Infiniium DSO80000B Series Oscilloscopes and InfiniiMax Series Probes

2 GHz to 13 GHz Real-time Oscilloscope Measurement Systems

Data Sheet

- 2 GHz to 13 GHz bandwidth with up to 40 GSa/s sample rate
- Up to 2 Mpts MegaZoom memory at 40 GSa/s sample rates and 64 Mpts MegaZoom deep memory at 4 GSa/s
- Full bandwidth probe system for all use models – up to 13 GHz bandwidth for differential solder-in, browser and SMA connections
- Industry's lowest noise floor for both oscilloscopes and probes
- Industry's lowest jitter measurement floor
- Industry's only environmental chamber probing solution supporting temperatures from –55 to +150 °C
- Industry's flattest frequency response
- Industry's only full bandwidth economical lead-free solder-in probe solution
- Industry's only bandwidth–upgradeable series from 2 GHz to 13 GHz
- Industry's largest selection of application software packages
- Industry's first software event finder "InfiniiScan"
- Industry's only server based oscilloscope application software license solution
- Now LXI class C compliant

With the superior signal integrity, probing and application software selection of Agilent Technologies' Infiniium 80000B Series and InfiniiMax II probing system will lead to improved measurements and increased design margins.

The signal integrity advantages of Agilent's Infiniium 80000B Series Scopes and InfiniiMax probing system include the industry's lowest noise floor, lowest jitter measurement floor, lowest trigger jitter and flattest frequency response. These foundational capabilities are crucial for achieving accurate and repeatable measurements. These superior signal integrity capabilities come from Agilent's RF design experience, proprietary packaging technologies and unique CMOS ADC architecture. Superior signal integrity maximizes your design margins by not wasting any measurement accuracy due to poor noise, jitter or frequency response of the scope or probing system.

Agilent Technologies

Benefits

The probing advantages of the InfiniiMax Series probes include the low noise and flat frequency response mentioned above. The InfiniiMax Series also offers the industry's widest selection of probe amplifier bandwidths (currently six) and the industry's widest variety of different probe head types (currently 11 + one extension cable). InfiniiMax is also the probing system that offers 13 GHz bandwidth for the differential solder-in, differential browsing and differential SMA use models. It now supports a unique environmental chamber probe extension solution as well. Since its inception, the award-winning InfiniiMax probe system has provided maximum performance with unmatched usability.

The application software for the Infiniium 80000B Series is the industry's largest – currently offering a choice of 29 different application packages. Application specific software solutions include compliance test packages for industry standards such as: PCI-Express®, DDR, FBD, SATA, SAS, FC, DVI, HDMI, USB, FireWire, Ethernet, XAUI, Serial Rapid IO, CPRI, OBSAI RP3, and DisplayPort as well as more general purpose jitter and serial data analysis packages. Agilent is also the industry-leading vendor to offer innovative packages for ultra-wideband vector signal analysis, noise reduction and bandwidth control, and InfiniiScan event identification software.

The industry-leading signal integrity, probing and software application capabilities of the Infiniium 80000B Series scopes and InfiniiMax Series probes have recently won four industry awards.

Superior signal integrity and probing for your application

Agilent doesn't only deliver industry leading oscilloscope performance. It also uses the company's extensive technology base to provide superior signal integrity, probing and analysis software for the designer's specific application. The most notable benefits of the Agilent solution are:

Signal integrity

- Industry's lowest scope noise floor
- Industry's lowest jitter floor
- Industry's lowest trigger jitter
- Industry's flatest frequency response
- Industry's leading hardware sensitivity
- Industry's only bandwidth upgradeable series

Probing

- Industry's lowest probe noise floor
- Industry's widest range of probe amplifier bandwidths
- Industry's widest range of probe head types
- Industry's flatest probe frequency response
- Industry's only environmental chamber probing solution supporting temperatures from –55 to +150 °C

Applications

- Industry's largest set of applications
- Industry's only event identification software
- Industry's only wideband spectrum analyzer software
- Industry's first noise reduction software
- Industry's only calibrated jitter measurement
- Industry's only compliance test framework to support FibreChannel, DDR1, 2, and 3, XAUI, Serial Rapid IO, CPRI, OBSAI PR3, and DisplayPort
- Industry's only application server license solution for the oscilloscopes

U.S. Navy imagery used in illustration without endorsement expressed or implied.

Specifications

80000B Series Infiniium oscilloscopes

Model	Real-time bandwidth on 2 channels and 40 GSa/s	Equivalent-time bandwidth on 4 channels	Real-time bandwidth on 4 channels at 20 GSa/s
DSO81304B	13 GHz*	13 GHz	8 GHz
DSO81204B	12 GHz	12 GHz	8 GHz
DSO81004B	10 GHz	10 GHz	8 GHz
DSO80804B	8 GHz	8 GHz	8 GHz
DSO80604B	6 GHz	6 GHz	6 GHz
DSO80404B	4 GHz	4 GHz	4 GHz
DSO80304B	3 GHz	3 GHz	3 GHz
DSO80204B	2 GHz	2 GHz	2 GHz

* Real-time, user selectable DSP enhanced bandwidth

How much bandwidth do I need to measure a given rise/fall time accurately?

Rise/fall time (20 - 80%)	3% accuracy	10% accuracy	20% accuracy
100 ps	5.6 GHz	4.8 GHz	4.0 GHz
75 ps	7.5 GHz	6.4 GHz	5.3 GHz
60 ps	9.3 GHz	8.0 GHz	6.7 GHz
50 ps	11.2 GHz	9.6 GHz	8.0 GHz
40 ps	14.0 GHz	12.0 GHz	10.0 GHz
30 ps	18.7 GHz	16.0 GHz	13.3 GHz

Notes: Maximum signal frequency content = 0.4/rise time (20 - 80%)
Scope bandwidth required = 1.4 x maximum signal frequency for 3% accuracy measurements
Scope bandwidth required = 1.2 x maximum signal frequency for 10% accuracy measurements
Scope bandwidth required = 1.0 x maximum signal frequency for 20% accuracy measurements

InfiniiMax II Series probe amplifiers

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

InfiniiMax I Series probe amplifiers

Model	Bandwidth	Description
1134A	7 GHz	InfiniiMax I probe amplifier – order one or more probe heads
1132A	5 GHz	InfiniiMax I probe amplifier – order one or more probe heads
1131A	3.5 GHz	InfiniiMax I probe amplifier – order one or more probe heads
1130A	1.5 GHz	InfiniiMax I probe amplifier – order one or more probe heads

InfiniiMax I probe amplifier specifications: Dynamic range = 5 V, DC offset range = ± 12 V, maximum voltage = ± 30 V

Specifications (continued)

InfiniiMax II Series probe heads

InfiniiMax II Series probe heads are recommended for 1169A/68A probe amplifiers. The typical performance when used with a DSO81304B is shown below.

Probe head	Model number	Differential measurement (bandwidth, input C, input R)	Single-ended measurement (bandwidth, input C, input R)
Hi-bandwidth differential SMA	N5380A	12.5 GHz	12.5 GHz
Hi-bandwidth differential solder-in	N5381A	13 GHz, 0.21 pF, 50 kΩ	13 GHz, 0.35 pF, 25 kΩ
Hi-bandwidth differential browser	N5382A	13 GHz, 0.21 pF, 50 kΩ	13 GHz, 0.35 pF, 25 kΩ
Hi-bandwidth differential replaceable ZIF solder-in*	N5425A/N5426A (requires both N5425A and N5426A)	13 GHz, 0.33 pF, 50 kΩ	13 GHz, 0.53 pF, 25 kΩ
Hi-bandwidth differential replaceable long wire ZIF solder-in*	N5451A (requires N5425A)	9 GHz at 7 mm wire	5 GHz at 11 mm wire

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

Probe head	Model number	Differential measurement (bandwidth, input C, input R)	Single-ended measurement (bandwidth, input C, input R)
Hi-bandwidth differential replaceable ZIF long solder-in*	N5425A/N5426A (requires both N5425A and N5426A)	12 GHz, 0.33 pF, 50 kΩ	12 GHz, 0.53 pF, 25 kΩ
Hi-bandwidth differential replaceable wire ZIF solder-in*	N5451A (requires N5425A)	9 GHz at 7 mm wire	5 GHz at 11 mm wire
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
Differential kit	E2669A (includes E2675A, E2677A and E2678A)		
Single-ended kit	E2668A (includes E2676A, E2679A and E2678A)		
High-impedance adapter	E2697A (includes 500 MHz passive probe)		

* Number of insertions supported: 20 cycles (50 cycles (typical)

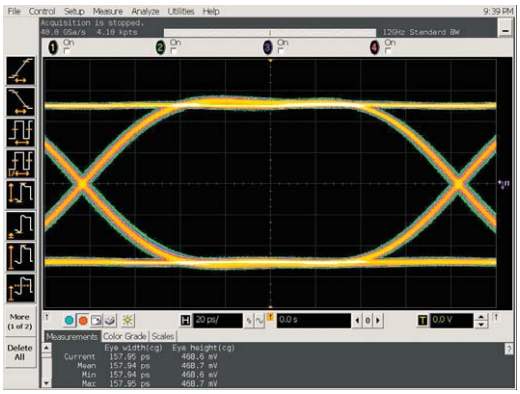
Specifications (continued)

What is the recommended bandwidth and Infiniium 80000B Series support for popular bus standards?

