Agilent
PNA Series
RF Network Analyzers

Configuration Guide

E8356A/E8801A/N3381A	**300 kHz to 3 GHz**
E8357A/E8802A/N3382A	**300 kHz to 6 GHz**
E8358A/E8803A/N3383A	**300 kHz to 9 GHz**

System configuration summary

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

Full S-parameter measurements

❒ **Agilent RF PNA Series network analyzer**

❒ **Test port cables, 50 ohms**

❒ **Calibration kit for applicable connector type**

This configuration guide describes standard configurations, options, accessories, upgrade kits and compatible peripherals for the RF PNA Series of vector network analyzers. This guide should be used with the Agilent RF PNA Series Technical Specifications for a complete description of these analyzers.

Agilent Technologies

Ordering guide for PNA Series

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

❏ = **Choose ONE and ONLY one**
  (Options are mutually exclusive)
❍ = **Choose any combination**

Step 1: Choose a frequency range and number of ports
(Must choose one and only one)
❏ 300 kHz – 3 GHz, 2-ports
❏ 300 kHz – 6 GHz, 2-ports
❏ 300 kHz – 9 GHz, 2-ports
❏ 300 kHz – 3 GHz, 3-ports, (N3381A) Skip to Step 3
❏ 300 kHz – 6 GHz, 3-ports, (N3382A) Skip to Step 3
❏ 300 kHz – 9 GHz, 3-ports, (N3383A) Skip to Step 3
❏ 45 MHz – 50 GHz, please refer to the
 Microwave PNA Series Configuration Guide
 (literature number 5988-3993EN)

Step 2: Choose the number of receivers for your 2-port unit
(Must choose one and only one)
❏ 3 measurement receivers
 • 3 GHz, 3 receivers, choose E8801A
 • 6 GHz, 3 receivers, choose E8802A
 • 9 GHz, 3 receivers, choose E8803A
❏ 4 measurement receivers, Skip to step 5
 • 3 GHz, 4 receivers, choose E8356A
 • 6 GHz, 4 receivers, choose E8357A
 • 9 GHz, 4 receivers, choose E8358A

Step 3: Would you like a high-stability time base?
❏ Yes (Option 1E5)
❏ No (Standard time base)

Step 4: Would you like extended power range
(-85 dBm to +10 dBm output power)?
❏ Yes (Option 1E1)
❏ No (Standard power range)

Step 5: Would you like a configurable test set?
❏ Yes (Option 015 with E8356/7/8A or Option 014
 with all others)
❏ No (Standard test set)

Step 6: Would you like time domain analysis?
❏ Yes (Option 010)
❏ No

Step 7: Would you like any accessories for your network analyzer?
❍ Rack mount kit for instrument with handles
 (Option 1CP)
❍ Rack mount kit for instrument without handles
 (Option 1CM)

Step 8: Would you like a commercial calibration certificate with test data?
❏ Yes (Option UK6)
❏ No

Step 9: Would you like an additional warranty for a total of 5 years?
❏ Yes (Option W50)
❏ No

Step 10: Would you like any additional documentation for your network analyzer?
English CD-ROM comes standard
❍ Service documentation, assembly level (Option 0BW)
❍ Service documentation, component level (Option 0BV)
❍ United States - English documentation set
 (Option ABA)
❍ Taiwan - Chinese localization (Option AB0)
❍ Korea - Korean localization (Option AB1)
❍ China - Chinese localization (Option AB2)
❍ Germany - German localization (Option ABD)
❍ Spain - Spanish localization (Option ABE)
❍ France - French localization (Option ABF)
❍ Japan - Japanese localization (Option ABJ)

Agilent RF PNA Series

Each PNA Series instrument is an integrated network analyzer with a built-in LCD display, hard and floppy disk drives, S-parameter test set and synthesized source. The analyzer has two or three 50-ohm Type-N (f) test ports. Included with each instrument is a mouse, keyboard, CD-ROM containing a copy of online help and programming documentation, and a 3-year return-to-Agilent service warranty.

