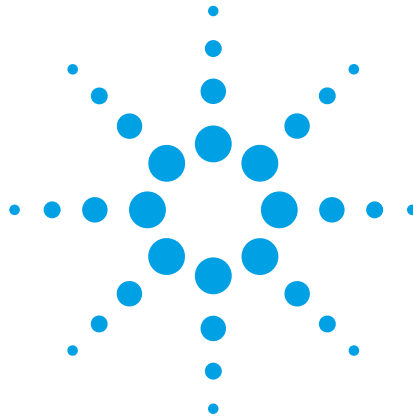


Agilent ENA RF Network Analyzer

Configuration Guide

E5071C	9 kHz to 3 GHz 100 kHz to 3 GHz (with bias tees) 9 kHz to 8.5 GHz 100 kHz to 8.5 GHz (with bias tees)
E5091A	Multiport test set



This configuration guide describes standard configurations, options, accessories and peripherals for the ENA RF network analyzer. Refer to the ENA Data Sheet for a complete description of the ENA RF network analyzers and the E5091A multiport test set.

Ordering guide for the ENA

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

= Choose ONE and ONLY one

= Choose any combination

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

Up to 3 GHz range

9 Hz to 3 GHz (without bias tees)

2-port S-parameter test set, choose Option E5071C-230

4-port S-parameter test set, choose Option E5071C-430

100 kHz to 3 GHz (with bias tees)

2-port S-parameter test set, choose Option E5071C-235

4-port S-parameter test set, choose Option E5071C-435

Up to 8.5 GHz range

9 Hz to 8.5 GHz (without bias tees)

2-port S-parameter test set, choose Option E5071C-280

4-port S-parameter test set, choose Option E5071C-480

100 kHz to 8.5 GHz (with bias tees)

2-port S-parameter test set, choose Option E5071C-285

4-port S-parameter test set, choose Option E5071C-485

Step 2: Would you like to add frequency-offset measurement capability?

Yes, choose Option E5071C-008¹

No

Step 3: Would you like to add time domain analysis?

Yes, choose Option E5071C-010

No

Step 4: Would you like to add Measurement Wizard Assistant (MWA) Software?

Yes, choose Option E5071C-790

No

Step 5: Would you like a high-stability time base?

Yes, choose Option E5071C-1E5

No, choose Option E5071C-UNQ

Step 6: Would you like any rack mount accessories?

Rack mount kit only, choose Option E5071C-1CM

Front handle kit only, choose Option E5071C-1CN

Rack mount and front handle kit, choose Option E5071C-1CP

Step 7: Would you like to add any accessories?

Add a keyboard, choose Option E5071C-810

Add a mouse, choose Option E5071C-820

Step 8: Choose calibration certificate options

ISO 17025 compliant calibration certificate with test data, choose Option E5071C-1A7

ANSI Z540 compliant calibration certificate with test data, choose Option E5071C-A6J

Step 9: Would you like to add external test set?

Yes, order E5091A

No

Step 10: Which would you like, a nine-port test set or a thirteen/sixteen-port configurable test set?

Nine-port, choose E5091A-009

Thirteen/sixteen-port configurable test set, choose E5091A-016

Step 11: Would you like any rack mount accessories for the test set?

Rack mount kit only, choose Option E5091A-1CM

Front handle kit only, choose Option E5091A-1CN

Rack mount and front handle kit, choose Option E5091A-1CP

Step 12: Choose a language of the manual or delete a manual set

Add English manual set, choose Option E5091A-ABA

Add Japanese manual set, choose Option E5091A-ABJ

Delete a manual set, choose Option E5091A-0B0

Step 13: Would you like additional manual set?

Extra English manual set, Choose Option E5091A-800 and specify quantity

Extra Japanese manual set, Choose Option E5091A-801 and specify quantity

Step 14: Would you like a calibration certificate (ISO 17025 compliant) with test data?

Yes, choose Option E5091A-1A7

No

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

Agilent ENA

RF network analyzer

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

Options

Test ports, frequency range, and with or without bias tees Options

Up to 3 GHz range

- 9 Hz to 3 GHz (without bias tees)
- Option E5071C-230** 2-port S-parameter test set
- Option E5071C-430** 4-port S-parameter test set
- 100 kHz to 3 GHz (with bias tees)
- Option E5071C-235** 2-port S-parameter test set
- Option E5071C-435** 4-port S-parameter test set

Up to 8.5 GHz range

- 9 Hz to 8.5 GHz (without bias tees)
- Option E5071C-280** 2-port S-parameter test set
- Option E5071C-480** 4-port S-parameter test set
- 100 kHz to 8.5 GHz (with bias tees)
- Option E5071C-285** 2-port S-parameter test set
- Option E5071C-485** 4-port S-parameter test set

Additional feature options

- Option E5071C-008**¹ add frequency-offset measurement capability
Adds frequency-offset sweep and harmonics measurement capabilities.
- Option E5071C-010** add time domain analysis capability
Adds time domain transform and gating capabilities.
- Option E5071C-790** add Measurement Wizard Assistant (MWA) Software
Adds Measurement Wizard Assistant (MWA) software to further simplify your multipoint measurements.

