InfiniiMax III/III+ Probing System

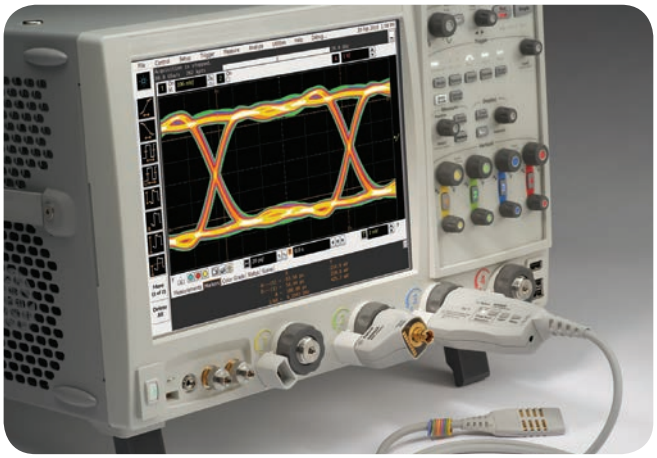
Data Sheet

The world's highest performing probe system keeps getting better

- Full 30 GHz bandwidth to the probe tip
- InfiniiMode probing for making differential, single-ended and common mode measurements with a single probe (with InfiniiMax III+)
- 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 upgradable (InfiniiMax III only)
- Variety of probe heads for different use models with maximum usability

InfiniiMax III probe amplifier

InfiniiMax III+ probe amplifier



Unmatched performance

Industry-leading probe performance

The InfiniiMax III 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. 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 to accommodate your highest performance needs and is unmatched by any product in the market.

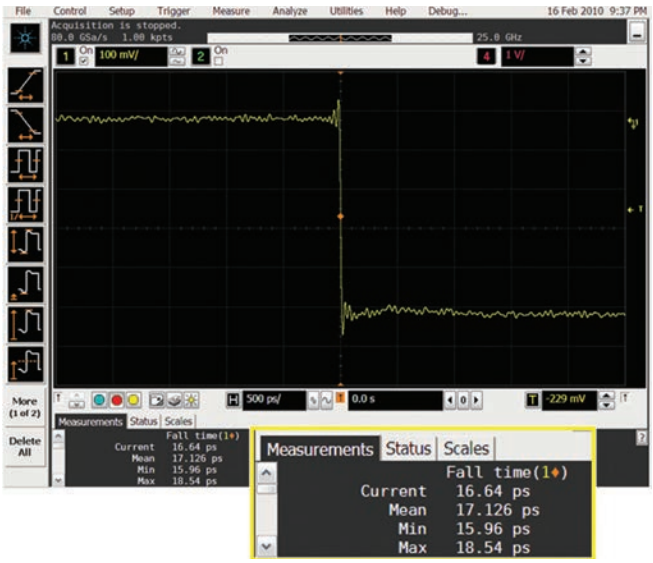
The N2830A Series InfiniiMax III+ probing system is the next generation of InfiniiMax probing, greatly expanding the measurement capabilities and usability of a probe capable of measuring all components of a differential signal. The built-in InfiniiMode technology allows you to switch to differential, single-ended, and common mode without adjusting probe tip connections. The N2830A 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)**

The InfiniiMax III+ works with the full array of InfiniiMax III probe heads and supports the full bandwidth of the InfiniiMax III+.