				Serial data analysis (E2688A)				
Bus standard	**Bit rate**	**Recommended bandwidth[1]**	**Jitter analysis[2]**	**SW clock recovery**	**8b/10b decode**	**Mask testing**	**Compliance testing**	**Test fixtures**
Ethernet	250 Mbs	2 GHz	Yes	Yes	N/A	Yes	N5392A	N5395B
USB 2.0	up to 480 Mbs	2 GHz	Yes	Yes	N/A	Yes	N5416A	E2649A
DDR1	up to 400 MTs	2 GHz	Yes	N/A	N/A	No	U7233A	No
DDR2	up to 800 MTs	4 GHz	Yes	N/A	N/A	No	N5413A	No
DDR3	up to 1.6 GTs	6 GHz	Yes	N/A	N/A	No	U7231A	No
SATA 1.5 Gbps	1.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	N5411A	COMAX
SAS 150	1.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	N5412A	N5421A
DVI	1.65 Gbps	4 GHz	Yes	Yes	Yes	Yes	N5394A	Silicon Image
Fibre Channel	2.125 Gbps	4 GHz	Yes	Yes	Yes	Yes	N5410A	No
HDMI 1.3a/b	up to 3.4 Gbps	8 GHz	Yes	Yes	Yes	Yes	N5399A	N1080A
DisplayPort 1.1	2.7 Gbps	8 GHz	Yes	Yes	Yes	Yes	U7232A[4]	W2641A
PCI Express I	2.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	N5393A[3]	PCI-SIG®
ExpressCard	2.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	N5393A[3]	PCMCIA.org
InfiniBand	2.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	No	Fujikura
Advanced TCA	2.5 Gbps	6 GHz	Yes	Yes	Yes	Yes	No	No
SATA 3Gbps	3.0 Gbps	10 GHz	Yes	Yes	Yes	Yes	N5411A[4]	COMAX
SAS 300	3.0 Gbps	10 GHz	Yes	Yes	Yes	Yes	N5412A[4]	N5421A
10G Ethernet	3.125 Gbps	8 GHz	Yes	Yes	N/A	Yes	No	No
XAUI	3.125 Gbps	8 GHz	Yes	Yes	Yes	Yes	N5431A	No
Serial Rapid IO	up to 3.125 Gbps	8 GHz	Yes	Yes	Yes	Yes	N5431A	No
FireWire	up to 3.2 Gbps	8 GHz	Yes	Yes	N/A	N/A	Yes - QP	Quantum Parametrics
Fibre Channel	4.25 Gbps	10 GHz	Yes	Yes	Yes	Yes	N5410A[4]	No
FBD I	up to 4.8 Gbps	12 GHz	Yes	Yes	N/A	Yes	N5409A[4]	N4235A/36/38A
PCI Express II	5.0 Gbps	12 GHz	Yes	Yes	Yes	No	No	No
InfiniBand II	5.0 Gbps	12 GHz	Yes	Yes	Yes	No	No	No
SATA 6Gbps	6.0 Gbps	13 GHz	Yes	Yes	Yes	No	No	No
SAS 600	6.0 Gbps	13 GHz	Yes	Yes	Yes	No	No	No
Fibre Channel	8.5 Gbps	13 GHz	Yes	Yes	Yes	No	No	No
FBD II	up to 9 Gbps	13 GHz	Yes	Yes	N/A	No	No	No

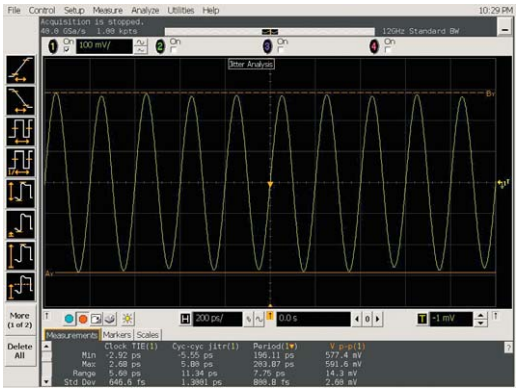
1 Recommended bandwidth is derived from a combination of data rate and edge speed
2 Jitter analysis solutions: EZJIT (E2681A), EZJIT Plus (N5400A), oscilloscope tools (E2690B)
3 Requires E2688A serial data analysis software
4 Requires E2688A serial data analysis and N5400A EZJIT Plus jitter analysis software

Benefits (continued)

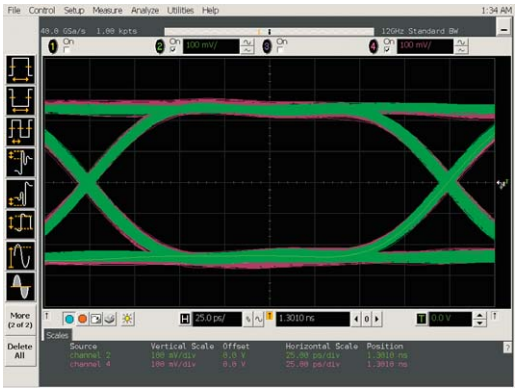


The industry's lowest noise floor delivers superior measurement results and maximizes design margins (see page 13 for noise floor characteristics).

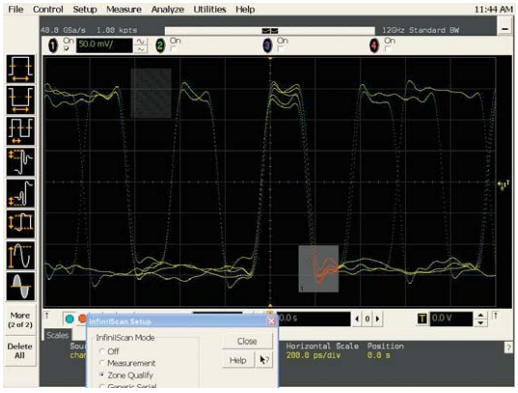
The industry's lowest trigger jitter, less than 500 fs rms (typically, less than 200 fs rms on 5 Gbps PRBS signal), facilitates accurate waveform viewing of multiple waveforms.



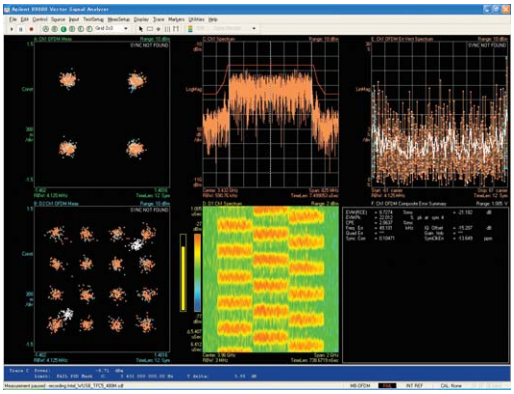
The industry's lowest jitter measurement floor minimizes the oscilloscope's contribution to jitter measurements and provides superior compliance test results.



The industry's flattest frequency response leads to excellent correlation between scope only (green trace) and scope plus probe (red trace) measurements as shown in this dual infinite persistence eye diagram.



The "true" ease of use. Just draw boxes and the scope will trigger. The industry's only software event finder, InfiniiScan event identification tool provides the next level of ease of use for the scope triggering system.



The scope meets the spectrum analyzer. The industry's only integrated vector signal analysis software (89600A) solution provides unmatched new frequency domain analysis capability for wideband signals.

Overview of Infiniium 80000B Series Application Software

Jitter

Application software package	
E2681A	EZJIT jitter analysis (Option 002)
N5400A	EZJIT Plus jitter analysis (Option 004)
E2690B	Amherst oscilloscope tools

Analysis

Application software package	
E2688A	SDA high-speed serial data analysis (Option 003)
N5414A	InfiniiScan event identification software (Option 009)
N5391A	I^2C/SPI serial data analysis (Option 007)
N5402A	CAN serial data analysis (Option 008)
N5430A	Infiniium user-defined function (Option 010)
89601A	Vector signal analysis

Compliance

Application software package	
N5392A	Ethernet compliance
N5393A	PCI Express compliance
N5394A	DVI compliance
N5399A	HDMI compliance
N5409A	Fully buffered DIMM compliance
N5410A	Fiber channel compliance
N5411A	SATA I/II compliance
N5412A	SAS compliance
N5413A	DDR2 compliance
N5416A	USB compliance
N5431A	XAUI electrical validation with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO support
U7231A	DDR3 compliance
U7232A	DisplayPort compliance
U7233A	DDR1 compliance
	FireWire compliance (Quantum Parametrics)

Utilities

Application software package	
N5403A	Noise reduction and bandwidth control option (Option 005)
N5435A	Infiniium application server license
E2625A	Communications mask test kit
E2699A	My Infiniium integration package (Option 006)
E2682A	Voice control option

Infiniium: Award-winning scopes

Infiniium has received ten industry awards to date, including EDN's "Innovation of the Year" award (twice) and T&M World's "Best in Test." Agilent is committed to breaking new ground and providing tools that bring unique value to our customers.

Up to 40-GSa/s sample rate on two channels significantly reduces the chances of aliasing, increases measurement accuracy, and delivers the full real-time bandwidth of the oscilloscope on two channels simultaneously.

Four channels at 20-GSa/s with 8 GHz real-time bandwidth or full bandwidth equivalent time modes are also available.

Get fast answers to your questions with the built-in information system. Infiniium's task-oriented Setup Guide provides step-by-step instructions for several advanced measurements and procedures. A 3.2 GHz CPU processes measurements quickly.

See your signal more clearly with an (8.4-inch 21.34 cm) XGA (1024 x 768) high-resolution touch screen color display. Infiniium's bright TFT display with anti-glare coating lets you see the details of your signal from all angles.

≥ 40-Gb hard drive, a front-panel high-speed USB 2.0 port and four rear panel high-speed USB 2.0 ports make it easy to save setup files, data files, screen shots, etc.

Identify anomalies easily with a 256-level intensity-graded or color-graded persistence display that provides a three dimensional view of your signals.

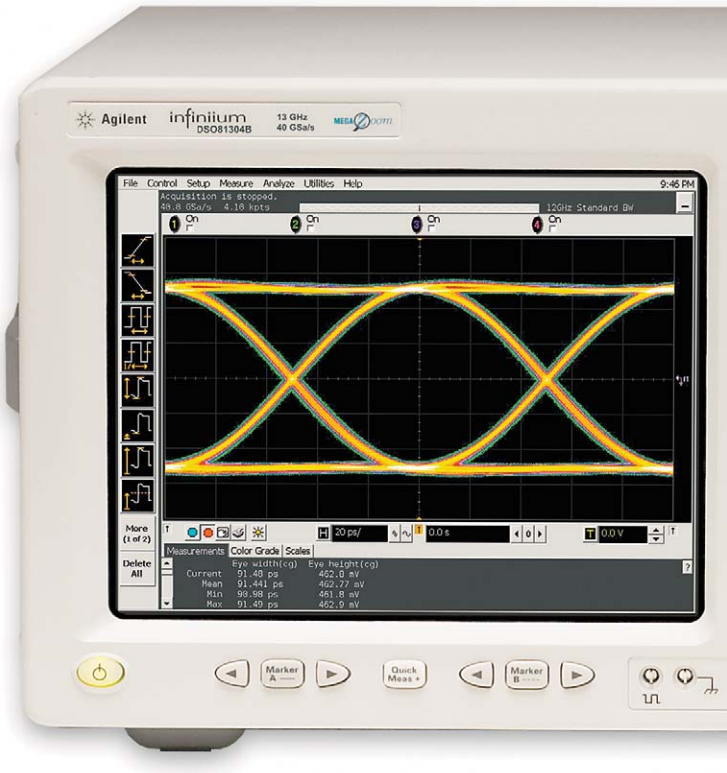
Label waveforms and add notes to your screen captures – Infiniium's keyboard makes it easy.