❐ **E8356A** network analyzer, 300 kHz to 3 GHz, 2 port, 4 receiver
❐ **E8357A** network analyzer, 300 kHz to 6 GHz, 2 port, 4 receiver
❐ **E8358A** network analyzer, 300 kHz to 9 GHz, 2 port, 4 receiver
❐ **E8801A** network analyzer, 300 kHz to 3 GHz, 2 port, 3 receiver
❐ **E8802A** network analyzer, 300 kHz to 6 GHz, 2 port, 3 receiver
❐ **E8803A** network analyzer, 300 kHz to 9 GHz, 2 port, 3 receiver
❐ **N3381A** network analyzer, 300 kHz to 3 GHz, 3 port, 4 receiver
❐ **N3382A** network analyzer, 300 kHz to 6 GHz, 3 port, 4 receiver
❐ **N3383A** network analyzer, 300 kHz to 9 GHz, 3 port, 4 receiver

Options

❐ **Option 010** time-domain capability
For viewing reflection and transmission responses in time or distance domain.
❐ **Option 014** (except E8356/7/8A)
Adds front panel access to the source, the receivers and couplers. This provides the ability to improve measurement sensitivity for measuring low-level signals, or to add components and other peripheral instruments for a variety of measurement applications.
❐ **Option 015** configurable test set (E8356/7/8A only)
Adds front panel access to the source output and coupler input on both ports 1 and 2. Also, 35 dB step attenuators are added between the couplers and receivers. This capability provides the ability to improve measurement sensitivity for measuring low-level signals, or to add components and other peripheral instruments for a variety of measurement applications.
❐ **Option 1CM** rack mount kit
Adds a rack mount (part number 5063-9216) and rail kit (E3663AC) for use without handles.
❐ **Option 1CP** rack mount kit
Adds a rack mount (part number 5063-9236) and rail kit (E3663AC) for use with previously supplied handles.
❐ **Option 1E1** 70 dB step attenuator (Included as standard equipment on E8356/7/8A)
Adds a built-in 70 dB step attenuator to extend the output power range down to -85 dBm.
❐ **Option 1E5** high-stability time base (Included as standard equipment on E8356/7/8A)
Replaces standard time base reference with a higher stability unit.

Documentation
❐ **Option AVK** adds printed copy of Online Help and programming documentation (part number E8356-90028)
❐ **Option 0BW** adds printed copy of assembly level service manual

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

❐ **Option ABD** German manual (part number E8356-90032)
❐ **Option ABE** Spanish manual (part number E8356-90031)
❐ **Option ABF** French manual (part number E8356-90029)
❐ **Option ABJ** Japanese manual (part number E8356-90030)

Certification options
❐ **Option UK6** Commercial calibration certificate with test data

Service and support options
❐ **Option W01** Converts 3-year return-to-Agilent service warranty to 1-year on-site service (check with your local Agilent sales or service office for availability in your area)
❐ **Option W31** Converts 3-year return-to-Agilent service warranty to 3-year on-site service (check with your local Agilent sales or service office for availability in your area)
❐ **Option W32** 3-year return-to-Agilent commercial calibration agreement
❐ **Option W34** 3-year return-to-Agilent standards-compliant calibration agreement
❐ **Option W50** Extends return-to-Agilent service warranty to 5 years
❐ **Option W51** Converts 3-year return-to-Agilent service warranty to 5-year on-site service (check with your local Agilent sales or service office for availability in your area)
❐ **Option W52** 5-year return-to-Agilent commercial calibration agreement
❐ **Option W54** 5-year return-to-Agilent standards-compliant calibration agreement

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**

Accessories are available in these connector types: 50 ohm Type-N, 3.5 mm, 7 mm, and 7-16. Test port cables and a calibration kit should be added for a complete measurement system. A verification kit is used to verify corrected system performance.