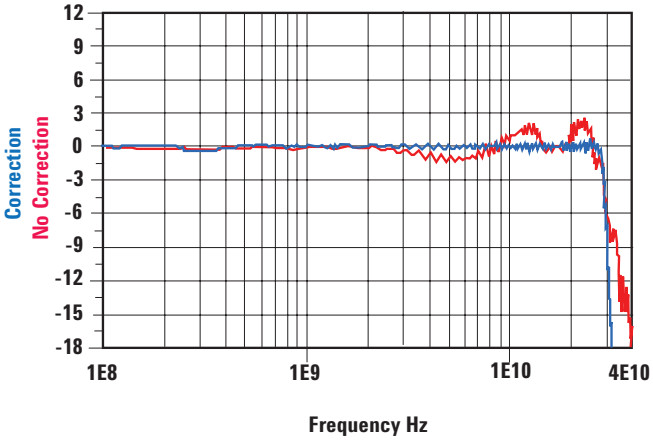
Highest fidelity and accuracy

The InfiniiMax III provides the highest bandwidth and incredibly low loading to allow for a new level of signal fidelity and accuracy. Continuing the probe head topology pioneered by Agilent in the InfiniiMax I and II probe systems, five probe heads are provided to accommodate multiple use models: a 30 GHz browser that is extremely usable, a 25/28 GHz ZIF probe head with economical replaceable/removable ZIF tips, a 28 GHz 2.92 mm probe head which allows cabled measurements using 2.92 mm, 3.5 mm, or SMA coax cables, an economical 16/26 GHz solder-in probe head for demanding measurements, and a 16 GHz QuickTip for a quick and secure connection.



More accurate probe correction

Each individual InfiniiMax III and III+ probe amp contains its unique S-parameters, and this frequency response data is used with the S-parameters of the various probe heads to further flatten the probe's magnitude and phase response for accuracy. Traditionally, probe correction uses a nominal model based on a typical probe amplifier instead of the specific amplifier. Generally, the biggest variation between probing systems is a result of the probe amplifier. The ability to correct a specific probe amplifier's response results in a more accurate probe correction, which yields a more accurate measurement.

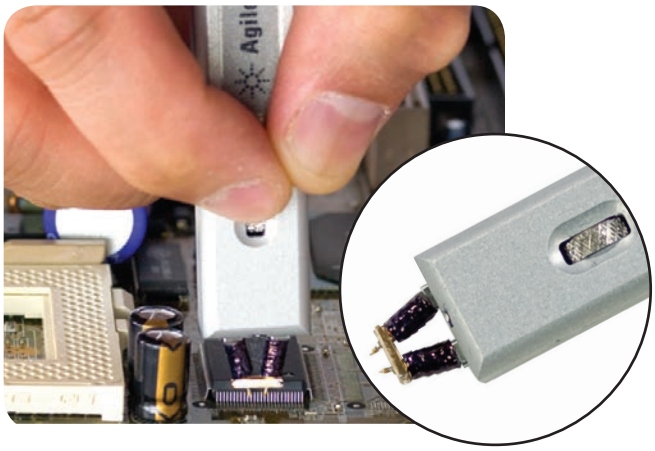


Uncompromised usability

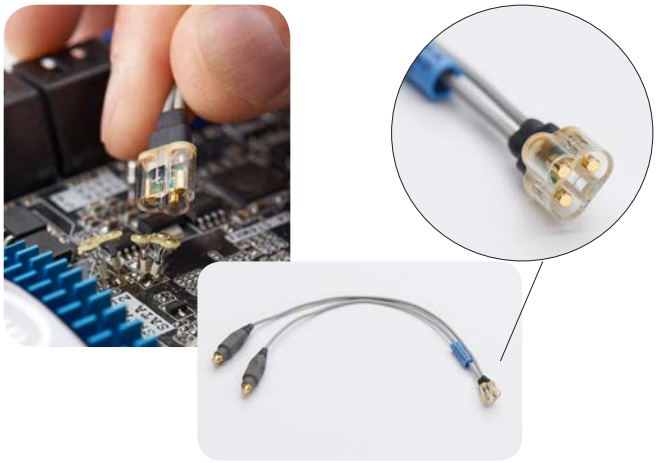
Extensive line-up of probe heads and accessories

Agilent's InfiniiMax III/III+ probes support a wide variety of high-speed applications with an extensive line-up of probe heads and accessories.

- The N5445A browser head (30 GHz) is the best choice for quick general-purpose troubleshooting of differential signals with its z-axis compliance and variable spacing from 20 mil – 125 mil (or 0.5 mm – 3.1 mm). The span between the signal tips is easily adjusted with a thumb wheel on the browser. Integrated LED lighting at the tip illuminates the probing area for better visibility. Order N5476A for replacement browser tips (set of 4).



