Infiniium Oscilloscope Probes and Accessories

Data Sheet

To get the most out of your Infiniium oscilloscope, you need the right probes and accessories for your particular applications. Whether you need the high bandwidth and low loading of an active probe, an easy way to connect to surface mount ICs, or a passive probe to measure high voltages, there's a wide selection of high-quality probes and accessories for your Infiniium oscilloscope.

Table of Contents

Probe Compatibility Table

For ordering information when replacing your probe or probe accessory:

Refer directly to the page number listed in the table of contents for your probe model.

To assist you in selecting the proper probe for your application:

Use our probe compatibility table below to find the probes that are recommended for use with your Infiniium scope.

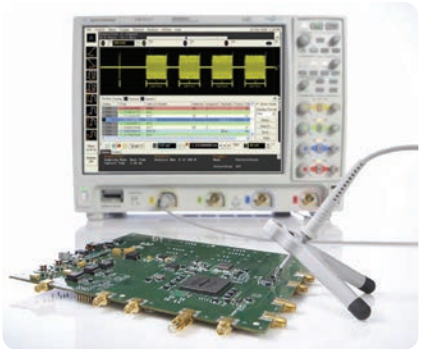
Or refer to our probe overview page at the beginning of each section in the table of contents explaining what the different probe types are and the models available for your Infiniium.

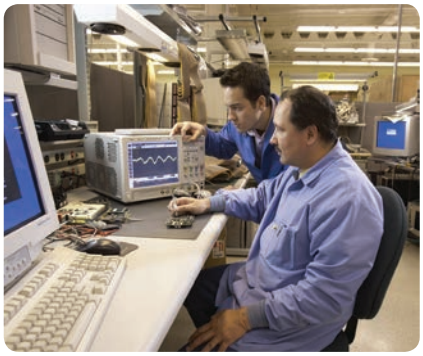
	9000 Series	80000/90000/90008A Series[1]	90000 X Series	90000 Q Series
Scope Bandwidth	600 MHz – 4 GHz	2.5 GHz – 13 GHz	16 GHz – 33 GHz	16 GHz – 63 GHz
Probe Interface	AutoProbe	AutoProbe	AutoProbe II	AutoProbe II
Standard Probe	N2873A			
InfiniiMax Active Probing System, page 4	1130A/31A/32A	1131A/32A/34A, 1168A/69A	N2800A/81A/82A/83A[2]	N2800A/81A/82A/83A[2]
InfiniiMode Active Probes, page 19	N2750A/51A/52A	N2750A/51A /52A[3]	N2750A/51A/52A with N5442A	N2750A/51A/52A with N5442A
Single-ended Active Probes, page 22	N2795A/96A, 1156A/57A/58A	N2795A/96A[3], 1156A/57A/58A	N2795A/96A[3], 1156A/57A/58A with N5442A	N2795A/96A, 1156A/57A/58A with N5442A
General Purpose Differential Active Probes, page 27	N2790A/91A/92A/93A/891A ,1141A/53A	N2792A/93A, N2791A/N2891A with E2697A, 1141A/53A	N2790A/91A/891A with N5449A, N2792A/93A with N5442A	N2790A/91A/891A with N5449A, N2792A/93A with N5442A
Current Probes, page 30	1146A/47A, N2780B/81B/82B/83B/N2893A	1146A, N2780B/81B/82B/83B with E2697A	1147B, N2893A with N5449A	1147B, N2893A with N5449A
General Purpose Passive Probes, page 33	N2870A-76A, 10073D, 10070D, 1165A	N2870A-76A, 10073D, 10070D, 1165A with E2697A	N2873A with N5449A (N5449A includes one N2873A)	N2873A with N5449A (N5449A includes one N2873A)
High Voltage Passive Probes, page 38	10076B, N2771B	10076B, N2771B with E2697A	10076B, N2771B with N5449A	10076B, N2771B with N5449A

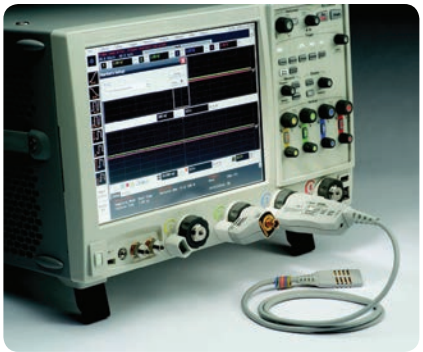
[1] The 1147B, N2790A and N2893A are not compatible with 80000, 90000 and 90008 Series scopes.

[2] InfiniiMax I and II differential probes are also compatible with 90000X, 90000Q Series with N5442A precision BNC adapter.

[3] The Infiniium 80000 Series does not support N2795A/96A and N2750A/51A/52A. Use the 1156A/57A/58A or InfiniiMax probes.





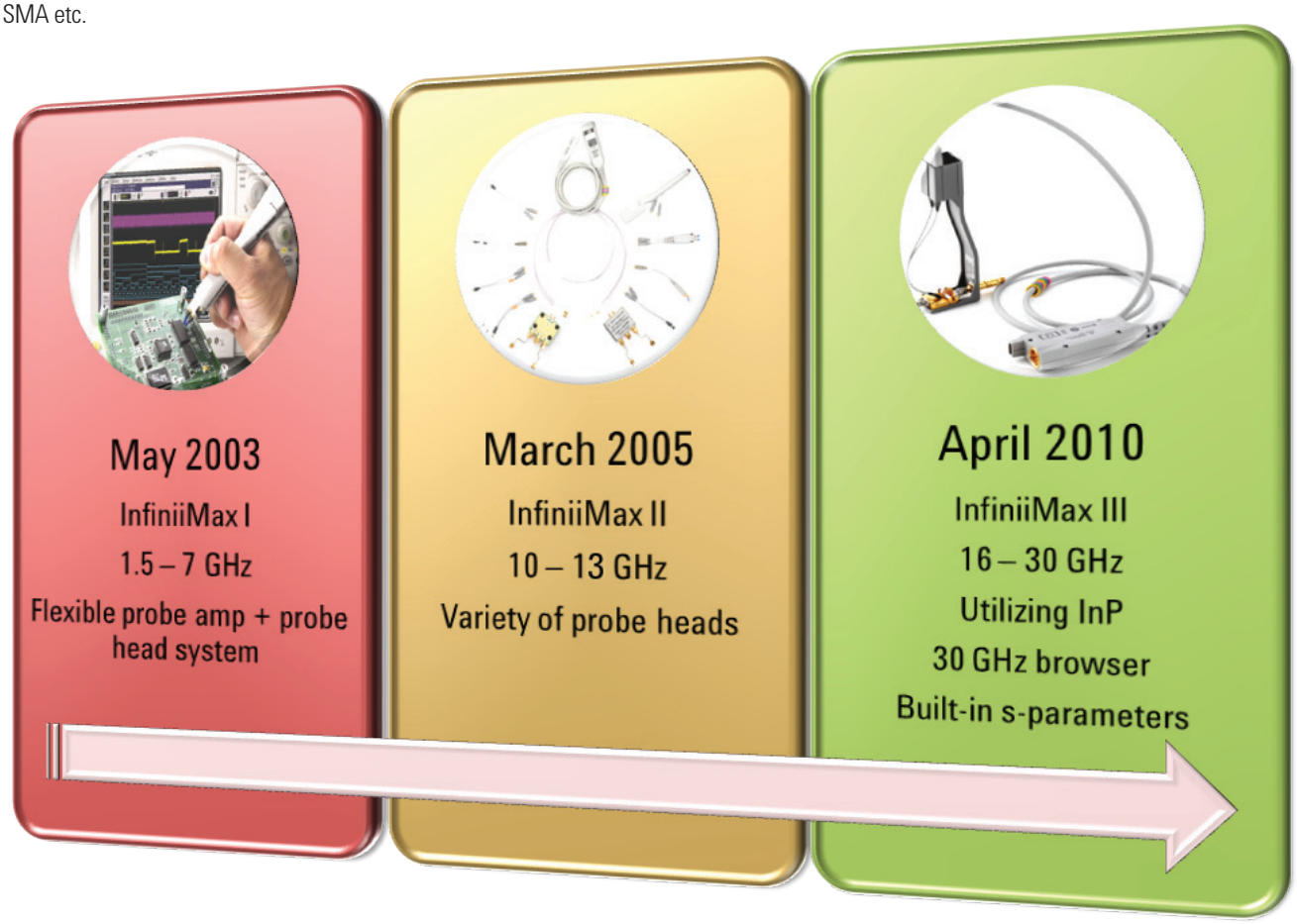


InfiniiMax Active Probe System Overview

The InfiniiMax probing system offers you the highest performance available for measuring differential and single-ended signals, with flexible connectivity solutions for today's high-density ICs and circuit boards. Agilent pioneered "probe head" type probes starting with the InfiniiMax I probe system in 2003. InfiniiMax I boasted a 7GHz bandwidth and provided both differential and single-ended probe heads to fit multiple use models. The "probe head" topology allows higher performance. It allows more flexibility in the use models accommodating browser, solder-in, SMA etc.

In 2005 Agilent released InfiniiMax II 1168A/69A Series. This continued the probe head style probe topology while boosting the bandwidth to 13GHz. The technology used for InfiniiMax II is the same as the one for InfiniiMax I except for the use of a new 70GHz SiGe bipolar IC process. InfiniiMax II set new standards for performance, low noise, and low loading.

While the 13GHz bandwidth of the InfiniiMax II probe system is still very adequate for many measurement needs, the extreme speeds of emerging serial data and communication technologies has driven the need for even higher performance levels. To respond to this need, Agilent has developed the InfiniiMax III 30 GHz probing system. A wide range of probe heads allows connection using a browser, ZIF (zero insertion force) tip, 2.92-mm or 3.5-mm SMA cable, or solder-in tips. These probing solutions complement the new Infiniium 90000 X- Series oscilloscopes with their industry-leading bandwidth of 33 GHz.



Model	Bandwidth range	Applications and Use	Page
InfiniiMax III N2800A/01A/02A/03A	16 GHz – 30 GHz	PCIe Gen 3, 10 Gigabit Ethernet, SATA/SAS, GDDR5, QPI, high speed optical applications with 2.92mm probe head etc.	5
InfiniiMax II 1168A/69A	10 GHz – 12 GHz	PCIe Gen 2, DDR2, DDR3, USB, SATA, XAUI etc.	9
InfiniiMax I 1130A/31A/32A/34A	1.5 GHz – 7 GHz	PCIe Gen 1 & 2, DDR2, USB, Ethernet, XAUI etc.	15

Key features

- Full 30 GHz bandwidth to the probe tip
- Industry's lowest probe and scope system noise
- Industry's highest fidelity and accuracy due to bandwidth and extremely low loading
- Probe amplifiers loaded with measured S-parameters for more accurate response correction
- Bandwidth upgradeable
- Variety of probe heads for different use models with maximum usability

Scope compatibility

Scope Family	Compatible Probes
DSOX90000, DSAX90000 Series	N2800A, N2801A, N2802A, N2803A
DSOQ90000, DSAQ90000 Series	N2800A, N2801A, N2802A, N2803A

The InfiniiMax III probing system provides the highest bandwidth and incredibly low loading to allow for a completely new level of signal fidelity and accuracy. Four different InfiniiMax III probe amplifiers ranging from 16 GHz to 30 GHz are available for matching your probing solution to your performance and budget requirements. A proprietary 200 GHz fT InP (indium phosphide) IC process with backside ground vias and novel thick film technology is utilized for the InfiniiMax III probe system to accommodate your highest performance needs and is unmatched by any product in the market.

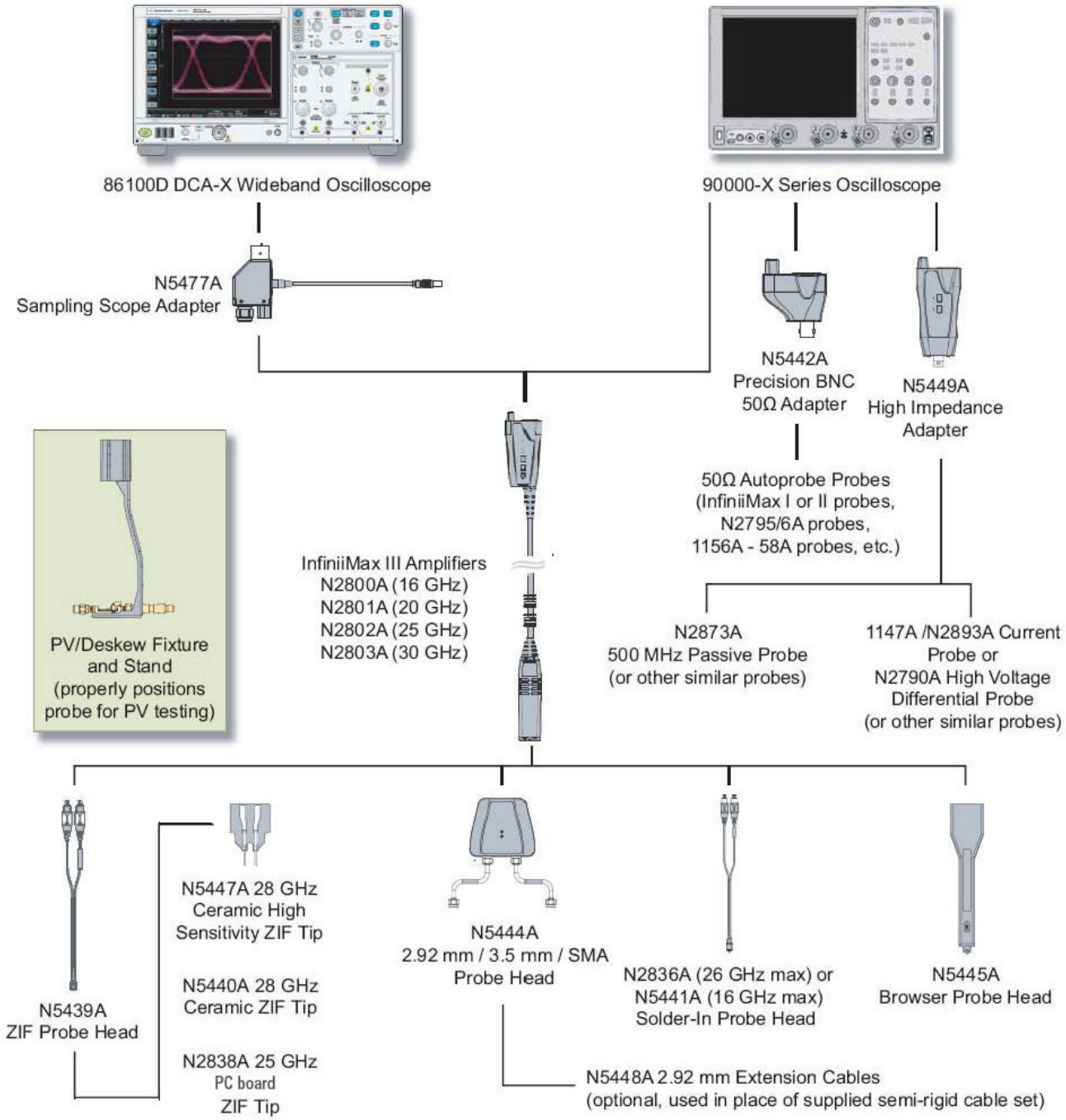
InfiniiMax III probe heads

InfiniiMax III probe heads are recommended for InfiniiMax III N2800A/01A/02A/03A probe amplifiers.

Probe Heads	Model Numbers	BW and Input Loading	Key Features
Differential browser head 	N5445A	30 GHz, Cdiff = 35fF, Cse = 50 fF, Rdiff = 100 kΩ, Rse = 50 kΩ	Z axis compliance and variable spacing from 20 mil to 125 mils, integrated LED lighting
ZIF probe head/tips 	N5439A head, N2838A 450 Ω PCB tip, N5440A 450 Ω ceramic tip, N5447A 200 Ω ceramic tip	28 GHz, Cdiff = 95fF, Cse = 130 fF, with N2838A: Cdiff = 32fF, Cse = 44 fF, with N5440A: Rdiff = 100 kΩ, Rse = 50 kΩ N5447A: Rdiff = 50 kΩ, Rse = 25 kΩ with N5440A/N2838A	Extremely low loading, Variable spacing from 5 mil to 80mil , User replaceable damping resistor tips (N2838A only)
2.92mm/3.5mm/SMA probe head 	N5444A	28 GHz, N/A, 55 Ω to Vterm	Provides termination voltage of ±4V controlled by scope or externally
	N5441A	16 GHz, Cdiff = 77 fF, Cse = 105 fF, Rdiff=100kΩ, Rse=50kΩ	
Solder-in head 	N5441A N2836A	16 GHz, Cdiff = 77 fF, Cse = 105 fF, Rdiff=100kΩ, Rse = 50kΩ 26 GHz, Cdiff = 108 fF, Cse = 140 fF, Rdiff=100kΩ, Rse=50kΩ	Economical and semi-permanent connection, variable span of leads ranges from 5 mil to 80 mil, User replaceable damping resistor tips (N2836A only)

InfiniiMax III probing system family diagram

The following diagram is not drawn to scale. The N5449A inclides one N2873A probe. The adapter is specifically tuned for the N2873A probe. Similar probes (1 MΩ input) can be used. Other probes may not meet the bandwidth specification.



