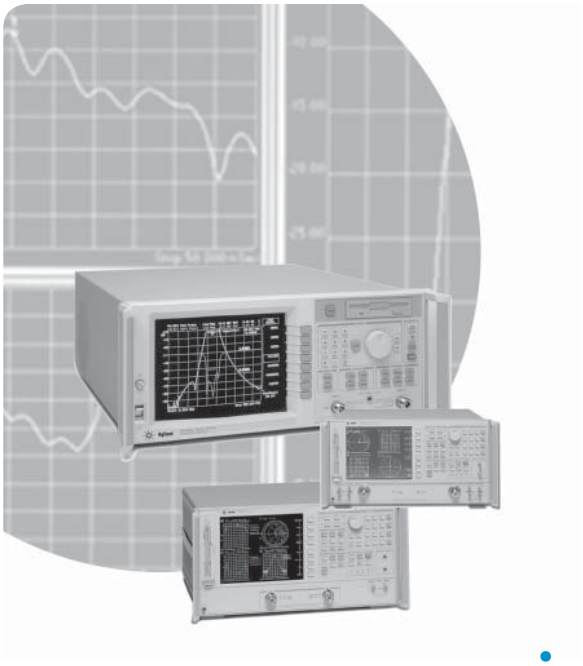


Agilent
RF and Microwave Network Analyzer Replacement Guide

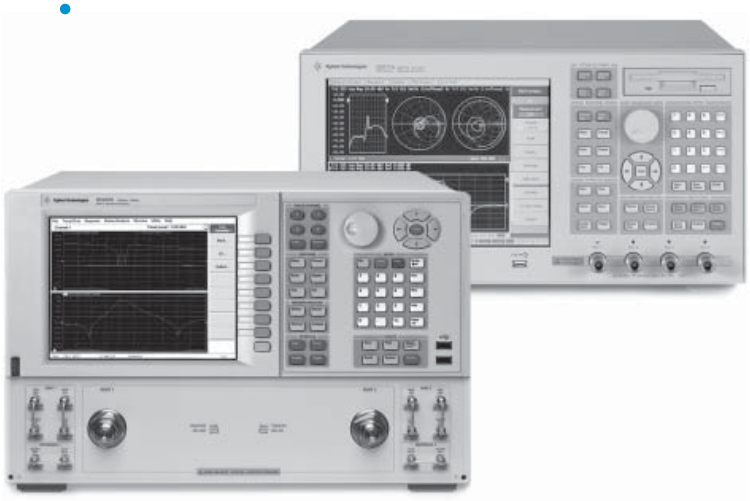
Migrating from previous generation network analyzer platforms to realize the innovative performance of the modern ENA and PNA Series