Test-port cables

Test port cables are used to connect the network analyzer to the device under test.
- ❒ **N6314A** 50 ohm Type-N RF cable, 300 kHz to 9 GHz
  Includes one 610 mm (24 in) cable with male connectors (part number 8120-8862)
- ❒ **N6315A** 50 ohm Type-N RF cable, 300 kHz to 9 GHz
  Includes one 610 mm (24 in) cable with both female and male connectors (part number 8121-0027)

Calibration kits

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

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

Choose a calibration kit for each connector type to be used.
　　Economy, includes:
- open standards (male and female)
- short standards (male and female)
- fixed-termination standards (male and female)
- in-series adapters

　　Standard, includes the devices in the economy kit and adds:
- connector tools

　　Precision, includes the devices in the economy kit and adds:
- 50 ohm airline for TRL calibration
- TRL adapters
- connector tools

For devices with Type-N connectors

Mechanical calibration kits
- ❒ **85032F** economy: 30 kHz to 9 GHz. Includes:
  85032-60017 Type-N (m) fixed load
  85032-60018 Type-N (f) fixed load
  85032-60013 Type-N (m) open
  85032-60014 Type-N (f) open
  85032-60016 Type-N (m) short
  85032-60015 Type-N (f) short
  - ❒ **Option 100** adds:
    85032-60021 Type-N (f) to Type-N (f) adapter
  - ❒ **Option 200** adds:
    85032-60019 Type-N (m) to Type-N (m) adapter
  - ❒ **Option 300** adds:
    85032-60020 Type-N (m) to Type-N (f) adapter
  - ❒ **Option 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: 45 MHz 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 MOF** module with:
    85092-60005 Type-N (f) to Type-N (m) RF ECal module
  - ❒ **Option 00M** module with:
    85092-60006 Type-N (m) to Type-N (m) RF ECal module
  - ❒ **Option 00F** module with:
    85092-60007 Type-N (f) to Type-N (f) RF 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

For devices with 3.5 mm or SMA connectors

(see **Adapters** section for information about the Agilent 11878A 3.5 mm adapter kit)

Mechanical calibration kits

❏ **85033E** economy: 30 kHz to 9 GHz. Includes:
   85033-60016 3.5 mm (m) load
   85033-60017 3.5 mm (f) load
   85033-60018 3.5 mm (m) open
   85033-60019 3.5 mm (f) open
   85033-60020 3.5 mm (m) short
   85033-60021 3.5 mm (f) short
   8710-1761 torque wrench
   ❏ **Option 100** adds:
      85027-60005 3.5 mm (f) to 3.5 mm (f) adapter
   ❏ **Option 200** adds:
      85027-60007 3.5 mm (m) to 3.5 mm (m) adapter
   ❏ **Option 300** adds:
      85027-60006 3.5 mm (m) to 3.5 mm (f) adapter
   ❏ **Option 400** adds:
      1250-1744 3.5 mm (f) to Type- N 50 ohm (m) adapter
      1250-1743 3.5 mm (m) to Type- N 50 ohm (m) adapter
      1250-1745 3.5 mm (f) to Type- N 50 ohm (f) adapter
      1250-1750 3.5 mm (m) to Type- N 50 ohm (f) adapter
   ❏ **Option 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: 45 MHz 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: 45 MHz 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. Includes:
   85093-60005 3.5 mm (f) to 3.5 mm (m) RF ECal module
   ❏ **Option 00M** module with:
      85093-60006 3.5 mm (m) to 3.5 mm (m) RF ECal module
   ❏ **Option 00F** module with:
      85093-60007 3.5 mm (f) to 3.5 mm (f) RF 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

For devices with 7 mm connectors

(see A**dapters** section for information about Agilent 7 mm adapters)

Mechanical calibration kits

❏ **85031B** economy: 30 kHz to 6 GHz. Includes:
   00909-60008 7 mm coax termination
   85031-60001 7 mm open/short