Performance characteristics (of N2803A, 30 GHz probe amplifer, with each probe head)

N2802A: BW=25 GHz, tr=17.4 psec N2801A: BW=20 GHz, tr=21.7 psec N2800A: BW=16 GHz, tr=27.1 psec

	N2803A with N5439A and N5447A (Ceramic ZIF 200Ω)	N2803A with N5439A and N5440A (Ceramic ZIF 450Ω) / N2838A (PCB ZIF 450 Ω)	N2803A with N5445A (browser)	N2803A with N5441A (16 GHz solder-in)/N2836A (26 GHz solder-in)	N2803A with N5444A (SMA adapter)
Probe bandwidth (-3dB), probe only	28 GHz (typical)	28 GHz (typical), 26 GHz* (warranted) /25 GHz (typical)	30 GHz (typical), 28 GHz* (warranted)	17.2 GHz (typical)/ 27 GHz (typical)	28 GHz
Rise and fall time, probe only	20.9 psec (10-90%), 13.8 psec (20-80%)	20.9 psec (10-90%), 13.8 psec (20-80%)/ 23.1 psec (10-90%) 14.9 psec (20-80%)	16.2 psec (10-90%), 10.9 psec (20-80%)	34.8 psec (10-90%), 26.6 psec (20-80%)/ 21.1 psec (10-90%) 13.8 psec (20-80%)	18.8 psec (10-90%), 12.7 psec (20-80%)
System bandwidth (-3dB) with DSO/DSAX93204A	28 GHz	28 GHz/25 GHz	30 GHz	16 GHz /26 GHz	28 GHz
Rise and fall time with DSO/DSAX93204A	15.5 psec (10-90%) 11.0 psec (20-80%)	15.5 psec (10-90%) 11.0 psec (20-80%)/ 17.6 psec (10-90%) 12.5 psec (20-80%)	14.3 psec (10-90%) 10.2 psec (20-80%)	27.1 psec (10-90%) 19.2 psec (20-80%)/ 16.5 psec (10-90%) 11.7 psec (20-80%)	15.5 psec (10-90%) 11.0 psec (20-80%)
Input capacitance	Cdiff=32fF, Cse=44fF/	Cdiff=32fF,Cse=44fF/ Cdiff=95 fF, Cse=130 fF	Cdiff=35fF, Cse=50fF	Cdiff=77fF, Cse=105fF/ Cdiff=108 fF, Cse=140 fF	N/A
DC input resistance*	Rdiff=50 kΩ ±2%, Rse=25 kΩ ±2%	Rdiff=100 kΩ ±2%, Rse=50 kΩ ±2%			55 Ω to Vterm
Input resistance >10 kHz	Rdiff=500 Ω, Rse=250 Ω	Rdiff=1 kΩ Rse=500 Ω			50 Ω to 0.909x Vterm
Input voltage range (differential or single-ended)	0.8Vpp, ±0.4V (HD2&3 <-38db), 1.6Vpp, ±0.8V (HD2&3<-34db)**	1.6Vpp, ±0.8V (HD2&3 <-38db), 2.5Vpp, ±1.25V (HD2&3<-34db)**			2.5 Vrms
Input common mode range	±6V DC to 250Hz ±1.25V > 250Hz	±12V DC to 250Hz ±2.5V > 250Hz			±12V DC to 250Hz ±2.5V > 250Hz (must not exceed max input voltage)
DC attenuation ratio	3:1	6:1			
Offset range	±16V when probing a single-ended signal				±16V when probing a single-ended signal (must not exceed max input voltage)
Noise referenced to input, probe only	2mVrms	4mVrms			
Maximum input voltage	18V peak CAT I				Same as input voltage range

* Denotes warranted characteristic. All others are typical.

** Harmonic distortion < -38 dB is standard; < -34 dB wider input range with slightly increased distortion

Ordering information

InfiniiMax III probe amplifier models

Model Number	Description	Recommended Oscilloscope
N2803A	30 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q Series 28 GHz - 63 GHz modelse
N2802A	25 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q Series 25 GHz models
N2801A	20 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q Series 20 GHz models
N2800A	16 GHz InfiniiMax III probe amplifier	Infiniium 90000X Series 16 GHz models

Note: N2800A-N2803A InfiniiMax probe amps are not compatible with existing InfiniiMax I or II probe heads.

InfiniiMax III probe heads

Model Number	Description	Notes
N5445A	InfiniiMax III browser head	Order N5476A for replacement probe tips (set of 4)
N5439A	InfiniiMax III ZIF probe head	Order N2838A PC board ZIF (450 Ω), N5440A Ceramic ZIF (450 Ω) or N5447A Ceramic ZIF (200 Ω) for a set of 5 ZIF tips with plastic sporks.
N5444A	InfiniiMax III 2.92 mm/3.5 mm/SMA probe head	Order N5448A 2.92 mm head flex cables to extend the cable length.
N5441A	InfiniiMax III solder-in probe head	
N2836A	InfiniiMax III 26 GHz solder-in probe head	Order N2836-68701 for replacement resistor tips

Note: N54xxA InfiniiMax III probe heads are not compatible with InfiniiMax I or II probe amps.

InfiniiMax III probe adapters

Model Number	Description	Notes
N5442A	Precision BNC adapter (50 Ω)	For use with InfiniiMax I and II probes, N2795A/96A, 1156A-58A etc.
N5449A	High impedance probe adapter	Includes one N2873A 500MHz 10:1 passive probe
N5477A	Sampling scope adapter	For use with Agilent 86100C DCA-J sampling scope
N5443A	Performance verification and deskew fixture	

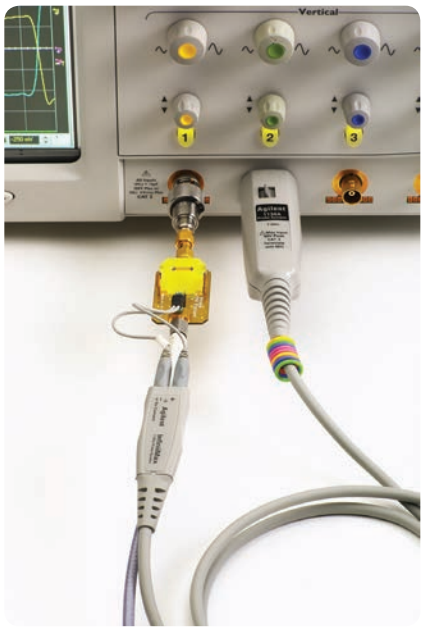
Probe bandwidth upgrade options

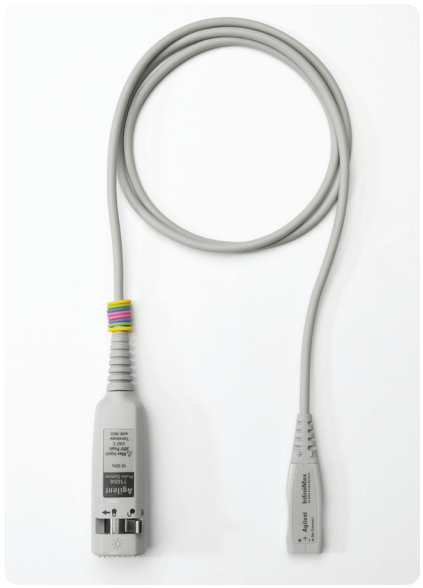
Model Number	Description	Notes
N5446A	16 GHz to 20 GHz bandwidth upgrade	
N5446B	20 GHz to 25 GHz bandwidth upgrade	
N5446C	25 GHz to 30 GHz bandwidth upgrade	

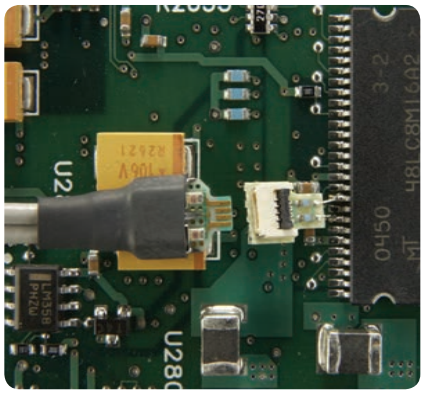
Note: Purchase two or more upgrade options to go from 16 to 25 or 30 GHz and 20 to 30 GHz. To upgrade the probe bandwidth, you simply need to send the probe to the Agilent service center.

Other recommended accessories for InfiniiMax III probing system

Model Number	Description	Notes
N5450B	Infiniium extreme temperature extension cable	-55°C – +150°C testing with N5441A solder-in head
N2787A	3D probe positioner	For hands-free probing
N2812A	High performance input cable, 2.92 mm connectors, 1 m length	For use with Infiniium 90000 Q-Series and Infiniium 90000X/Q Series oscilloscope
MV-23	Carson Optical MagniVisor	www.carsonoptical.com/Magnifiers







Key features

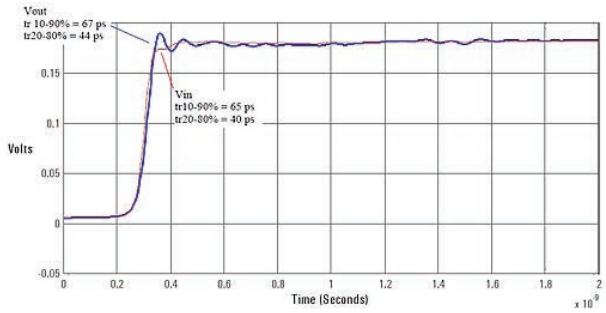
- Up to 13 GHz bandwidth for differential, solder-in, browser and SMA connections
- Low noise and flat frequency response
- Industry's widest variety of differential probe head types

Scope compatibility

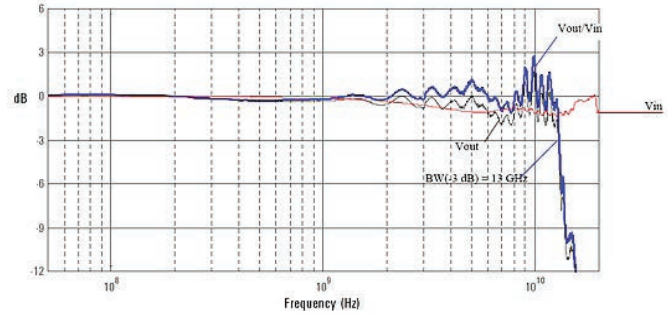
Scope Family	Recommended Probes
DSO90000, DSA90000, DSO80000, DSA80000 Series	1168A, 1169A

The InfiniiMax II series 1168A/69A probing system designed to be used with Infiniium 80000 and 90000 Series oscilloscopes provides real-time bandwidth to 12 GHz specified and has 13 GHz typical performance. The innovative InfiniiMax probing system supports even the most demanding mechanical access requirements without sacrificing performance.

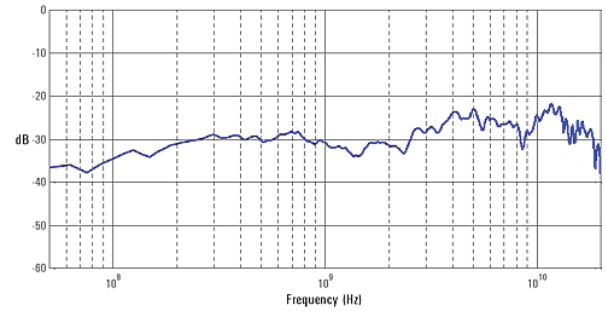
Characterized performance plots: 1169A with N5381A differential solder-in probe head



Graph of Vin and Vout of 1169A and N5381A solder-in head with a 25 Ω 58 psec step generator



Frequency response of 1169A and N5381A with a 25Ω source



Common mode rejection ratio of 1169A

Ordering information

InfiniiMax II Series probe amplifiers

Model Number	Bandwidth	Description
1169A	12 GHz (spec) 13 GHz (typical)	InfiniiMax II probe amplifier – order one or more probe heads
1168A	10 GHz	InfiniiMax II probe amplifier – order one or more probe heads

InfiniiMax probe amplifier specifications: Dynamic range = 3.3 V, DC offset range = ± 16 V, maximum voltage = ± 30 V

InfiniiMax II Series probe heads

InfiniiMax II Series probe heads are recommended for 1169A/68A probe amplifiers. When used with a DSO81304A or DSO91304A, the N5380B, N5381A, and N5382A will typically achieve 13 GHz bandwidth.

Probe Head	Model Number	Differential measurement (BW, input C, input R)	Single-ended measurement (BW, input C, input R)
Hi-BW differential SMA	N5380B	12 GHz	12 GHz
Hi-BW differential solder-in	N5381A	12 GHz, 0.21 pF, 50 kΩ	12 GHz, 0.35 pF, 25 kΩ
Hi-BW differential browser	N5382A	12 GHz, 0.21 pF, 50 kΩ	12 GHz, 0.35 pF, 25 kΩ
ZIF solder-in	N5425A with N5426A with N5451A 7mm, 0 deg with N5451A 11mm, 0 deg with N2884A	 12 GHz, 0.33 pF, 50 kΩ 9.9 GHz, - , 50 kΩ 5 GHz, - , 50 kΩ 12 GHz, 350 fF, 50kΩ	 12 GHz, 0.53 pF, 25 kΩ 9.9 GHz, 0.6 pF, 25 kΩ 5 GHz, 0.68 pF, 25 kΩ 12 GHz, 320 fF, 25kΩ

InfiniiMax I Series probe heads can be used with 1169A/68A probe amplifiers with limitations.

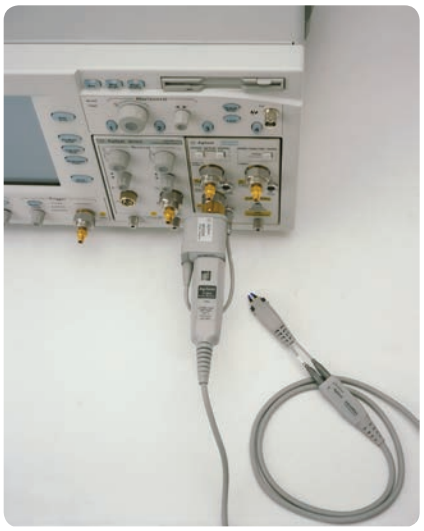
Probe Head	Model Number	Differential measurement (BW, input C, input R)	Single-ended measurement (BW, input C, input R)
Differential solder-in (Higher loading, high frequency response variation)	E2677A	12 GHz, 0.27 pF, 50 kΩ	12 GHz, 0.44 pF, 25 kΩ
Differential socket (Higher loading)	E2678A	12 GHz, 0.34 pF, 50 kΩ	12 GHz, 0.56 pF, 25 kΩ
Differential browser – wide span	E2675A	6 GHz, 0.32 pF, 50 kΩ	6 GHz, 0.57 pF, 25 kΩ
Differential SMA	E2695A	8 GHz	8 GHz
Single-ended solder-in (must bandlimit input to ≤ 6 GHz)	E2679A	N/A	6 GHz, 0.50 pF, 25 kΩ
Single-ended browser	E2676A	N/A	6 GHz, 0.67 pF, 25 kΩ

Overcoming measurement challenges with InfiniiMax probe

InfiniiMax probe is not just for Infiniium scope.

The benefits of Agilent's award winning InfiniiMax probes are not restricted to Agilent Infiniium oscilloscopes. A variety of accessories are available that allow you to use InfiniiMax probes with other test equipment, such as spectrum analyzers and sampling oscilloscopes.

To learn more about how to use the InfiniiMax probe with your test equipment other than Agilent Infiniium oscilloscopes, refer to the Agilent literature number 5989-1869EN.



Operating at high or low temperatures

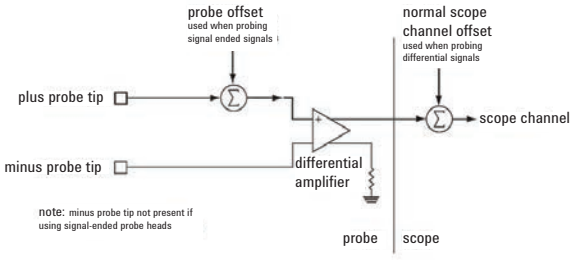
You may need to monitor a system in a temperature chamber with an oscilloscope probe to verify performance over a wide range of operating temperatures, or to determine the cause of failures at high or low temperatures. Agilent InfiniiMax I/II probe amplifiers have a specified operating temperature range from 5° C to 40°C. However, the probe heads can be operated over a much wider range. You can use the Agilent N5450B extension cable set to physically separate the probe heads from the probe amplifiers. This will allow you to operate the probe heads inside a temperature chamber with the probe amplifier located outside the temperature chamber. To learn more about how to extend the operating range of the InfiniiMax probes in temperature, refer to the Agilent literature number 5989-7587EN.

Increasing the voltage dynamic range and offset range

The dynamic range of the InfiniiMax probes is 5 V p-p for InfiniiMax I and 3.3 V p-p for InfiniiMax II. For applications that need to measure larger signals with faster edges, the N2880A in-line coaxial attenuator kit allows you to increase the dynamic range of the probe system up to 50 Vpp and the offset range up to +/-30V, without affecting the bandwidth or rise time characteristics of the probe system. The N2881A DC blocking capacitors can be used in series with the N2880A InfiniiMax in-line attenuator to block out unwanted DC components of the input signal up to 30 V. To learn more about how to extend the operating range of the InfiniiMax probes in input range, refer to the Agilent literature number 5989-7587EN.

How would I measure small AC riding on top of large DC with InfiniiMax probe?

