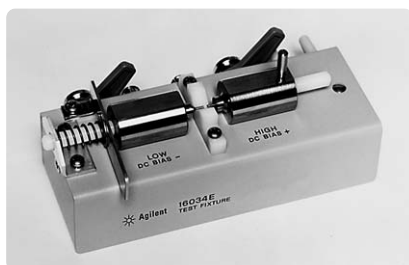


Test Fixtures and Accessories (Four-Terminal-Pair)

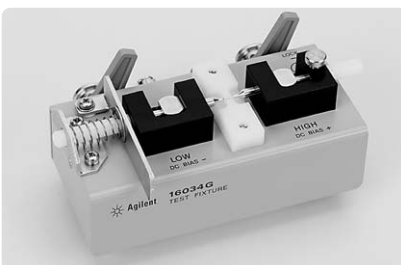
Basic test fixtures



16034E SMD/chip test fixture

Frequency: ≤ 40 MHz

Maximum dc bias: ± 40 V



16034G small SMD/chip test fixture

Frequency: ≤ 110 MHz

Maximum dc bias: ± 40 V



16034H SMD/chip test fixture

Frequency: ≤ 110 MHz

Maximum dc bias: ± 40 V

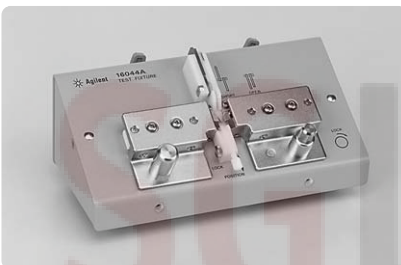
Suitable for array-type devices



16043A/B test fixture

Frequency: ≤ 110 MHz

Maximum dc bias: ± 40 V



16044A SMD Kelvin contact test fixture

Frequency: ≤ 10 MHz

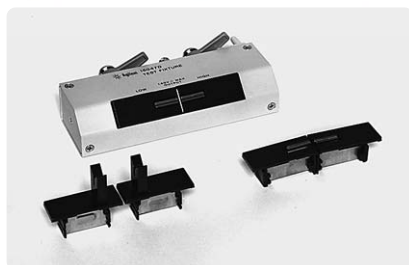
Maximum dc bias: ± 40 V



16334A SMD/chip tweezers

Frequency: ≤ 15 MHz

Maximum dc bias: ± 42 V



16047A/D axial & radial test fixture

Frequency: A: ≤ 13 MHz, D: ≤ 40 MHz
Maximum dc bias: A: ± 35 V, D: ± 40 V



16047E test fixture

Frequency: ≤ 110 MHz
Maximum dc bias: ± 40 V



16089A/B/C/D/E clip leads

Connector type: A/B/C/E: Kelvin
D: alligator

Frequency: 5 Hz to 100 kHz

Cable length: A/B/C/D: 0.94 m

E: 1.3 m

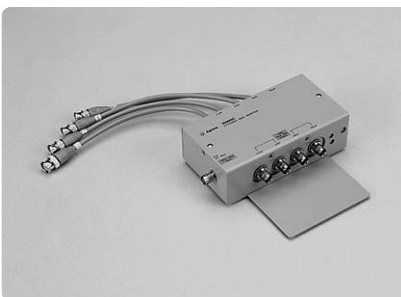
Test Fixtures and Accessories (Four-Terminal-Pair)

External DC bias fixtures



16065A axial and radial test fixture with safety cover

Frequency: 50 Hz to 2 MHz
Maximum externally supplied dc bias: ± 200 V
Blocking capacitor of $5.6 \mu\text{F}$ is connected in series with the Hc terminal



16065C external bias adapter

Frequency: 50 Hz to 1 MHz
Maximum externally supplied dc bias: ± 40 V
Blocking capacitor of $50 \mu\text{F}$ is connected in series with the Hc terminal

Test leads



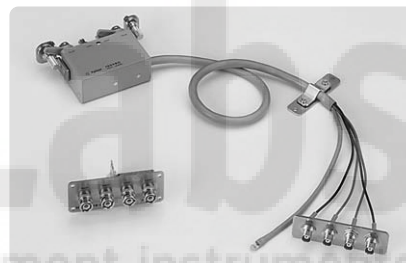
16048A/D/E BNC test leads

Frequency: A: ≤ 30 MHz, D: ≤ 30 MHz, E: ≤ 1 MHz
Cable length: A: 0.94 m, D: 1.89 m, E: 3.8 m
Maximum dc bias: ± 40 V