Performance

Speed

Flexibility

Ease-of-use



Agilent Technologies

Agilent's previous generation & modern platform comparisons

RF network analyzers

Specification and feature comparisons

	8712 series	ENA-L series	8753 series	ENA series
Model number	8712ES/ET 8714ES/ET  *(Discontinued July 1, 2004)*	E5061A E5062A 	8753ES/ET  *(Discontinued Nov. 1, 2005)*	E5070B E5071B 
Frequency range	8712ES/ET: 300 kHz to 1.3 GHz 8714ES/ET: 300 kHz to 3 GHz	E5061A: 300 kHz to 1.5 GHz E5062A: 300 kHz to 3 GHz	30 kHz to 3 GHz (ES) 30 kHz to 6 GHz (ES with Opt. 006) 300 kHz to 3 GHz (ET) 300 kHz to 6 GHz (ET with Opt. 006)	E5070B: 300 kHz to 3 GHz E5071B: 300 kHz to 8.5 GHz
Number of ports	2	2	2	2, 3 or 4
Balanced measurements	no	no	no	yes
System impedance	50 or 75 ohms	50 ohms or 75 ohms	50 ohms 75 ohms (ES model only)	50 ohms
System dynamic range	8712ET: 115 dB 8714ET: 114 dB 8712ES: 104 dB 8714ET: 101 dB	115 dB	110 dB (to 3 GHz) 105 dB (to 6 GHz)	120 dB (to 1.5 GHz)
Power at test port	8712ES: –60 to +13 dBm 8712ET: 0 to +16 dBm –60 to +15 dBm (atten. Opt. 1E1) 8714ES: –60 to +9 dBm 8714ET: –5 to +11 dBm –60 to +10 dBm (atten. Opt. 1E1) (75 ohm option reduces max output by 3 dB)	–5 to +10 dBm –45 to +10 dBm (Option 1E1, 250 or 275)	ES: –85 dBm to +10 dBm –85 dBm to +8 dBm (Opt. 075 or 014) ET: –20 dBm to +5 dBm –85 dBm to +10 dBm (Opt. 004)	–50 dBm to +10 dBm
Power sweep range	8712ES/ET: 13 dB 8714ES/ET: 15 dB	15 dB	25 dB	25 dB
Sweep type	linear, power	linear, log, segment[2], power, CW	linear, log, segment[2], power, CW	linear, log, segment[2], power, CW
Error correction				
Full 2-port	yes (ES model only)	yes (S-parameter test sets only)	yes (ES model only)	yes
Full 3 or 4-port	no	no	no	yes
TRL	no	no	TRL* only (ES model only)	yes
Adapter-removal	no	no	yes (ES model only)	yes
ECal support	no	yes	yes	yes
Measurement channels	2	4	2	16
Maximum number of data traces	2	16	4	81
Windows-OS	no	yes (closed)[3]	no	yes (closed)[3]
Internal automation	IBASIC	VBA, SCPI, COM	test sequencing	VBA, SCPI, COM
I/O	LAN, GPIB, VGA, parallel, handler, mini-DIN	LAN, USB, GPIB, VGA, parallel, handler, mini-DIN	GPIB, VGA, parallel, RS-232, mini-DIN	LAN, USB, GPIB, VGA, parallel, RS-232, mini-DIN
ADS linkage	no	no	Software driver supported	File format supported
Built-in source attenuator	yes (ES: standard, ET: option)	yes	yes	yes (with option)
DC bias input	no	no	yes	no
Time domain	no	yes [4]	yes (with Opt. 010)	yes (with Opt. 010)
Corrected specifications[1]	(enhanced response cal, type N, 50 ohms, ES model) Dir 47 to 50 dB SM 36 to 42 dB LM 47 to 50 dB Refl trk ±0.02 dB Trans trk ± 0.04 to 0.055 dB	(type-N, 50 ohms, 2-port cal) Dir 46 to 49 dB SM 40 to 41 dB LM 46 to 49 dB Refl trk ±0.011 to ±0.021 dB Trans trk ± 0.015 to ±0.018 dB	(2-port cal, type N, 50 ohms, ES model) Dir 47 to 50 dB SM 36 to 49 dB LM 47 to 50 dB Refl trk ± 0.005 to 0.02 dB Trans trk ± 0.014 to 0.026 dB	(2-port cal, type-N, 50 ohms) Dir 47 to 52 dB SM 36 to 45 dB LM 39 to 47 dB Refl trk ± 0.040 to 0.070 dB Trans trk ± 0.039 to 0.136 dB
Trace noise	0.01 dB rms (narrowband, 250 Hz BW)	0.005 dB rms @ 3 kHz IFBW ≥ 1 MHz	0.006 dB rms (30 kHz to 3 GHz) (3 kHz BW)	0.001 dB rms (3 MHz to 4.25 GHz) (3 kHz BW)
Measurement speed[1] **(1 sweep, 201 points)**	72 ms (1-port cal, 6.5 kHz BW) 119 ms (1-port cal, 4.0 kHz BW) 240 ms (2-port cal, 4.0 kHz BW, ES model only)	35 ms (2-port cal, 30 kHz BW)	70 ms (1-port cal) 139 ms (2-port cal, ES model only) (6 kHz BW)	8 ms (2-port cal, 100 kHz BW)

1. Includes system retrace time, but does not include source bandswitch times. Refer to product data sheets for detailed measurement conditions.
2. Segment includes sweep types that are known as list and fast swept list.
3. The ENA series does not allow you to access the Window desktop operating system.
4. Time domain gating is not supported.

