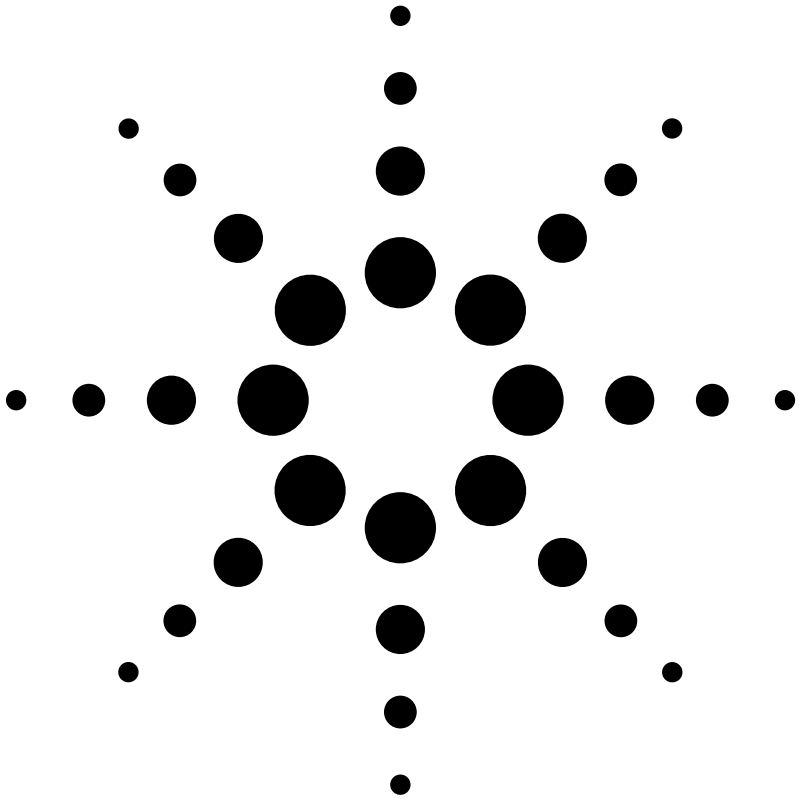
Agilent
8712E Series
RF Vector Network Analyzers
Configuration Guide



Agilent 8712E series
RF vector network analyzers

- ❑ **8712ET transmission/reflection vector network analyzer, 300 kHz to 1.3 GHz**
- ❑ **8712ES S-parameter vector network analyzer, 300 kHz to 1.3 GHz**
- ❑ **8714ET transmission/reflection vector network analyzer, 300 kHz to 3.0 GHz**
- ❑ **8714ES S-parameter vector network analyzer, 300 kHz to 3.0 GHz**

This configuration guide describe standard configurations, options, accessories, upgrade kits, and service and support products. For more information about these analyzers, please read the following documents:

8712E Series Technical Specifications:	5967-6314E
8712E Series Brochure:	5967-6316E

For more information, please refer to the sources listed on the back page of this guide.

Agilent Technologies

Standard analyzers include:

- Fully integrated synthesized source and test set
- Built-in 3.5 inch floppy disk drive
- Narrowband and broadband receivers
- LAN interface
- IBASIC programming language
- 50 ohm system impedance (75 ohm system impedance available as Option 1EC)
- Type-N economy test-port cable
- 175 MHz demonstration bandpass filter
- Operating and programming manuals (in binder and CD-ROM format)
- Example program disks
- Three-year return-to-Agilent warranty

Options

❏ **Option 1EC** 75 ohm system impedance
Converts test-port impedances to 75 ohms. Test-port connector type is 75 ohm type-N female.

❏ **Option 1E1** 60 dB step attenuator
Adds a built-in 60 dB step attenuator to extend the output-power range down to –60 dBm. This option only applies to the transmission/reflection analyzers (ET models), as the attenuator is standard in the S-parameter analyzers (ES models).

❏ **Option 100** fault location and structural return loss (SRL)
Adds time-domain-based fault location and SRL measurement capability.