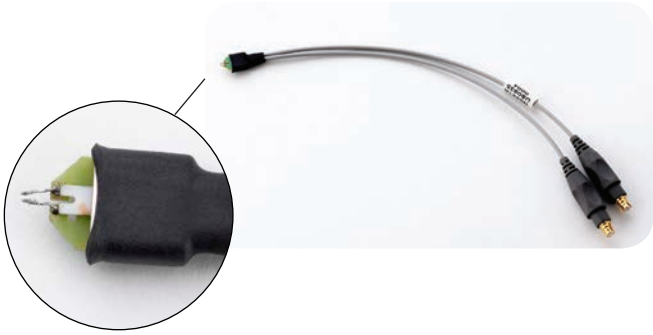
- The N2848A/49A QuickTip offers the industry's first magnetically-engaged probe head and tip for a quick and secure connection, pushing the usability to the next level. The N2848A QuickTip probe head quickly snaps to the N2849A probe tip, utilizing magnets to connect to the two sides of the differential signal and ground. Multiple N2849A probe tips can be installed on a DUT, allowing quick and reliable measurement of many probe points. The QuickTip supports the InfiniiMode probing when used with the InfiniiMax III+ probe amp and supports differential probing with the InfiniiMax III probe amp.



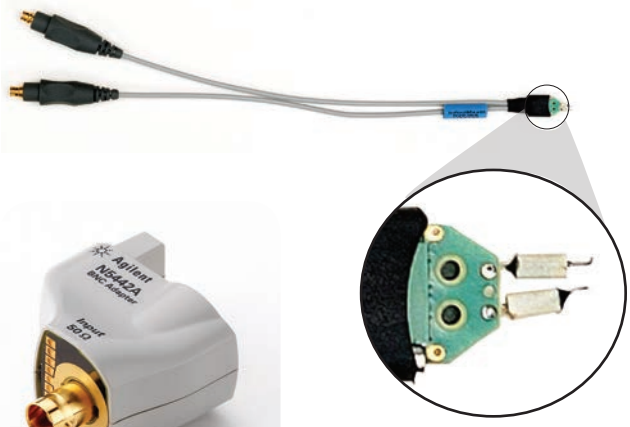
- The N5439A ZIF probe head provides 28 GHz bandwidth in an economical replaceable tip form factor. For differential measurement, the N5439A ZIF probe head with the N5440A or N5447A ceramic ZIF tip provides the industry's lowest signal loading. The ZIF tips can be left on the DUT as the probe head is moved from one probing site to the next. Order N5440A (450 Ω ceramic), N5447A (200 Ω ceramic) or the new N2838A (450 Ω PC board) for a set of 5 ZIF tips with plastic sporks to aid in soldering the tips to your DUT. The N2838A PC board ZIF tip increased the robustness of the ZIF tip significantly while maintaining the bandwidth performance up to 25 GHz when used in conjunction with the N2803A and N5439A. Variable spacing from 5 mil – 80 mil (or 0.127 mm – 2 mm). (The N5447A 200 Ω ZIF tip is not compatible with InfiniiMax III+ probes.)

- The N5444A 2.92 mm/3.5 mm/SMA probe head (28 GHz) allows you to connect two 2.92 mm, 3.5 mm or SMA cables to make a differential measurement on a single oscilloscope channel. Order N5448A 2.92 mm head flex cables (10" or 25 cm) to extend the cable length and add convenience.

- The N5441A solder-in probe head is an economical, semi-permanent connection that provides up to 16 GHz of bandwidth. Variable span of the leads ranges from 5 mil – 80 mil (or 0.127 mm – 2 mm).



- The N2836A solder-in head provides up to 26 GHz bandwidth when used in conjunction with the N2803A probe amplifier. This probe head supports InfiniiMode probing when used with the InfiniiMax III+ probe amp.