The built-in touch screen or a plug-in mouse can be used to access all menus, drag and drop measurement icons or position markers.

Easy access to advanced features like math functions and FFTs, is provided by the Windows®-based graphical user interface. This GUI also gives you unique capabilities like drag-and-drop measurements and zooming, and offers a graphical equivalent to all front-panel controls.

Remote access with Web-enabled connectivity, e-mail on trigger, and GPIB over LAN allows you to access your scope from remote locations. LXI Class C compliant.

64 Mpts acquisition memory at 4 GSa/s sample rate on two channels allows you to capture long time windows at high resolution – such as identifying glitches caused by a power supply start-up from reset.



QuickMeas+ key gives you any five automated measurements with a push of a button. You can also configure this key to print/save screen shots, save waveforms, or load a favorite setup.

Zoom and search with instant response. Zoom into your signal using the horizontal scale knob and search through your waveform with the position knob. MegaZoom technology allows you to find your area of interest quickly and easily – even with 64-Mpts waveforms.

Built-in CD-ROM drive on rear panel allows you to update the system software conveniently and can be used to install third-party application packages.

Hands-free operation with the Infiniium VoiceControl option. Just speak into the microphone to operate front-panel controls.

Segmented memory acquisition mode captures bursting signals at maximum sample rate without consuming memory during periods of inactivity.

Removable hard disk drive option is available for added data security.

Install third-party software packages such as Excel, LabVIEW*, Agilent VEE, MATLAB®, anti-virus software, and more, to perform customized processing and automation of your oscilloscope or to make the scope compliant to the network environment of your company.

An external monitor allows you to run third-party applications on a large, high-resolution SXGA (1280 x 1024) display while using the scope's built-in monitor for high-speed waveform display.

Windows XP Pro operating system

A familiar interface makes simple tasks simple. Infiniium's analog-like front panel has a full set of controls color coded to the waveforms and measurements, making simple tasks simple.

One-year standard warranty and a variety of Agilent support options protect your investment for the long term.

10-MHz reference clock can be input to or output from the scope to allow precise timebase synchronization with RF instruments or logic analyzers.

An 18-GHz, BNC-compatible connector provides a high signal fidelity connection to Agilent active probes, SMA adapters, and standard BNCs.

AutoProbe interface completely configures your scope for use with the InfiniiMax probing system and previous-generation Agilent active probes.

10/100/1000 BaseT LAN interface lets you easily print waveforms on networked printers, save your results on your office PC, share information with others, and control the scope over the Web.

* LabVIEW is a product of National Instruments, Inc.

InfiniiMax II: The World's Best High-Speed Probing System Just Keeps Getting Better

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.

Fully characterized performance for all InfiniiMax probe heads, including:

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

One-year standard warranty on active probes and a variety of Agilent support options to choose from.

Controlled impedance transmission lines in every probe head deliver full performance versus the performance limitations produced 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 as it is attached to the scope.

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

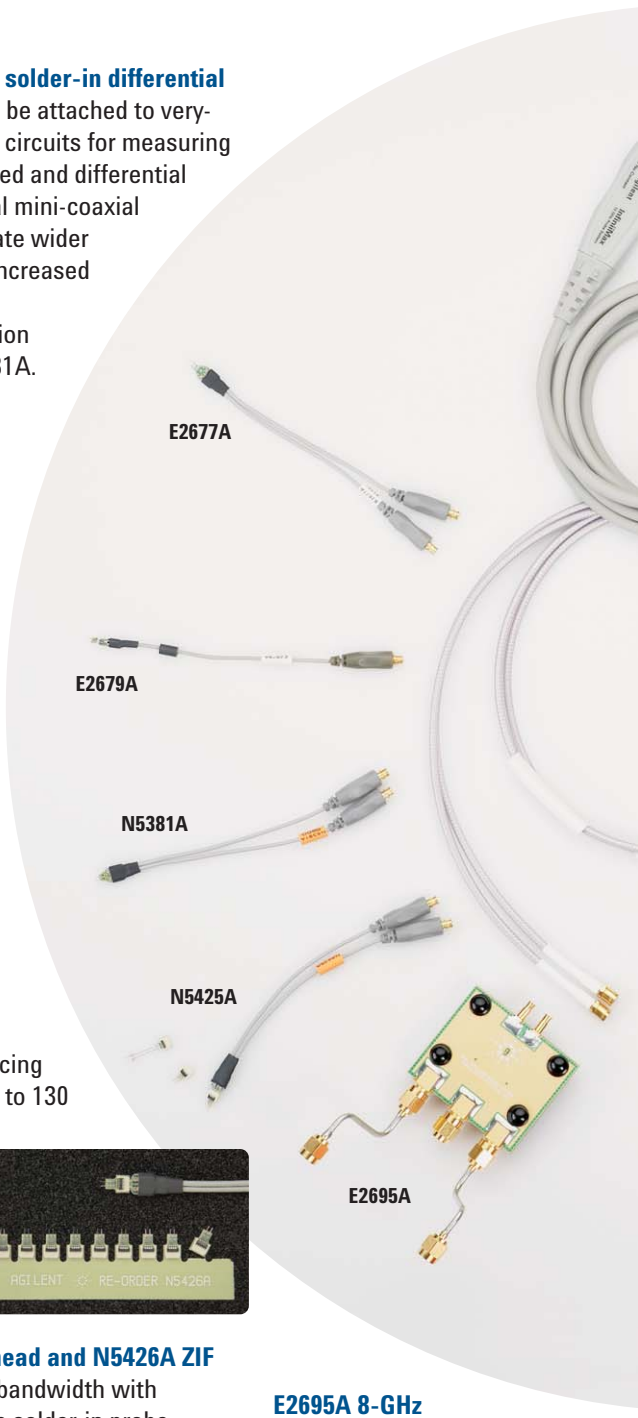
Probe calibration software delivers the most accurate probe measurements, and linear phase response and allows various probe combinations to be deskewed to the same reference time.

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

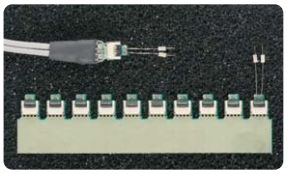


N5426A

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

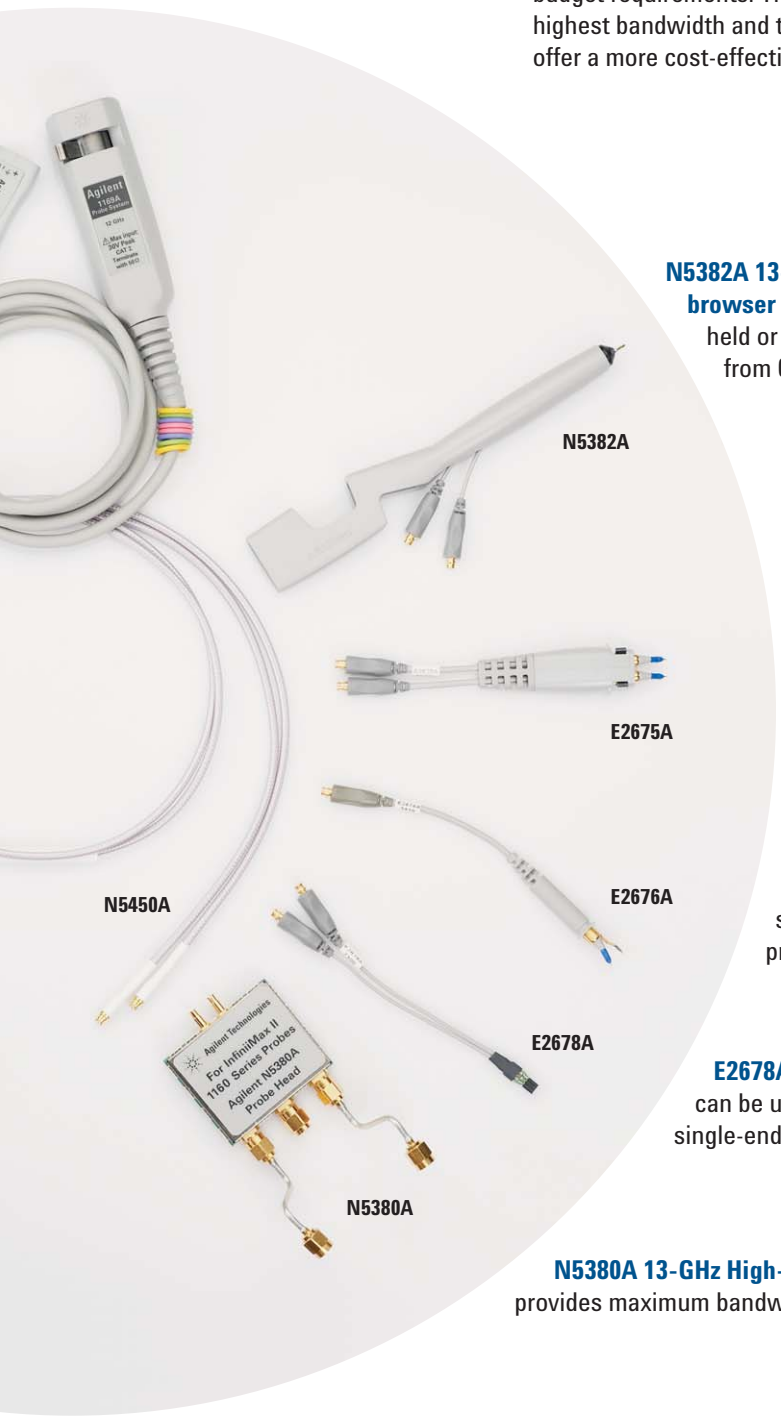
E2695A 8-GHz differential SMA probe head allows you to connect two SMA cables to make a differential measurement on a single scope channel.