❏ **Option 101** transport case, fault location and structural return loss (SRL)
Adds a rugged transport and operation case (part number 08712-60059) for field measurements of fault location and SRL.
Note: this case is not intended for use as a shipping container. To protect the transport case and instrument during commercial ground or air shipping, place in a suitable transit case.

❏ **Option 1CL** keyboard
Adds a full-size, standard PC keyboard with a mini-DIN cable (model number D4950B, Option ABA). A key board overlay is also included (part number 08712-80028) to aid in instrument operation using the keyboard.

❏ **Option 1CM** rack mount kit
Adds a rack mount kit (without handles) for installation in a test rack.

❏ **Option AFN** extra 50 ohm economy cable
Adds an extra 50 ohm economy cable and a type-N female-to-female adapter (for high-volume applications, Option B20 is recommended).

❏ **Option AFP** extra 75 ohm economy cable
Adds an extra 75 ohm economy cable and a type-N female-to-female adapter (for high-volume applications, Option B21 is recommended).

❏ **Option B20** add 50 ohm precision cable
Adds a 50 ohm precision cable. This option is recommended for high-volume applications.

❏ **Option B21** add 75 ohm precision cable
Adds a 75 ohm precision cable. This option is recommended for high-volume applications.

❏ **Option B22** substitute 50 ohm precision cable
This option replaces the standard 50 ohm economy test cable with a precision test cable. It can only be ordered once. For additional 50 ohm precision cables, order multiple quantities of Option B20.

❏ **Option B23** substitute 75 ohm precision cable
This option replaces the standard 75 ohm economy test cable with a precision test cable. It can only be ordered once. For additional 75 ohm precision cables, order multiple quantities of Option B21.

❏ **Option 1FP** performance-test software (used for recalibrating instruments)

❏ **Option UK6** commercial calibration certificate with test data

❏ **Option 0Q8** factory-delivered service training

Documentation

❏ **Option 0B0** delete manual set
❏ **Option 0B1** add additional manual set
❏ **Option AVB** delete service guide
❏ **Option AV7** delete programming guides

Localization

The following options provide manuals that are partially or completely translated into the specified languages, depending on the region.

❏ **Option ABO** Traditional Chinese (Taiwan) manual
❏ **Option AB2** Simplified Chinese (PRC) manual
❏ **Option ABD** German manual
❏ **Option ABE** Spanish manual
❏ **Option ABF** French manual
❏ **Option ABJ** Japanese manual
❏ **Option ABZ** Italian manual

Measurement accessories

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

50 ohm accessories

Calibration kits

Calibration kits include mechanical standards such as opens, shorts and precision loads, which are measured by the network analyzer during calibration. After a calibration has been performed, subsequent measurements are more accurate.

- ❏ **85032E** type-N economy calibration kit
  Contains male 50 ohm precision load, open, and short standards.
- ❏ **85032B** type-N standard calibration kit
  Contains male and female 50 ohm precision load, open, and short standards. To delete the 7-mm-to-type-N adapters, order Option 001.
- ❏ **85033D** 3.5 mm calibration kit
  Contains male and female 50 ohm precision load, open, and short standards. To replace the 7-mm-to-3.5-mm adapters with type-N-to-3.5-mm adapters, order Option 002.
- ❏ **85038A** 7-16 calibration kit
  Contains male and female 50 ohm precision open, short and fixed-load standards. Adapters are not included (see **Adapters** section for information about the Agilent 11906 series of 7-16 adapter kits).
- ❏ **85038F** 7-16 calibration kit (female standards only)
  Contains female 50 ohm precision open, short and fixed-load standards, and a 7-16 (f-f) adapter. Other adapters are not included (see **Adapters** section for information about the Agilent 11906 series of 7-16 adapter kits).
- ❏ **85038M** 7-16 calibration kit (male standards only)
  Contains male 50 ohm precision open, short and fixed-load standards, and a 7-16 (m-m) adapter. Other adapters are not included (see **Adapters** section for information about the Agilent 11906 series of 7-16 adapter kits).