16048B SMC test leads

Frequency: ≤ 30 MHz
Cable length: 0.94 m
Maximum dc bias: ± 40 V



16048G/H BNC test leads

Frequency: ≤ 110 MHz
Cable length: G: 1 m, H: 2 m
Maximum dc bias: ± 40 V
Use with only 4294A

Terminal adapters



42942A four-terminal-pair to 7 mm terminal adapter

Frequency: ≤ 110 MHz
Maximum dc bias: ± 40 V
Use with only 4294A



16085B four-terminal-pair to 7 mm terminal adapter

Frequency: ≤ 40 MHz
Maximum dc bias: ± 40 V

Test Fixtures and Accessories (Four-Terminal-Pair)

Others



162941A impedance probe kit

Frequency: 40 Hz to 100 MHz
Maximum dc bias: ± 40 V
Probe cable length: 1.5 m
Use with only 4294A.



16060A transformer test fixture

Frequency: dc to 100 kHz
Use with only 4263B



16064B LED display/trigger box

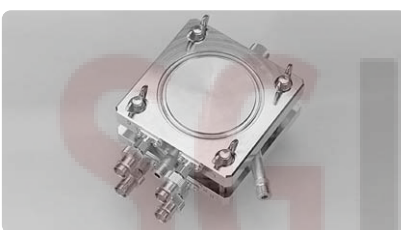
For production test applications.
Use with only 4263B, 4338B, 4339B and 4349B

Material measurements



16451B dielectric test fixture

Measurement parameters:
capacitance (C), dissipation factor (D),
and dielectric constant (ϵ_r' , ϵ_r'')
Material-under-test size:
thickness: ≤ 10 mm
diameter: 10 to 56 mm
Frequency: ≤ 30 MHz



16452A liquid test fixture

Measurement parameter:
capacitance (C), dielectric constant
(ϵ_r' , ϵ_r'') Liquid sample
Quantity: ≤ 6.8 ml
Frequency: 20 Hz to 30 MHz

Balanced/unbalanced test fixture



**16314A balanced/unbalanced
4-terminal converter**

Frequency: 100 Hz to 10 MHz
Connectors: 4 BNCs (unbal.), 2 signal
terminals (bal.) & 1 ground terminal
Characteristic Z: 50 Ω



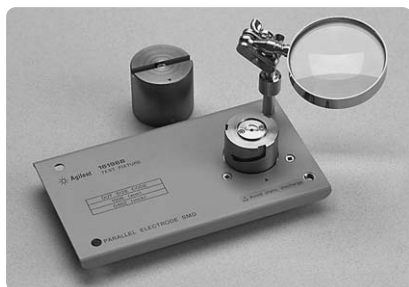
**16315A¹ 50 Ω balanced/
50 Ω unbalanced converter**

Frequency: 100 Hz to 10 MHz
**16316A¹ 100 Ω Balanced/50 Ω
Unbalanced Converter**
Frequency: 100 Hz to 10 MHz
**16317A¹ 600 Ω Balanced/50 Ω
Unbalanced Converter**
Frequency: 100 Hz to 3 MHz

1. All have 1 BNC connector (unbalanced) and 2 signal terminals (balanced) and 1 ground terminal.

Test Fixtures and Accessories (7-mm Terminal)

RF SMD/chip components



16196A/B/C/D SMD test fixture

Coaxial fixture for parallel electrode SMDs.

Frequency: dc to 3 GHz

Maximum dc bias: ± 40 V

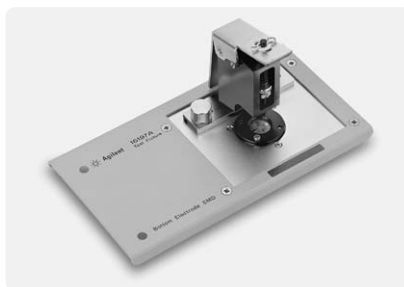
Applicable SMD size:

16196A: 1.6 mm x 0.8 mm

16196B: 1.0 mm x 0.5 mm

16196C: 0.6 mm x 0.3 mm

16196D: 0.4 mm x 0.2 mm



16197A bottom-electrode SMD test fixture

Frequency: dc to 3 GHz

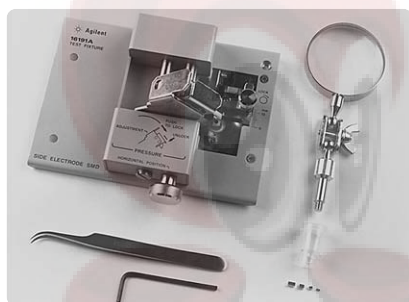
Maximum dc bias: ± 40 V



16092A axial, radial, and SMD test fixture

Frequency: ≤ 500 MHz

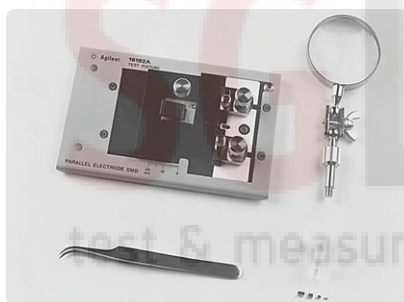
Maximum dc bias: ± 40 V



16191A bottom-electrode SMD test fixture

Frequency: dc to 2 GHz

Maximum dc bias: ± 40 V



16192A parallel-electrode SMD test fixture

Frequency: dc to 2 GHz

Maximum dc bias: ± 40 V



16194A high temperature component test fixture

Frequency: dc to 2 GHz

Maximum dc bias: ± 40 V

Operating temperature: -55 °C to $+200$ °C

Material measurements



16200B external DC bias adapter

Frequency: 1 MHz to 1 GHz

External dc bias: up to 5 A, ± 40 V



16453A dielectric test fixture

Frequency: 1 MHz to 1 GHz

Sample size (smooth sheets only):

thickness: 0.3 mm to 3 mm

diameter: ≥ 15 mm



16454A magnetic test fixtures

Frequency: 1 kHz to 1 GHz

Sample size (toroids only):

height: ≤ 8.5 mm

inner diameter: ≥ 3.1 mm

outer diameter: ≤ 20 mm

Simplify and Improve Your Measurements with Agilent's Test Accessories

Selecting a test fixture is as important as selecting the right instrument. Agilent offers a wide range of accessories for axial, radial, and SMD/Chip devices. In addition, a variety of test leads are available to simplify remote testing and systems applications. External test fixtures with safety covers are also available.

You will improve your measurement results with the proper test fixture.

- more reliable and repeatable measurement
- higher through-put
- fewer handling errors
- tighter test limits
- better measurement accuracy

For sales information or technical assistance call Agilent Technologies.

Table 3. Test accessories/fixtures

			4263B	4268A	4279A	4284A	4285A	4287A	4288A	4294A	4294A with 42942A	4395A w/Option 4395A-010 and 43961A	4396B w/Option 4396B-010 and 43961A	E4991A
16034E	SMD/chip test fixture	DC-40 MHz	•	•	•	•	•	•	•	•				
16034G	SMD/chip test fixture, small	DC-110 MHz	•	•	•	•	•	•	•	•				
16034H	SMD/chip test fixture, general	DC-110 MHz	•	•	•	•	•	•	•	•				
1643A/B	3-terminal SMD test fixture	DC-110 MHz	•	•	•	•	•	•	•	•				
16044A	SMD/chip test fixture, Kelvin contacts, 10 MHz	DC-10 MHz	•	•	•	•	•	•	•	•				
16047A	Axial and radial test fixture	DC-13 MHz	•	•	•	•	•	•	•	•				
16047D	Axial and radial test fixture	DC-40 MHz	•	•	•	•	•	•	•	•				
16047E	Axial and radial test fixture, 110MHz	DC-110 MHz	•	•	•	•	•	•	•	•				