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



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-effective 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 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.

N5380A 13-GHz High-bandwidth differential SMA probe head provides maximum bandwidth for SMA-fixtured differential pairs.

N5450A InfiniiMax extreme temperature extension cable provides extra reach into environmental chambers.

Probe performance plots available
The InfiniiMax II probe manuals contain an extensive set of performance plots (bandwidth, probe tracking, CMRR, step response, impedance) for various probe configurations. See the following Web site for this information
http://cp.literature.agilent.com/litweb/pdf/01169-97000.pdf

Infiniium 80000B Series Oscilloscopes Performance Characteristics

Vertical

Input channels	4							
Analog bandwidth (–3 dB)*[10]	80204B 2 GHz	80304B 3 GHz	80404B 4 GHz	80604B 6 GHz	80804B 8 GHz	81004B 10 GHz	81204B 12 GHz	81304B 12 GHz
DSP enhanced bandwidth[9]	81304B: 13 GHz real-time, user selectable DSP enhanced-bandwidth							
Rise time/fall time[12] 10 - 90% 20 - 80%	80204B 210 ps 158 ps	80304B 140 ps 105 ps	80404B 105 ps 79 ps	80604B 70 ps 53 ps	80804B 54 ps 38 ps	81004B 42 ps 32 ps	81204B 35 ps 26 ps	81304B 32 ps 24 ps
Input impedance	50 Ω ± 3%							
Sensitivity[1]	1 mV/div to 1 V/div							
Input coupling	DC							
Vertical resolution[2]	8 bits, ≥ 12 bits with averaging							
Channel-to-channel isolation (any two channels with equal V/div settings)	DC to 3 GHz: 60 dB 3 GHz to 8 GHz: 40 dB 8 GHz to BW: 35 dB							
DC gain accuracy*[1]	± 2% of full scale at full resolution channel scale							
Maximum input voltage*	± 5 V							
Offset range	Vertical sensitivity: 0 mV/div to ≤ 40 mV/div > 40 mV/div to ≤ 75 mV/div > 75 mV/div to ≤ 130 mV/div > 130 mV/div to ≤ 240 mV/div > 240 mV/div				Available offset: ± 0.4 V ± 0.9 V ± 1.6 V ± 3.0 V ± 4.0 V			
Offset accuracy*[1]	≤ 3.5 V: ± (2% of channel offset + 1% of full scale) +1 mV > 3.5 V: ± (2% of channel offset + 1% of full scale)							
Dynamic range	± 4 div from center screen							
DC voltage measurement accuracy*[1]	Dual cursor: ± [(DC gain accuracy)+(resolution)] Single cursor: ± [(DC gain accuracy)+(offset accuracy)+(resolution/2)]							

* Denotes warranted specifications, all others are typical. Specifications are valid after a 30-minute warm-up period, and ± 5°C from annual calibration temperature.

1 Full scale is defined as 8 vertical divisions. Magnification is used below 5 mV/div. Below 5 mV/div, full-scale is defined as 40 mV. The major scale settings are 5 mV, 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V.

9 13 GHz DSP enhanced bandwidth not applicable at 5 mV/div

10 11.8 GHz analog bandwidth at 5 mV/div for DSO81304B and DSO81204B models

12 Calculated from the bandwidth

Infiniium 80000B Series Oscilloscopes Performance Characteristics (continued)

Vertical (continued)

RMS noise floor (scope only)

		DSO80204B	DSO80304B	DSO80404B	DSO80604B
Volts/div	5 mV	131 µV	161 µV	188 µV	241 µV
	10 mV	153 µV	186 µV	217 µV	274 µV
	20 mV	224 µV	270 µV	314 µV	390 µV
	50 mV	521 µV	628 µV	732 µV	904 µV
	100 mV	1.01 mV	1.22 mV	1.42 mV	1.76 mV
	200 mV	1.99 mV	2.39 mV	2.77 mV	3.42 mV
	500 mV	5.26 mV	6.36 mV	7.39 mV	9.20 mV
	1 V	10.2 mV	12.3 mV	14.4 mV	17.8 mV

		DSO80804B	DSO81004B	DSO81204B	DSO81304B
Volts/div	5 mV	294 µV	342 µV	387 µV	419 µV
	10 mV	329 µV	382 µV	438 µV	498 µV
	20 mV	460 µV	529 µV	612 µV	737 µV
	50 mV	1.06 mV	1.218 mV	1.39 mV	1.71 mV
	100 mV	2.07 mV	2.34 mV	2.71 mV	3.34 mV
	200 mV	4.01 mV	4.55 mV	5.26 mV	6.55 mV
	500 mV	10.8 mV	12.3 mV	14.2 mV	17.3 mV
	1 V	21.0 mV	23.9 mV	27.6 mV	33.9 mV

RMS noise floor (scope with probe)

		80204B w/1131A	80304B w/1131A	80404B w/1132A	80604B w/1134A
Volts/div	20 mV	3.2 mV	3.4 mV	3.6 mV	4.2 mV
	50 mV	3.3 mV	3.4 mV	3.6 mV	4.2 mV
	100 mV	3.4 mV	3.6 mV	3.8 mV	4.4 mV
	200 mV	3.8 mV	4.2 mV	4.5 mV	5.3 mV
	500 mV	6.0 mV	6.9 mV	7.9 mV	9.9 mV
	1 V	10 mV	12 mV	14 mV	18 mV

		80804B w/1168A	81004B w/1168A	81204B w/1169A	81304B w/1169A
Volts/div	20 mV	2.7 mV	2.7 mV	2.9 mV	3.0 mV
	50 mV	2.8 mV	2.9 mV	3.1 mV	3.4 mV
	100 mV	3.3 mV	3.5 mV	3.8 mV	4.6 mV
	200 mV	5.2 mV	5.6 mV	6.2 mV	7.8 mV
	500 mV	12 mV	13 mV	14 mV	17 mV
	1 V	22 mV	24 mV	27 mV	34 mV

Infiniium 80000B Series Oscilloscopes Performance Characteristics (continued)

Horizontal

Main timebase range	5 ps/div to 20 s/div real-time, 5 ps/div to 500 ns/div equivalent-time			
Main timebase delay range	–200 s to 200 s real-time, –25 µs to 200 s equivalent-time			
Delayed timebase range	1 ps/div to current main time scale setting			
Channel deskew	± 25 µs range, 100 fs resolution			
Time scale accuracy[3]	± 1 ppm pk			
Delta-time measurement accuracy[6,7]				
	80204B	80304B	80404B	80604B
≥ 256 averages, rms	250 fs rms	150 fs rms	100 fs rms	80 fs rms
≥ 256 averages, peak	500 fs peak	500 fs peak	500 fs peak	500 fs peak
Averaging disabled, rms	2.0 ps rms	2.0 ps rms	2.0 ps rms	1.0 ps rms
Averaging disabled, peak	6 ps peak	6 ps peak	6 ps peak	5 ps peak
	80804B	81004B	81204B	81304B
≥ 256 averages, rms	55 fs rms	35 fs rms	35 fs rms	45 fs rms
≥ 256 averages, peak	500 fs peak	500 fs peak	500 fs peak	500 fs peak
Averaging disabled, rms	0.9 ps rms	0.8 ps rms	0.8 ps rms	0.9 ps rms
Averaging disabled, peak	5 ps peak	5 ps peak	5 ps peak	5 ps peak
Jitter measurement floor[6]				
	80204B	80304B	80404B	80604B
Time interval error	1.10 ps rms	0.90 ps rms	0.85 ps rms	0.75 ps rms
Period jitter	1.6 ps rms	1.3 ps rms	1.1 ps rms	1.0 ps rms
N-cycle, cycle-cycle jitter	2.6 ps rms	2.1 ps rms	1.9 ps rms	1.6 ps rms
	80804B	81004B	81204B	81304B
Time interval error	0.70 ps rms	0.65 ps rms	0.65 ps rms	0.70 ps rms
Period jitter	0.9 ps rms	0.8 ps rms	0.8 ps rms	0.9 ps rms
N-cycle, cycle-cycle jitter	1.4 ps rms	1.3 ps rms	1.3 ps rms	1.4 ps rms

Acquisition

Maximum real-time sample rate	40 GSa/s (2 channels simultaneously) 20 GSa/s (4 channels simultaneously)	
Memory depth per channel		
Standard	524,288 (2 channels)	262,144 (4 channels)
Option 001	2,050,000 (2 channels)	1,025,000 (4 channels)
	65,600,000 at 4 GSa/s (2 channels)	32,800,000 ≤ 2 GSa/s (4 channels)

3 Within one year of previous calibration.

6 Test signal amplitude ≥ 5 divisions peak-to-peak, test signal rise time ≤ 2 times scope rise time, vertical scale ≥ 20 mV/div, sample rate = 40 GSa/s; sin(x)/x interpolation enabled, measurement threshold = fixed voltage at 50 % level.

7 Between two edges on a single channel. Rms value refers to the standard deviation of 256 consecutive measurements performed using an individual instrument.

Infiniium 80000B Series Oscilloscopes Performance Characteristics (continued)

Acquisition (continued)

Sampling modes	
Real-time	Successive single-shot acquisitions
Real-time with averaging	Selectable from 2 to 65534
Real-time with peak detect	2 GSa/s peak detect (4 channels), 4 GSa/s peak detect (2 channels)
Real-time with hi resolution	Real-time boxcar averaging reduces random noise and increases resolution
Equivalent-time (alternating real-time)	Resolution: 100 fs Full bandwidth on all 4 channels, 262,144 sample points maximum memory. Acquires channels 1 and 3 simultaneously, followed by channels 2 and 4 simultaneously on subsequent triggers at 40 GSa/s each.
Segmented memory	Captures bursting signals at maximum sample rate without consuming memory during periods of inactivity. Selectable number of segments up to 16,384 with Option 001 deep memory installed. Minimum intersegment time (the time between the end of the previous acquisition and the beginning of the next acquisition) of 20 µs. See the table below for various performance points.