It is challenging to measure very small signals riding on top of large signals with scopes, as most scopes have limited dynamic ranges and offset ranges. Consider using an InfiniiMax active probe which provides a huge offset range that can allow you to make measurements you need. To learn more about how to use the InfiniiMax probe's offset range, refer to the Agilent literature number 5990-8255EN and 5988-9264EN.



InfiniiMax offers you the highest performance available for measuring differential and single-ended signals, with flexible connectivity solutions for today's high-density ICs and circuit boards.

InfiniiMax probes have fully characterized performance for all of their various probe heads. This includes:

- Swept frequency response plot
- Common mode rejection versus frequency plot
- Impedance versus frequency plot
- Time-domain probe loading plot
- Time-domain probe tracking plot

Controlled impedance transmission lines in every probe head deliver full performance versus the performance limitations introduced by traditional wire accessories.

Probe interface software allows you to save the calibration information for up to 10 different probe heads per channel and will automatically retrieve calibration data for a probe amplifier when attached to the scope.

High-input impedance active probes minimize loading, support differential measurements and DC offset, and can compensate for cable loss.

Probe calibration software delivers the most accurate probe measurements and linear phase response and allows various probe combinations to be deskewed to the same reference time.

A flat frequency response over the entire probe bandwidth eliminates the distortion and frequency-dependent loading effects that are present in probes that have an in-band resonance.

E2677A 12-GHz solder-in differential probe head can be attached to very-small-geometry circuits for measuring both single-ended and differential signals. External mini-coaxial resistors facilitate wider span but have increased high-frequency response variation relative to N5381A.

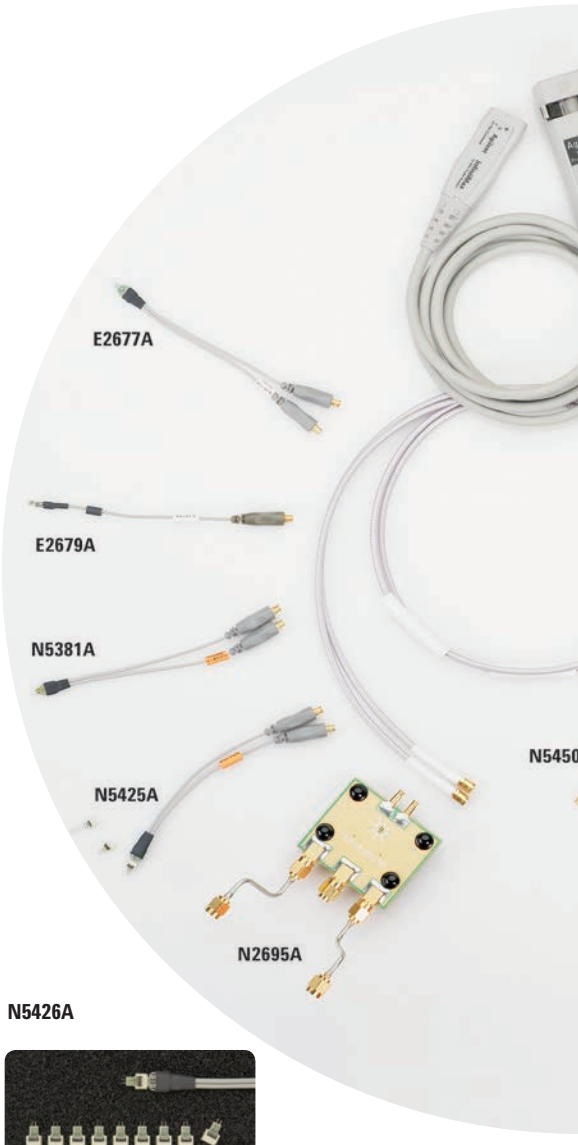
E2679A 6-GHz extremely small single-ended, solder-in probe heads for probing even the hardest-to-reach single-ended signals.

N5381A 13-GHz high-bandwidth solder-in differential probe head provides maximum bandwidth and minimizes capacitive loading to ≤ 210 fF. Variable spacing from 0.2 to 3.3 mm (8 to 130 mills).

N5425A 13-GHz high-bandwidth solder-in differential ZIF probe head and N5426A ZIF tip provides maximum bandwidth with the industry's first lead-free solder-in probe solution in an economical replaceable tip form factor.

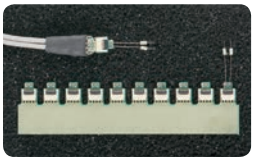
N5451A 9-GHz/5-GHz long-wire ZIF tip provides a high-bandwidth economical replaceable solder-in tip with extra reach (9 GHz with 7 mm and 5 GHz with 11 mm wire).

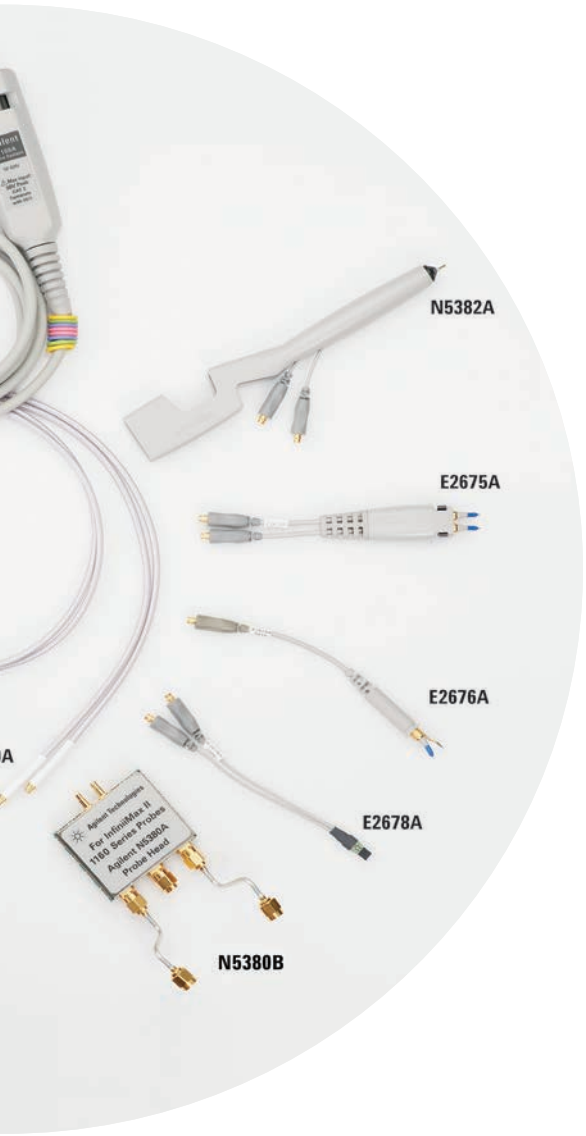
E2695A 8-GHz differential SMA probe head allows you to connect two SMA cables to make a differential measurement on a single scope channel.



N5426A

N5451A





Six different InfiniiMax probe amplifiers from 1.5 GHz to 13 GHz are available for matching your probing solution to your performance and budget requirements. The 1168/69A InfiniiMax II amplifiers offer the highest bandwidth and the lowest noise floors. The 1134/32/31/30A offer a more cost efficient solution and wider dynamic range.

N5382A 13-GHz high-bandwidth differential browser provides maximum bandwidth for hand-held or probe holder use. Variable spacing from 0.2 to 3.3 mm (8 to 130 mills).

E2675A 6-GHz differential browser is the best choice for general-purpose trouble shooting of differential or single-ended signals with z-axis compliance and variable spacing from 0.25 - 5.80 mm (10 - 230 mills).

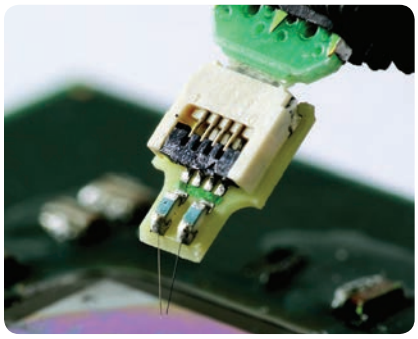
E2676A 6-GHz single-ended browser is the best choice for general-purpose probing of single-ended signals when the small size of the probe head is the primary consideration.

E2678A 12-GHz differential socket probe head can be used to measure either differential or single-ended signals via a plug-on socket connection.

N2880A In-line Attenuator Kit allows you to increase the dynamic range and the offset range of the InfiniiMax probe without affecting the bandwidth.

N2881A DC Blocking Capacitors can be used to in series with the N2880A InfiniiMax in-line attenuators to block out unwanted DC components of the input signal up to 30V.

N2884A Differential Fine-wire Probing Tip InfiniiMax differential fine-wire probing tip is a high fidelity, high bandwidth solution for probing an active IC.



N2887A InfiniiMax Soft touch Pro Probe Adapter adapts from the Agilent Pro Series (36 ch) Soft touch connectorless logic analyzer foot print to the Agilent InfiniiMax I & II series probe amplifier input connectors

N2888A InfiniiMax Soft touch half-channel Probe Adapter adapts from the Agilent half-channel (18 ch) Soft touch connectorless logic analyzer foot print to the Agilent InfiniiMax I & II series probe amplifier input connectors

N5380B 13-GHz high-bandwidth differential SMA probe head provides maximum bandwidth for SMA-fixtured differential pairs.

N5450B InfiniiMax extreme temperature extension cable provides extra reach into environmental chambers.

Performance characteristics

	1169A	1168A
Bandwidth*	1169A: > 12 GHz (13 GHz typical)	1168A: > 10 GHz
Rise and fall time		
Probe only	1169A: 28 ps (20 - 80%), 40 ps (10 - 90%)	1168A: 34 ps (20 - 80%), 48 ps (10 - 90%)
When phase compensated by 90000A Series oscilloscope	1169A w/91204A: 25 ps (20 - 80%) 36 ps (10 - 90%) 1169A w/91304A: 23 ps (20 - 80%) 33 ps (10 - 90%)	1168A w/90804A: 38 ps (20 - 80%) 54 ps (10 - 90%)
System bandwidth (–3 dB)	1169A w/91304A: 13 GHz (typical) 1169A w/91204A: 12 GHz	1168A w/90804A: 8 GHz
Input capacitance[1]	Cm = 0.09 pF Cm is between tips Cg = 0.26 pF Cg is to ground for each tip Cdiff = 0.21 pF Differential mode capacitance = Cm + Cg/2 Cse = 0.35 pF Single-ended mode capacitance = Cm + Cg	
Input resistance*	Differential mode resistance = 50 kΩ ± 2% Single-ended mode resistance = 25 kΩ ± 2%	
Input dynamic range	3.3 V peak to peak, ± 1.65 V	
Input common mode range	±6.75 V dc to 100 Hz; ±1.25 V > ±100 Hz	
Maximum signal slew rate	25 V/ns when probing a single-ended signal 40 V/ns when probing a differential signal	
DC attenuation	3.45:1	
Zero offset error referred to input	± 1.5 mV	
Offset range	± 16.0 V when probing single-ended	
Offset gain accuracy	< ± 1% of setting when probing single-ended	
Noise referred to input	2.5 mV rms, probe only	
Propagation delay	~6 ns (this delay can be deskewed relative to other signals)	
Maximum input voltage	30 V peak, CAT I	
ESD tolerance	> 8 kV from 100 pF, 300 Ω HBM	
Temperature	Operating: 5 °C to +40 °C Non-operating: 0 °C to +70 °C	

* Denotes warranted specifications, all others are typical.
1 Measured using the probe amplifier and N5381A solder-in differential probe head.

Key features

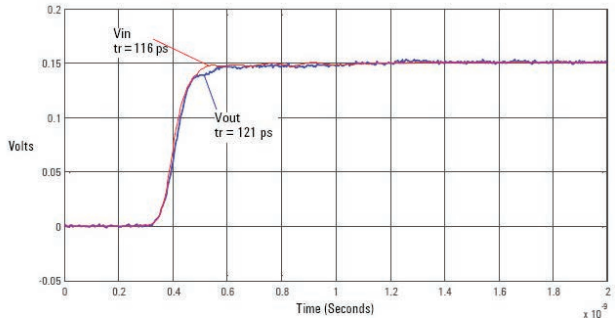
- Up to 7 GHz bandwidth for differential, solder-in, browser and SMA connections
- Low noise and flat frequency response
- Wide dynamic range (±2.5 V) and offset range (±12 V)

Scope compatibility

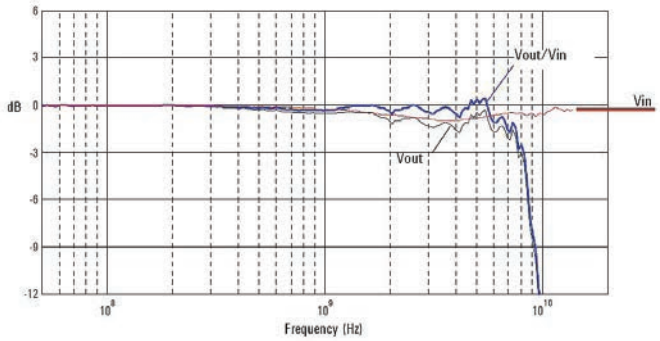
Scope Family	Recommended Probes
DSO/DSA90604A	1134A
DSO/DSA90404A,DSO/MSO9404A	1132A
DSO/DSA90254A, DSO/MSO9254A, 54845/46/53A/B	1131A
DSO/MSO9104A, 9064A, 8104A, 5483xB/D	1130A

For high-speed differential or single-ended probing in embedded designs, the InfiniiMax 1130A Series differential probe amplifiers are perfect complements to the Infiniium 600 MHz – 6 GHz oscilloscopes. Its extremely low input capacitance, flat frequency response and the patented resistor probe tip technology provide ultra low loading of the DUT and superior signal fidelity.

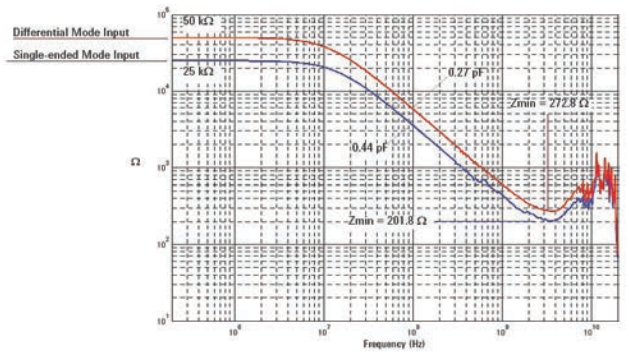
Characterized performance plots: with E2677A differential solder-in probe head



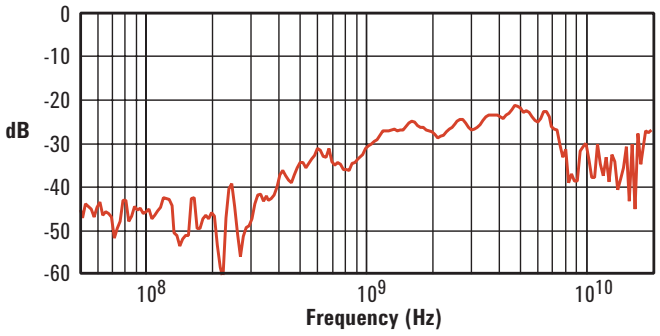
Vin and Vout of probe with a 25 Ω, 100 psec step signal



Swept frequency response with a 25 Ω source.



Probe input impedance vs. frequency



Common mode rejection versus frequency.

Agilent 1130A/31A/32A/34A InfiniiMax high-performance active probe system

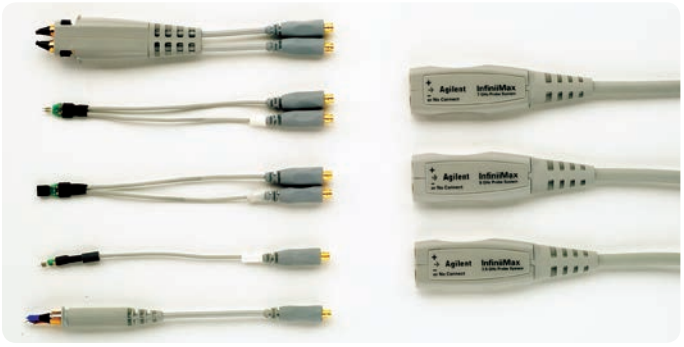
- **InfiniiMax 7 GHz, 5 GHz, 3.5 GHz, and 1.5 GHz probing system**
- **Each InfiniiMax probe amplifier supports both differential and single-ended measurements for a more cost-effective solution**
- **Unrivaled InfiniiMax probing accessories support browsing, solder-in, and socket use models at the maximum performance available**

The Agilent InfiniiMax 1134A, 1132A, 1131A and 1130A probe systems provide 7 GHz, 5 GHz, 3.5 GHz and 1.5 GHz of bandwidth respectively, and offer the following benefits:

- The probes have a **flat frequency response over the entire bandwidth specification,** eliminating the distortion and loading that affect probes with in-band resonance. The probing system enables engineers to utilize their oscilloscope's entire bandwidth without being limited to measuring only 50 Ω transmission lines or using passive resistive divider probes that produce voltage measurement error and circuit loading. Designers can achieve system measurement bandwidths of 4.5 to 6 GHz even when manually "browsing" with the probe. Solder-in probe heads and solder-in sockets provide even higher bandwidths.
- The Agilent InfiniiMax 1130A series probe system supports **a wide variety of real-world applications with an extensive line up of probe heads and accessories.** The accessories can meet the most demanding mechanical access requirements. Small probe heads can be placed between densely packed PC boards. Solder-in sockets are available for signals that need frequent measurement. A differential SMA probe head is available to connect to fixtures that have SMA connections. A smart ergonomic design allows users to set the spacing between the probe pins (variable span). When not concerned with minimum probe size, designers can use a browsing sleeve to make holding the probe more comfortable. Both probe tips of the differential probe can "flex" to support various probing angles and target system characteristics (z-axis compliance). Innovative damped-wire accessories compensate for the inductance and capacitance associated with the leads, and prevent distortion of the measured signal.
- The groundbreaking design of Agilent InfiniiMax 1130A probe system also enables users to make **either single-ended or differential measurements from a single probe amplifier,** depending on their choice of probe head and accessory. This can result in significant savings in cost and time. The common mode rejection of the differential probe head reduces a measurement's noise floor. Overall, the Agilent 1130 series probing system delivers unmatched performance, accuracy and connectivity.