- The N5442A Precision BNC 50 Ω adapter allows you to use your existing InfiniiMax I (1130A-1134A), InfiniiMax II (1168A/69A), N2750A-52A, N2795A-97A active probes or a general purpose 50 Ω BNC cable with the 90000 X- or 90000 Q-Series oscilloscope.

- The N5449A high impedance adapter allows connection for probes that require a high impedance scope input such as a high impedance passive probe, 1147B current probe, or N2790A differential probe to the Infiniium 90000-X/Q Series oscilloscopes. The N5449A provides switchable AC/DC coupling as well as 10:1 and 1:1 attenuation settings. The adapter comes with a N2873A 500 MHz 10:1 passive probe.

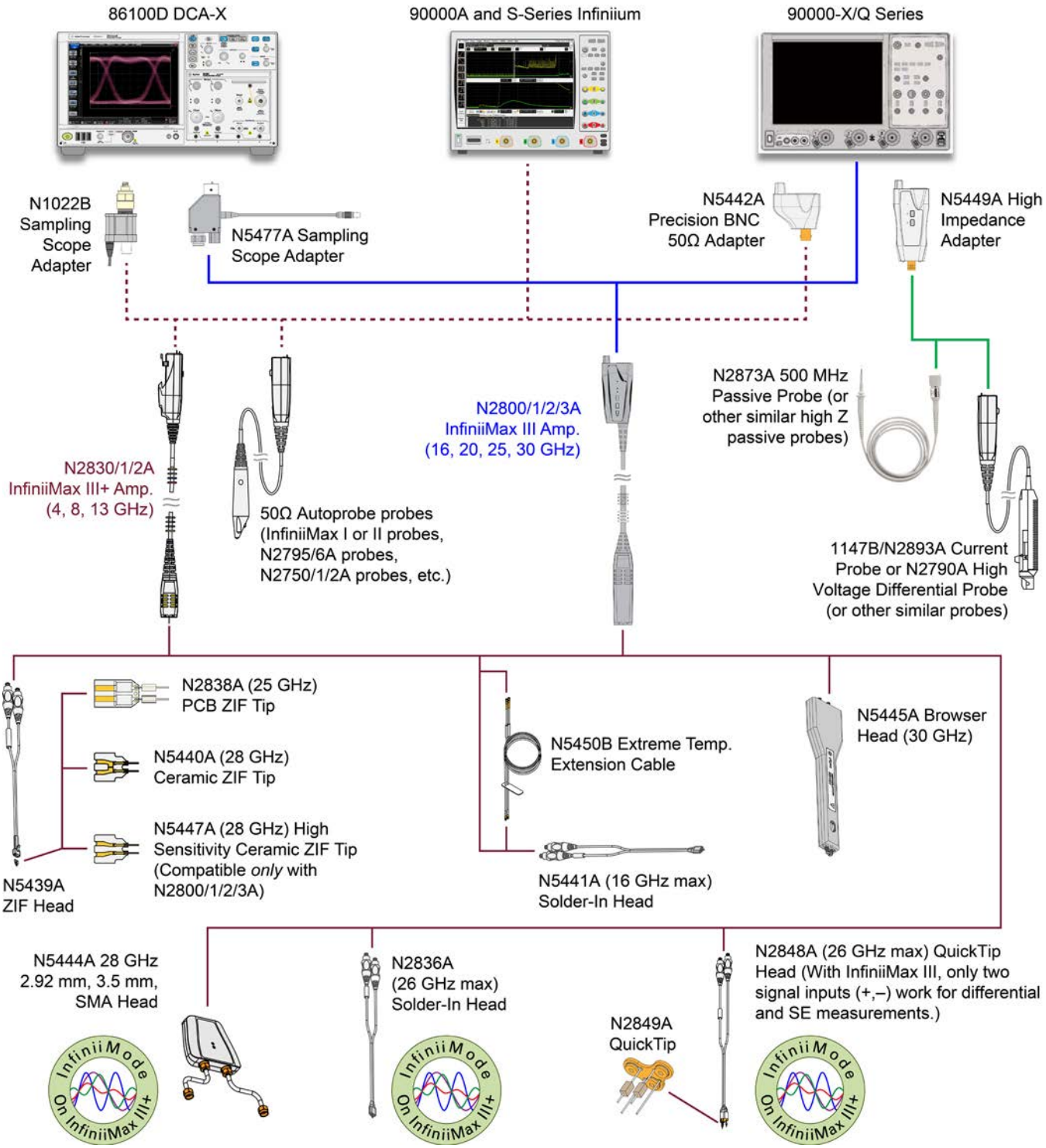
- The N5477A sampling oscilloscope adapter makes the InfiniiMax III probing system fully compatible with the Infiniium 86100C DCA-J sampling oscilloscope. Previously the DCA-J was limited to 13 GHz of probing, but with the N5477A, the DCA-J now has 30 GHz of probing, increasing its performance and flexibility. To use the InfiniiMax III+ probe on sampling oscilloscopes, order the N1022B probe adapter and the 1143A probe offset control and power module.