Infiniium 80000B Series

Maximum number of segments	**Standard memory**		**Optional memory**	
Sample rate	4-channel mode	2-channel mode	4-channel mode	2-channel mode
40 GSa/s	N/A	128	N/A	4096
20 GSa/s	64	128	4096	8192
5 GSa/s - 10 GSa/s	64	128	8192	8192
≤ 4 GSa/s	128	256	16384	16384

Maximum trigger rate (typical)	**1 channel on**		**2 channel on (2 ch mode)**	
Sample rate	1 k pts	10 k pts	1 k pts	10 k pts
40 GSa/s	33 kHz	22 kHz	31 kHz	21 kHz
20 GSa/s	41 kHz	24 kHz	37 kHz	22 kHz
5 GSa/s - 10 GSa/s	47 kHz	25 kHz	42 kHz	23 kHz
4 GSa/s	50 kHz	45 kHz	42 kHz	38 kHz
2 GSa/s	50 kHz	43 kHz	42 kHz	36 kHz

Filters	
Sin(x)/x Interpolation	On/off selectable FIR digital filter. Digital signal processing adds points between acquired data points to enhance measurement accuracy and waveform display quality.

Hardware trigger

Sensitivity[1]	
Internal low[1]	2.0 div p-p 0 to 5 GHz
Internal high[1]	0.3 div p-p 0 to 4 GHz, 1.0 div p-p 4 to 7.5 GHz
Auxiliary	DC to 1 GHz: 200 mV p-p into 50 Ω
Level range	
Internal	± 4 div from center screen or ± 4 Volts, whichever is smallest
Auxiliary	± 5 V, also limit input signal to ± 5 V
Sweep modes	Auto, triggered, single

1 Full scale is defined as 8 vertical divisions. Magnification is used below 5 mV/div. Below 5 mV/div, full-scale is defined as 40 mV. The major scale settings are 5 mV, 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V.

Hardware trigger (continued)

Trigger jitter[6,8]	≤ 500 fs rms for 8-GHz to 13-GHz models ≤ 1 ps rms for 2-GHz to 6-GHz models
Trigger holdoff range	100 ns to 10 s
Trigger actions	Specify an action to occur and the frequency of the action when a trigger condition occurs. Actions include e-mail on trigger and QuickMeas+.
Trigger modes	
Edge	Triggers on a specified slope (rising, falling or alternating between rising and falling) and voltage level on any channel or auxiliary trigger.
Glitch	Triggers on glitches narrower than the other pulses in your waveform by specifying a width less than your narrowest pulse and a polarity. Triggers on glitches as narrow as 500 ps. Glitch range settings: < 1.5 ns to < 10 s.
Line	Triggers on the line voltage powering the oscilloscope
Pattern / pulse range	Triggers when a specified logical combination of the channels is entered, exited, present for a specified period of time or is within a specified time range. Each channel can have a value of high (H), low (L) or don't care (X). Triggers on patterns as narrow as 500 ps.
State	Pattern trigger clocked by the rising or falling edge or alternating between rising and falling edge of one channel
Delay by time	The trigger is qualified by an edge. After a specified time delay between 5 ns to 10 s, a rising or falling edge on any one selected input will generate the trigger.
Delay by events	The trigger is qualified by an edge. After a specified delay between 1 to 16,000,000 rising or falling edges, another rising or falling edge on any one selected input will generate the trigger.
Trigger shortcuts	Provides easy shortcuts to all trigger features
Violation triggers	
Pulse width	Trigger on a pulse that is wider or narrower than the other pulses in your waveform by specifying a pulse width and a polarity. Triggers on pulse widths as narrow as 500 ps. Pulse width range settings: 1.5 ns to 10 s.
Setup/hold	Triggers on setup, hold or setup and hold violations in your circuit. Requires a clock and data signal on any two input channels as trigger sources. High and low thresholds and setup and/or hold time must then be specified.
Transition	Trigger on pulse rising or falling edges that do not cross two voltage levels in > or < the amount of time specified.

Software trigger (InfiniiScan event identification software-Option 009)

Trigger modes	
Generic serial	Software triggers on NRZ-encoded data up to 8.0 Gbps, up to 80-bit pattern. Support multiple clock data recovery methods including constant frequency, 1st order PLL, 2nd order PLL, explicit clock, explicit 1st order PLL, 2nd order PLL (requires E2688A except for the constant frequency).
Measurements	Software triggers on the results of the measurement values. For example, when the "pulse width" measurement is turned on, InfiniiScan measurement software trigger triggers on a glitch as narrow as 75 ps.
Non-monotonic	Software triggers on the non-monotonic edge. The non-monotonic edge is specified by setting a hysteresis value.
Runt	Software triggers on a pulse that crosses one threshold but fails to cross a second threshold before crossing the first again.
Zone qualify	Software triggers on the user defined zones on screen. Zones can be specified as either "must intersect" or "must not intersect". Up to four zones can be defined.

6 Test signal amplitude ≥ 5 divisions peak-to-peak, test signal rise time ≤ 2 times scope rise time, vertical scale ≥ 20 mV/div, sample rate = 40 GSa/s; sin(x)/x interpolation enabled, measurement threshold = fixed voltage at 50 % level.

8 Internal trigger. Trigger level contained within full scale display range of trigger channel.

Measurements and math

Waveform measurements	
Voltage	Peak to peak, minimum, maximum, average, RMS, amplitude, base, top, overshoot, preshoot, upper, middle, lower
Time	Rise time, fall time, period, frequency, positive width, negative width, duty cycle, burst width, Tmin, Tmax, setup time (requires Option 002 or 004), hold time (requires Option 002 or 004), delta time, channel-to-channel phase
Mixed	Area, slew rate
Frequency domain	FFT frequency, FFT magnitude, FFT delta frequency, FFT delta magnitude
Level qualification	Any channels that are not involved in a measurement can be used to level qualify all timing measurements.
Statistics	Displays the mean, standard deviation, minimum, maximum and number of measurements value for the displayed automatic measurements
Histograms	Vertical (for timing and jitter measurements) or horizontal (noise and amplitude change) modes, regions are defined using waveform markers. Measurements included: mean, standard deviation, peak-to-peak value, median, min, max, total hits, peak (area of most hits), and mean ± 1, 2, and 3 sigma.
Eye-diagram measurements	Eye height, eye width, eye jitter, crossing percentage, Q factor, and duty-cycle distortion
Jitter analysis measurements (E2681A EZJIT or N5400A EZJIT Plus jitter analysis software)	Cycle-cycle jitter, N-cycle jitter, cycle-cycle + width, cycle-cycle – width, cycle-cycle duty cycle, data rate, unit interval, time interval error data, time interval error clock, setup time, hold time, phase, period, frequency, + width, – width, duty cycle, rise time, fall time
Mask testing	Allows pass/fail testing to user-defined or Agilent-supplied waveform templates. AutoMask lets you create a mask template from a captured waveform and define a tolerance range in time/voltage or percentage. Test modes include test forever, test to specified time or event limit, and stop on failure. Communications mask test kit option provides a set of ITU-T G.703, ANSI T1.102, and IEEE 802.3 industry-standard masks for compliance testing.
Waveform math	Four functions, select from absolute value, add, average, common mode, differentiate, divide, FFT magnitude, FFT phase, high-pass filter, integrate, invert, low-pass filter (4th order Bessel Thompson Filter), magnify, max, min, multiply, smoothing, square, square root, subtract, versus, and optional user-defined function (Option 010)
FFT	
Frequency range[4]	DC up to 20 GHz (at 40 GSa/s) or 10 GHz (at 20 GSa/s)
Frequency resolution	Sample rate/memory depth = Resolution
Best resolution at maximum sample rate	20 kHz
Frequency accuracy	(1/2 frequency resolution)+(1 x 10^{-6})(signal frequency)
Signal-to-noise ratio[5]	60 dB to > 100 dB depending on settings
Window modes	Hanning, flat-top, rectangular
Measurement modes	
Automatic measurements	Measure menu access to all measurements, five measurements can be displayed simultaneously
QuickMeas+	Front-panel button activates five preselected or five user-defined automatic measurements
Drag-and-drop measurement toolbar	Measurement toolbar with common measurement icons that can be dragged and dropped onto the displayed waveforms
Marker modes	Manual markers, track waveform data, track measurements

4 FFT amplitude readings are affected by scope and probe bandwidth limitations and input amplifiers roll-off (e.g. –3 dB roll-off at specified bandwidth of scope/probe).

5 The FFT signal to noise ratio varies with volts/division setting, memory depth and use of time or frequency averaging.

Infiniium 80000B Series Performance Characteristics (continued)

Display

Display	
Display	8.4-inch color (21.34 cm) XGA TFT-LCD with touch screen
Intensity grayscale:	256-level intensity-graded display
Resolution	XGA: 1024 pixels horizontally x 768 pixels vertically
Annotation	Up to 12 labels, with up to 100 characters each, can be inserted into the waveform area
Grids	Can display 1, 2 or 4 waveform grids
Waveform styles	Connected dots, dots, infinite persistence, color-graded infinite persistence. Includes up to 256 levels of intensity-graded waveforms.
Waveform update rate	
Fastest	4,800 waveforms/sec (memory depth: 64 pts, sampling: 10 GS/s, time/div: 50 ps, connect dots: off, Sin (x)/x: off, color grade: off)
Nominal	800 waveforms/sec (memory depth: 1000 pts, sampling: 40 GS/s, time/div: 500 ps, connect dots: on, Sin (x)/x: on, color grade: off)