InfiniiMax: The World's Best High-Speed Oscilloscope Probing System

EDN Magazine has awarded Agilent's InfiniiMax active probe system the 2002 Innovation of the Year Award.



InfiniiMax offers you the highest performance available for measuring differential and single-ended signals.

Performance characteristics

	1130A/31A/32A/34A
Probe Bandwidth*	1134A: > 7 GHz 1132A: > 5 GHz 1131A: > 3.5 GHz 1130A: > 1.5 GHz
Rise and fall time (10% to 90%)	1134A: 60 psec 1132A: 86 psec 1131A: 100 psec 1130A: 233 psec
System bandwidth (–3 dB)	1134A with DSO/DSA90604A: 6 GHz 1132A with DSO/DSA90404A, DSO/MSO9404A: 4 GHz 1131A with DSO/DSA90254A, DSO/MSO9254A: 2.5 GHz 1130A with DSO/MSO9104A: 1 GHz 1130A with DSO/MSO9064A: 600 MHz
Input capacitance**	Cm = 0.1 pF Cm is between tips. Cg = 0.34 pF Cg is to ground for each tip. Cdiff = 0.27pF Differential mode capacitance = Cm + Cg/2 Cse = 0.44 pF Singe-ended mode capacitance = Cm + Cg
Input resistance*	Differential mode resistance = 50 kΩ ± 1% Single-ended mode resistance = 25 kΩ ± 1%
Input dynamic range	±2.5 V
Input common mode range	±6.75 V dc to 100 Hz; ±1.25 V >100 Hz
Maximum signal slew rate	18 V/ns when probing a single-ended signal 30 V/ns when probing a differential signal
DC attenuation	10:1 ± 3% before calibration on oscilloscope 10:1 ± 1% after calibration on oscilloscope
Zero offset error referred to input	< 30 mV before calibration on oscilloscope < 5 mV after calibration on oscilloscope
Offset range*	± 12.0 V when probing single-ended
Offset accuracy	< 3 % setting before calibration on oscilloscope < 1 % setting after calibration on oscilloscope
Noise referred to input	3.0 mVrms
Propagation delay	~6 nsec (This delay can be deskewed relative to other signals.)
Maximum input voltage*	30 Vpeak, CAT I
ESD tolerance	> 8 kV from 100 pF, 300 Ω HBM

* Denotes warranted specifications, all others are typical.

** Measured using the probe amplifier and solder-in differential probe head with full bandwidth resistors.

Ordering information

InfiniiMax I probe amplifier models

Model Number	Description	Quantity
1134A	7 GHz InfiniiMax Probe Amplifier (order one or more probe heads or connectivity kits per amplifier).	1
1132A	5 GHz InfiniiMax Probe Amplifier (order one or more probe heads or connectivity kits per amplifier).	1
1131A	3.5 GHz InfiniiMax Probe Amplifier (order one or more probe heads or connectivity kits per amplifier).	1
1130A	1.5 GHz InfiniiMax Probe Amplifier (order one or more probe heads or connectivity kits per amplifier).	1

* Note: Requires 54830 Series system software revision A.03.10 or higher. For A.02.xx or lower, order N5383A to upgrade system software.

InfiniiMax I connectivity kits models

Model Number	Description	Quantity
E2669A	InfiniiMax connectivity kit for differential/single-ended measurements. Includes one differential browser, four solder-in differential probe heads and two socketed differential probe heads. Includes all necessary accessories.	1
E2668A	InfiniiMax connectivity kit for single-ended measurements. Includes one single-ended browser, one solder-in probe heads and one socketed probe heads. Includes all necessary accessories.	1

InfiniiMax I individual probe heads

Model Number	Description	Quantity
E2675A	InfiniiMax differential browser probe head and accessories. Includes 20 replaceable tips and ergonomic handle. Order E2658A for replacement accessories.	1
E2676A	InfiniiMax single-ended browser probe head and accessories. Includes 2 ground collar assemblies, 10 replaceable tips, a ground lead socket and ergonomic handle. Order E2663A for replacement accessories.	1
E2677A	InfiniiMax differential solder-in probe head and accessories. Includes 20 full bandwidth and 10 medium bandwidth damping resistors. Order E2670A for replacement accessories.	1
E2678A	InfiniiMax single-ended/differential socketed probe head and accessories. Includes 48 full bandwidth damping resistors, 6 damped wire accessories, 4 square pin sockets and socket heatshrink. Order E2671A for replacement accessories.	1
E2679A	InfiniiMax single-ended solder-in probe head and accessories. Includes 16 full bandwidth and 8 medium bandwidth damping resistors and 24 zero ohm ground resistors. Order E2672A for replacement accessories.	1
E2695A	Differential SMA probe head. Includes semi-rigid coax to change span between SMA connectors.	1

InfiniiMax I adapters

Model Number	Description	Quantity
N1022B	Adapts 113X/115X active probes to 86100 Infiniium DCA.	1
N2887A	InfiniiMax Soft touch Pro probe adapter (36 channel, up to 4 GHz)	1
N2888A	InfiniiMax Soft touch half-channel probe adapter (18 channel, up to 4 GHz)	1

InfiniiMode Active Probes
N2750A/51A/52A InfiniiMode probes

- 1.5 GHz, 3.5 GHz, and 6 GHz probe bandwidth models
- Dual attenuation ratio (2:1/10:1)
- High input resistance (200 kΩ dif ferential, 100 kΩ single-ended)
- Wide input dynamic range (10 Vpp) and offset range (±15 V)
- High CMRR (>60 dB at 1 MHz)
- InfiniiMode probing for making differential, single-ended, and common mode measurements with a single probe
- Built-in quick action scope control for quick access to a variety of scope functions
- Built-in headlight
- Includes solder-in, browser, and socketed tips standard
- AutoProbe interface for auto configuration and probe power for Infiniium scopes

The N2750A Series InfiniiMode differential probes are a new generation of low-cost, 1.5 GHz, 3.5 GHz, and 6 GHz differential active probes compatible with Infiniium oscilloscope's AutoProbe interface.

Measurement Versatility

The N2750A Series differential probes offer 2:1 and 10:1 dual attenuation settings, allowing them to be used for a broad range of applications. Dual attenuation range is automatically configured depending on the size of the input signal.

The new differential probes have an input resistance of 200 kΩ (differential) or 100 kΩ (each input to ground) and an extremely low input capacitance of 700 fF to minimize circuit loading. This, accompanied with superior signal fidelity, makes these probes useful for most digital design and debug applications. And with their wide dynamic range (10 Vpp) and offset range (±15 V), these probes can be used in a wide variety of analog signal measurements as well.

InfiniiMode Usability

The N2750A Series probes come with new InfiniiMode operation modes. The InfiniiMode allows convenient measurements of differential, single-ended, and common mode signals with a single probe tip without reconnecting the probe to change the connection. The N2750A probe's InfiniiMode provides the following modes of operation.

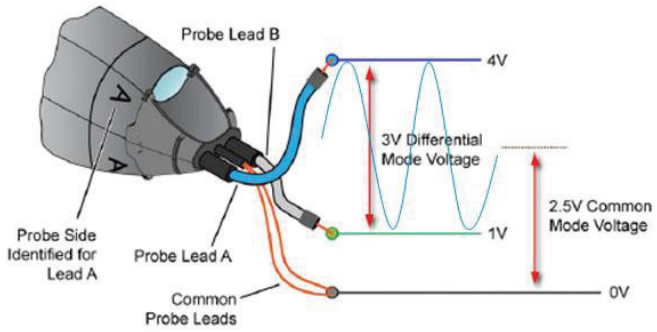
- A – B (differential),
- A – ground (single-ended A)
- B – ground (single-ended B)
- (A+B)/2 – ground (common mode)

Quick action scope control

The N2750A Series differential probes provide convenient and quick access to various functions on the scope. You often have a need to control the scope while you hold a probe in your hand. With the quick action scope control feature built into the probe, you can turn the built-in headlight of the probe on and off or control some frequently used scope functions, such as RUN/STOP,
auto scale, quick print, quick save, etc., with only the push of a button on the probe. Get control of your most needed function with a push of the quick action control button on the probe.

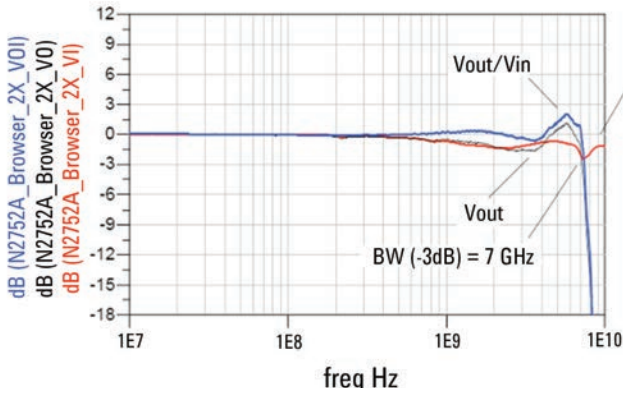
Flexibility in probe use models is also a vital necessity. The probes come standard with three different types of exchangeable probe tips that allow for easy connections to the circuit under test. These probe tips enable you to access multiple signals on anything from header connectors to hard-to-reach, high-density circuitry. The probes are equipped with a white LED headlight to illuminate the circuit under test which will help you see where you are probing.

The probes are powered directly by the Infiniium Autoprobe interface, eliminating the need for an additional power supply.

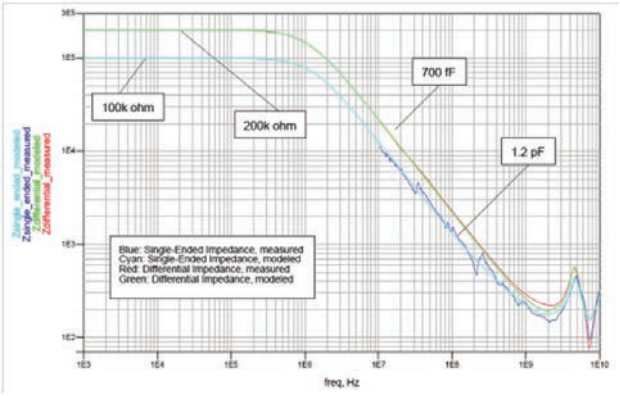


The InfiniiMode probe allows convenient measurements of differential, single-ended (A and B) and common mode signals with a single probe.

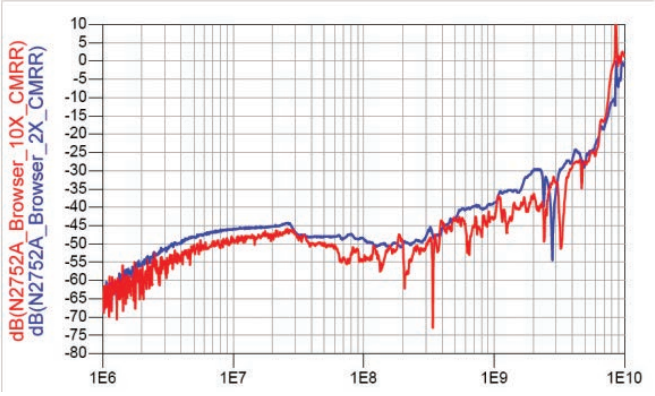
Characteristics and specifications			
Model Number	N2750A	N2751A	N2752A
Probe Bandwidth* (-3dB)	1.5 GHz	3.5 GHz	6 GHz (warranted), 7 GHz (typical)
Rise time, probe only (10-90%)	233 psec	100 psec	58.3 psec
System Bandwidth (with Agilent oscilloscope)	1 GHz (with Agilent's 1 GHz Infiniium oscilloscope)	2.5 GHz (with Agilent's 2.5 GHz Infiniium oscilloscope)	4/6 GHz (with Agilent's 4/6 GHz Infiniium oscilloscope)
Input Resistance (@DC)*		200kΩ ± 2% (differential mode) 100kΩ ± 2% (single-ended mode) 50kΩ ± 2% (common mode)	
Input Capacitance		700 fF (with browser)	
Attenuation Ratio (@DC)		2:1 / 10:1	
Input Dynamic Range		±1 V, 2 Vpp (@2:1) / ±5 V, 10 Vpp (@10:1)	
Input Common Mode Range		±15 V (from DC to 100 Hz), ±2.5 V (for >100 Hz) ****	
Offset Range		±15 V	
Offset Accuracy**		< 3%	
Maximum Non-destructive Input Voltage		±30 V (DC + peak AC)	



V_{out}/V_{in} frequency response of N2752A (at 2:1) with browser tip



V_{out}/V_{in} frequency response of N2752A (at 2:1) with browser tip



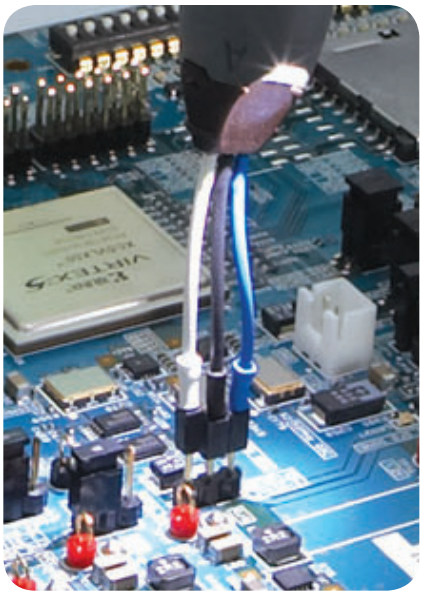
Common mode rejection ratio (red= 2:1, blue= 10:1)

Ordering information	
Model number	Description
N2750A	1.5 GHz InfiniiMode differential probe
N2751A	3.5 GHz InfiniiMode differential probe
N2752A	6 GHz InfiniiMode differential probe
N2776A	Differential browser tips (qty 3)
N2777A	InfiniiMode solder-in tips (qty 3)
N2778A	InfiniiMode socketed tips (qty 3)

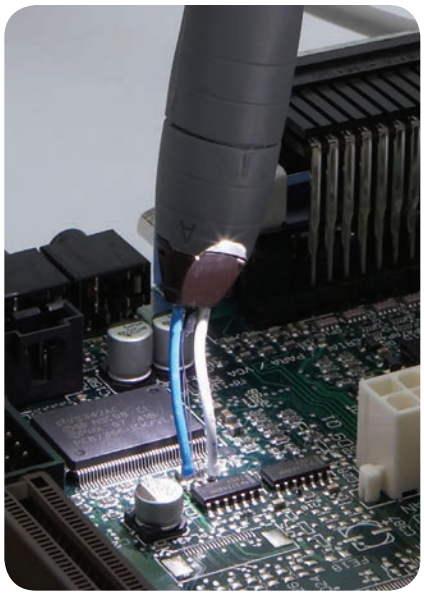
The N2750A/51A/52A InfiniiMode probes include one browser tip, one socketed tip and two solder-in tips as standard.

Other Recommended Accessories	
Model number	Description
N2787A	3D probe positioner
E2655C	Performance verification and deskew fixture
N5442A	Precision BNC adapter for 90000X/Q Series oscilloscopes

N2750A with browser tip



N2750A with socketed tip

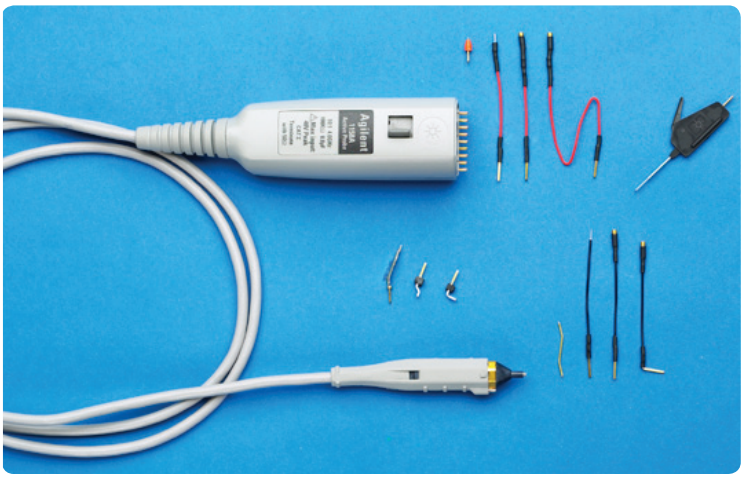


N2750A with solder-in tip

For more information about the N2750A Series InfiniiMode probes, refer to the data sheet with the Agilent literature number, 5991-0560EN.