Microwave network analyzers

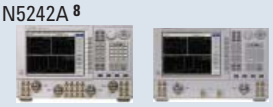
Specification and feature comparisons

	PNA (RF) series	PNA-L series	8720 series	PNA series
Model numbers	E8356/7/8A E8801/2/3A N3381/2/3A ***(Discontinued May 1, 2005)*** 	N5230C 	8719ES/ET 8720ES/ET 8722ES/ET  ***(Discontinued May 1, 2005)***	E8362C E8363C E8364C E8361C 
Frequency range	E8356A/E8801A/N3381A: 300 kHz to 3 GHz E8357A/E8802A/N3382A: 300 kHz to 6 GHz E8358A/E8803A/N3383A: 300 kHz to 9 GHz	300 kHz to 6 GHz (Option 020, 025) 300 kHz to 13.5 GHz (Option 120, 125) 300 kHz to 20 GHz (Option 240, 245) 10 MHz to 20 GHz (Option 220, 225) 10 MHz to 40 GHz (Option 420, 425) 10 MHz to 50 GHz (Option 520, 525)	8719ES/ET: 50 MHz to 13.5 GHz 8720ES/ET: 50 MHz to 20 GHz 8722ES/ET: 50 MHz to 40 GHz	E8362C 10 MHz to 20 GHz E8363C 10 MHz to 40 GHz E8364C 10 MHz to 50 GHz E8361C 10 MHz to 67 GHz
Number of ports [1]	2 or 3	2/4 [1]	2	2
Balanced measurements [2]	no	no yes [2] (Option 240, 245)	no	no
System impedance	50 ohms	50 ohms	50 ohms	50 ohms
System dynamic range	123 dB (to 1 MHz) 128 dB (to 3 GHz) 118 dB (to 6 GHz) 113 dB (to 9 GHz) (Direct receiver access increases dynamic range 15 dB in each frequency range)	108 dB (Option 220, 225) depends on configuration	8719/20ET: 102 to 104 dB 8719/20ES: 77 to 100 dB 8722ET: 84 to 97 dB 8722ES: 67 to 93 dB	94 to 125 dB (max. 136 dB with direct receiver access)
Power at test port	–85 dBm to +10 dBm Available with E8356/7/8A (Opt. UNL)	–27 to +3 dBm (Option 220, 225) depends on configuration (60 dB source attenuator option expands min. power to –82 dBm at 10 GHz) 10 dBm at 6 GHz (Option 020)	8719/20ET: –10 to +10 dBm 8719/20ES: –70 to +5 dBm 8722ET: –15 to 0 dBm (to 20 GHz) –15 to –5 dBm (20 GHz to 40 GHz) (Opt. 004 expands min. power by 55 dB) 8722ES: –75 to –5 dBm (to 20 GHz) –75 to –10 dBm (20 GHz to 40 GHz) (Opt. 007 adds +5 dBm to min/max power level)	–25 to +5 dBm at 10 GHz (60 dB source attenuator option expands min. power to –82 dBm at 10 GHz)
Power sweep range	20 to 25 dB	25 dB/37 dB (Option 020)	8719/20: 20 dB 8722: 15 dB	31 dB