Test Sets

- ❏ **87050E** multiport test sets
  Provides a complete solution for testing a variety of 50 ohm multiport devices, including multiband filters, signal splitters, and distribution amplifiers. Test sets can be configured with four, eight, or twelve test ports (for more information, please consult the product brochure, literature number 5968-4763E).

Cables

Test port cables are used to connect the network analyzer to the device under test. One economy test port cable is shipped with each analyzer as a standard accessory. For high-volume applications, precision cables are recommended.

- ❏ **Economy test port cable** (part number 8120-6469)
  Economy 50 ohm 0.61 m (2 ft.) cable. Comes with male type-N connectors on both ends.
- ❏ **Precision test port cable** (part number 8120-8862)
  Precision 50 ohm 0.61 m (2 ft.) cable. Comes with male type-N connectors on both ends. RF performance includes SWR < 1.1 (up to 3 GHz).

Detector

- ❏ **86200B RF scalar detector**
  External 50 ohm scalar detector, 10 MHz to 3 GHz, with male type-N connectors. See literature number 5962-9931E for detailed technical specifications. A two-meter detachable cable is included (part number 8120-5514); order twenty-meter cable separately (part number 8120-5515).

Adapters

- ❏ **11852B Option 004** type-N 50-to-75 ohm minimum-loss pad
  This impedance-matching attenuator is used to convert a 50 ohm test port to 75 ohms. One end has a 50 ohm male type-N connector and the other end has a 75 ohm female type-N connector. Nominal insertion loss is 5.7 dB.
- ❏ **11853A** type-N accessory kit
  Contains 50 ohm type-N (m-m) and (f-f) adapters, and type-N male and female shorts.
- ❏ **11854A** BNC accessory kit
  Provides the components generally required for measuring devices with 50 ohm BNC connectors (up to 3 GHz). Contains four type-N to BNC adapters in all combinations of connector sexes, plus a male BNC short.
- ❏ **11878A** 3.5 mm accessory kit
  Contains 50 ohm type-N-to-3.5-mm adapters, in all combinations of connector sexes. Type-N female-to-female adapter (part number 1250-0777) Can be used to connect two 50 ohm male type-N cables together. Suitable for use with economy and precision cables.
- ❏ **11906A** 7-16 to 7-16 adapter kit
  Contains one 7-16 (m-m) adapter, one 7-16 (f-f) adapter, and two 7-16 (m-f) adapters.
- ❏ **11906B** 7-16 to 50 ohm type-N adapter kit
  Contains 7-16-to-type-N adapters, in all combinations of connector sexes.
- ❏ **11906C** 7-16 to 7 mm adapter kit
  Contains two 7-16 (m) to 7 mm adapters, and two 7-16 (f) to 7 mm adapters.
- ❏ **11906D** 7-16 to 3.5 mm adapter kit
  Contains 7-16-to-3.5-mm adapters, in all combinations of connector sexes.

75 ohm accessories

Calibration kits

Calibration kits include mechanical standards such as opens, shorts and precision loads, which are measured by the network analyzer during calibration. After a calibration has been performed, subsequent measurements are more accurate.

- ❑ **85036E** type-N economy calibration kit
  Contains male 75 ohm precision load, open, and short standards.
- ❑ **85036B** type-N standard calibration kit
  Contains male and female 75 ohm precision load, open, and short standards. Also includes phase-matched adapters for accurate measurements of non-insertable devices.
- ❑ **85039B** type-F calibration kit
  Contains male and female 75 ohm precision load, open, and short standards. Also includes the following precision adapters: type-N to type-F (f-m) and (m-f), and type-F (m-m) and (f-f).
- ❑ **Option 00M** male standards only
  Contains male 75 ohm precision load, open, and short standards. Also includes a precision type-F (m-m) adapter.
- ❑ **Option 00F** female standards only
  Contains female 75 ohm precision load, open, and short standards. Also includes a precision type-F (f-f) adapter.