- The N5443A performance verification and deskew fixture is required to calibrate and verify the performance of the InfiniiMax III probe. Agilent is currently the only oscilloscope vendor in the market that provides the hardware for customers to validate their high performance probing system. Order E2655C to calibrate and verify the performance of the InfiniiMax III+ probes.

Bandwidth upgradability (for InfiniiMax III)

As frequencies have continued to increase, so have the cost of probes. The InfiniiMax III system offers the world's first fully upgradable probe amplifier. Purchase a 16 GHz probe amplifier today, knowing that in the future, you can upgrade the amplifier to higher bandwidths (20/25/30 GHz) at a fraction of the cost of a new probe amplifier.

InfiniiMax III/III+ probing system family diagram



Performance specifications and characteristics

InfiniiMax III/III+ warranted specifications

Probe head	Probe amp	Bandwidth	DC input
N5440A_N5439A ceramic 450 Ω ZIF tip and ZIF probe head	N2803A 30 GHz probe amp	26 GHz	Rdiff=100 kΩ ± 2%, Rse=50 kΩ ± 2%
N5445A 450 Ω browser	N2803A 30 GHz probe amp	28 GHz	Rdiff=100 kΩ ± 2%, Rse=50 kΩ ± 2%
N2836A 450 Ω solder-in probe head vertical orientation with no ground wires	Differential mode N2832A 13-GHz probe amp	13 GHz	Rdiff=100 kΩ ± 2%, Rse=50 kΩ ± 2%

InfiniiMax III/III+ probe head characteristics

These characteristics are mainly determined by the probe head. Performance numbers listed are: -3 dB bandwidth/10-90% transition time/20-80% transition time. Performance listed is with the highest bandwidth probe amp models in each family. Performance with lower bandwidth amps is the lower of the: AmpBW, (.434/AmpBW), (.308/AmpBW), or bandwidth measured with the highest bandwidth amp in the family.

		InfiniiMax III N2803A 30-GHz probe amp	InfiniiMax III+ N2832A 13-GHz probe amp		
Probe head	Input C	Differential mode	Differential mode	Single-ended mode	Common mode
N5440A_N5439A ceramic 450 Ω ZIF tip and ZIF probe head	Cdiff=32 fF; Cse=44 fF	28 GHz, 15.5 pS, 11.0 pS	13 GHz, 33.4 pS, 23.7 pS	n/a	
N5447A_N5439A ceramic 200 Ω ZIF tip and ZIF probe head	Cdiff=32 fF; Cse=44 fF	28 GHz, 15.5 pS, 11.0 pS	n/a		
N5445A 450 Ω browser	Cdiff=35 fF; Cse=50 fF	30 GHz, 14.5 pS, 10.3 pS	13 GHz, 33.4 pS, 23.7 pS	n/a	
N5441A 450 Ω solder-in probe head	Cdiff = 77 fF; Cse = 105 fF	17.2 GHz, 34.8 pS, 26.6 pS	13 GHz, 33.4 pS, 23.7 pS	n/a	
N2838A_N5439A PC board 450 Ω ZIF tip and ZIF probe head	Cdiff=95 fF; Cse=130 fF	25 GHz, 17.4 pS, 12.3 pS	13 GHz, 33.4 pS, 23.7 pS	n/a	
N2836A 450 Ω solder-in probe head vertical orientation with no ground wires	Cdiff=108 fF; Cse=140 fF	27 GHz, 16.1 pS, 11.4 pS	13 GHz, 33.4 pS, 23.7 pS	n/a	
N2836A 450 Ω solder-in probe head flat orientation with minimum length ground wires	Cdiff=108 fF; Cse=140 fF	27 GHz, 16.1 pS, 11.4 pS	13 GHz, 33.4 pS, 23.7 pS		
N2849A_N2848A 450 Ω QuickTip and QuickTip probe head with ground wires connected	Cdiff=340 fF; Cse=200 fF	16 GHz, 27.1 pS, 19.3 pS	13 GHz, 33.4 pS, 23.7 pS		
N5444A 2.92 mm, SMA, 3.5 mm probe head	n/a	28 GHz, 15.5 pS, 11.0 pS	13 GHz, 33.4 pS, 23.7 pS		