Sweep type	linear, log, segment[3], power, CW	linear, log, power, CW, segment[3]	linear, log, power, CW, segment	linear, log, CW, power, segment
Error correction				
Full 2-port	yes	yes	yes (ES model only)	yes
TRL	yes	yes (except 4-port model)	optional (TRL* standard, ES model only)	yes
Adapter-removal	yes[4]	yes	yes (ES model only)	yes
ECal support	yes	yes	yes (ES model only)	yes
Measurement channels	32[4]	32	2	32
Maximum number of data traces	64	64	4	64
Windows-OS	Windows 2000[5]	Windows XP[5]	no	Windows XP[5]
Internal automation	SCPI, COM/DCOM[6]	SCPI, COM/DCOM[6]	test sequencing	SCPI, COM/DCOM
I/O	LAN, USB[7], GPIB, VGA, parallel, handler, RS-232	LAN, USB [7], GPIB, VGA, handler parallel, RS-232	GPIB, VGA, parallel, RS-232, mini-DIN	LAN, USB [7], GPIB, VGA, parallel, RS-232
ADS linkage	Software driver supported	Software driver supported	yes	Software driver supported
Built-in source attenuator	yes	yes (with Option x25)	yes (standard for ES model, Opt. 004 for ET model)	yes (with Option UNL)
DC bias input	yes	no	yes (ES model only)	yes (with Option UNL)
Time domain	yes (with Opt. 010)	yes (with Opt. 010)	yes (with Option 010)	yes (with Option 010)
Corrected [8]	(2-port cal, type N, 50 ohms, E835xA model) Dir 47 to 54 dB SM 36 to 45 dB LM 39 to 47 dB Refl trk ±0.040 to ±0.070 dB Trans trk ±0.039 to ±0.135 dB	(2-port cal, 3.5 mm, 20 GHz models only) Dir 44 to 48 SM 31 to 40 LM 44 to 48 Refl trk ±.003 to .006 dB Trans trk ±.010 to .104 dB	(2-port cal, 3.5 mm) Dir 44 to 48 dB SM 31 to 40 dB LM 44 to 48 dB (ES model) LM 15 to 22 dB (ET model) Refl trk ± 0.006 to 0.008 dB Trans trk ± 0.017 to 0.099 dB	(2-port cal, 2.4 mm) Dir 36 to 42 dB SM 31 to 41 dB LM 35 to 42 dB Refl trk ± 0.001 to 0.027 dB Trans trk ± 0.014 to 0.200 dB
Trace noise	0.002 dB rms (1 kHz BW)	0.006 dB rms, 1 kHz BW (at 20 GHz) 0.004 dB rms, 100 kHz BW (at 6 GHz)	0.03 dB rms (to 13.5 GHz) (3 kHz BW)	0.006 dB rms (1 kHz BW)
Measurement speed (1 sweep, 201 points)	29 ms (2-port cal) (35 kHz BW) (6 kHz BW)	9 ms (250 kHz BW) 6 ms (600 kHz BW)	65 ms (1-port cal) 158 ms (2-port cal, ES model only)	12 ms (35 kHz BW)