Computer system and peripherals, I/O ports

Computer system and peripherals	
Operating system	Windows XP Pro
CPU	Intel® Celeron 3.2-GHz microprocessor
PC system memory	1-GB DDR2
Drives	≥ 40-Gb internal hard drive (optional removable hard drive), CD-ROM drive on rear panel
Peripherals	Logitech optical USB mouse, compact keyboard and stylus supplied. All Infiniium models support any Windows-compatible input device with a serial, PS/2 or USB interface.
File types	
Waveforms	Compressed internal format (*.wfm), comma-separated values (*.csv), tab-separated values (*.tsv) and Y value files (*.txt)
Images	BMP, PCX, TIFF, GIF or JPEG
I/O ports	
LAN	RJ-45 connector, supports 10Base-T, 100Base-T, and 1000Base-T. Enables Web-enabled remote control, e-mail on trigger or demand, data/file transfers and network printing.
GPIB	IEEE 488.2, fully programmable
RS-232 (serial)	COM1, printer and pointing device support
Parallel	Centronics printer port
PS/2	Two ports. Supports PS/2 pointing and input devices.
USB 2.0 Hi-Speed	One port on front panel plus four ports on rear panel. All USB 2.0 High-speed compatible. Allows connection of USB peripherals like storage devices and pointing devices while the oscilloscope is on.
Dual-monitor video output	15-pin XGA, full color output of scope waveform display or dual monitor video output (up to SXGA resolution with a dual monitor use)
Auxiliary output	DC (± 2.4 V); square wave (~715 Hz and 456 MHz); trigger output (255 mV p-p into 50 Ω)
Trigger output	5 V 50 Ω back-terminated
Time base reference output	10-MHz filtered sine wave with all harmonics ≤ –40 dBc. Amplitude into 50 Ω: 800 mV p-p to 1.26 V p-p (4 dBm ± 2 dB) if derived from internal reference. Tracks external reference input amplitude ± 1 dB if applied and selected.
Time base reference input	Must be 10 MHz, input Z_0 = 50 Ω. Minimum 360 mV p-p (–5 dBm), maximum 2.0 V p-p (+10 dBm)
LXI compliance	Functional Class C

General characteristics

Temperature[11]	Operating: 5 °C to +40 °C Non-operating: –40 °C to +70 °C
Humidity	Operating: Up to 95% relative humidity (non-condensing) at +40°C Non-operating: Up to 90% relative humidity at +65°C
Altitude	Operating: Up to 4,600 meters (15,000 feet) Non-operating: Up to 15,300 meters (50,000 feet)
Vibration	Operating: Random vibration 5-500 Hz, 10 minutes per axis, 0.3 g(rms) Non-operating: Random vibration 5-500 Hz, 10 minutes per axis, 2.41 g(rms); resonant search 5-500 Hz, swept sine, 1 octave/minute sweep rate, (0.75g), 5-minute resonant dwell at 4 resonances per axis
Power	100 - 240 VAC at 50/60 Hz; maximum input power 550 Watts
Weight	Net: 13 kg (28.5 lbs.) Shipping: 16 kg (35.2 lbs.)
Dimensions (excluding handle)	Height: 216 mm (8.5 in) Width: 437 mm (17.19 in) Depth: 440 mm (17.34 in)
Safety	Meets IEC 61010-1 +A2, CSA certified to C22.2 No.1010.1, self-certified to UL 3111

* Denotes warranted specifications, all others are typical. Specifications are valid after a 30-minute warm-up period, and ± 5°C from annual calibration temperature.

1 Full scale is defined as 8 vertical divisions. Magnification is used below 5 mV/div. Below 5 mV/div, full-scale is defined as 40 mV. The major scale settings are 5 mV, 10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V.

2 Vertical resolution for 8 bits = 0.4% of full scale, for 12 bits = 0.024% of full scale

3 Within one year of previous calibration

4 FFT amplitude readings are affected by scope and probe bandwidth limitations and input amplifiers roll-off (e.g. –3 dB roll-off at specified bandwidth of scope/probe).

5 The FFT signal to noise ratio varies with volts/division setting, memory depth and use of time or frequency averaging.

6 Test signal amplitude ≥ 5 divisions peak-to-peak, test signal rise time ≤ 2 times scope rise time, vertical scale ≥ 20 mV/div, sample rate = 40 GSa/s; sin(x)/x interpolation enabled, measurement threshold = fixed voltage at 50 % level.

7 Between two edges on a single channel. Rms value refers to the standard deviation of 256 consecutive measurements performed using an individual instrument.

8 Internal trigger. Trigger level contained within full scale display range of trigger channel.

9 13 GHz DSP enhanced bandwidth not applicable at 5 mV/div

10 11.8 GHz analog bandwidth at 5 mV/div for DSO81304B and DSO81204B models

11 Channel 1 limited to 11.5 GHz between 35 °C and 40 °C

12 Calculated from the bandwidth

InfiniiMax II Series Probes Performance Characteristics

	1169A	1168A
Bandwidth*	1169A: > 12 GHz (13 GHz typical)	1168A: > 10 GHz
Rise and fall time • Probe only • When phase compensated by 80000B Series oscilloscope	1169A: 28 ps (20 - 80%), 40 ps (10 - 90%) 1169A w/81204B: 25 ps (20 - 80%) 36 ps (10 - 90%) 1169A w/81304B: 23 ps (20 - 80%) 33 ps (10 - 90%)	1168A: 34 ps (20 - 80%), 48 ps (10 - 90%) 1168A w/80804B: 38 ps (20 - 80%) 54 ps (10 - 90%) 1168A w/81004B: 30 ps (20 - 80%) 42 ps (10 - 90%)
System bandwidth (–3 dB)	1169A w/81304B: 13 GHz (typical) 1169A w/81204B: 12 GHz	1168A w/80804B: 8 GHz 1168A w/81004B: 10 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 peak to peak dc to 100 Hz; 1.25 V peak to peak > 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.

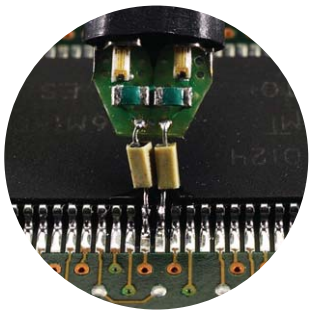
1 Measured using the probe amplifier and N5381A solder-in differential probe head

InfiniiMax I Series Probes Performance Characteristics

	1134A, 1132A, 1131A, 1130A	
Bandwidth*	1134A: > 7 GHz 1132A: > 5 GHz	1131A: > 3.5 GHz 1130A: > 1.5 GHz
Rise and fall time (10% to 90%)	1134A: 60 ps 1132A: 86 ps	1131A: 100 ps 1130A: 233 ps
System bandwidth (–3 dB)	1134A w/80604B: 6 GHz 1132A w/80404B: 4 GHz 1131A w/80304B: 3 GHz 1131A w/80204B: 2 GHz 1130A w/8104A: 1 GHz	
Input capacitance[1]	Cm = 0.10 pF Cg = 0.34 pF Cdiff = 0.27 pF Cse = 0.44 pF	Cm is between tips Cg is to ground for each tip Differential mode capacitance = Cm + Cg/2 Single-ended mode capacitance = Cm + Cg
Input resistance*	Differential mode resistance = 50 kΩ ± 2% Single-ended mode resistance = 25 kΩ ± 2%	
Input dynamic range	5.0 V peak to peak, ± 2.5 V	
Input common mode range	6.75 V peak to peak dc to 100 Hz; 1.25 V peak to peak > 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	< ± 1% of setting when probing single-ended	
Noise referred to input	3.0 mV rms	
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 solder-in differential probe head with full bandwidth resistors



Ordering Information
Infiniium 80000B Series oscilloscopes and accessories

Infiniium 80000B Series oscilloscopes

Model	Bandwidth	Channels	Sample rate	Standard acquisition memory
DSO81304B	13 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO81204B	12 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO81004B	10 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO80804B	8 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO80604B	6 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO80404B	4 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO80304B	3 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)
DSO80204B	2 GHz	4	40 GSa/s (2 channels) 20 GSa/s (4 channels)	524 kpts (2 channels) 262 kpts (4 channels)

Note:
The DSO81304B uses DSP boost software to achieve 13 GHz bandwidth. It also adds a valuable DSP noise reduction feature to reduce noise at bandwidths of 10, 8, 6, 4, 2, and 1 GHz. The non-DSP boosted bandwidth of the DSO81304B is 12 GHz.

Standard accessories:
- Optical USB mouse
- Compact keyboard
- User's quick-start guide
- Documentation CD (Service guide, Programmer's guide, Programmer's quick reference guide)
- Accessory pouch
- Power cord
- High-performance calibration cable
- E2655B probe deskew and performance verification kit
- Two 54855-67604 BNC-compatible to precision 3.5 mm (f) adapters
- One-year warranty

Note: No probes are included with the 80000B Series oscilloscopes. The InfiniiMax Series probes must be purchased separately.

Ordering Information (continued)
Infiniium 80000B Series oscilloscopes and accessories

After-Burner II Upgrade program

If you find you need a little more speed after you purchase your Infiniium 80000B Series oscilloscope, the After-Burner II Upgrade program is available. This upgrade program allows you to upgrade any 80000B Series scope to a higher-bandwidth model, protecting your valuable Infiniium oscilloscope and probing system investment over the long term.

Upgrade	Description	Return to service center required
N5420A	DSO81204B to DSO81304B upgrade (12 GHz to 13 GHz)	No
N5420B	DSO81004B to DSO81204B upgrade (10 GHz to 12 GHz)	Yes
N5420C	DSO80804B to DSO81004B upgrade (8 GHz to 10 GHz)	Yes
N5420D	DSO80604B to DSO80804B upgrade (6 GHz to 8 GHz)	Yes
N5420E	DSO80404B to DSO80604B upgrade (4 GHz to 6 GHz)	Yes
N5420F	DSO80304B to DSO80404B upgrade (3 GHz to 4 GHz)	Yes
N5420G	DSO80204B to DSO80304B upgrade (2 GHz to 3 GHz)	Yes

Note: Order as many upgrades as needed to reach the desired final bandwidth of the instrument. For example, to upgrade from a DSO80804B to DSO81304B, order N5420C, N5420B, and N5420A.

Infiniium 80000B Series oscilloscope options and accessories

Options	Description
001	2-M (2 channels), 1-M (4 channels) memory upgrade 64 M (2 channels at 4 GSa/s) or 32 M (4 channels ≤ 2 GSa/s)
002	EZJIT jitter analysis software (installed at the factory)
003	High-speed serial data analysis/mask testing with clock recovery and 8b/10b decoding (installed at the factory)
004	EZJIT Plus jitter analysis software (installed at the factory)
005	Noise reduction and bandwidth control option (installed at the factory). Included standard for DSO81304B.
006	My Infiniium integration package (installed at the factory)
007	Low-speed serial data analysis for I^2C/SPI (installed at the factory)
008	Low-speed serial data analysis for CAN (installed at the factory)
009	InfiniiScan event identification software (installed at the factory)
010	Infiniium user defined function application software (installed at the factory)
017	≥ 40 Gb removable hard disk drive. Replaces internal hard disk with a removable hard disk. Order the N5422A for additional hard disk drive cartridges.