Performance specifications and characteristics (cont'd)

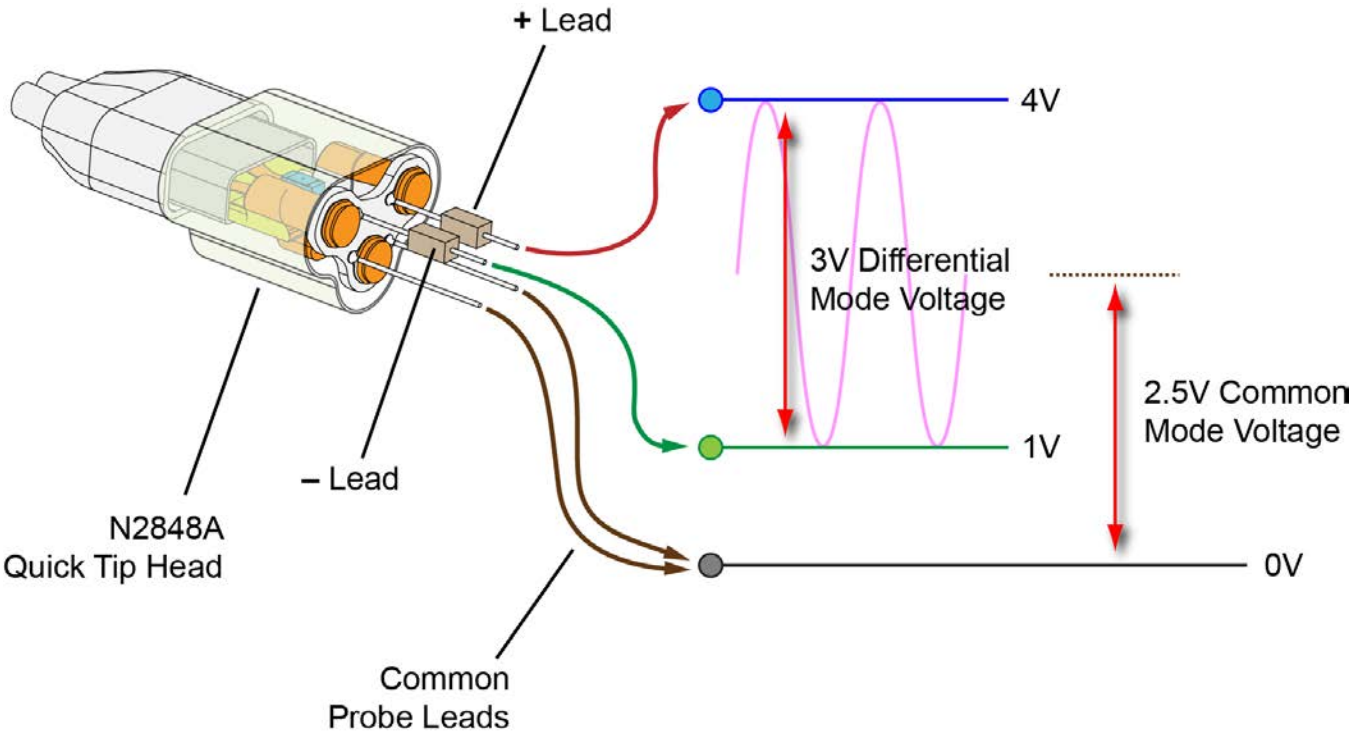
InfiniiMax III/III+ probe amp characteristics

These characteristics are mainly determined by the probe amp.