1. 4-ports are available with the 20 GHz PNA-L model.
2. Only on 4-port model.
3. Segment includes sweep types that are known as list and fast swept list.
4. For E8356/7/8A, these functions are available with firmware revision A.02.50 or later.
5. Open Windows environment. You can load any software on the instrument, such as Visual Basic.
6. DCOM enables you to have a seamless programming environment between the instrument and a PC.
7. Keyboard and mouse can be used with USB ports.
8. Dir = directivity; SM = source match; LM = load match; Refl trk= reflection tracking; Trans trk = transmission tracking

Microwave network analyzers

Specification and feature comparisons

	8510 series	PNA series	PNA-X series	PNA mm-wave series
Model numbers	8510 systems  *(Discontinued Nov. 1, 2004)*	E8362B/C E8363B/C E8364B/C E8361A/C 	N5242A [8] 	N5250C 
Frequency range	45 MHz to 110 GHz, depends on configuration	E8362B/C 10 MHz to 20 GHz E8363B/C 10 MHz to 40 GHz E8364B/C 10 MHz to 50 GHz E8361A/C [1] 10 MHz to 67 GHz	N5242A, 10 MHz to 26.5 GHz Opt 200, 2 ports, single source. Opt 400, 4 ports, dual source. Opt 423, 4 ports, internal combiner and mechanical switches. Opt 029, noise figure measurements. Opt 083, FCA. Opt 084, Embedded LO. Opt H08, Pulsed RF. Opt 510, Nonlinear Component Characterization Opt 514, Nonlinear X-parameters. Opt 518, Nonlinear Pulse Envelope Domain	10 MHz to 110 GHz, and extendable to 500 GHz
Number of ports [2]	2	2	2/4	2
Balanced measurements [2]	no	no	yes, True Stimulua Mode with Opt 400, 419 or 429	no
System impedance	50 ohms	50 ohms	50 ohms	50 ohms
System dynamic range (at 20 GHz)	60 to 93 dB, depends on configuration	94 to 125 dB (max. 136 dB with direct receiver access)	124 to 139 dB depends on options and frequency range	111 dB
Power at test port (at 20 GHz)	depends on system configuration	–25 to +5 dBm at 10 GHz (60 dB source attenuator option expands min. power to –82 dBm at 10 GHz)	5 to 20 dBm and depends on options frequency range	–5 dBm
Power sweep range	20 dB	31 dB	30 to 47 dB depending on options and frequency range	20 dB [3]
Sweep type	linear, power, CW, segment	linear, log, CW, power, segment	linear, log, power, CW, segment	linear, log, CW, power, segment
Error correction				
Full 2-port	yes	yes	yes	yes
TRL	yes	yes	yes (except 4-port)	yes
Adapter-removal	yes	yes	yes	yes
ECal support	yes	yes	yes	yes [3]
Measurement channels	depends on system configuration	32	32	32
Maximum number of data traces	4	64	64	64
Windows-OS	no	yes [5]	Windows XP [5]	yes [5]
Internal automation	no	SCPI, COM/DCOM	SCPI, COM/DCOM	SCPI, COM/DCOM
I/O	GPIB, VGA, parallel, RS-232	LAN, USB [6], GPIB, VGA, parallel, RS-232	LAN,USB,GPIB, VGA, handler, parallel, RS232	LAN, USB [6], GPIB, VGA, parallel, RS-232
ADS linkage	yes	Software driver supported	Software driver supported	Software driver supported
Built-in source attenuator	depends on system configuration	yes (with Option UNL)	yes, with Opt 219 or 419.	yes
DC bias input	yes	yes (with Option UNL)	yes, with Opt 219 or 419.	yes, with Opt 017 or 018
Time domain	yes (with Option 010)	yes (with Option 010)	yes, with Opt 010	yes (with Option 010)
Corrected [7]	(8510E, 2-port cal, 3.5 mm) Dir 44 to 48 dB SM 31 to 40 dB LM 44 to 48 dB Refl trk ± 0.003 to 0.006 dB Trans trk ± 0.017 to 0.084 dB	(2-port cal, 2.4 mm) Dir 36 to 42 dB SM 31 to 41 dB LM 35 to 42 dB Refl trk ± 0.001 to 0.027 dB Trans trk ± 0.014 to 0.200 dB	Dir 44 to 48 dB SM 31 to 40 dB LM 44 to 48 dB Refl trk ±0.003 to 0.006 dB Trans trk ±0.017 to 0.119 dB	– –
Trace noise	depends on system configuration	0.006 dB rms (1 kHz BW)	0.005 dB rms 1 KHz BW (at 26.5 GHz) 0.002 dB rms 1 KHz BW (at 13.5 GHz)	– –
Measurement speed [4] **(1 sweep, 201 points)**	470 ms (2-port cal) (10 kHz BW)	12 ms (35 kHz BW)	6 ms (600 KHz BW, Start/Stop = 9 - 10 GHz, uncorrected) 36 ms (10 KHz BW, Start/Stop = 9 - 10 GHz, uncorrected)	– –