Ordering Information (continued)
Infiniium 80000B Series oscilloscopes and accessories

Infiniium 80000B Series oscilloscope options and accessories (continued)

Instrument options	Description
1CM (E2609B)	Rack-mount kit

Service options	Description
A6J	ANSI Z540-compliant calibration

Accessories	Description
N5404A	After-purchase memory upgrade Order Option 001 when purchasing a new Infiniium oscilloscope
N5422A	Additional ≥ 40-Gb hard disk drive cartridge for Infiniium Option 017
54855-67604	18-GHz BNC-compatible to precision 3.5 mm (f) adapter Allows highest-fidelity connection of 3.5 mm or SMA cables
E2655B	Additional probe deskew/performance verification kit for InfiniiMax probes
E5850A	Logic analyzer/oscilloscope time-correlation fixture

Now you can more effectively verify and track down problems between the analog and digital portions of a design. Easily make time-correlated measurements between an Agilent 16900 Series logic analysis system and an Infiniium Series oscilloscope. With the E5850A time-correlation fixture, you can trigger the Infiniium from the logic analyzer (or vice versa), and automatically deskew the waveforms. The Infiniium time markers and the 16900 Series time markers are time-correlated and track each others. You can relate information on the oscilloscope and the logic analyzer precisely.

Foot switch	Kinesis Savant 2-action programmable foot switch P/N FS20A-USB-UL	Contact manufacturer

Allows you to easily program the 2-action foot pedals to perform the following scope functions: run, stop, toggle between run and stop, save waveform, save screenshot, measure any five waveform parameters and recall an instrument setup.

See **http://www.kinesis-ergo.com/** for additional information and ordering instructions.

1184A	Testmobile

Agilent's 1184A testmobile provides a convenient solution for your portability and storage needs. The 1184A includes a drawer for accessories and a keyboard tray with a mouse extension for either right- or left-handed operation.

Ordering Information (continued)
InfiniiMax probing system

InfiniiMax I and II Series probing system

InfiniiMax probe amplifiers	Description
1169A	12-GHz InfiniiMax II probe amp – order one or more probe heads
1168A	10-GHz InfiniiMax II probe amp – order one or more probe heads
1134A	7-GHz InfiniiMax I probe amp – order one or more probe heads
1132A	5-GHz InfiniiMax I probe amp – order one or more probe heads
1131A	3.5-GHz InfiniiMax I probe amp – order one or more probe heads
1130A	1.5-GHz InfiniiMax I probe amp – order one or more probe heads

InfiniiMax II probe heads	Recommended for use with InfiniiMax II probe amplifiers
N5380A	InfiniiMax II 12-GHz differential SMA adapter. Includes semi-rigid coax to change span between SMA connectors.
N5381A	InfiniiMax II 12-GHz differential solder-in probe head and accessories. Includes wire for replacement leads. Order 01169-21306 for 0.005 inch (.0127 cm) or 01169-81301 for 0.007 inch (.0178 cm) replacement nickel wire.
N5382A	InfiniiMax II 12-GHz differential browser. Includes wire for replacement leads. Order 01169-21304 for 0.007 inch (.0178 cm) replacement steel wire.
N5425A	InfiniiMax I and II 12-GHz differential solder-in ZIF probe head. Requires N5426A ZIF tip.
N5426A	InfiniiMax I and II 12-GHz ZIF Tip (replaceable solder-in tip). Includes 10 replaceable ZIF tip. Order N5426A for more ZIF tip.
N5451A	InfiniiMax I and II 9-GHz/5 GHz long wire ZIF tip (replaceable solder-in tip). Includes 10 replaceable ZIF Tips. Order N5451A for more long wire ZIF tips. Requires N5425A ZIF probe head.

InfiniiMax I probe heads*	Recommended for use with InfiniiMax I probe amplifiers
E2675A	InfiniiMax differential browser probe head and accessories. Includes 20 replaceable tips and ergonomic handle. Order E2658A for replacement accessories.
E2676A	InfiniiMax single-ended browser probe head and accessories. Includes 2 ground collar assemblies, 10 replaceable tips, a ground lead socket and ergonomic browser handle. Order E2663A for replacement accessories.
E2677A	InfiniiMax differential solder-in probe head and accessories. Includes 20 full bandwidth and 10 medium bandwidth damping resistors. Order E2670A for replacement accessories.
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 heat shrink. Order E2671A for replacement accessories. Order E5381-82103 for 34 damped wire accessories only.
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.
E2695A	Differential SMA probe head. Includes semi-rigid coax to change span between SMA connectors.

* (See page 4 for specifications and limitations when used with InfiniiMax II Series probe amplifiers.)

Ordering Information (continued)
InfiniiMax probing system

InfiniiMax II Series probing system (continued)

Connectivity kits model	Description
E2669A	InfiniiMax connectivity kit for differential/single-ended measurements. Includes a differential browser, four solder-in differential probe heads and two socketed differential probe heads. Includes all necessary accessories.
E2668A	InfiniiMax connectivity kit for single-ended measurements. Includes one single-ended browser, one solder-in probe head and one socketed probe head. Includes all necessary accessories.

Adapters	Description
N1022A	Adapts 113x/115x/116x active probes to 86100 Infiniium DCA.

Other	Description
N5450A	InfiniiMax extreme temperature extension cable provides you the extra reach to probe your device's signals in extreme testing conditions that were previously impossible, such as within heat or cold chambers. Cable length: 92 cm (about 36 inches) Supports two temperature range groups: Group 1: from –55 to +105 °C when used with N5381A differential solder-in probe head Group 2: from –25 to +80 °C when used with E2677A differential solder-in probe head, E2678A differential socket probe head, or N5426A ZIF Tip Supports two different test cycle numbers: At least 250 test cycles for Group 1 (with N5381A) At least 1000 test cycles for Group 2 (with E2677A/E2678A/N5426A)

Ordering Information (continued)
Other probes and accessories

Accessory	Description
E2697A	High impedance adapter (includes 500 MHz passive probe)

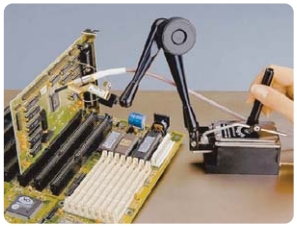
The E2697A high impedance adapter allows connection of probes that require a high-impedance input (e.g., passive probes, current probes) to the Infiniium 80000B Series high-performance oscilloscopes. The E2697A provides switchable AC/DC coupling, as well as 10:1 and 1:1 attenuation settings.

Specifications/characteristics

Bandwidth	Analog bandwidth (–3 dB) 500 MHz (with supplied 10073C passive probe) System bandwidth 500 MHz (with 10073C passive probe and 80000B Series oscilloscope)	
DC attenuation	1.16:1	E2697A internal attenuator at 1:1 (at scale settings > 200 mV/div signal size limited by input dynamic range)
	11.6:1	E2697A internal attenuator at 10:1 (at scale settings > 200 mV/div signal size limited by input dynamic range)
Input dynamic range	± 0.8 V	E2697A internal attenuator setting of 1:1
	± 8 V	E2697A internal attenuator setting of 10:1
Input dynamic range with 10073C passive probe	± 8 V	E2697A internal attenuator setting of 1:1
	± 80 V	E2697A internal attenuator setting of 10:1
Input impedance*	1 MΩ ± 1% (~12 pF)	
Input coupling	dc, ac (7 Hz)	
Maximum input voltage	± 100V [DC + AC] [AC < 10 kHz], CAT I	
Offset range	± 5 V	E2697A internal attenuator setting of 1:1
	± 50 V	E2697A internal attenuator setting of 10:1

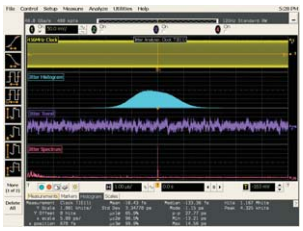
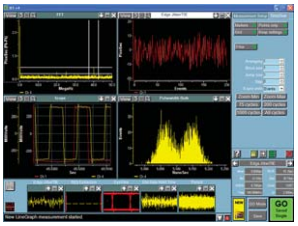
* Denotes warranted specifications, all others typical. Specifications are valid after a 30 minute warm-up period and ± 5 °C from calibration temperature.

Ordering Information (continued)
Other probes and accessories

Other compatible probes	Description
1144A	800-MHz active probe. Requires 1142A probe power supply when used with Infiniium scopes. Requires 01144-61604 probe power extender when using two or more 1144A active probes.
1145A	2-channel, 750-MHz active probe. Requires 1142A power supply when used with Infiniium oscilloscopes.
1153A	200-MHz differential probe for Infiniium scopes
1156A	1.5-GHz single-ended active probe for Infiniium scopes
1157A	2.5-GHz single-ended active probe for Infiniium scopes
1158A	4-GHz single-ended active probe for Infiniium scopes
54006A	7.5-GHz (typical) passive resistive divider probe – 10:1 (500 ohms) or 20:1 (1 kohms)
	EZ probe positioner Includes base, joystick, and articulating arm available from Cascade Microtech Inc. (**http://www.cascademicrotech.com**) 

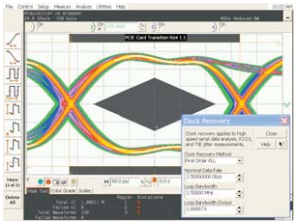
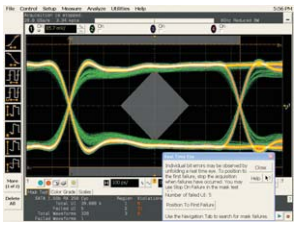
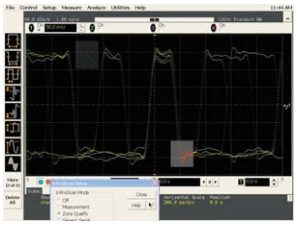
Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software