16048A	One meter test leads, BNC	DC-30 MHz	•	•	•	•	•	•	•	•				
16048B	One meter test leads, SMC	DC-30 MHz	•	•	•	•	•	•	•	•				
16048D	Two meter test leads, BNC	DC-30 MHz	•	•	•	•	•	•	•	•				
16048E	Four meter test leads, BNC	DC-1 MHz	•			•								
16048G	One meter test leads, BNC, 110 MHz	DC-110 MHz								•				
16048H	Two meter test leads, BNC, 110 MHz	DC-110 MHz								•				
16060A	Transformer test fixture	DC-100 kHz	•											
16065A	Ext. voltage bias with safety cover (<=200 vdc)	50 Hz-2 MHz	•	•	•	•	•	•	•	•				
16065C	External bias adapter (<=40 vdc)	50 Hz-1 MHz	•	•	•	•	•	•	•	•				
16085B	Four-terminal pair to 7-mm adapter	DC-40 MHz	•	•	•	•	•	•	•	•				
16089A/B/C/D/E	Kelvin clip leads	5 Hz-100 kHz	•	•	•	•	•	•	•	•				
16092A	RF spring clip: axial, radial and SMD	DC-500 MHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16094A	RF probe tip/adapter	DC-125 MHz	•1,2	•1,2	•1,2	•1,2	•1,2	•2,4	•1,2		•2	•2	•2	•2
16095A	LF impedance probe	DC-13 MHz	•3	•3	•3	•3	•3		•3					
16191A	Side (bottom) electrode SMD test fixture	DC-2 GHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16192A	Parallel electrode SMD test fixture	DC-2 GHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16194A	High temperature component test fixture	DC-2 GHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16196A/B/C/D	Parallel electrode SMD test fixture	DC-3 GHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16197A	Bottom electrode SMD test fixture	DC-3 GHz	•1	•1	•1	•1	•1	•4	•1		•	•	•	•
16200B	External DC bias adapter	1 MHz-1 GHz						•4			•	•	•	•
16314A	4-terminal balun (50 Ohm bal. to 50 Ohm unbal.)	100 Hz-10 MHz	•	•	•	•	•		•	•				
16315A	One terminal (BNC) Balun (50 Ohm bal. to 50 Ohm unbal.)	100 Hz-10 MHz										•	•	
16316A	One terminal (BNC) Balun (100 Ohm bal. to 50 Ohm unbal.)	100 Hz-10 MHz											•	•
16317A	One terminal (BNC) Balun (600 Ohm bal. to 50 Ohm unbal.)	100 Hz-3 MHz											•	•
16334A	SMD/chip tweezer	DC-15 MHz	•	•	•	•	•		•	•				
16451B	Dielectric material test fixture	5 Hz-30 MHz	•	•	•	•	•		•	•				
16452A	Liquid test fixture	20 Hz-30 MHz				•	•		•					
16453A	Dielectric material test fixture	1 MHz-1 GHz												•
16454A	Dielectric material test fixture	1 kHz-1 GHz									•			•
42842A/B	High bias current 20 A/40T test fixture	20 Hz-1 MHz				•								
42842C	High bias current 10 A test fixture	75 kHz-30 MHz					•							
42941A	Impedance probe kit	DC-110 MHz								•				
42942A	Four-terminal pair to 7-mm adapter	DC-110 MHz								•				