Single-ended Active Probes - 1156A/57A/58A Active Probes

- **Ideal for a range of hi-speed, single-ended applications**
- **88 ps rise time (on 4 GHz model)**
- **100 kΩ, 0.8 pF, non-resonant input impedance**
- **5 V peak-to-peak dynamic range**
- **± 15 V offset**
- **Accessories designed for minimal device loading and optimal response**
- **Small size for easier probing**



Agilent 1156A/57A/58A active probe for hi-speed signals.

As the speeds in your design increase, you may notice more overshoot, ringing, and other perturbations when connecting an oscilloscope probe. Probes form a resonant circuit where they connect to the device. If this resonance is within the bandwidth of the oscilloscope probe you are using, it will be difficult to determine if the measured perturbations are due to your circuit or the probe.

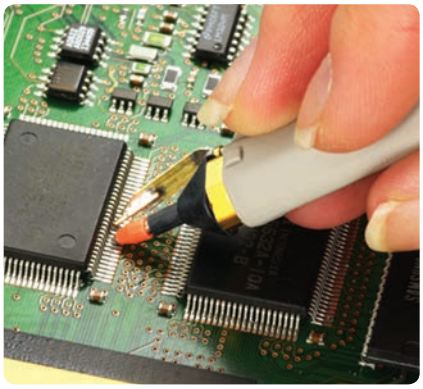
These probes are compatible with the AutoProbe interface, which completely configures the oscilloscope for use with the probe. Power for the active probe is supplied by the oscilloscope.

Faithful reproduction of your signal

Now you can accurately measure your hi-speed signals without introducing errors from a probe that has a resonant input impedance or non-flat frequency response. With the 1156A/57A/58A probes, a damping resistor is placed as close as possible to the point being probed, which keeps the input impedance from resonating low, and it also allows a flat frequency response across the entire bandwidth of the probe. Finally, there is a high-bandwidth active probe where the waveform onscreen matches the waveform at the probe tip. The 1158A offers a flat response for the entire bandwidth of a 4 GHz probe!

Small size

Have you experienced problems with large, clunky probes? If so, you probably found your probe awkward to hold and had difficulty connecting to your signals. With the small size of the 1156A/57A/58A, you can handle the probe expertly and gain access to tight spaces. Plus, the low mass makes the probe more durable. Agilent makes your job easier–giving you performance that is easy to use.



Probe with resistive signal pin and ground blade.

Superior accessories

Your device under test (DUT) determines the type of probing accessories you need. Of course, there are electrical trade-offs depending on the type of connection you use. Longer connections from your DUT produce lower performance probing systems.

Agilent offers a variety of accessories optimized to give you the most accurate reproduction of your signal. In addition, the performance of each accessory is characterized to fit your needs. Now you can make informed decisions and get the best measurement for your environment. Superior performance combined with the knowledge to use it–that's how Agilent helps you do your job better.

Operating characteristics

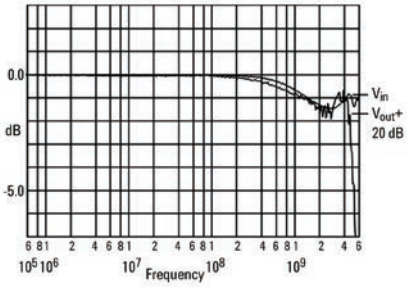
	1156A/57A/58A
Bandwidth (–3 dB)	1156A: > 1.5 GHz; 1157A: > 2.5 GHz; 1158A: > 4 GHz
System bandwidth (–3 dB)	1158A with DSO/DSA90404A, DSO/MSO9404A: 4 GHz 1157A with DSO/DSA90254A, DSO/MSO9254A: 2.5 GHz 1156A with DSO/MSO9104A: 1 GHz 1156A with DSO/MSO9064A: 600 MHz
Rise and fall time (10% to 90%) calculated from t_r = 0.35/band-width	1156A: < 233 ps; 1157A: < 140 ps; 1158A: < 88 ps
Input capacitance	0.8 pF
Input resistance*	100 kΩ 1%
Flatness, swept response	0.2 dB: 100 kHz to 100 MHz; 0.4 dB: 100 MHz to 2.5 GHz; 2.0 dB: 2.5 GHz to 4.0 GHz
Flatness, step response	±6.75 V dc to 100 Hz; ±1.25 V >100 Hz 10% overshoot: 75 ps input edge; 2%: 1 ns after edge
Dynamic range**	> 5.0 V peak-to-peak
DC attenuation*	10:1 ± 3% before calibration****; 10:1 ± 1% after calibration****
Zero offset error referred to input*	< 30 mV before calibration****; < 5 mV after calibration****
Offset range*	±15.0 V
Offset accuracy*	< 3% of setting before calibration****; 1% of setting after calibration****
Noise referred to input	3.0 mVrms
Propagation delay	5.5 ns
Maximum input voltage	40 V peak, CAT I***
ESD tolerance	> 5 kV from 100 pF, 300 Ω HBM
Temperature drift	Offset: < 1.0 mV/°C; Attenuation (Gain): 0.1 %/°C

* Denotes warranted specifications, all others are typical.

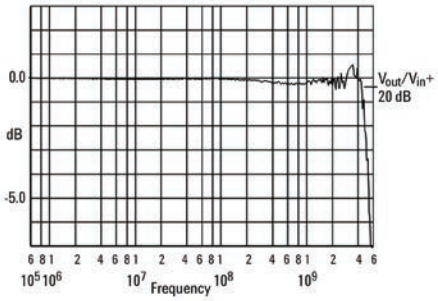
** For waveforms with edges > 3 ns, the dynamic range is > 12.0 V peak-to-peak.

*** Installation category (over voltage category) I: Signal level, special equipment, or parts of equipment, telecommun nication, electronic, etc., with smaller transient overvoltage than installation category (overvoltage category) II.

**** Probe calibrated to scope channel (under Probes Setup menu).



Notice how closely output matches input. Graph shows V_{in} and V_{out} when driven from a 25 Ω source.



The flat response means the waveform on the scope screen will match the waveform at the probe tip—across an entire 4 GHz bandwidth. Graph shows response (V_{out}/V_{in}).

Ordering information

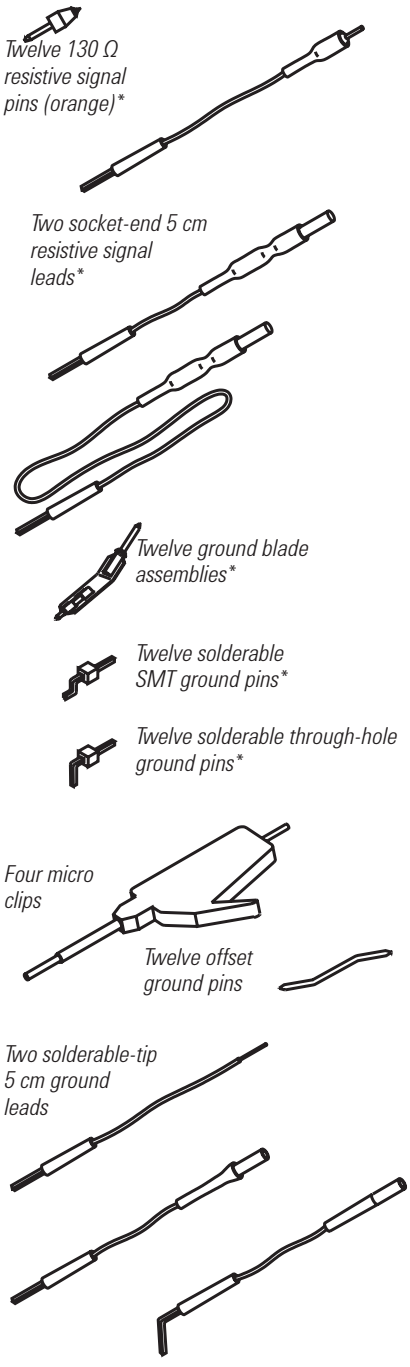
Model Number	Description	Quantity
1156A	1.5 GHz active probe*	1
1157A	2.5 GHz active probe*	1
1158A	4 GHz active probe*	1

* The Infiniium 54800A Series scope requires version A.04.30 or greater of the application software to work with the 1156A/7A/8A probes. An LS-120 drive is required for this upgrade.

Accessories

Model Number	Description	Quantity
E2637A	Precision measurement kit (includes 2 solderable ground sockets with 2 green resistive signal pins)	1
E2638A	Solderable-tip 5 cm resistive signal leads (10) with ground leads (3)	1
E2639A	Micro clips	4
E2640A	Resistive signal pins, (orange)	8
E2641A	Ground blade assembly	8

Accessories Supplied



Includes user's guide and one-year warranty.

These accessories are properly damped to give you a flat transmitted response and non-resonant input impedance. Use these supplied accessories to get the best performance from your probe.

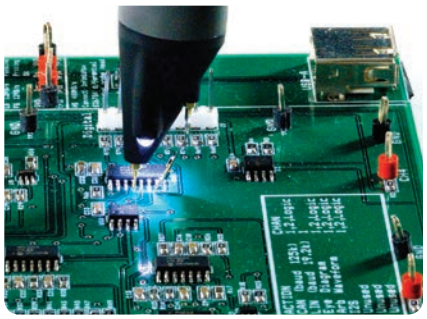
Single-ended Active Probes - N2795A/96A Active Probes

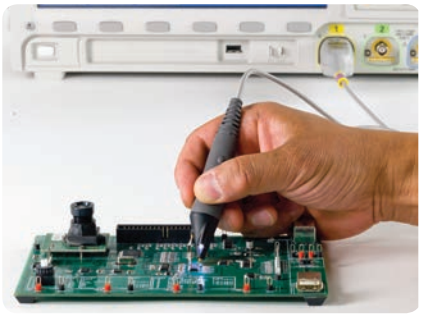
- **High resistance (1MΩ) and low capacitance (1 pF) input for low loading**
- **Wide input dynamic range (±8 V) and offset range (±12 V for N2796A, ±8 V for N2795A)**
- **Built-in headlight**
- **Direct connection to AutoProbe interface (no power supply required)**
- **Provides full system bandwidth with Infiniium oscilloscopes with bandwidths up to 1 GHz**

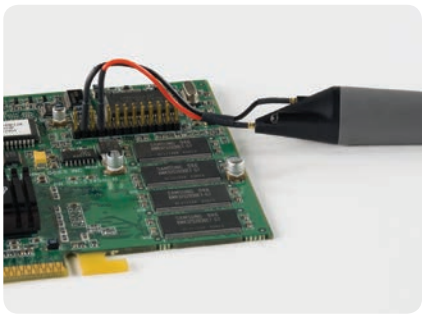
The N2795A/96A are a new generation of low-cost, 1 to 2 GHz single-ended active probes with the AutoProbe interface (compatible with Agilent's Infiniium family of oscilloscopes). These probes integrate many of the characteristics needed for today's general-purpose, high-speed probing—especially in digital system design, component design/characterization, and educational research applications. Its 1 MΩ input resistance and extremely low input capacitance (1 pF) provide ultra low loading of the DUT. This, accompanied with superior signal fidelity, makes these probes useful for most of today's digital logic voltages. And with their wide dynamic range (±8 V) and offset range (±12 V for N2796A, ±8 V for N2795A), these probes can be used in a wide variety of applications. For high signal integrity probing, the N2795A 1 GHz and N2796A 2 GHz active probes are perfect complements to Agilent's 500 to 600 MHz and 1 GHz bandwidth scopes, respectively.

The N2795A/96A are equipped with a white LED headlight to illuminate the circuit under test. The probes are powered directly by the Infiniium Autoprobe interface, eliminating the need for an additional power supply. The probes also come with a number of accessories that allow for easy connections to the circuit under test.

For more information about N2795A/96A active probe, refer to the Agilent N2795A/96A active probe data sheet, literature number 5990-6480EN.





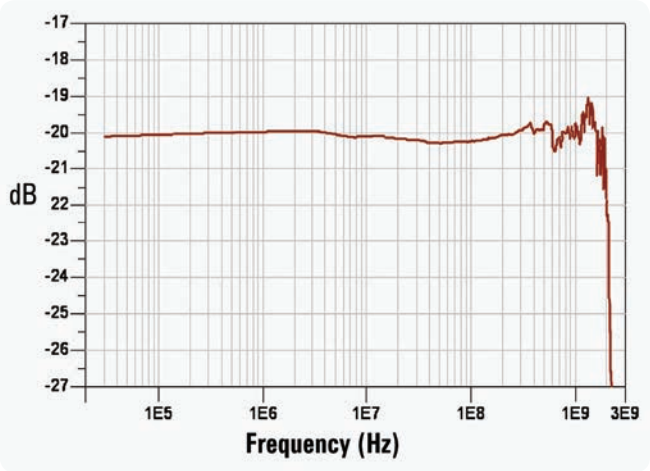


Characteristics for N2795A and N2796A active probes

	N2795A	N2796A
Probe bandwidth* (-3 dB)	1 GHz	2 GHz
Risetime	350 ps	175 ps
System bandwidth	600 MHz (with Agilent's 600 MHz Infiniium oscilloscope)	1 GHz (with Agilent's 1 GHz Infiniium oscilloscope)
System bandwidth		
Attenuation ratio (at dc)	10:1 ± 0.5%	
Input dynamic range	-8 to +8 V (DC or peak AC)	
Non-destructive input voltage	-20 to +20 V	
Offset range	±8 V	±12 V
DC offset error (output zero)	±1 mV	
Low frequency accuracy	0.5% at 70 Hz, 1 Vpp	
Input resistance*	1 MΩ	
Input capacitance	1 pF	
Output impedance	50 Ω	

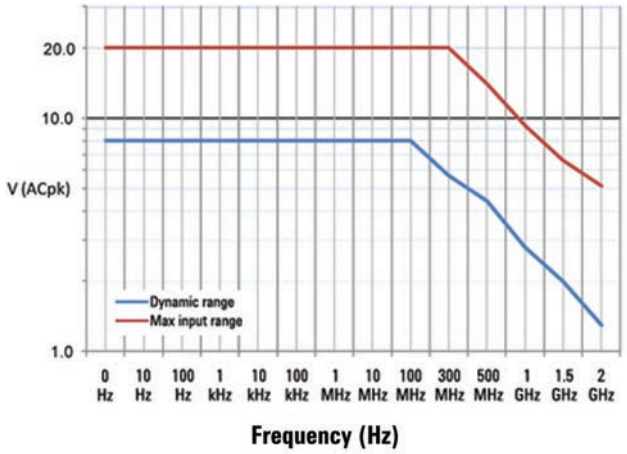
** denotes warranted electrical specifications after 20 minute warm-up, all others are typical*

Measurement plots

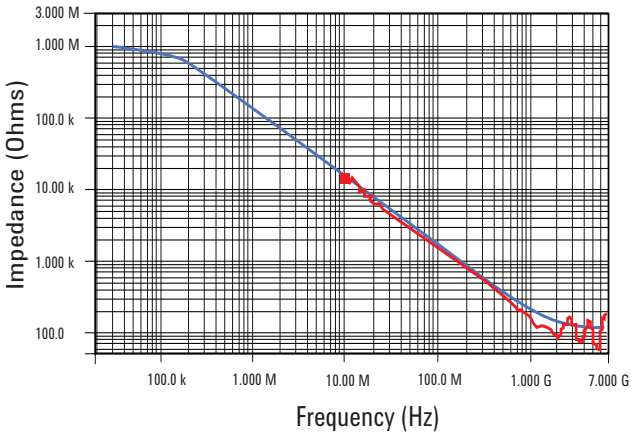


Frequency response of N2796A (Vout/Vin)

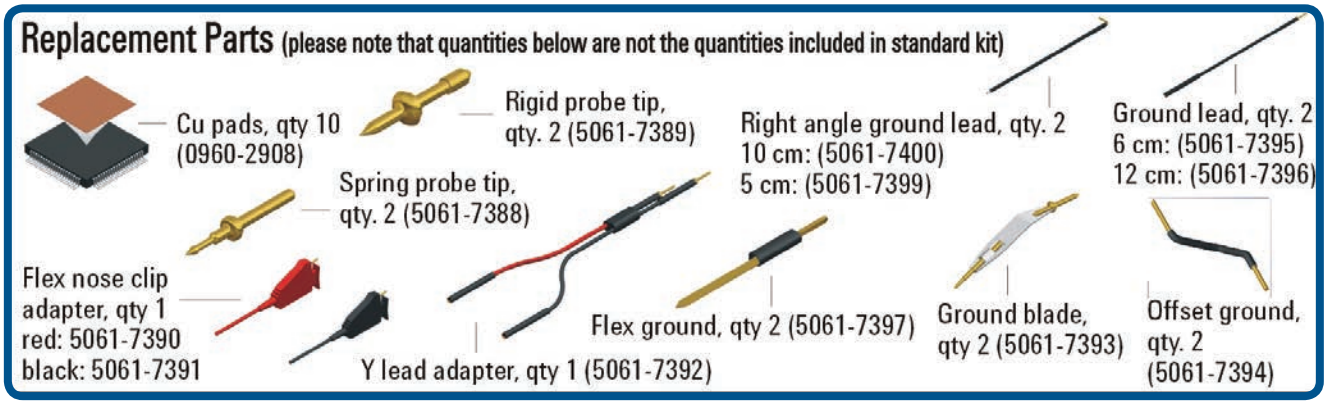
Time domain step response of N2796A (with Agilent MSO9404A)



Voltage derating over frequency (N2796A)



Input impedance over frequency (Red = measured, Blue = model)



General Purpose Differential Active Probes - N2790A/91A/891A

High-voltage Differential Probes

- **25 to 800 MHz bandwidth**
- **Switchable attenuation**
- **Measure up to 1,400 V CAT II and 7 kV CAT I**

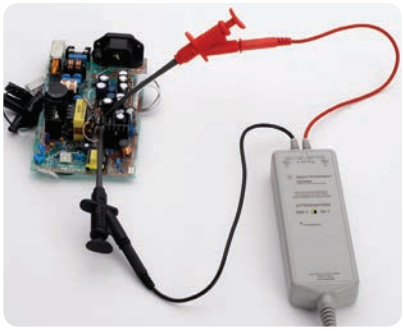
Oscilloscope users often need to make floating measurements where neither point of the measurement is at earth ground. Use N2790A, N2791A, or N2891A high voltage differential probes to make safe and accurate floating measurements with an oscilloscope. The N2790A, N2791A, and N2891A high voltage differential probes allow conventional earth-grounded Agilent oscilloscopes to be used for floating signal measurements.