Test Sets

- ❑ **87075C** multiport test sets
  Provides a complete solution for testing 75 ohm multiport devices like CATV distribution amplifiers or multi-taps. Test sets can be configured with six or twelve test ports (for more information, please consult the product brochure, literature number 5968-4766E).

Cables

Test port cables are used to connect the network analyzer to the device under test. One economy test port cable is shipped with each analyzer as a standard accessory. For high-volume applications, precision cables are recommended.

- ❑ **Economy test port cable** (part number 8120-6468)
  Economy 75 ohm 0.61 m (2 ft.) cable. Comes with male type-N connectors on both ends.
- ❑ **Precision test port cable** (part number 8120-8898)
  Precision 75 ohm 0.61 m (2 ft.) cable. Comes with male type-N connectors on both ends. RF performance includes SWR < 1.1 (up to 2 GHz).
- ❑ **11857B** precision test port cable set
  Precision 75 ohm 0.61 m (2 ft.) cables for testing insertable devices with type-N connectors. Includes type-N (m-m) and (m-f) cables. RF performance includes SWR < 1.1 (up to 2 GHz), high isolation, and phase-matching to within +/- 2 degrees at 2 GHz.

- ❑ **11857F** type-N-to-type-F test port cables
  Type-N-to-type-F test port cables for testing insertable devices with type-F connectors. Includes type-N-to-type-F (m-m) and (m-f) cables. Option 00M includes only the (m-m) cable, and Option 00F includes only the (m-f) cable.

Detector

- ❑ **86201B** RF scalar detector
  External 75 ohm scalar detector, 10 MHz to 3 GHz, with male type-N connectors. See literature number 5962-9931E for detailed technical specifications. A two-meter detachable cable is included (part number 8120-5514); order twenty-meter cable separately (part number 8120-5515).

Adapters

- ❑ **11852B** type-N 50-to-75-ohm minimum-loss pad
  This impedance-matching attenuator is used to convert a 75 ohm test port to 50 ohms. One end has a 75 ohm male type-N connector and the other end has a 50 ohm female type-N connector. Nominal insertion loss is 5.7 dB.
- ❑ **11855A** type-N accessory kit
  Contains 75 ohm type-N (m-m) and (f-f) adapters, type-N female short, and type-N male load.
- ❑ **11856A** BNC accessory kit
  Provides the components generally required for measuring devices with 75 ohm BNC connectors (up to 2 GHz). Contains four type-N-to-BNC adapters in all combinations of connector sexes, plus a male BNC short.
- ❑ **Type-N female-to-female adapter**
  (part number 1250-1529)
  Can be used to connect two 75 ohm male type-N cables together. Suitable for use with economy and precision cables.

General accessories

- ❏ **85024A** high-frequency active probe
  Provides high-impedance in-circuit test capability from 300 kHz to 3 GHz.
- ❏ **Anti-static mat kit** (part number 85043-80013)
  Agilent recommends using the network analyzer on an anti-static mat that has been grounded properly, to minimize the risk of damage due to electrostatic discharge (ESD).
- ❏ **Barcode readers**
  For more information about Agilent's line of barcode readers, including a worldwide list of distributors, please visit our web page at **www.semiconductor.agilent.com/barcode.**
- ❏ **Foot/hand switches**
  A rugged footswitch with a 2.4 m (8 ft.) BNC cable is available as Special Option 8714B-K87. Other custom foot or hand switches can be fabricated to suit your particular needs. Please contact your local Agilent sales representative for more information.
- ❏ **Transit case** (part number 9211-2656)
  Protects instrument during shipping and storage.

Manuals

Extra copies of the CD-ROM containing all the manuals for the 8712E series of vector network analyzer family can be ordered as part number 08714-90051. For the latest list of instrument manuals available online, please visit our web page at **www.agilent.com/find/manuals**.