Frequency stability options

- Option E5071C-1E5** high stability time base
Adds the standard time base reference with a higher stability unit.
- Option E5071C-UNQ** standard stability time base

Accessories options

- Option E5071C-1CM** rack mount kit
Adds a rack mount kit (part number 5063-9216)
- Option E5071C-1CN** front handle kit
Adds a front handle kit (part number 5063-9229)
- Option E5071C-1CP** rack mount and front handle kit
Adds a rack mount kit and a handle kit (part number 5063-9223)
- Option E5071C-810** Adds a keyboard
- Option E5071C-820** Adds a mouse

Certification option

- Option E5071C-1A7** ISO 17025 compliant calibration
- Option E5071C-A6J** ANSI Z540 compliant calibration

For online information about Agilent's service and support products visit: www.agilent.com/find/tm_services

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

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 75 ohm Type-N. 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)
- **11500E** cable, APC 3.5 mm (m), DC to 26.5 GHz
Includes one 610 mm (24 in) with male connectors. 3.5 mm (f) to 50 ohm Type-N (m) adapters (1250-1744) are recommended to connect to the network analyzer's test ports.
- **11500F** 150 cm cable, APC 3.5 mm (m), DC to 26.5 GHz
Includes one 1520 mm (60 in) with male connectors. 3.5 mm (f) to 50 ohm Type-N (m) adapters (1250-1744) are recommended to connect to the network analyzer's test ports.

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-, three-, or four-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 50 ohm Type-N connectors

Mechanical calibration kits

- **85032F** economy: DC to 9 GHz. Includes:
 - 85032-60017 Type-N (m) fixed load
 - 85032-60018 Type-N (f) fixed load
 - 85032-60013 Type-N (m) open
 - 85032-60014 Type-N (f) open
 - 85032-60016 Type-N (m) short
 - 85032-60015 Type-N (f) short
- **Option 85032F-100** adds:
 - 85032-60021 Type-N (f) to Type-N (f) adapter
- **Option 85032F-200** adds:
 - 85032-60019 Type-N (m) to Type-N (m) adapter
- **Option 85032F-300** adds:
 - 85032-60020 Type-N (m) to Type-N (f) adapter
- **Option 85032F-500** adds:
 - 85054-60001 Type-N (f) to 7 mm adapter (two included)
 - 85054-60009 Type-N (m) to 7 mm adapter (two included)
- **85054D** economy: DC to 18 GHz. Includes:
 - 85054-60025 Type-N (m) short
 - 85054-60026 Type-N (f) short
 - 85054-60027 Type-N (m) open
 - 85054-60028 Type-N (f) open
 - 85054-60031 Type-N (f) to 7 mm adapter
 - 85054-60032 Type-N (m) to 7 mm adapter
 - 85054-60037 Type-N (f) to Type-N (f) adapter
 - 85054-60038 Type-N (m) to Type-N (m) adapter
 - 85054-60046 Type-N (m) fixed load
 - 85054-60047 Type-N (f) fixed load

Electronic calibration kits

- **85092C** RF ECal: 300 kHz to 9 GHz, 2 ports. Includes:
 - **Option 85092C-MOF** module with:
 - 85092-60008 Type-N (f) to Type-N (m) RF ECal module
 - **Option 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** 4-port RF ECal module: 300 kHz to 13.5 GHz, 4 ports.
 - **Option N4431B-020**
 - Adds four Type-N, 50 ohm female module connectors
 - **Option N4431B-1A7**
 - ISO 17025 compliant calibration