❏ **85050C** precision TRL: 45 MHz to 18 GHz. Includes:
   00909-60008 7 mm coax termination
   85050-60003 7 mm to 7 mm airline
   85050-60005 7 mm to 7 mm TRL adapter
   85050-60006 7 mm fixed broadband load
   85050-80008 7 mm short
   85050-80009 7 mm short collet
   85050-80010 7 mm open

❏ **85050D** economy: 45 MHz to 18 GHz. Includes:
   85050-60006 7 mm fixed broadband load
   85050-80007 7 mm short
   85050-80010 7 mm open

Electronic calibration kits

❏ **85091C** RF ECal: 300 kHz to 9 GHz, 2 ports. Includes:
   85091-60003 7 mm to 7 mm RF ECal module

For devices with 7-16 connectors

(see **Adapters** section for information about the Agilent 11906B 7-16 to Type-N adapter kit)

Mechanical calibration kits

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

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

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

Electronic calibration kits

❒ **85098C** RF ECal: 300 kHz to 7.5 GHz, 2 ports. Includes:
    ❒ **Option MOF** module with:
        85098-60005 7-16 (m) to 7-16 (f) RF ECal module
    ❒ **Option 00F** module with:
        85098-60007 7-16 (f) to 7-16 (f) RF ECal module
    ❒ **Option 00M** module with:
        85098-60006 7-16 (m) to 7-16 (m) RF ECal module
    ❒ **Option 00A** adds:
        11906-80015 7-16 (m) to 7-16 (m) adapter
        11906-80016 7-16 (f) to 7-16 (f) adapter

Verification kits

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

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

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

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 Type-N 50 ohm (m) adapter
 1250-1743 3.5 mm (m) to Type-N 50 ohm (m) adapter
 1250-1745 3.5 mm (f) to Type-N 50 ohm (f) adapter
 1250-1750 3.5 mm (m) to Type-N 50 ohm (f) adapter
❏ **11524A** 7 mm to Type-N (f) adapter
❏ **11525A** 7 mm to Type-N (m) adapter
❏ **11906A** 7-16 to 7-16. Includes:
 7-16 (m) to 7-16 (m) adapter
 7-16 (f) to 7-16 (f) adapter
 7-16 (m) to 7-16 (f) adapter (two included)
❏ **11906B** 7-16 to Type-N. Includes:
 Type-N (m) to 7-16 (m) adapter
 Type-N (f) to 7-16 (f) adapter
 Type-N (f) to 7-16 (m) adapter
 Type-N (m) to 7-16 (f) adapter
❏ **11854A** 50 ohm BNC accessory kit. Includes:
 1250-0929 BNC (m) short
 1250-1473 BNC (m) to Type-N (m) adapter (two included)
 1250-1474 BNC (f) to Type-N (f) adapter (two included)
 1250-1476 BNC (f) to Type-N (m) adapter (two included)
 1250-1477 BNC (m) to Type-N (f) adapter (two included)

General accessories

USB periferals

❏ **N4688A** CD-ROM drive
 Provides an external read/write CD-ROM drive with a
 USB cable.
❏ **N4689A** USB hub
 Provides a USB hub for connecting additional USB
 peripherals.

Probe

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

Power meters and sensors

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

❏ **E4418B** single-channel power meter
❏ **E4419B** dual-channel power meter
❏ **8482A** power sensor, 100 kHz to 4.2 GHz, Type-N (m),
 100 mW
❏ **E4412A** CW power sensor, 10 MHz to 18 GHz, Type-N (m),
 200 mW

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1. RF connectors: 3.5 mm (f) on RF input and output; BNC (f) detector out.
    Type-N (f) on RF input and output for 8347A
2. A PNA Series analyzer is supplied with handles.

