)

## Literature and Information

*ENA Network Analyzers Brochure*  
Literature number 5992-0290EN

*ENA Network Analyzers Data Sheet*  
Literature number 5992-0291EN

*Keysight Network Analyzer Selection Guide*  
Literature number 5989-7603EN

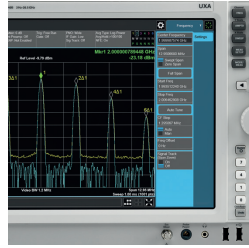
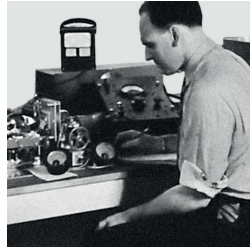
*Test Solutions for Multiport and Balanced Devices Selection Guide*  
Literature number 5988-2461EN

*Keysight RF & MW Test Accessories Catalog*  
Literature number 5990-8661EN

Key web resources for additional information on the ENA Series, visit:  
[www.keysight.com/find/ena](http://www.keysight.com/find/ena)

## From Hewlett-Packard through Agilent to Keysight

For more than 75 years, we've been helping you unlock measurement insights. Our unique combination of hardware, software and people can help you reach your next breakthrough. **Unlocking measurement insights since 1939.**



1939

THE FUTURE

### myKeysight

#### myKeysight

[www.keysight.com/find/mykeysight](http://www.keysight.com/find/mykeysight)

A personalized view into the information most relevant to you.

#### Three-Year Warranty

[www.keysight.com/find/ThreeYearWarranty](http://www.keysight.com/find/ThreeYearWarranty)

Keysight's committed to superior product quality and lower total cost of ownership. Keysight is the only test and measurement company with three-year warranty standard on all instruments, worldwide. And, we provide a full one-year warranty on all accessories, calibration devices, systems and custom products.



#### Keysight Assurance Plans

[www.keysight.com/find/AssurancePlans](http://www.keysight.com/find/AssurancePlans)

Up to ten years of protection and no budgetary surprises to ensure your instruments are operating to specification, so you can rely on accurate measurements.



#### Keysight Infoline

[www.keysight.com/find/service](http://www.keysight.com/find/service)

### Keysight Infoline

Keysight's insight to best in class information management. Free access to your Keysight equipment company reports and e-library.

#### Keysight Channel Partners

[www.keysight.com/find/channelpartners](http://www.keysight.com/find/channelpartners)

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

[www.keysight.com/find/e5080a](http://www.keysight.com/find/e5080a)

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)

### Americas

|               |                  |
|---------------|------------------|
| Canada        | (877) 894 4414   |
| Brazil        | 55 11 3351 7010  |
| Mexico        | 001 800 254 2440 |
| United States | (800) 829 4444   |

### Asia Pacific

|                    |                |
|--------------------|----------------|
| Australia          | 1 800 629 485  |
| China              | 800 810 0189   |
| Hong Kong          | 800 938 693    |
| India              | 1 800 11 2626  |
| Japan              | 0120 (421) 345 |
| Korea              | 080 769 0800   |
| Malaysia           | 1 800 888 848  |
| Singapore          | 1 800 375 8100 |
| Taiwan             | 0800 047 866   |
| Other AP Countries | (65) 6375 8100 |

### Europe & Middle East

|                |               |
|----------------|---------------|
| Austria        | 0800 001122   |
| Belgium        | 0800 58580    |
| Finland        | 0800 523252   |
| France         | 0805 980333   |
| Germany        | 0800 6270999  |
| Ireland        | 1800 832700   |
| Israel         | 1 809 343051  |
| Italy          | 800 599100    |
| Luxembourg     | +32 800 58580 |
| Netherlands    | 0800 0233200  |
| Russia         | 8800 5009286  |
| Spain          | 800 000154    |
| Sweden         | 0200 882255   |
| Switzerland    | 0800 805353   |
|                | Opt. 1 (DE)   |
|                | Opt. 2 (FR)   |
|                | Opt. 3 (IT)   |
| United Kingdom | 0800 0260637  |

For other unlisted countries:  
[www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)  
(BP-10-30-15)



[www.keysight.com/go/quality](http://www.keysight.com/go/quality)

Keysight Technologies, Inc.  
DEKRA Certified ISO 9001:2008  
Quality Management System



Unlocking Measurement Insights

This information is subject to change without notice.  
© Keysight Technologies, 2015  
Published in USA, December 1, 2015  
5992-0292EN  
[www.keysight.com](http://www.keysight.com)