For devices with 3.5 mm or SMA connectors

Mechanical calibration kits

- **85033E** economy: DC to 9 GHz. Includes:
 - 85033-60016 3.5 mm (m) load
 - 85033-60017 3.5 mm (f) load
 - 85033-60018 3.5 mm (m) open
 - 85033-60019 3.5 mm (f) open
 - 85033-60020 3.5 mm (m) short
 - 85033-60021 3.5 mm (f) short
 - 8710-1761 torque wrench
 - **Option 85033E-100** adds:
 - 85027-60005 3.5 mm (f) to 3.5 mm (f) adapter
 - **Option 85033E-200** adds:
 - 85027-60007 3.5 mm (m) to 3.5 mm (m) adapter
 - **Option 85033E-300** adds:
 - 85027-60006 3.5 mm (m) to 3.5 mm (f) adapter
 - **Option 85033E-400** adds:
 - 1250-1744 3.5 mm (f) to 50 ohm Type-N (m) adapter
 - 1250-1743 3.5 mm (m) to 50 ohm Type-N (m) adapter
 - 1250-1745 3.5 mm (f) to 50 ohm Type-N (f) adapter
 - 1250-1750 3.5 mm (m) to 50 ohm Type-N (f) adapter
 - **Option 85033E-500** adds:
 - 1250-1746 3.5 mm (m) to 7 mm adapter (two included)
 - 1250-1747 3.5 mm (f) to 7 mm adapter (two included)
- **85052C** precision TRL: 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: 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. Includes:
 - **Option 85093C-MOF** module with:
 - 85093-60008 3.5 mm (f) to 3.5 mm (m) RF ECal module
 - **Option 85093C-00M** module with:
 - 85093-60009 3.5 mm (m) to 3.5 mm (m) RF ECal module
 - **Option 85093C-00F** module with:
 - 85093-60010 3.5 mm (f) to 3.5 mm (f) RF ECal module
 - **Option 85093C-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
- **N4431B** 4-port RF ECal module: 300 kHz to 13.5 GHz, 4 ports.
 - **Option N4431B-010**
 - Adds four 3.5 mm female module connectors
 - **Option N4431B-1A7**
 - ISO 17025 compliant calibration

Adapters

- **11853A** 50 ohm Type-N accessory kit. Includes:
 - 1250-1472 Type-N (f) to Type-N (f) adapter (two included)
 - 1250-1475 Type-N (m) to Type-N (m) adapter (two included)
 - 11511A Type-N (f) short
 - 11512A Type-N (m) short
- **11878A** Type-N to 3.5 mm adapter kit. Includes:
 - 1250-1744 3.5 mm (f) to 50 ohm Type-N (m) adapter
 - 1250-1743 3.5 mm (m) to 50 ohm Type-N (m) adapter
 - 1250-1745 3.5 mm (f) to 50 ohm Type-N (f) adapter
 - 1250-1750 3.5 mm (m) to 50 ohm Type-N (f) adapter
- **11524A** 7 mm to Type-N (f) adapter
- **11525A** 7 mm to Type-N (m) adapter

For devices with 75 ohm Type-N connectors

Mechanical calibration kits

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

Adapters

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

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

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

Amplifiers

- ❑ **87405B** pre-amplifier, 24 dB gain, 10 MHz to 4 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 20 GHz
- ❑ **N1810UL** SPDT switch, unterminated, DC to 20 GHz
- ❑ **87104B** SP4T switch, terminated, DC to 20 GHz
- ❑ **87106B** SP6T switch, terminated, DC to 20 GHz

General accessories

Power meters and sensors¹

Recommended for source output power calibration.

- ❑ **E4416A** single-channel power meter
- ❑ **E4417A** dual-channel power meter
- ❑ **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

System racks and cases

- ❑ **5063-9229** handle kit, may be ordered as option 1CN (two included)
- ❑ **5063-9216** rack mount kit, for use without handles: may be ordered as option 1CM
- ❑ **5063-9223** rack mount kit, for use with previously supplied handles; may be ordered as option 1CP
- ❑ **E3663AC** rack mount rail kit, for use with 5063-9216 or 5063-9223
- ❑ **9211-2658** transit case

Interface cables

The following GPIB cables can be used to connect the network analyzer with an external device such as a computer

- ❑ **10833A GPIB** cable, 1.0 m (3.3 ft)
- ❑ **10833B GPIB** cable, 2.0 m (6.6 ft)
- ❑ **10833C GPIB** cable, 3.0 m (9.9 ft)
- ❑ **10833D GPIB** cable, 0.5 m (1.6 ft)

Monitors

- ❑ VGA-compatible monitor

Printers

- ❑ Hewlett Packard® 7830 and 7850 via USB port
Please refer to the following information for the latest recommended printer information.
http://www.agilent.com/find/ctdkobe_printers

Upgrade kits

Upgrade kits for the E5071C

Upgrade kits are available to add options after initial purchase. To order an upgrade kit for a ENA, order E5071CU, then indicate the option to be added:

- ❑ **E5071CU-018** hard disk drive kit (To be available in January 2007)

For the other software capability upgrades, order an upgrade kit with stand-alone product number E5003A/4A or 5A, then indicate the option to be added:

- ❑ **E5003A-1FP** Frequency-offset mode for E5071C
- ❑ **E5004A-1FP** Time domain analysis for E5071C
- ❑ **E5005A-1FP** Measurement Wizard assistant software for E5071C

Customers can install these software upgrade options.