Each probe offers user-selectable attenuation settings that make it highly versatile, allowing it to be used for a broad range of applications. The probe comes with probe tip accessories for use with small and large components in tight spaces.
The N2791A and N2891A are compatible with any oscilloscope with 1 MΩ BNC input. The N2791A and N2891A probe power is supplied by the included 4x AA batteries or the USB host port of the scope, or PC via a supplied USB power cable. The N2790A is compatible with the Agilent's AutoProbe interface where the probe power is supplied by the Agilent oscilloscope's probe interface. The N2790A is not compatible with 80000 and 90000 Series oscilloscope.

Characteristics for N2790A, N2791A and N2891A differential probe

	N2790A	N2791A	N2891A
Bandwidth	100 MHz	25 MHz	70 MHz
Risetime	3.5 ns	14 ns	5 ns
Attenuation ratio	50:1 / 500:1	10:1 / 100:1	100:1 / 1000:1
CMRR	-80 dB at 50/60 Hz -50 dB at 1 kHz -50 dB at 1 MHz	-80 dB at 50/60 Hz -40 dB at 1 MHz	-80 dB at 50/60 Hz -60 dB at 20 kHz
Max input voltage to ground	±1000 V (CAT II) ±600 V (CAT III)	±700 V at 100:1 ±70 V at 10:1	±7000 V at 1000:1 ±700 V at 100:1
Max input voltage between two inputs	±1400 V at 500:1 ±140 V at 50:1	±700 V at 100:1 ±70 V at 10:1	±7000 V at 1000:1 ±700 V at 100:1

N2790A 100 MHz high voltage differential probe



N2790A measuring a power supply signal

N2791A 25 MHz high voltage differential probe

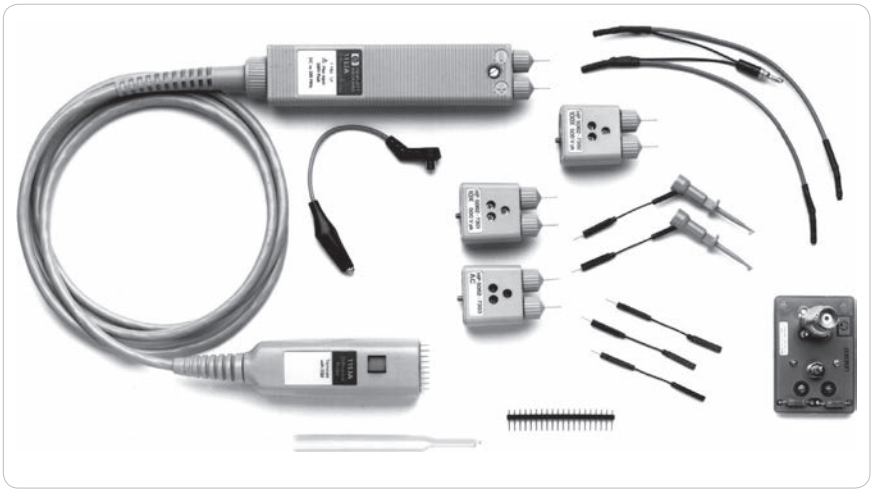
N2891A 70 MHz high voltage differential probe

The 1141A is a 1x FET differential probe with 200-MHz bandwidth and a 3000:1 CMRR. The probe has a high-input resistance and low-input capacitance of 7 pF to minimize circuit loading. The 1141A must be used with 1142A probe control and power module, which controls input coupling modes dc, dc with variable offset, and dc reject. Two attenuators, 10x and 100x are provided to expand the linear differential input range to ±30 V. This probe works with any 50-Ω input oscilloscope.

The 1153A is the same 1:1 differential probe with 200 MHz as the 1141A except that it is compatible with the AutoProbe interface, which completely configures the Infiniium scope for the probe. The probe interface recognizes the probe and automatically sets up the proper power, coupling mode, 50 Ω impedance and offset range. The 1142A probe power supply is unnecessary with the 1153A. The probe works with any Infiniium oscilloscope with AutoProbe I interface.

Characteristics for 1153A/41A differential probe

	1153A/41A
Bandwidth	200 MHz
Risetime	1.75 ns
Attenuation ratio	10:1 and 100:1 with attenuater
High CMRR	3000:1 at 1 MHz 10:1 at 100 MHz
Input impedance	Between inputs: 1 MΩ, 7 pF
Max input voltage	200 Vdc + peak ac (probe alone) 500 Vdc + peak ac (with attenuator)



Agilent 1153A 1:1 FET differential probe with 200 MHz bandwidth.

General Purpose Differential Active Probes - N2792A/93A General-purpose Differential Probes

The N2792A 200-MHz and N2793A 800-MHz differential probes provide the superior general-purpose differential signal measurements required for today's high-speed power measurements, vehicle bus measurements, and digital system designs.

The N2792A and N2793A probes offer a 10:1 attenuation setting and high input resistance and low input capacitance to minimize circuit loading.

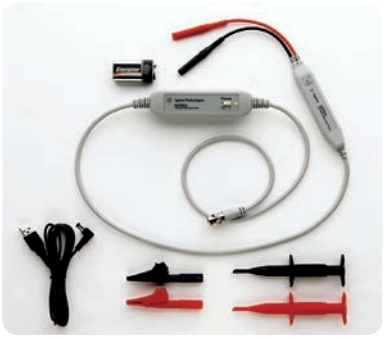
Both probes are compatible with any oscilloscope with 50 Ω BNC input. The probe can be powered by any USB port on a scope or computer, or by a 9 V battery.

Characteristics for N2792A and N2793A differential probes

	N2792A	N2793A
Bandwidth	200 MHz	800 MHz
Risetime	1.75 ns	437 ps
Attenuation ratio	10:1	10:1
CMRR	80 dB at 50/60 Hz 50 dB at 10 MHz	-60 dB at 50/60 Hz -15 dB at 500 MHz
Max input voltage to ground	±60 V	±40 V
Max input voltage between two inputs	±20 V	±15 V

Ordering information for Agilent differential probes and power supply

Model Number	Description
1141A	200-MHz differential probe
1142A	Probe control and power module for 1141A
1153A	200-MHz differential probe with AutoProbe interface
N2790A	100-MHz, 1.4 kV differential probe with AutoProbe interface
N2791A	N2791A 25-MHz, 700-V differential probe
N2792A	N2792A 200-MHz, 20-V differential probe
N2793A	N2793A 800-MHz, 15-V differential probe
N2891A	N2891A 70-MHz, 7,000-V differential probe

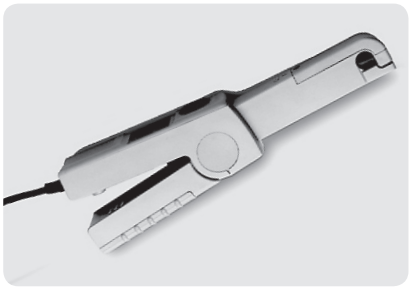


N2792A 200-MHz, 20-V differential probe

N2793A 800-MHz, 15-V differential probe

AC/DC Current Probes - 1146A Low-cost AC/DC Current Probe

The 1146A ac/dc current probe provides accurate display and measurement of currents from 100 mA to 100 Arms, dc to 100 kHz, without breaking into the circuit. A battery level indicator and overload indicator help ensure proper readings. It connects directly to the scope through a 2-m coaxial cable with an insulated BNC. This probe works with any 1 MΩ input oscilloscope.



1146A 100 mA to 100 Arms, dc to 100 kHz probe.

Operating characteristics of the 1146A current probe

	1146A
Bandwidth*	dc to 100 kHz (-3 dB)
Current range*	100 mV/A:100 mA to 10 A peak 10 mV/A:1 to 100 A peak
Output signal	1000 mV peak max
AC current accuracy*	
Range	100 mV/A (50 mA to 10 A peak)
Accuracy	3% of reading ±50 mA
Range	10 mV/A (500 mA to 40 A peak)
Accuracy	4% of reading ±50 mA
Range	10 mV/A (40 A to 100 A peak)
Accuracy	15% max at 100 A
Noise	Range 10 mV/A: 480 µV Range 100 mV/A: 3 mV
Insertion impedance	0.01 Ω (50/60 Hz)
Maximum working voltage	600 Vrms CAT II or 300 Vrms CAT III
Maximum common mode voltage	600 Vrms CAT II or 300 Vrms CAT III
Influence of adjacent conductor	< 0.2 mA/A AC
Influence of conductor position	0.5% of reading at 1 kHz in jaw
Battery	9 V alkaline (NEDA 1604A, IEC 6LR61)
Low battery	Green LED on when ≤ 6.5 V
Battery life	55 hours typical

Note: Reference conditions 23 ± 5 °C, (73.4 ± 41 °C) 20 to 75% relative humidity, dc to 1 kHz, probe zeroed, 1-minute warmup, batteries at 9 V + 0.1 V, external magnetic field <40 A/m, no dc component, no external current carrying conductor, 1 MΩ/100 pF load, conductor centered in jaw.

** Characteristics marked with asterisks are specified performance. Others are typical characteristics.*

Ordering information

Model Number	Description
1146A	100-kHz current probe

The 1147B/N2893A is a wide bandwidth, dc to 50-MHz/100-MHz current probe. The probe offers a flat frequency response across the entire dc to 50-MHz/100-MHz bandwidth, low noise (< –2.5 mArms), and low circuit insertion loss.

The 1147B/N2893A probe is compatible with the AutoProbe interface, which completely configures the oscilloscope for the probe when used with the Infiniium 9000 Series scope (1 MΩ input). Probe power is provided by the scope, so there is no need for an external power supply. The N2893A uniquely provides an auto demagnetization and offset elimination feature when used in conjunction with Infiniium scope. The 1147B and N2893A are not compatible with Infiniium 80000 and 90000 Series oscilloscope.

Operating characteristics of the 1147B/N2893A current probes

	1147B/N2893A
Bandwidth (–3 dB)	dc to 50 MHz (1147B) dc to 100 MHz (N2893A)
Risetime	7 ns or less
Maximum current (continuous)	15 A peak, 15 A DC, 10 Arms
Maximum peak current (non-continuous)	30 A peak
Output voltage rate	0.1 V/A
Amplitude accuracy	±1% rdg, ±10 mA (dc and 45 to 66 Hz, rated current)
Noise	Equivalent to 2.5 mArms or less (for 20 MHz bandwidth measuring instrument)
Temperature coefficient for sensitivity	±2% or less (within a range of 0 to 40 °C or 32 to 104 °F)
Effect of external magnetic fields	Equivalent to a maximum of 20 mA (in a dc to 60 Hz, 400 A/m magnetic field)
Maximum rated power	3 VA (with rated current)
Maximum input voltage	300 V CAT I
Diameter of measurable conductors	5 mm dia. (0.2 in dia.)
Probe interface	AutoProbe interface (1 MΩ terminated)
Cable lengths	Sensor cable: Appox. 1.5 m (59.0n in) Power supply cable: Appox. 1 m (39.4 in)
Note: The above specifications are guaranteed at 23 ± 3 °C (or 73 ± 5 °F)	

Ordering information

Model Number	Description
1147B	50-MHz current probe with AutoProbe interface
N2893A	100-MHz current probe with AutoProbe interface

1147B 50-MHz current probe with AutoProbe interface

N2893A 100-MHz current probe with AutoProbe interface

The N2780B/L Series current probes are high bandwidth, active current probes, featuring flat bandwidth, low noise (2.5 mArms) and low circuit insertion loss. Compatible with any oscilloscope with a 1 MΩ BNC input, the N2780B/L Series current probes offer accurate and reliable solution for measuring DC and AC currents. Because of the split-core design, they can easily clip on and off of a wire. In conjunction with the power supply (model N2779A), this probe can be used with any oscilloscope with a high-impedance BNC input. The companion power supply N2779A (3 x 12 ±Vdc output) lets you connect up to any three N2780B-83B /83L current probes to a single power supply.

The N2783L 80 MHz current probe offers 5 m long cable, which allows you to reach DUTs in long distance very easily. Other than the bandwidth performance, the N2783A and N2783L have the same electrical performance. The N2783L also requires the N2779A power supply to power the probe.

Operating characteristics of the N2780B/L Series current probes

	N2780B/L Series
Bandwidth (-3 dB)	dc to 2 MHz (N2780B) dc to 10 MHz (N2781B) dc to 50 MHz (N2782B) dc to 100 MHz (N2783B) dc to 80 MHz (N2783L)
Maximum current (continuous)	500 A (N2780B) 150 A (N2781B) 30 A (N2782B/N2783B/N2783L)
Maximum peak current (non-continuous)	700 A peak (N2780B) 300 A peak (N2781B) 50 A peak (N2782B/N2783B/N2783L)
Maximum input voltage**	300 V CAT I (N2782B, 83B, 83L) 300 V CAT III, 600 V CAT II (N2780B, 81B)
Output voltage rate	0.01 V/A (N2780B/N2781B) 0.1 V/A (N2782B/N2783B /N2783L)
Amplitude accuracy*	±1.0 % rdg ±500 mA (N2780B) ±1.0 % rdg ±100 mA (N2781B) ±1.0 % rdg ±10 mA (N2782B) ±1.0 % rdg ±10 mA (N2783B/N2893L)

Note *: The amplitude accuracy specification is guaranteed at 23°C ± 3°C (or 73°F ± 5°F).
Note **: Insulated conductor should be used.

Ordering information

Model Number	Description
N2780B	2-MHz current probe
N2781B	10-MHz current probe
N2782B	50-MHz current probe
N2783B	100-MHz current probe
N2779A	Power Supply for the N2780B/81B/82B/83B Current Probes
N2783L	80-MHz current probe with 5m cable

N2783L with 5m long cable

N2780B Series current probes with N2779A power supply

General Purpose Passive Probes - N2870A-76A Passive Probes

- **Small 2.5 mm probe tip**
- **Replaceable spring-loaded probe tip for reliable contact**
- **1:1, 10:1, 20:1 and 100:1 attenuation ratios with auto probe ID readout**
- **Wide compensation range for a variety of scope inputs**
- **Comes with various probe tip accessories**
- **Optional probe accessory kits**
- **N2873A, 500 MHz, 10:1 probe ships with the 9000 Series Infiniium oscilloscope**

The N2870A Series passive probe family sets new standards in high performance probing of up to 1.5 GHz bandwidth. These general purpose probes and accessories offer high quality measurements at a very reasonable price.

Compact 2.5-mm probe head diameter, low input capacitance, and various fine-pitch probe tip accessories make the Agilent N2870A Series passive probes ideal for probing densely populated IC components or surface-mount devices used in today's high-speed digital applications. The sharp probe tip is spring loaded to help engineers keep the probe from slipping off the device under test. Insulating IC caps keep the small probe tip centered on the IC lead and keep it from shorting adjacent leads. Standard flat blade ground connector and self-adhesive copper ground pads help reduce ground inductance, while offering easy ground access. Optional probe tip accessories provide specialized capabilities for demanding applications.

The N2873A 500 MHz passive probe ships with Agilent's 9000 Series Infiniium oscilloscope.