	N280XA InfiniiMax III probe amp			N283XA InfiniiMax III+ probe amp	
Features	**450 Ω probe heads**	**200 Ω probe heads**	**N5444A 2.92 mm, SMA, 3.5 mm probe head**	**450 Ω probe heads**	**N5444A 2.92 mm, SMA, 3.5 mm probe head**
DC input resistance	Rse=50 kΩ ± 2% each input to ground, Rdiff=100 kΩ ± 2% and Rcm=25kΩ ± 2%	Rse=50 kΩ ± 2% each input to ground, Rdiff=100 kΩ ± 2% and Rcm=25 kΩ ± 2%	55 Ω to Vterm	Rse=50 kohm ± 2% each input to ground, Rdiff=100 kΩ ± 2% and Rcm=25 kΩ ± 2%	55 Ω to Vterm
Input resistance >10kHz	Rse=500 Ω each input to ground, Rdiff=1 kΩ and Rcm=250 Ω	Rse=500 Ω each input to ground, Rdiff=1 kΩ and Rcm=250 Ω	50 Ω to .901*Vterm	Rse=500 Ω each input to ground, Rdiff=1 kΩ and Rcm=250 Ω	50 Ω to .901*Vterm
Input voltage range (differential or single-ended)	1.6 Vpp, ±0.8 V (HD2&3 < -34 dbc), 2.5 Vpp, ±1.25 V (HD2&3 < -38 dbc)	0.8 Vpp, ±0.4 V (HD2&3 < -34 dbc), 1.6 Vpp, ±0.8 V (HD2&3 < -38 dbc)	1.6 Vpp, ±0.8 V (HD2&3 < -34 dbc), 2.5 Vpp, ±1.25 V (HD2&3 < -38 dbc)	2.5 Vpp or ±1.25 V at 5:1 attenuation, 5.0 Vpp or ±2.50 V at 10:1 attenuation	2.5 Vpp or ±1.25 V at 5:1 attenuation, 5.0 Vpp or ±2.50 V at 10:1 attenuation without violating max input power
Max input power	n/a	n/a	125 mW calculated by {[rms(vin-vterm)]^2/55]} for each input	n/a	125 mW calculated by {[rms(vin-vterm)]^2/55]} for each input
Input common mode range	±12 VDC to 250 Hz, ±1.25 V > 250 Hz	±6 VDC to 250 Hz, ±0.65 V > 250 Hz	±6 VDC to 250 Hz, ±1.25 V > 250 Hz without violating max input power	±7 VDC to 100 Hz, ±1.25 V >100 Hz at 5:1 attenuation, ±2.5 V > 100 Hz at 10:1 attenuation	± 6 VDC to 100 Hz, ±1.25 V >100 Hz at 5:1 attenuation, ±2.5 V > 100 Hz at 10:1 attenuation without violating max input power
DC attenuation ratio	6:1	3:1	6:1	5:1 or 10:1 Automatically selected based on volts/division (all modes)	5:1 or 10:1 Automatically selected based on volts/division (all modes)
Offset range (for probing a single-ended signal)	± 16 V	± 8 V	± 6 V without violating max input power	± 16 V	± 6 V without violating max input power
Input referred noise spectral density	23.9 nV/rt (Hz)	12.0 nV/rt (Hz)	23.9 nV/rt (Hz)	Diff 5:1 atten 33.5 nV/rt(Hz), Diff 10:1 atten 53.9 nV/rt(Hz), SE A or B 5:1 atten 27.8 nV/rt(Hz), SE A or B 10:1 atten 47.7 nV/rt(Hz), CM 5:1 atten 21.8 nV/rt(Hz), CM 10:1 atten 38.4 nV/rt(Hz)	
Input referred noise example	4 mVrms with 28 GHz probe head and 30 GHZ probe amp	2 mVrms with 28 GHz probe head and 30 GHz probe amp	4 mVrms	4.5 mVrms in diff mode 5:1 atten with >= 18 GHz probe head and 13 GHz probe amp	4.5 mVrms in diff mode 5:1 atten with 28 GHz N5444A probe head and 13 GHz probe amp
Maximum input voltage	18 Vpeak Cat 1	18 Vpeak Cat 1	8 Vpeak without violating max input power	18 Vpeak Cat 1	8 Vpeak without violating max input power