1. Specified to 67 GHz, with operation to 70 GHz.
2. 4-ports available with the 20 GHz PNA-L and 26.5 GHz PNA-X models.
3. Functions up to 67 GHz.
4. Includes system retrace time, but does not include source bandswitch times. The speed of a one-port calibrated measurement is equal to that of enhanced-response and uncorrected.
5. Open Windows environment. You can load any software on the instrument, such as Visual Basic.
6. Keyboard and mouse can be attached using USB ports.
7. Dir = directivity; SM = source match; LM = load match; Refl trk= reflection tracking; Trans trk = transmission tracking
8. For more information on the PNA-X refer to **www.agilent.com/find/pnax**

ENA and PNA Network Analyzer Descriptions

ENA-L Series
www.agilent.com/find/ena

The Agilent ENA-L Series network analyzers provide reliable basic S-parameter measurements with easy-to-use features and solid performance based on the latest in modern technologies. The Transmission/Reflection (T/R) test set options offer lower cost solutions, while the S-Parameter test set options provide more accurate measurements with full two-port calibration. 75-ohm options, as well as 50-ohm, are available for CATV component measurements.

ENA Series
www.agilent.com/find/ena

The Agilent ENA Series network analyzers offer fast and accurate measurements for RF components. Built-in 2, 3, and 4 test ports provide simultaneous measurement of all signal paths for components with up to four ports. The ENA Series provides built-in balanced measurement capability, which enables you to test balanced components such as SAW filters and differential amplifiers. It provides mixed-mode S-parameter measurements with a fixture simulator function.

PNA-L Series
www.agilent.com/find/pnal

The Agilent PNA-L series network analyzers are designed for your general-purpose network analysis needs and priced for your budget. PNA-L provides efficiency and flexibility in both manufacturing and R&D applications for industries ranging from wireless LAN components to aerospace and defense.

PNA Series
www.agilent.com/find/pna

The Agilent PNA Series network analyzers offer an unsurpassed combination of speed and precision to meet the challenges of general-purpose, high-performance and millimeter-wave component testing from 300 kHz to 110 GHz with frequency extension available up to 325 GHz. Frequency-offset capability for the PNA Series offers industry-leading accuracy and ease-of-use for non-linear measurements, including mixer and converter test, as well as amplifier IMD and harmonic measurement capability.

PNA-X
www.agilent.com/find/pnax

The Agilent PNA-X is an extension of the PNA Series family. This premier microwave network analyzer offers a unique single-connection multiple measurement (SCMM) solution for active device characterization and component measurements. The flexibility and highly integrated configurable nature of the PNA-X can easily perform amplifier noise figure, intermodulation distortion, hot-S22, traditional S-parameter, non-linear device characterization, non-linear pulse envelope domain, X-parameter extraction and pulsed-S-parameter measurements.