Note: Refer to the accessory descriptions for frequency and operational limits.

1. Compatible when used in conjunction with 16085B.
2. 7-mm cable is required
3. Do not connect the ground lead to the instrument
4. 3.5-mm (M) to 7-mm adapter is required

Applications Information

Helping you make better measurements

Agilent's application knowledge can help you make better measurements. Use the matrix below to select the Agilent Application Notes of interest. For copies of these Application Notes, contact your local Agilent Technologies sales office. "8 Hints for successful Impedance Measurement" (P/N 5968-1947E) and "The Impedance Measurement Handbook" (P/N 5950-3000) are comprehensive guide to impedance measurements.

Beginning with the basics it contains in-depth practical advice to help you make better measurements. These documents answer many commonly asked questions. To get your copy, contact your local Agilent Technologies sales office.

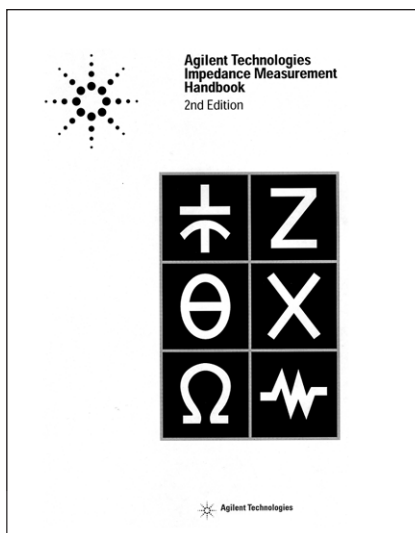


Table 4. List of application notes

Kind	Number	Title	Product	P/N
OT	-	Impedance Measurement Handbook 2nd Edition	General	5950-3000
OT	-	Accessories Selection Guide For Impedance Measurement	General	5965-4792E
AN	346-4	8 Hints for Successful Impedance Measurements	General AN	5968-1947E
PN	-	16196A/B/C/D Correlating RF Impedance Measurements When Using SMD Test Fixtures	16196A/B/C/D	5980-1336E
AN	1305-3	Effective Transformer/LF Coil Testing	4263B	5967-5377E
AN	1305-4	Effective Electrolytic Capacitors Testing	4263B	5967-5378E
AN	1224-5	Effective Multi-tap Transformer Measurement using a Scanner and the 4263B LCR Meter	4263B	5091-6310E
AN	369-1	Optimizing Electronic Component and Material Impedance Measurements	4284A	5950-2949
AN	369-3	Impedance Measurements of Magnetic Heads Using Constant Current	4284A	5950-2951
AN	369-5	Multi-frequency C-V Measurements of Semiconductors	4284A	5950-2953
AN	369-6	Impedance Testing Using Scanner	4284A	5950-2975
AN	369-7	Measurement of Capacitance Characteristics of Liquid Crystal Cell	4284A	5950-2994
AN	369-8	Wide Range DC Current Biased Inductance Measurement	4284A	5950-2367
AN	369-9	Improve Electronic Product Quality and Performance with Agilent Precision LCR Meters	4284A	5090-0233
AN	346-2	Balanced Circuit Measurement with an Impedance Analyzer/LCR Meter/Network Analyzer	4284A	5091-4480E
AN	346-3	Effective Impedance Measurement Using OPEN/SHORT/LOAD Correction	4284A	5091-6553E
AN	369-12	Measurement of Impedance of Magnetic Heads	4285A	5965-6663E
PN	4294-1	Reliable Electronic Component Evaluation and Circuit Design with the 4294A 110 MHz Precision Impedance Analyzer	4294A	5968-4505E
PN	4294-2	New Technologies For Accurate Impedance Measurements (40 Hz to 110 MHz)	4294A	5968-4506E
PN	4294-3	Evaluation of MOS Capacitor Oxide C-V Characteristics Using the 4294A	4294A	5988-5102EN
PN	E4991A-1	New Generation Analyzer Offers Exceptional and Powerful Analysis Functions for RF Impedance Measurement	E4991A	5988-0200EN
PN	E4991A-2	Achieving Fast Cycle Time Using an Electronic Design Automation (EDA) Tool and the E4991A RF Impedance/Material Analyzer	E4991A	5988-3029EN
AN	1369-1	Solutions for Measuring Permittivity and Permeability with LCR Meters and Impedance Analyzers	E4991A	5980-2862EN
AN	1369-2	Advanced Impedance Measurement Capability of the RF I-V Method Compared to the Network Analysis Method	E4991A	5988-0728EN
AN	1369-3	Accurate Impedance Measurement with Cascade Microtech Probe System	E4991A	5988-3279EN
AN	1305-1	Contact Resistance and Insulation Resistance Measurements of Electro-Mechanical Components	4338B/4339B	5968-0325E
AN	1288-1	Combining Network and Spectrum Analysis and IBASIC to Improve Device Characterization and Test Time	4396B	5965-7656E
AN	1288-2	Configuring the 4396B 1.8 GHz Network/Spectrum Impedance Analyzer for O/E Testing	4396B	5965-7657E
AN	1288-4	How to Characterize CATV Amplifiers Effectively	4396B	5965-9434E
PN	4395/96-1	How to Measure Noise Accurately Using the Agilent Combination Analyzers	4396B	5966-2292E
PN	4395-1	4395A Network/Spectrum/Impedance Analyzer ADSL Copper Loop Measurements	4395A	5968-1196E
PN	4395-2	4395A Network/Spectrum/Impedance Analyzer Switching Power Supply Evaluation	4395A	5968-7274E
AN	1308-1	"Network, Spectrum and Impedance Evaluation of Electronic Circuits and Components"	4395A	5967-5942E

Complementary Products and Accessories

To help you find a complete solution, we have listed the following companies that make complementary products or specialized accessories for Agilent's impedance measurement products. Please contact each company directly if you are interested in its products. (Agilent does not make any special endorsement of these companies' products; this list is for reference only.)

Company name	Product specialty/ expertise	Web site address
Cascade Microtech, Inc.	RF and microwave probes and accessories for semiconductor and IC applications.	www.cascademicrotech.com/
Inter-continental Microwave (ICM)	Automated device handling systems, RF and microwave test fixtures and non-coaxial calibration standards.	www.icmicrowave.com/
North Hills Signal Processing	Wide-band transformers (baluns) for balanced measurement.	www.northhills-sp.com/
Espec/ ESPEC Corp. (America)	Temperature chamber for component and material testing.	www.espec.com/ www.espec.co.jp/english
BH Electronics	Wideband transformers	www.bhelectronics.com/
ArumoTech (Asia)	Custom test fixtures	www.arumotech.com/en

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

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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 receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

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 contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering 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.

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