What is InfiniiMode?

InfiniiMode allows convenient measurement of differential, single-ended and common mode signals with a single probe tip - without reconnecting the probe from its connection point.



Ordering information

InfiniiMax III/III+ probe amplifier models

Model number	Description	Recommended oscilloscope
N2803A	30 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q/Z Series 28 GHz - 63 GHz models
N2802A	25 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q/Z Series 25 GHz models
N2801A	20 GHz InfiniiMax III probe amplifier	Infiniium 90000X/Q/Z Series 20 GHz models
N2800A	16 GHz InfiniiMax III probe amplifier	Infiniium 90000X Series 16 GHz models
N2832A	13 GHz InfiniiMax III+ probe amplifier	Infiniium 90000X 13 GHz and 90000A models
N2831A	8 GHz InfiniiMax III+ probe amplifier	Infiniium 90000A and S-Series
N2830A	4 GHz InfiniiMax III+ probe amplifier	Infiniium 90000A and S-Series

Note: InfiniiMax III and III+ probe amps are not compatible with existing InfiniiMax I or II probe heads.

InfiniiMax III/III+ probe heads

Model number	Description	Notes
N2848A	InfiniiMax III QuickTip probe head	Compatible with InfiniiMax III/III+ amp Supports InfiniiMode with InfiniiMax III+ amp
N2849A	InfiniiMax III QuickTip tips	Set of 4 tips
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. Supports InfiniiMode with InfiniiMax III+ amp
N5441A	InfiniiMax III 16 GHz solder-in probe head	
N2836A	InfiniiMax III 26 GHz solder-in probe head	Supports InfiniiMode with InfiniiMax III+ amp

Note: N54xxA InfiniiMax III/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/II/III+ probes, N2750A-52A, N2795A/96A/97A, 1156A-58A etc.
N5449A	High impedance probe adapter	Includes one N2873A 500MHz 10:1 passive probe
N5477A	Sampling scope adapter	For InfiniiMax III amp to use with Agilent 86100C DCA-J sampling scope
N1022B	Probe adapter	For InfiniiMax III+ amp to use with 86100C DCA-J sampling scope
N5443A	Performance verification and deskew fixture	For InfiniiMax III
E2655C	Performance verification and deskew fixture	For InfiniiMax III+

Ordering information (cont'd)

Probe bandwidth upgrade options (for InfiniiMax III only)

Model number	Description	Notes
N5446A-001	16 GHz to 20 GHz bandwidth upgrade	
N5446A-002	20 GHz to 25 GHz bandwidth upgrade	
N5446A-003	25 GHz to 30 GHz bandwidth upgrade	
N5446A-004	16 GHz to 25 GHz bandwidth upgrade	
N5446A-005	16 GHz to 30 GHz bandwidth upgrade	
N5446A-006	20 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/III+ probing system

Model number	Description	Notes
N2787A	3D probe positioner	For hands-free probing
N5450B	Extreme temperature extension cable	1 m long
N2812A	High performance input cable, 2.92 mm connectors, 1 m length	For use with Infiniium 90000-X/Q Series oscilloscope
MV-23	Carson Optical MagniVisor	www.carsonoptical.com/Magnifiers

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