N2873A 500 MHz passive probe with standard accessories

Electrical characteristics

Model Number	Bandwidth (-3 dB)	Attenuation Ratio*	Input C	Input R* (Scope and probe)	Max Input Voltage (AC RMS)	Scope Input Coupling	Scope Comp Range
N2870A	35 MHz	1:1	39 pF (+oscilloscope)	1 MΩ	55V CAT II	1 MΩ	—
N2871A	200 MHz	10:1	9.5 pF	10 MΩ	400 V CAT I 300 V CAT II	1 MΩ	10-25 pF
N2872A	350 MHz	10:1	9.5 pF	10 MΩ	400 V CAT I 300 V CAT II	1 MΩ	10-25 pF
N2873A	500 MHz	10:1	9.5 pF	10 MΩ	400 V CAT I 300 V CAT II	1 MΩ	10-25 pF
N2874A	1.5 GHz	10:1	1.8 pF	500 Ω	8.5 V CAT I	50 Ω	—
N2875A	500 MHz	20:1	5.6 pF	20 MΩ	400 V CAT I 300 V CAT II	1 MΩ	7-20 pF
N2876A	1.5 GHz	100:1	2.2 pF	5 kΩ	21 V CAT I	50 Ω	—

Note *Denotes warranted specifications, all others are typical. Attenuation ratio= ± 2% at DC, Input R (probe only, N2870A excluded)= ±1%

Common to all

Probe ID readout: Compatible with Agilent's InfiniiVision and Infiniium Series oscilloscopes

Mechanical characteristics

- Weight (probe only): 48 g
- Cable length: 1.3 m
- Ground sleeve diameter: 2.5 mm

Environmental characteristics

temperature

- Operating: 0 °C to +50 °C
- Non-operating: -40 °C to +70 °C

Altitude

- Operating: 2,000 m (6,561 ft)
- Non-operating: 15,000 (49,212 ft)

Humidity

- Operating: 80% room humidity for temperatures up to 31 °C, decreasing linearly to 40% at 50 °C

Pollution degree: 2

Optional accessory kits

N2877A
Deluxe Accessory Kit

N2878A
General Purpose Accessory Kit

N2879A
Fine Pitch Accessory Kit

N2885A
PCB Socket Adapter Kit

Standard accessories

	N2871A, N2872A, N2873A, N2875A	N2870A	N2874A, N2876A
Rigid probe tips, qty 2	●	●	●
Spring-loaded probe tips, qty 2	●	●	●
Sprung hook 2.5 mm	●	●	
Short sprung hook 2.5 mm			●
Ground blade 2.5 mm with 2 copper pads	●	●	●
IC cap 2.5-0.5 mm green	●	●	●
IC cap 2.5-0.65 mm blue	●	●	●
IC cap 2.5-0.8 mm grey	●	●	●
IC cap 2.5-1.0 mm brown	●	●	●
IC cap 2.5-1.27 mm black	●	●	●
Insulating cap 2.5 mm	●	●	●
Protection cap 2.5 mm	●	●	●
BNC adapter 2.5 mm	●	●	●
Ground spring 2.5 mm	●	●	●
Ground lead 15 cm	●	●	●
Trimmer tool	●		
Color coded rings 3x4	●	●	●
User's guide manual	●	●	●

Replacement parts

Part Number	Description
0960-2905	Sprung Hook Adapter 2.5mm for N2870A,71A,72A,73A,75A
0960-2906	Ground Lead 15cm for N2870A Series probes
0960-2907	Short Spring Hook 2.5mm for N2874A and N2876A 1.5 GHz passive probe
0960-2908	10 Self-adhesive Copper-pads 2X2cm for N2870A Series probes
0960-2898	Dual Lead-Adapter for N2870A Series probes

For other re-orderable accessories for N2870A-76A passive probes, check out the product web page on Agilent.com.

- **Standard passive probe for Infiniium 5483x Series**
- **Compact design, removable probe handle for tight probing areas**

These general purpose replacement devices are built and tested for high reliability. Kevlar strengthener has been added to the probe cable for extra pull strength. Durable probe tips are replaceable.

The compact design significantly reduces the problem of probing densely populated integrated circuit components or the characteristically minute conductors on printed circuit boards. These small, lightweight probes allow measurements that were previously difficult, while reducing the danger of shorting. For tight probing areas, the probe handle can be unscrewed and pulled back along the cable.

When probing about the circuit in debug mode, the probes easily slip inside the included browsers. The browsers feature a crown point that digs into solder and avoids the danger of slipping off the test point and shorting to adjacent leads. A pogo pin allows hand movement on the probes without losing contact with the device under test.

A snap-on BNC connector simplifies attaching the probe to the scope. Leads are available for connecting to a wide variety of test points. See "Ordering Information" for a complete list.

Electrical characteristics

Model Number	Type of Probe	System Bandwidth (scope+probe)	Division Ratio	Input R	Input C	Scope Input R	Comp Range	Length
1165A	High impedance, passive	600 MHz typical with 54830B/31B/32B/33A 54830D/31D/32D/33D	10:1	10 MΩ	10 pF	1 MΩ	12 - 14 pF	1.5 m

Operating characteristics 1165A passive probe

	1165A
Approximate propagation delay	6.7 ns
Maximum input voltage	300 V (dc + peak ac), CAT II
Safety	Meets IEC1010-2-31
Pulling strength (BNC to barrel)	≤ 12 lb static pull
Net weight	2.6 oz

116XA 500 MHz passive probe

Environmental characteristics

	1165A
Temperature (operating)	0° C to +55° C
Humidity (operating)	Up to 95% relative humidity at 40° C
Altitude (operating)	Up to 4,600 meters (15,000 ft.)
Shock	50 g (400 g tip only)

No-slip browser crown point.

Ordering information

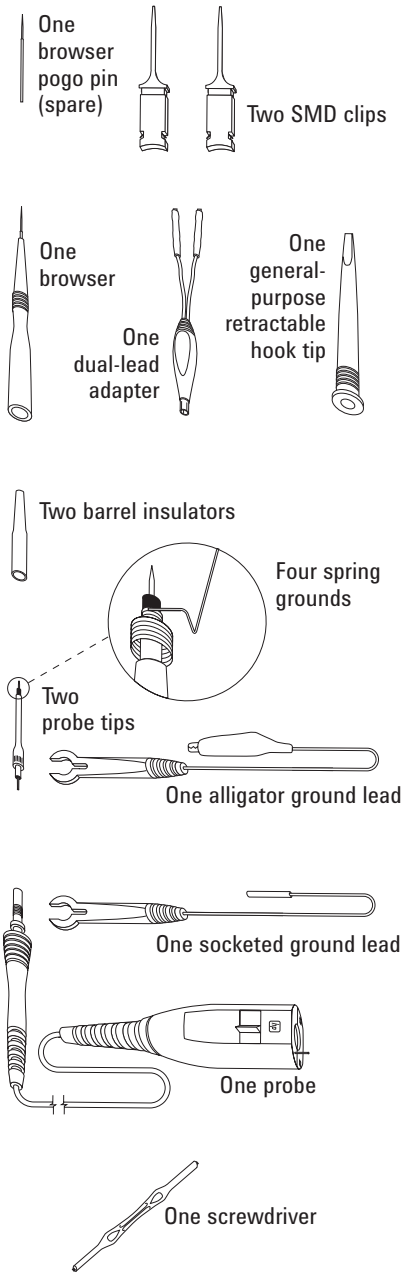
Probes and accessories

Model Number	Description	Quantity
1165A	10:1, 10 MΩ, 1.5 m, miniature passive probe	1
5063-2143	Probe tip to BNC (m)	1
	IC clips: See "Probing Accessories"	
	Horizontal and vertical mini-probe sockets: See "Probing Accessories"Wedge Probe Adapters: See "Probing Accessories"	

Replacement parts

Part Number	Description	Quantity
5063-2135	General purpose retractable hook tip	2
5063-2140	Alligator ground lead	2
5063-2120	Socketed ground lead	1
5063-2115	Browser	1
5063-2147	Dual lead adapter	1
5063-2149	SMD clips	5
01160-68701	Accessory kit (includes four spring grounds, four browser pogo pins, four barrel insulators, one screwdriver)	1
5063-2137	1165A probe tip, brown	5

Probe parts supplied



Includes user's guide and three-year warranty.

- **Useful in probing high-frequency signals with low source impedance**
- **Supplied with 10:1, 500 Ω and 20:1, 1 kΩ resistor dividers**
- **Low capacitive loading to extremely high frequencies**

The Agilent 54006A allows you to probe signals up to 6 GHz using replaceable tips that provide either 10:1 division ratio with 500 Ω input resistance, or a 20:1 division ratio with 1 kΩ input resistance. This 6 GHz probe gives access to circuit nodes that are not 50 Ω or do not have 50 Ω connectors allowing you to see signals at specific points, such as the input to a gate. Agilent 54006A's input capacitive loading is approximately 0.25 pF, allowing you to get very accurate timing measurements for a wide bandwidths of signals.

The 54006A probe is a good, low-cost alternative for high-frequency probing where the higher resistive loading is not an issue and the other features of the InfiniiMax probing system are not needed (such as differential inputs and multiple connectivity options).

Operating characteristics the 54006A passive probe

	54006A
Bandwidth (–3 dB)	6 GHz
Attenuation ratio	10:1, 20:1
Input resistance	500 Ω, 1 kΩ
Input capacitance	0.25 pF
Max dc volts	20 V
Length in meters (feet)	0.9 m (3 ft)

Ordering information

Model Number	Description	Quantity
54006A*	6 GHz Resistor Divider Probe Includes: One 10:1 500 Ω probe body, six 450 Ω resistors, One 20:1, 1 kΩ probe body, six 950 Ω resistors, One 36 in, 50 Ω coaxial cable, SMA (m-m) One blocking cap, 10 GHz-26 GHz APC – 3,5 (m-f)	1

* Requires the 54855-67604 SMA to precision-BNC adapter to connect to BNC scope input.

54006A for probing high frequency, up to 100 Ω impedance signals.

- **Ideal for measuring up to 30 kV**
- **Up to 250 MHz bandwidth**
- **100:1 or 1000:1 attenuation**

The Agilent 10076B 4 kV 100:1 passive probe gives you the voltage and bandwidth you need for making high-voltage measurements. Its compact design makes it easier to probe today's small power electronics components and its rugged construction means it can withstand rough handling without breaking.

The 10076B is compatible with any oscilloscope with 1 MΩ BNC input. For use with the Infiniium 90000 Series scope, use the E2697A high impedance probe adapter. For use with the Infiniium 90000 X- and 90000 Q-Series scope, use the N5449A high impedance probe adapter.

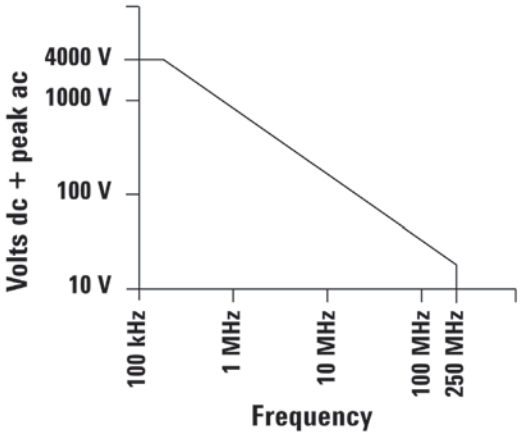
10076B passive probe

Operating characteristics the 10076B 100:1 passive probe

	10076B
Bandwidth	250 MHz (-3 dB)
Risetime (calculated)	< 1.4 ns
Attenuation ratio	100:1
Input resistance	66.7 MΩ (when terminated into 1 MΩ)
Input capacitance	Approx 3 pF
Maximum input	4000 Vpk CAT I, 1000Vpk CAT II
Compensation	6 to 20 pF range
Probe readout	Yes
Cable length	1.8 m

Ordering information

Model Number	Description	Quantity
10076B	High-voltage probe: includes one retractable hook tip, one-ground-bayonet, one IC probing tip, one-alligator ground lead and a compensation screwdriver	1
10077A	Accessory kit for 10076B including 1x retractable hook pin, 1x ground lead, 1x insulation cap, 2x measuring pins and 8x ID tags	1



10076B derating curve

- **Ideal for measuring up to 30 kV**
- **Up to 250 MHz bandwidth**
- **100:1 or 1000:1 attenuation**

The N2771B is a 1000:1 divider probe for the measurement of fast high voltage signals up to 30 kV dc + peak ac, 10 kV rms.

The probe's large size and rugged construction provide superior protection. The ground lead is fed through the body of the probe and protrudes behind the safety barrier, keeping the ground connection away from the high voltage. Typical applications include PMTs, motor drives, high voltage switches, magnatrons, and modern projection systems.

The N2771B is compatible with any oscilloscope with 1 MΩ BNC input. For use with the Infiniium 90000 Series scope, use the E2697A high impedance probe adapter. For use with the Infiniium 90000X and 90000 Q-Series scope, use the N5449A high impedance probe adapter.

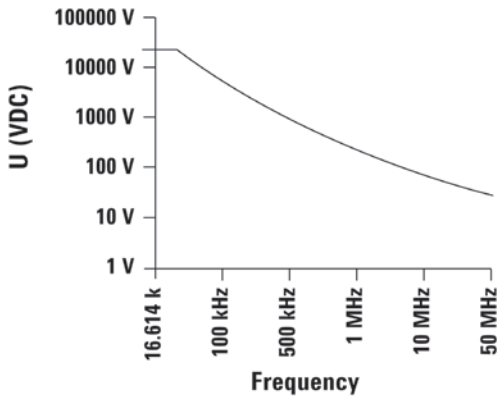
N2771B high-voltage probe

Operating characteristics the N2771B 1000:1 passive probe

	N2771B
Bandwidth	50 MHz (-3 dB)
Risetime	< 7 ns
Attenuation ratio	1000:1
Input resistance	100 MΩ (when terminated into 1 MΩ)
Input capacitance	1 pF
Compensation range	6 to 20 pF
Max. voltage	15 kV dc, 10 kV rms, 30 kV dc + peak ac
Operating temperature	0 to +50°C, 80% RH
Storage temperature	-20 to +70°C, 90% RH
Dimensions	2 cm (max width of probe stem after handle) x 33 cm 7.5 cm (max probe widthat probe handle) x 33 cm
Probe readout	No
Cable length	2 m

Ordering information

Model Number	Description	Quantity
N2771B	High-voltage probe: includes alligator ground lead, 1-sharp-probe tip	1



N2771B derating curve

Mixed Signal Oscilloscope Logic Probes and Accessories

- **Compatible with all 40-pin logic probe**
- **Flying leads offer flexibility and convenience**

MSO probes offer great value and performance

The logic probe for the MSO9000A Series mixed signal oscilloscopes (MSOs) are the same one used with Agilent industry leading high-performance logic analyzers. This means we can offer the best performance, great value and access to the industry's broadest range of logic probing accessories.

The Infiniium MSO9000A Series comes with a 54826-68701 16-channel logic probe kit containing a 40-pin (F) to 40-pin (F) logic probe cable assembly (or external digital cable), 2-inch ground leads (qty 5), SMT IC clips (qty 20) and a 16-channel flying lead probe tip assembly. The standard cable gives the MSO the standard 40-pin female input connector that many Agilent logic analyzers have. With this cable, a user can connect a wide variety of logic analyzer probes such as Mictor, Samtec, and Soft Touch probes. For information on these probes, see Probing solutions for logic analyzers (with Agilent literature number 5968-4632E).

For optimal signal fidelity, connect ground at each logic probe, in addition to taking a common ground to all eight signals via a separate ground connector on the probe pod.

Characteristics for Agilent 54826-68701 Logic Probe	
Analog bandwidth of cable and flying leads	400 MHz
Input resistance	100 kΩ ±2%
Input capacitance	8 pF at the tip

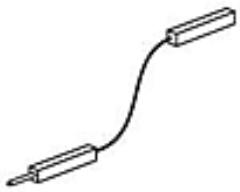
Kit parts supplied	
16-channel probe set leads	x1
Ground leads	x5
SMT IC clips	x20
External digital cable	x1

The complete kit and its individual components are orderable as noted below.

Eternal digital cable
(part number 54826-61605)

SMT IC clip
(part number 5090-4833)

Sixteen-channel probe lead set
(part number 54838-61608)



Ground leads contain 5 short ground leads
(part number 5959-9334)

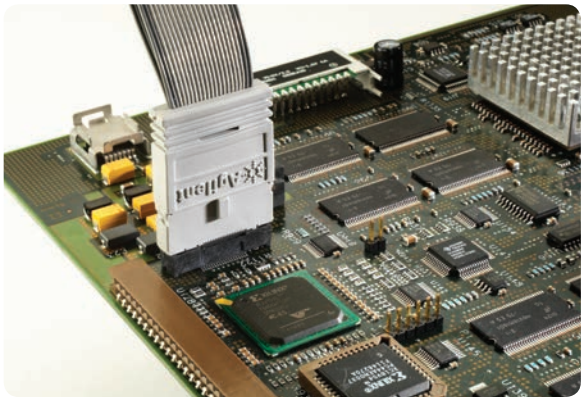
Mixed Signal Oscilloscope Logic Probes and Accessories

The 9000 MSO digital channels were architected to be compatible with a wide variety of probing accessories developed over 20 years for logic analyzers. There's a good chance that the logic analyzer accessories you already own work with your MSO. With the standard 40-pin cable that comes with your MSO, the MSO accepts numerous logic analyzer accessories including:

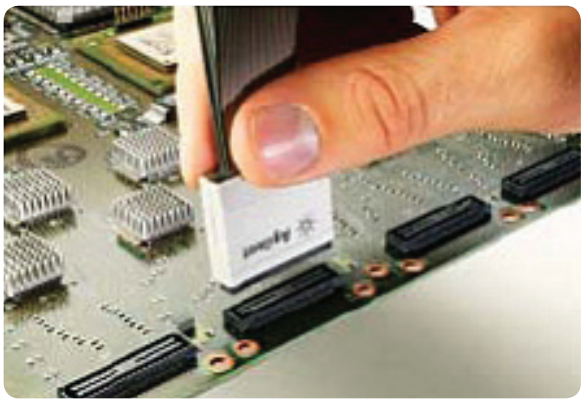
- E5346A 34-channel Mictor connector probe
- E5385A 34-channel Samtec connector
- E5383A 16-channel flying lead set 01650-63203 16-channel termination adaptor (also available as a bundle of both the termination adapter and the 40-pin cable with PN 10085-68701)
- E5404A 34-channel soft touch pro connectorless probe
- E5394A 34-channel soft touch connectorless probe
- E5396A 16-channel soft touch connectorless probe
- Any other accessory that connects to a logic analyzer via a 40-pin cable

For logic accessories of greater channel width than MSO digital channels (> 16 channels), there are two use models.