Frequency and Application Guide

Max Freq.	Discontinued and "to be" discontinued products	Suggested Replacement Family	T/R test set or 75 Ω	Multiport or Balanced/ Differential	Frequency-offset mode: Mixers & harmonics	Vector & Scalar Mixer Cal	Configurable test set	Pulsed RF or Antenna test
1.5 GHz	8712ET/ES	ENA-L Series	ENA-L E5061A					
3 GHz	E8356A E8801A N3381A 8753ET/ES 8714ET/ES	ENA-L or ENA Series	ENA-L E5062A	ENA (E5070B, Opt. 314 or 414)	ENA (E5070B, Opt. 008)	ENA (E5070B, Opt. 008)		
6 GHz	E8357A E8802A N3382A 8753ET/ES (Opt. 006)	ENA or PNA-L Series		ENA (E5071B, Opt. 314 or 414)	ENA (E5071B, Opt. 008) **PNA-L (N5230C, Opt. 020 or 025 & 080)**	ENA (E5071B, Opt. 008)	**PNA-L (N5230C, Opt. 025)**	**PNA-L (N5230C, Opt. 025)**
9 GHz	E8358A E8803A N3383A	PNA-L Series			**PNA-L (N5230C, Opt. 120 or 125 & 080)**		**PNA-L, (N5230C Opt. 125)**	**PNA-L (N5230C, Opt. 125)**
13.5 GHz	8719ES 8719ET	PNA-L Series			**PNA-L (N5230C, Opt. 120 or 125 & 080)**		**PNA-L (N5230C, Opt. 125)**	**PNA-L (N5230C, Opt. 125)**
20 GHz 4-port	8720ES with test set	PNA-L Series		**PNA-L (N5230C, Opt. 240 or 245)**	**PNA-L (N5230C, Opt. 240 or 245 & 080)**		**PNA-L (N5230C, Opt. 245)**	
26.5 GHz 4-port	8720ES with test set	PNA-X		**PNA-X (N5242A, Opt. 400, 427)**	**PNA-X (N5242A, Opt. 219, 224)**	**PNA-X (N5242A, Opt. 083 FCA, 084 Embedded LO)**	**PNA-X (N5242A, Opt. 400)**	**PNA-X (N5242A,Opt. H08, 020, 021, 022, 025)**
20/ 40 GHz	8720/22ES 8720/22ET	PNA-L or PNA Series			**PNA-L (N5230C, Opts. 220 or 225, 420 or 425, 520 or 525 & 080)**	**PNA (E836xC, Opt. 014 & UNL & 080 & 081 & 083)**	**PNA-L (N5230C, Opt. 225 or 425 or 525)** **PNA E836xC (Opt. 014)**	**PNA (E836xC, Opt. 014 & UNL & 080 & 081 & H11 & H08)**

* **Bold text** = PNA & PNA-L Series

Network Analyzer Code Compatibility

The following table describes various options available to Agilent network analyzer users when transitioning from 871x, 8753, 8720, 8510 or RF PNA to newer network analyzers such as ENA-L, ENA, and PNA series.

	PNA-L (N5230A) PNA (E836x) PNA-X (N5242A)	ENA-L (E506x) ENA (E507x)
RF PNA (E835xA, E880xA, N338xA)	No conversion necessary same platform and software. (See PNA Code Compatibility below)	Agilent Startup, productivity & application consulting services: **www.agilent.com/find/consulting**
8753 series	Code Conversion Assistant & Code Translator	Code Conversion Assistant
8719/20/22x	Code Conversion Assistant & Code Translator	Code Conversion Assistant
8510 series	Code Conversion Assistant & Code Translator	Transition not applicable.
8711/12/13/14	Transition not applicable.	Comparison Table and Code Conversion Tips

All Agilent code-compatibility software applications and documentation are offered free of charge.

PNA Code Compatibility

Code Compatibility between PNA RF and PNA-L or PNA MW Network Analyzers
Agilent will be discontinuing the following RF PNA models May 1, 2005: E8356A, E8357A, E8358A, E8801A, E8802A, E8803A, N3381A, N3382A, N3383A. If you use one of these models, in terms of programming and software, the easiest and most productive network analyzers for you to transition to are the 6 & 13.5 GHz PNA-L products. These network analyzers share a firmware set with the discontinued product and are therefore code-compatible.

8753/8720/8510 to PNA-L or PNA Network Commitment to Code Emulation

You have made significant investments in the development and qualification of your test codes for existing products such as the 8510, 8719/20/22 and 8753 families. With our built-in code emulation features in the PNA and ENA families, it is not necessary to rewrite these codes, we're breaking down the barriers so you can take advantage of the new platform capabilities. The Code Translator (CxL) is a utility that maps commands real-time. CxL maps your 8753/8720 and 8510 commands to equivalent PNA commands. CxL is a free software that runs on the PNA.