Amplifiers[1]

❏ **8347A** RF power amplifier, 100 kHz to 3 GHz, 25 dB gain, power out: +20 dBm

❏ **83006A** power amplifier, 10 MHz to 26.5 GHz, 20 dB gain, power out: +18dBm to 10 GHz or +16 dBm to 20 GHz or +14 dBm to 26.5 GHz

❏ **83017A** power amplifier, 50 MHz to 26.5 GHz, 25 dB gain, power out: +20 dBm to 20 GHz, or +15 dBm to 26.5 GHz

❏ **83018A** power amplifier, 2 to 26.5 GHz, 27 dB gain to 20 GHz or 23 dB to 26.5 GHz, power out: +24 dBm to 20 GHz or +21 dBm to 26.5 GHz

❏ **83020A** power amplifier, 2 to 26.5 GHz, 30 dB gain to 20 GHz or 27 dB to 26.5 GHz, power out: +30 dBm to 20 GHz or +26 dBm to 26.5 GHz

Couplers

❏ **87300B** coaxial coupler, 1 to 20 GHz, SMA (f), 10 dB coupling

❏ **87300C** coaxial coupler, 1 to 26.5 GHz, 3.5 mm (f), 10 dB coupling

Equipment racks and case

❏ **5063-9223** rack mount flange kit, for use with handles; includes handles[2]

❏ **5063-9216** rack mount kit, for use without handles; may be ordered as option 1CM

❏ **5063-9236** rack mount kit, for use with previously supplied handles; may be ordered as option 1CP

❏ **E3663AC** rail kit, included with option 1CM and 1CP.

❏ **9211-2658** transit case

Material measurement

❏ **85070D** High-temperature dielectric probe kit
The 85070D allow the measurement of the dielectric properties of materials quickly and conveniently. Measurements made with this probe are nondestructive and require no sample preparation. The dielectric probe is well suited for measurements of liquid, semisolid and flat solid materials. Measurement results can be viewed in a variety of formats (er', e r ", tan d or Cole-Cole). The supplied software can be run in the PNA analyzer or on a PC.

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

Filter tuning

❏ **N4261A** N4261A filter tuning software
This software will significantly reduce filter tuning training times and increase manufacturing throughput. Through the graphical user interface, visual training indicators show when the individual resonators and couplers in a filter have been tuned within specifications. The indicators also show the user when and how to tune each filter element, reducing the number of times each element has to be re-tuned before the filter meets specifications.

Applications

Peripherals

The following peripherals may be used with all RF PNAs. Other peripherals not listed here may also be compatible with these instruments.

CD-ROM drive
❏ USB-compatible CD-ROM drive. This can be ordered as Option AM8

Monitors
❏ VGA-compatible monitor

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

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

Upgrade kits

Upgrade kits for the E8356/7/8A, E8801/2/3A, and N3381/2/3A

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

❏ **Option 006** for E8356A, E8801A or N3381A only.
Adds 6 GHz operation. Includes installation at an Agilent service center. Instrument calibration is required for an additional fee.
❏ **Option 009** for E8356A, E8357A E8801A, E8802A, N3381A or N3382A only.
Adds 9 GHz operation. Includes installation at an Agilent service center. Instrument calibration is required for an additional fee.
❏ **Option 010** time-domain upgrade kit (part number E8356-60101) The serial number of the PNA to be retrofitted must be specified when ordering this kit. Installation is not included.
❏ **Option 015** for E8356A, E8357A or E8358A only.
Configurable test set upgrade kit (part number E8356-60102). Includes installation at an Agilent service center.
❏ **Option AM8** CD RW drive
Includes an external read/write CD drive with a USB cable
❏ **Option B30** USB hub
Includes a 4-port USB hub for connecting additional USB peripherals
❏ **Option 098** CPU board upgrade for E8356/7/8A built before November, 2001.
Includes installation at an Agilent service center
❏ **Option 099** firmware upgrade (part number E8356-60103) Provides the latest revision of firmware for the PNA Series on CD-ROM. Firmware is user-installable. Installation requires USB CD-ROM drive or external computer connected via LAN. The latest firmware is also available from our web site. Visit our web page at **www.agilent.com/find/pna**
❏ **Option 1E1** for E8801/2/3A and N3381/2/3A only.
Adds a built-in step attenuator to extend the output power range down to -85 dBm.
❏ **Option 1E5** for E8801/2/3A and N3381/2/3A only.
Replaces standard frequency reference with a higher stability unit.