- Route up to 16 signals to the probe and don't use the additional probe channels.
- Route up to 32 signals to the probe and measure ½ of them at a time. Simply plug the 40-pin cable to the other side of the probe to see the other ½ of the signals.



E5346A 34-channel Mictor connector probe



E5385A 34-channel Samtec connector probe

E5396A 16-ch (half size) soft touch connectorless probe

Probing Accessories - InfiniiMax Probe

InfiniiMax 1130A/31A/32A/34A and InfiniiMax II 1168A/69A Probe Accessories

Unrivaled InfiniiMax and InfiniiMax II probing accessories support browsing, solder-in, socket, and SMA use models at the maximum performance available

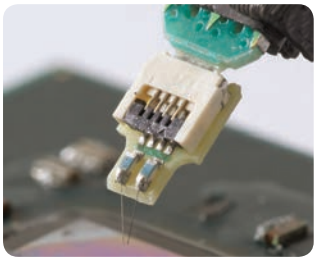
E2669A	InfiniiMax connectivity kit for differential/single-ended measurements	Fully compatible with 1130/31/32/34A InfiniiMax probe amplifier and compatible 1168A/69A InfiniiMax II probe amplifier with limitations
E2668A	InfiniiMax connectivity kit for single-ended measurements	
E2675A	InfiniiMax differential browser probe head and accessories (6-GHz BW)	
E2676A	InfiniiMax single-ended browser probe head and accessories (6-GHz BW)	
E2677A	InfiniiMax differential solder-in probe head and accessories (12-GHz BW)	
E2678A	InfiniiMax single-ended/differential socketed probe head and accessories (12-GHz BW)	
E2679A	InfiniiMax single-ended solder-in probe head and accessories (6-GHz BW)	
E2695A	Differential SMA probe head (8-GHz BW)	
N5425A/N5426A	12-GHz differential ZIF solder-in probe head and ZIF probe tips	
N5451A	InfiniiMax long-wire ZIF probe tips (for use with N5425A ZIF probe head)	
N5450B	InfiniiMax extreme temperature extension cable (allows for probing in temperatures ranging from –55 to 150 °C)	
N2880A	InfiniiMax in-line attenuator kit (pairs of 6, 12, and 20 dB attenuators in a kit)	
N2881A	InfiniiMax DC blocking caps (a pair of 30-Vdc blocking caps)	
N2884A	InfiniiMax fine-wire probe tips for wafer probing	
N5380B	InfiniiMax II differential SMA adapter (12-GHz BW)	• Recommended for use with InfiniiMax II 1168A/69A probe amplifier • N5381A is compatible with InfiniiMax I amps, (select E2677A in the probe menu).
N5381A	InfiniiMax II differential solder-in probe head and accessories (12-GHz BW)	
N5382A	InfiniiMax II differential browser (12-GHz BW)	
N2887A	InfiniiMax Soft touch Pro probe interface adapter (4 GHz)	
N2888A	InfiniiMax Soft touch half-channel probe interface adapter (4 GHz)	

InfiniiMax III N2800A/01A/02A/03A Probe Accessories

N5445A	InfiniiMax III browser head (30 GHz)	Order N5476A for replacement probe tips (set of 4)
N5439A	InfiniiMax III ZIF probe head (28 GHz)	Order N2838A (450 Ω), N5440A (450 Ω) or N5447A (200 Ω) for a set of 5 ZIF tips with plastic sporks
N5444A	InfiniiMax III 2.92 mm/3.5 mm/SMA probe head (28 GHz)	Order N5448A 3.5/2.92 mm head flex cable to extend the cable length
N2836A	InfiniiMax III solder-in probe head (26 GHz)	
N5441A	InfiniiMax III solder-in probe head (16 GHz)	

InfiniiMax probe with N5450B extreme temperature extension cable

N2880A InfiniiMax in-line attenuator (probe amplifier and head not included)



N2884A InfiniiMax fine-wire probe tip (ZIF probe head not included)

Probing Accessories - N2744A T2A Probe Interface Adapter

- **Enables Tektronix® TekProbe®-BNC level 2 probes to connect to Agilent's AutoProbe interface on InfiniiVision 3000X, 5000, 6000, 7000, and Infiniium 9000, 90000 oscilloscopes**
- **An easy-to-use plug-on adapter to the Agilent oscilloscope's AutoProbe interface**
- **Provides necessary probe power, calibration, and offset control as needed to the attached TekProbe probe**

The N2744A T2A interface adapter enables selected TekProbe® interface level 2 probes to be used with Agilent oscilloscopes with AutoProbe interface. Existing TekProbe-BNC probe types can simply be plugged into the T2A adapter, which is then plugged directly into any AutoProbe input channel on an InfiniiVision or Infiniium oscilloscope. Select the probe model in the scope menu and the Agilent oscilloscope sets up the attenuation factor and the probe type automatically. The T2A interface adapter supplies the necessary probe power, calibration (for selected models only), and offset control as used by the connected TekProbe probe. The adapter is targeted for customers using both Tek active probes with TekProbe-BNC level 2 interfaces and Agilent oscilloscopes with the AutoProbe interface.

Tek probe compatibility

The N2744A T2A adapter supports only the probes listed below with TekProbe interfaces.

AC/DC Current Probe

TCP202	50-MHz AC/DC current probe

Single-ended Active Probes

P6243	Single-ended active probe, 1 GHz, 10:1 without offset control
P6245	Single-ended active probe, 1.5 GHz, 10:1 with offset control
P6205	Single-ended active probe, 750 MHz, 10:1 without offset control
P6241	Single-ended active probe, 4 GHz, 10:1 with offset control
P6249	Single-ended active probe, 4 GHz, 5:1 with offset control

Differential Active Probes

P5205	Differential probe, 100 MHz, 50:1/500:1 with offset control
P5210	Differential probe, 50 MHz, 100:1/1000:1 with offset control
P6246	400 MHz, 10:1/1:1 with offset control
P6247	1 GHz, 10:1/1:1 with offset control
P6248	1.5 GHz, 10:1/1:1 with offset control
P6250	500 MHz, 50:1/5:1 with offset control
P6251	1 GHz, 50:1/5:1 with offset control

Agilent scope compatibility

- Agilent InfiniiVision 3000 X-Series with software version 1.10 or higher
- Agilent InfiniiVision 5000, 6000, and 7000 Series and future revisions (except 6000 100-MHz) with software version 06.16 or higher
- Agilent Infiniium 9000 and 90000 , 90000X and 90000Q (with N5442A) Series with software version 03.11 or higher

Optical-to-Electrical Converters

(works with InfiniiVision 5000, 6000 and 7000 with version 6.16 software only)

P6701B	1 GHz Optical-to-electrical converter with FC/PC connector
P6703B	1.2 GHz Optical-to-electrical converter with FC/PC connector
P6711	250 MHz Optical-to-electrical converter
P6713	300 MHz Optical-to-electrical converter

Ordering information

N2744A	T2A probe interface adapter

- **Easy-to-manipulate probe arms for hands-free browsing**
- **One- or two-articulated arms with stable high-mass base (N2784A and N2785A)**
- **Quick and stable XY positioning (N2786A)**
- **Stable 3D probe positioning for hard-to-reach XYZ access**
- **Compatible with most scope probes**
- **Applications: Hands-free browsing for electronic components on PC board**

The N2784A and N2785A probe positioners provide quick and stable X-Y positioning for PC boards and devices that require hands-free probing.

Unlike other probe positioners that require multiple adjustments to lock the probe holder into position, the N2784A and N2785A need only the "lift and drop" motion to put the probe in place. The weight stabilization technique used in these probe holders keeps constant pressure at the probing point so the probe tip stays in position even when the target board is bumped.

The N2786A is a low cost, easy-to-use XY axis probe holder for general purpose probing appliactions. The two-leffed positioner is designed to be easy to use—the positioner itself has no controls to positioner it in place.

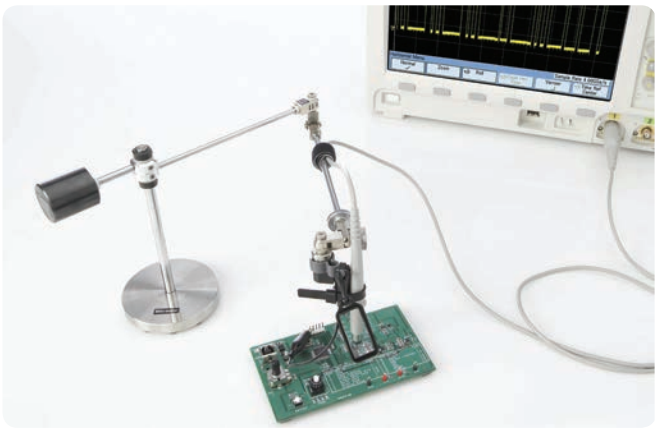
The N2787A is a 3D probe positioner with a flexible, articulating arm that can be quickly positioned in a variety of configurations.

For more information about Agilent's probe positioners, refer to literature number 5989-9131EN.

Ordering information

Product number	Description
N2784A[1]	1-arm probe positioner
N2785A[1]	2-arm probe positioner
N2786A	2-leg probe positioner
N2787A	3D probe positioner

Note[1] Includes 3x magnifying glass, arm strap, cable tie, probe rest, and manual.



N2784A one-arm probe positioner

N2786A 2-leg probe positioner

N2787A 3D probe positioner

- **Easy connection to surface mount ICs**
- **Safe, with no chance of shorting**
- **Mechanically non-invasive contact**
- **3-, 8-, and 16-signal versions**
- **Supports 0.5 and 0.65-mm TQFP and PQFP packages**

Problem-free probing

The Agilent wedge probe adapter eliminates many of the frustrations associated with probing surface mount components. If you've ever accidentally shorted IC pins together, experienced electrical and/or mechanical problems with soldering small wires onto leads, or gotten frustrated juggling multiple probes while you're trying to operate your scope, the Wedge was designed with you in mind.

Make the inaccessible accessible

When you use the Wedge, you don't have to worry about shorting IC pins together on a delicate component–or worse yet, on an irreplaceable prototype. The Wedge is easy to insert and it stays put. There's no need to solder small wires onto leads. The Wedge is mechanically non-invasive, so you won't damage the legs of the IC. Instead, you'll have easy access to hard-to-reach components.

Operating characteristics

	E26xx Series Wedge Probe Adapters
Operating voltage	< 40 Vdc + peak ac
Operating current	0.5 A maximum
Capacitance between contacts	2 pF typical (all except Agilent-E2643A/44A) 4.33 pF typical at 1 MHz (Agilent-E2643A/44A)
Self-inductance	15 nH typical (all except Agilent E2643A/44A) 37 nH typical at 1 MHz (Agilent E2642A/44A)
Cross coupling	-31 dB typical at 100 MHz (Agilent E2643A/44A)
Contact resistance	< 0.1 Ω

Ordering information

Model Number	Description	Quantity
E2613A	0.5 mm Wedge probe adapter, 3 signal	1
E2613B	0.5 mm Wedge probe adapter, 3 signal	2
E2614A	0.5 mm Wedge probe adapter, 8 signal	1
E2643A	0.5 mm Wedge probe adapter, 16 signal	1
E2615A	0.65 mm Wedge probe adapter, 3 signal	1
E2615B	0.65 mm Wedge probe adapter, 3 signal	2
E2616A	0.65 mm Wedge probe adapter, 8 signal	1
E2644A	0.65 mm Wedge probe adapter, 16 signal	1
10072A	SMT kit for 10070 probe family	
10075A	0.5 mm IC clip kit	

Electrical reliability

The Wedge makes two contact points with each leg of the IC. This redundant physical connection increases the electrical reliability of the connection. Also the Wedge's low capacitance and inductance provides superior performance to many other alternatives.

The Wedge probe adapter connects directly to 1145A/1155A active probes and the dual lead adapter provided with the 1160A-65A passive probe family and N2877A/N2879A accessory kits for use with N287xA Series passive probes.

IC clip kits

As an inexpensive solution for probing fine-pitch ICs, the 10072A SMT Kit includes 10 IC clips and 2 dual-lead adapters that connect the clips directly to 10070-family probes.

The 10075A 0.5-mm IC clip kit is ideal for connecting to IC's as fine as 0.5 mm. The clip body allows many clips to be mounted side-by-side. The kit includes four 0.5-mm IC clips and two dual-lead adapters that connect the IC clips directly to 10070-family probes.

0.5 mm IC clips

- **Extremely small size**
- **Thin body for mounting multiple clips side-by side**
- **Connection to PQFP and SOIC SMT packages from 0.5 to 0.8 mm (0.020 in. to 0.032 in.) lead pitch**

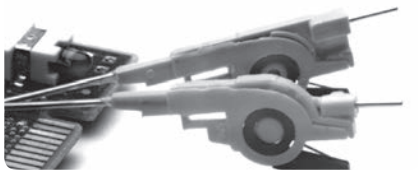
The 0.5 mm IC clips connect directly to the Infiniium MSO logic probe flying leads, 1160A-65A passive probe with dual lead adapter, and 1007XC passive probe with optional 10072A or 10075A that contain the dual lead adapter. Maximum input voltage is +40 V.

Operating characteristics

	0.5 IC Clips
Length	31.75 mm (1.25 inch)
Tip diameter	0.75 mm (0.029 inch)
Pin diameter	0.75 mm (0.029 inch)

Ordering information

Part Number	Description	Quantity
10467-68701	0.5 mm IC clips	4



Extremely small-sized clips for probing PQFP and SOIC SMT packages.

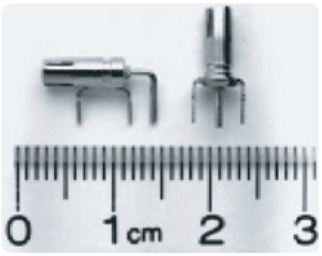
PC board mini-probe sockets

- **Hands-free probing of through-hole devices**
- **Compatible with N2870A-76A and 1160A-65A family probes**

The PC board mini-probe sockets are ideal for a reliable, convenient, high bandwidth connection between the N2870A-76A and 1160A-65A family passive probe tip, and the circuit under test.

Ordering information

Part Number	Description	Quantity
N2766A	Horizontal mini-probe socket	25
N2768A	Vertical mini-probe socket	25



Horizontal and vertical versions of the PC board mini-probe socket make it easy to fit into your target board.

E2697A High Impedance Adapter

- **Allows connection of high impedance probes to the 50 ohm input of Infi niium 54850, 80000 and 90000 Series oscilloscopes**
- **Includes 500 MHz passive probe (10073D)**
- **Provides switchable AC/DC coupling as well as 10:1 and 1:1 attenuation settings**

The E2697A high impedance adapter allows connection of probes that require a 1 MΩ high impedance input (e.g., passive probes, current probes) to the Infiniium 54850, 80000 and 90000 Series oscilloscopes. The E2697A high impedance adapter extends the capability of Agilent Infiniium high-performance oscilloscopes, making them ideal for a variety of general-purpose measurements such as power supplies, inverters, semiconductor devices, etc. The E2697A provides switchable AC/DC coupling, as well as 10:1 and 1:1 attenuation settings. Use the N5449A high impedance adapter with Infiniium 90000X and 90000Q Series scopes.

Ordering information

Part number	Description	Quantity
N2697A	High impedance adapter	1

Related Literature

Publication Title	Publication Type	Publication Number
Agilent Oscilloscope Probes and Accessories	Selection Guide	5989-6162EN
InfiniiVision Oscilloscope Probes and Accessories	Data Sheet	5968-8153EN
8 Hints for Better Scope Probing	Application Note	5989-7894EN
Oscilloscope Probing for High-Speed Signals	Application Note	5989-9177EN
Performance Comparison of Differential and Single-ended Active Voltage Probes	Application Note	5988-8006EN
Improving Usability and Performance in High-Bandwidth Active Oscilloscope Probes	Application Note	5988-8005EN
Optimizing Oscilloscope Measurement Accuracy on High-Performance Systems with Agilent Active Probes	Application Note	5988-5021EN
Restoring Confidence in Your High-Bandwidth Probe Measurements	Application Note	5988-7951EN
The Truth About the Fidelity of High-Bandwidth Voltage Probes	Application Note	5988-6515EN
Extending the Range of Agilent InfiniiMax Probes	Application Note	5989-7587EN
Understanding and Using Offset in InfiniiMax Active Probes	Application Note	5988-9264EN
Tips for Making Low Current Measurements with an Oscilloscope and Current Probe	Application Note	5989-7529EN
Using Agilent InfiniiMax Probes with Test Equipment Other Than Oscilloscopes	Application Note	5989-1869EN
Why Oscilloscope Measurements may Require Extreme Probing	Application Note	5990-4721EN
Side by Side Comparison of Agilent and Tektronix Probing	Application Note	5989-0553EN
Tips and Techniques for Making Power Supply Noise Measurements with an Oscilloscope	Application Note	5989-6755EN
Time-Domain Response of Agilent InfiniiMax Probes	Application Note	5988-9608EN
How Offset, Dynamic Range and Compression Affect Measurements	Application Note	5990-8255EN
Agilent InfiniiMax Probes Impact on Lead-Free (ROHS) Compliance	Application Note	5989-5179EN

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Revised: October 11, 2012

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

Published in USA, November 26, 2012
5968-7141EN

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