8753 or 872x to ENA/ ENA-L Code Conversion Assistant Editor

The 8753-to-ENA/ENA-L code conversion assistant editor helps to convert 8753 GPIB commands. This software consists of a text editor (EmEditor) and plug-in software, which works on a PC and helps to edit programs in text file format. The editor is also useful for 872x analyzers as most of the 872x commands are the same as 8753's.

For more detailed information regarding code compatibility, conversion tips, and to download code utilities visit: **www.agilent.com/find/nadisco**
Or contact your local Agilent Technologies sales office.

Optional Electronic Calibration (ECal) Modules Drastically Simply your Calibrations

- Control ECal directly from the PNA or ENA network analyzer
- 300 kHz to 26.5 GHz modules
- 10 MHz to 67 GHz modules
- Nine connector types available
- Ideal calibration technique for manufacturing
- Mixed-connectors available (Type-N 50 ohm, 3.5 mm and 7-16)

Fast, accurate, repeatable calibration; up 30 times faster than mechanical calibration

Electronic calibration (ECal) is a precision, single-connection, one-, two-, three-, or four-port calibration technique for your vector network analyzer. ECal modules use fully traceable and verifiable electronic impedance standards. The modules are state-of-the-art, solid-state devices with programmable and highly repeatable impedance states. ECal modules use transfer standards that provide consistent calibrations and eliminate operator errors while bringing convenience and simplicity to your calibration routine. Consistent calibrations provide consistent measurements.

ECal replaces the traditional calibration technique, which uses mechanical standards. With mechanical standards you are required to make numerous connections to the test ports for a single calibration. These traditional calibrations require intensive operator interaction, which is prone to error. With ECal, a full one- to four-port calibration can be accomplished with a single connection to the ECal module with minimal operator interaction. This results in faster and more repeatable calibrations.

Suggested ECal and network analyzer/firmware compatibility[1]

Agilent VNA model number	ECal module model number	85097B Interface kit required
8753E/ES/ET[2]	85090 Series	Y
RF PNA Series[3, 4]	85090 Series, N4431B	N
8719D/ES/ET[2, 5]	N4690 Series	Y
8720D/ES/ET[2, 5]	N4690 Series	Y
8722D/ES/ET[2, 5]	N4690 Series	Y
ENA Series[6]	N4431B, 85090 Series	N
ENA-L Series[7]	N4431B, 85090 Series	N
PNA Series[8]	N4690 Series	N
PNA-L Series[9]	N4431B, N4690 Series	N
PNA-X Series[10]	N4691B	N

Mixed-connector options are available for the 85092C, 85093C, 85098C, and N4431B. The available connectors are Type-N 50 ohms, 3.5mm, and 7-16.

1. For complete compatibility refer to the *ECal Reference Guide* (publication N4693-90001)
2. Analyzer firmware control available with firmware rev. 7.68.
3. RF PNA series consists of the E8356/7/8, E8801/2/3 and N3381/2/3.
4. N4431A supports N3381/2/3 PNAs with firmware revision 2.5 or higher.
5. N4690 series supports 8719, 8720, and 8722 network analyzers with firmware revision 7.74 or higher.
6. ENA series consists of E5070/1.
7. ENA-L series consists of E5061/2.
8. PNA series consists of E8361/2/3/4.
9. PNA-L series consists of N5230C.
10. PNA-X series consists of N5242A.

Web Resources

Visit our Web sites for additional product information and literature.

Migration to new models & code compatibility:
www.agilent.com/find/nadisco

Startup, productivity & application consulting services:
www.agilent.com/find/consulting

Microwave and RF network analyzers:
www.agilent.com/find/na

Electronic calibration (ECal):
www.agilent.com/find/ecal

Test and measurement accessories:
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