Contact your local Agilent sales or service office for further information.

Additional services

The ease-of-use and performance of the PNA Series vector network analyzers is only a small part of what is available from Agilent. Contact your local Agilent Sales or Support Desk regarding additional service and support products available:

- Calibration services
- Repair services
- Technical consulting
- Process consulting
- Education and training

❒ **W50**   5-year extended repair coverage
Provides warranty repair coverage with return-to-Agilent logistics for an additional 2 years over the standard 3-year warranty that comes with the hardware.

❒ **W01**   1-year on-site warranty conversion
Upfront option that converts 3-year return-to-Agilent service warranty to one year on-site. Limited coverage area. Contact Agilent.

❒ **W31**   3-year on-site warranty conversion
Upfront option that converts 3-year return-to-Agilent service warranty to 3 years on-site. Limited coverage area. Contact Agilent.

❒ **W51**   5-year on-site warranty conversion
Upfront option that converts 3-year return-to-Agilent service warranty to 5 years on-site. Limited coverage area. Contact Agilent.

❒ **W32**   3-year calibration service
Upfront option that provides (return-to-Agilent) standard calibrations based on manufacturer calibration cycles for the hardware over 3-year period.

❒ **W34**   3-year accredited calibration service
Upfront option that provides (return-to-Agilent) accredited calibrations (premium documentation and adjustment recording) based on manufacturer calibration cycles for the hardware over 3-year period.

❒ **W52**   5-year calibration service
Upfront option that provides (return-to-Agilent) standard calibrations based on manufacturer calibration cycles for the hardware over 5-year period.

❒ **W54**   5-year accredited calibration service
Upfront option that provides (return-to-Agilent) accredited calibrations (premium documentation and adjustment recording) based on manufacturer calibration cycles for the hardware over 5-year period.

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

Literature and information

PNA Series Brochure
　　literature number 5968-8472E
RF PNA Series Technical Specifications
　　literature number 5980-1236E

Application and product notes

Application Development with the Agilent PNA Series of Network Analyzers
　　literature number 5980-2666ENUS
Understanding and Improving Network Analyzer Dynamic Range Application Note 1363-1
　　literature number 5980-2778EN
The "Need for Speed" in Component Manufacturing Test
　　literature number 5980-2783EN
Generate Component Data Sheets with Agilent's BenchLinkXL
　　literature number 5980-2781EN
Connectivity Advances in a LAN-enabled Instrument
　　literature number 5980-2782EN
De-embedding and Embedding S-parameter Networks Using the PNA Series Network Analyzer Application Note 1364-1
　　literature number 5980-2784EN
Advanced Filter Tuning Using Time Domain Application Note 1287-10
　　literature number 5980-2785EN
Understanding the Fundamental Principles of Vector Network Analysis Application Note 1287-1
　　literature number 5965-7707E
Exploring the Architectures of Network Analyzers Application Note 1287-2
　　literature number 5965-7708E
Applying Error Correction to Network Analyzer Measurements Application Note 1287-3
　　literature number 5965-7709E
Network Analyzer Measurements: Filter and Amplifier Examples Application Note 1287-4
　　literature number 5965-7710E
Improving Throughput in Network Analyzer Applications Application Note 1287-5
　　literature number 5966-3317E
Using a Network Analyzer to Characterize High-Power Components Application Note 1287-6
　　literature number 5966-3319E
Simplified Filter Tuning Using Time-Domain Analysis Application Note 1287-8
　　literature number 5968-5328E
In-Fixture Measurements Using Vector Network Analyzers Application Note 1287-9
　　literature number 5968-5329E
10 Hints for Making Better Network Analyzer Measurements Application Note 1291-1
　　literature number 5965-8166E

Key web resources

Visit our component manufacturer industry area at:
www.agilent.com/find/component_test

Visit the PNA Series home page at:
www.agilent.com/find/pna

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

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can help you choose the right Agilent products for
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