Peripherals

Monitors

For enhanced viewing, any external VGA-compatible color monitor can easily be connected to the network analyzer to provide operators with a clear, full-color view of all display information, such as trace data and pass/fail indicators. For information about HP monitors, please visit the web page at **www.hp.com/go/monitors.**

Printers

Hardcopy measurement results can be obtained from printers with LAN, parallel, serial and GPIB interfaces. Most PCL-based printers are supported. Windows®-only printers are not supported. For more information about HP printers, please visit the web page at **www.hp.com/go/printers.**
For a list of HP printers compatible with the RF vector network analyzers, please visit our web page at **www.agilent.com/find/pcg.**

Interface accessories

- ❏ 10833A GPIB cable, 1.0 m (3.3 ft.)
- ❏ 10833B GPIB cable, 2.0 m (6.6 ft.)
- ❏ 10833D GPIB cable, 0.5 m (1.6 ft.)
- ❏ HP C2950A parallel (Centronics) printer cable, 2.0 m (6.6 ft.)
- ❏ HP C2913A serial (RS-232C) printer cable, 1.2 m (3.9 ft.)
- ❏ HP 92268A Ethertwist "straight-through" LAN cable, 4.0 m (13.1 ft.)

Upgrade kits

Note: installation is not included with upgrade kits. All upgrades can be installed at the customer's site, however, upgrade Options 1E1 and UNE are best done at an authorized Agilent service center.

Upgrade kits for ET and ES models

The following upgrade options are available for transmission/reflection instruments (8712ET and 8714ET). To order, add a "U" to the model number of the instrument to be upgraded, and specify one or more of these options:

- ❏ **Option 1E1** 50 ohm step attenuator kit
  Adds a 60 dB attenuator (part number 08714-60043) to extend the power range down to –60 dBm (for 50 ohm models only).
- ❏ **Option UNE** 75 ohm step attenuator kit
  Adds a 60 dB attenuator (part number 08714-60044) to extend the power range down to –60 dBm (for 75 ohm models only).

The following upgrade options are available for all E models (8712ET, 8712ES, 8714ET, and 8714ES). To order, add a "U" to the model number of the instrument to be upgraded, and specify one or more of these options:

- ❏ **Option 099** firmware kit
  Provides the latest version of instrument firmware for all ET/ES models (also available as part number 08714-60045, or via the web–see *Firmware Upgrades via Lan* on page 7).
- ❏ **Option 100** fault location and structural return loss kit
  Adds fault location and structural return loss capability (also available as part number 08714-60046).
- ❏ **Option 101** transport case, fault location and structural return loss
  Combines Option 100 with a rugged transport and operation case (part number 08712-60059) for field measurements of fault location and structural return loss (fault location firmware and transport case are also available as part number 08714-60047).

Upgrade kits for C models

- ❏ **86221B** AM delay kit for 50 ohm analyzers
- ❏ **86225B** AM delay kit for 75 ohm analyzers
  These AM delay kits add an AM modulator (part number 08711-60062) to provide group-delay measurements of frequency-translating devices. They also include a power splitter and two detectors of the appropriate impedance.
- ❏ **86223B** step attenuator kit
  Adds a 60 dB attenuator (part number 08711-60067) to extend the power range down to –60 dBm.
- ❏ **86224C** IBASIC kit
  Adds IBASIC programming capability (also available as part number 08711-60164, or via the web).
- ❏ **86226C** firmware kit
  Provides the latest version of instrument firmware (also available as part number 08711-60047).
- ❏ **86227C** LAN kit
  Adds a TCP/IP-compliant Ethertwist LAN interface (part number 08711-60052).
- ❏ **86228C** fault location and structural return loss kit
  Adds fault location and structural return loss (SRL) capability (also available as part number 08711-60048).
- ❏ **Rackmount kit** (part number 08712-60036); does not include handles.

Service and support products

A three-year return-to-Agilent warranty is standard. Customers may convert the standard three-year warranty to a one-year on-site warranty (at no additional charge) by ordering Option W01. This option must be ordered at the time of the initial network analyzer purchase. Please note that on-site support is not available everywhere (check with your local Agilent sales or service office for availability in your area).