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

Agilent E5091A multiport test set

The E5091A is a multiport test set used with 4-port ENA Series network analyzers to expand the number of test ports up to sixteen.

Options

Test set configuration options

- **Option E5091A-009** 9-port configuration
Includes nine test ports to the device under test and four interconnection ports to an analyzer.
- **Option E5091A-016** 13/16-port configurable test set configuration
Includes thirteen to sixteen configurable test ports to the device under test and four interconnection ports to the analyzer.

Accessories options

- **Option E5091A-1CM** rack mount kit
Adds a rack mount kit (part number 5063-9212) for use without handles.
- **Option E5091A-1CN** front handle kit
Adds a front handle kit (part number 5063-9226) for use with analyzer handles.
- **Option E5091A-1CP** rack mount and front handle kit
Adds a rack mount and a handle kit (part number 5063-9219) for use with analyzer handles.

Included documentation options

- **Option E5091A-ABA** add English manual set
- **Option E5091A-ABJ** add Japanese manual set
- **Option E5091A-0B0** delete manual set

Additional documentation options

- **Option E5091A-800** extra English manual set
- **Option E5091A-801** extra Japanese manual set

Certification option

- **Option E5091A-1A7** ISO 17025 compliant calibration

Literature and information

ENA Series RF Network Analyzers Brochure

Literature number 5989-5478EN

ENA Series RF Network Analyzers Data Sheet

Literature number 5989-5479EN

Agilent Network Analyzer Selection Guide

Literature number 5989-5481EN

ENA-L RF Network Analyzers Brochure

Literature number 5989-0167EN

ENA-L RF Network Analyzers Data Sheet

Literature number 5989-0018EN

Test Solutions for Multiport and Balanced Devices Selection Guide

Literature number 5988-2461EN

Application and product notes

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

Literature number 5988-4923EN

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

Literature number 5988-6192EN

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

literature number 5988-5886EN

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

Literature number 5988-6522EN

Characterizing Differential Amplifiers with True Differential Signals

Application Note 1463

literature number 5988-9463EN

Improve the Circuit Evaluation Efficiency of Wireless LAN Chip Set Design

Application Note 1463-2

Literature number 5988-9803EN

Differential S-parameter Measurements of PCI Express Connectors using the ENA Series Network Analyzer

Application Note 1463-3

Literature number 5988-9848EN

On-Wafer Impedance Measurements using the ENA and the Impedance Parameter Display Software

Application Note 1472

Literature number 5989-0033EN

Impedance Characteristic Evaluation of SMD by Using the ENA with Inter-Continental Microwave (ICM)

Application Note 1463-5

Literature number 5989-0547EN

Accurate Mixer Measurements Using the Frequency-Offset Mode

Application Note 1463-6

Literature number 5989-1420EN

Accurate Mixer Conversion Loss Measurement Techniques

Application Note 1463-7

Literature number 5989-1986EN

7 Reasons to Migrate from Your 8753 to an ENA Network Analyzer

Application Note 1478

Literature number 5989-0206EN

Key web resources

For additional information on the ENA Series, visit:
www.agilent.com/find/ena

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to

www.agilent.com/find/removealldoubt



Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.



Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.



www.agilent.com/find/open

Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.



is the US registered trademark of the LXI Consortium.

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Phone or Fax

United States:

(tel) 800 829 4444

(fax) 800 829 4433

Canada:

(tel) 877 894 4414

(fax) 800 746 4866

China:

(tel) 800 810 0189

(fax) 800 820 2816

Europe:

(tel) 31 20 547 2111

Japan:

(tel) (81) 426 56 7832

(fax) (81) 426 56 7840

Korea:

(tel) (080) 769 0800

(fax) (080) 769 0900

Latin America:

(tel) (305) 269 7500

Taiwan:

(tel) 0800 047 866

(fax) 0800 286 331

Other Asia Pacific

Countries:

(tel) (65) 6375 8100

(fax) (65) 6755 0042

Email: tm_ap@agilent.com

Contacts revised: 09/26/06

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2006

Printed in USA, October 16, 2006

5989-5480EN



Agilent Technologies