Selected service and support products are listed below. For more information on the full range of service, support, and training products available from Agilent Technologies, please consult your local sales or service office.

❑ **Service kit** (part number 08712-60012)
Service kit includes extender board, extender cables, voltage reference, and special wrench.

Service options

❑ **Option W01** converts three-year return-to-Agilent service to one-year on-site service (check with your local Agilent sales or service office for availability in your area)
❑ **Option W50** five-year return-to-Agilent service

Calibration options

❑ **Option W32** three-year return-to-Agilent commercial calibration agreement
❑ **Option W34** three-year return-to-Agilent mil-standard (standards-compliant) calibration agreement
❑ **Option W52** five-year return-to-Agilent commercial calibration agreement
❑ **Option W54** five-year return-to-Agilent mil-standard (standards-compliant) calibration agreement
❑ **Option UK6** commercial calibration certificate with test data
❑ **Option 1FP** performance-test software (used for recalibrating instruments)

Training options

❑ **Option 0Q8** factory-delivered service training

Firmware upgrades via LAN

To download the latest instrument firmware via LAN, please visit our web page at
www.agilent.com/find/8712

VXIplug&play driver

To download a free VXIplug&play driver, please visit our web page at **www.agilent.com/find/8712**

Recommended test equipment

The following test equipment is recommended for self support, adjustments, and performance tests to verify proper instrument operation.

Power meters and sensors

- **437B** power meter (discontinued) *or*
- **438A** dual-channel power meter (discontinued) *or*
- **E4418A** (EPM-441A) power meter *or*
- **E4419A** (EPM-442A) dual-channel power meter
- **8482A** power sensor (for both 50 and 75 ohm instruments)
- **8483A** power sensor (for 75 ohm instruments)
- **8481D** diode power sensor (for models with step attenuators only)

Function generators

- **8116A** function generator (discontinued) *or*
- **33120A** function generator

Instrument controllers and computers

- **HP 9000** series 200, 300 or 700 (discontinued) *or*
- PC with an GPIB interface card **(82350A)** and **HP BASIC for Windows** (model number E2060C)

Calibration kits

- **85032B** (for 50 ohm instruments)
- **85036B** (for 75 ohm instruments)

Accessories

- **11852B** minimum loss pads (for 75 ohm instruments; two required)
- **8496A** or **8496G** 10 dB step attenuator
- **8491A series** 20 dB fixed attenuator (for 75 ohm instruments, use part number 0955-0768)
- **Voltage reference** (part number 08712-60031)
Note: this is part of the service kit (part number 08712-60012)

Additional test equipment and accessories which may be helpful include Agilent 8560 series or 8566A/B spectrum analyzers, plus miscellaneous fixed attenuators, cables, adapters and RF power splitters.

Additional information

For online information on Agilent's 8712E series of RF vector network analyzers, please visit our web page at **www.agilent.com/find/8712**

Agilent Technologies' Test and Measurement Support, Services, and Assistance

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

Our Promise

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

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contacting us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional 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.

By internet, phone, or fax, get assistance with all your test & measurement needs

Online assistance:

www.agilent.com/find/assist

Phone or Fax:

United States:
(tel) 1 800 452 4844

Canada:
(tel) 1 877 894 4414
(fax) (905) 282-6495

China:
(tel) 800 810 0189
(fax) 1 0800 650 0121

Europe:
(tel) (31 20) 547 2323
(fax) (31 20) 547 2390

Japan:
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840
Korea:
(tel) (82 2) 2004-5004
(fax) (82 2) 2004-5115

Latin America:
(tel) (305) 269 7500
(fax) (305) 269 7599

Taiwan:
(tel) 080 004 7866
(fax) (886 2) 2545 6723

Other Asia Pacific Countries:
(tel) (65) 375 8100
(fax) (65) 836 0252
Email: tm_asia@agilent.com
Korea:
(tel) (82 2) 2004-5004
(fax) (82 2) 2004-5115

Latin America:
(tel) (305) 269 7500
(fax) (305) 269 7599

Taiwan:
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