Accessories	Description
E2681A	EZJIT jitter analysis software (Option 002)
	EZJIT jitter analysis software, used with Agilent Infiniium oscilloscopes, is a key tool for identifying and quantifying jitter components that affect the reliability of your design. Time correlation of jitter to the real-time signal makes it easy to trace jitter components to their sources. Features: • Includes: cycle-to-cycle jitter, n-cycle jitter, period jitter, time interval error, setup/hold time, data rate, unit interval • Displays: measurement histogram, measurement trend, and jitter spectrum • Jitter setup wizard • Complete real-time integration to the scope application • Selectable PLL clock recovery type
N5400A	EZJIT Plus jitter analysis software (Option 004)
	Building on the capabilities of the EZJIT software, EZJIT Plus adds additional compliance views and an expanded measurement setup wizard for simplifying and automating RJ/DJ separation for testing against industry standards. Order N5401A to upgrade E2681A EZJIT to N5400A EZJIT Plus analysis software. Features: • Automated data rate and pattern detection of repetitive data signals • Arbitrary data analysis mode allows for RJ/DJ separation on non-repetitive data waveforms • PLL clock recovery (PCI Express, Fibre Channel, 1st order, 2nd order, or explicit clock (1st and 2nd order)) • Real-time trend, histogram and spectrum displays • Composite histogram views of separated RJ, PJ, DJ, DDJ, DCD and ISI jitter subcomponents • Bathtub curve of total jitter versus eye-opening down to 10^{-18} BER • Automated RJ/DJ setup wizard
E2690B	Oscilloscope tools
	ASA's oscilloscope tools, licensed from Amherst Systems Associates (ASA), comprise the most powerful suite of analysis, debug, collaboration, and automation tools for Agilent real-time oscilloscopes (**www.amherst-systems.com**). Features: • AutoMeasure automatically detects which scope channels have signals, scales the signals, and sets up the analysis software • Decompose jitter into random and deterministic jitter, including all components of jitter (Rj, Dj, Pj, DDj, DCD, and ISI) • Locate repetitive phenomena with repetition interval analysis tools • TestScript enables you to record repetitive sequences of measurements, button pushes, and limit comparisons • Record/playback console allows you to collect full record-length cquisitions over hours or days, then replay and analyze them • Powerful offline analysis feature sets

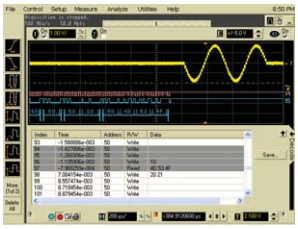
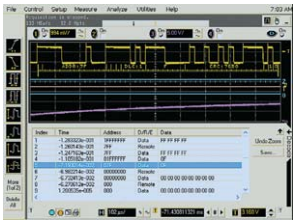
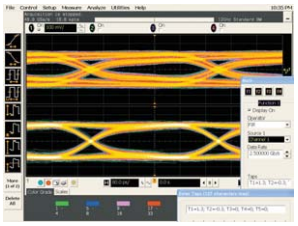
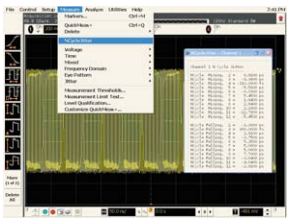
Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
E2688A	High-speed serial data analysis (with clock recovery feature) (Option 003)
	Easily perform mask testing and characterize serial data streams that employ embedded clocks using built in "Serial Data Wizard." The E2688A provides mask templates and selectable clock recovery for verifying compliance to popular standards. You can even characterize proprietary serial buses with the built-in, general purpose golden PLL clock recovery. Features include: • Golden PLL clock recovery • Set up wizard to configure the clock recovery • Real-time eye diagram display with eye-mask unfolding • Recovered clock display • Time interval error (TIE) jitter measurement with statistics on the data stream • Mask template loading • 8b/10b decode with symbol trigger and search • Serial listing window for tabular view and navigation of 8b/10b codes
	Clock recovery methods available: • First-order PLL • Second-order PLL • Constant frequency • Explicit clock • Explicit clock first-order PLL • Explicit clock second-order PLL
	Standard masks include: PCI Express (2.5 Gbps), Serial ATA (1.5 Gbps), Fibre Channel electrical (1.0625, 2.125, 4.25 Gbps), Ethernet IEEE 802.3 (10/100/1000Base-T), serial attached SCSI, XAUI
	Highlighted feature: Eye-mask unfolding • Correlates eye diagram failures with live waveform locations with time stamped information relative to the trigger location • The number of failed UI count on the last acquisition provided • Navigation control allow users to scroll through each failed UI • Restore original mask feature recreates the eye diagram from the unfolded waveform
N5414A	InfiniiScan event identification software (Option 009)
	The Agilent InfiniiScan event identification software quickly and easily identifies signal integrity issues. This innovative software scans through thousands of acquired waveforms per second to help isolate anomalous signal behavior. InfiniiScan can scan for multiple events simultaneously with resolution down to 70 ps events plus automated navigation to failure events. InfiniiScan software finders consist of • Measurement software finder • Zone qualify (shown on the left) • Generic serial pattern software finder • Non-monotonic edge software finder • Runt software finder InfiniiScan goes beyond the classic limitations of hardware triggering and deep memory.

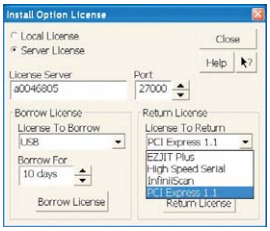
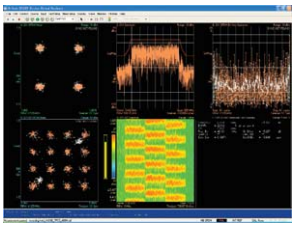
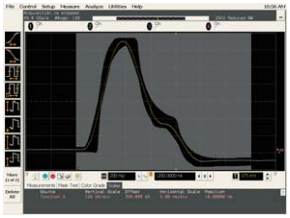
Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
N5391A	I^2C/SPI serial data analysis software (Option 007)
	The N5391A low-speed serial data analysis (SDA) software provides a fast and easy way to debug inter-integrated circuit (I^2C) and 2-wire or 3-wire serial peripheral interface (SPI) serial communication busses. The low-speed SDA software provides the ability to capture and automatically display decoded serial data in numerical format synchronized with the analog or digital waveform view of I^2C or SPI serial data streams. The low-speed SDA software also features a listing window view with automatic click and zoom capability that contains a protocol decode list of all I^2C or SPI packets that have been captured.
N5402A	CAN serial data analysis software (Option 008)
	The Agilent N5402A CAN serial data analysis (SDA) software allows engineers to view both protocol layer information and physical layer signal characteristics inside a single instrument, the Infiniium oscilloscope. Numerical decode values are automatically displayed and synchronized below the captured signal's waveform. A listing window view with automatic click and zoom capability shows the index number, time stamp value, address, data/remote/error frame type, and data content of all CAN packets that have been captured.
N5430A	Infiniium user-defined function (Option 010)
	The Agilent N5430A Infiniium user-defined function will open up new possibilities to mathematical analysis features of Infiniium by creating the gateway to MATLAB from MathWorks (**www.mathworks.com/**). You can now add your favorite MATLAB .m scripts as "math function operators," and use them just like any other standard functions provided with the Infiniium. The scope passes data to MATLAB and then displays the result back on the screen in real time. The screen shot is showing a signal equalization example using user-defined function. Requires MATLAB software separately. Features: • Seamless gateway to powerful MATLAB analysis functionality • Real-time analysis, real-time update • Requires XML programming and .m script file • Supports 2 control variables, and 2 sources • Supports MATLAB version R14 SP1 and later Visit **www.agilent.com/find/scope_forum_hints** and share your user defined function experiences!
E2699A	My Infiniium integration package (Option 006)
	My Infiniium allows you to customize Infiniium GUI by letting you launch user created applications, such as those written for Agilent VEE Pro, NI LabVIEW, MATLAB or Microsoft Excel, directly from the oscilloscope's front panel or graphical user interface. For more detailed information, please request Agilent publication number 5988-9934EN. Visit **www.agilent.com/find/scope_forum_hints** and share your My Infiniium experiences!

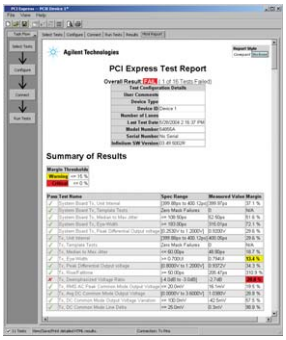
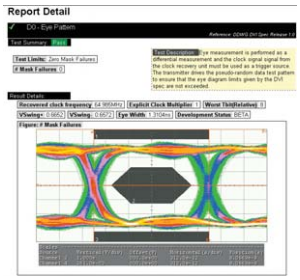
Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
N5435A	Infiniium application server license
	The Agilent N5435A Infiniium application server license allows you to transport your scope application licenses from one oscilloscope to another through your server. License files are supported by current Infiniium oscilloscope platforms, as well as the future-generation Infiniium platforms.
89600A	Vector signal analysis software
	Turn your scope into a wideband spectrum analyzer. Infiniium oscilloscopes team up with the 89600A vector signal analysis software to provide powerful, flexible, wideband signal analysis with up to 13 GHz bandwidth for applications including wideband communications, modulated radar, and WiMedia-based MB-OFDM ultra wide band. Features include: • Analysis bandwidth of up to 13 GHz depending on scope model. Multi-channel capture for BBIQ and MIMO • Flexible analog and digital demodulation supports the most advanced, complex modulation formats • Flexible, powerful displays including EVM, CCDF, PDF, CPE, frequency error, I/O offset, and spectrogram provide rapid insight into dynamic signal behavior • The newest demodulation feature includes PHY radio test support for Certified Wireless USB, high-speed Bluetooth® and wireless HDMI, all based on WiMedia MB-OFDM UWB technology
N5392A	Ethernet electrical performance validation and compliance software
	The Agilent N5392A Ethernet electrical performance validation and compliance software performs a wide range of electrical tests to meet the Ethernet electrical specifications for 1000Base-T, 100Base-TX and 10Base-T systems as documented in the IEEE 802.3-2005 and ANSI X3.263-1995 standards. Features: • Test setup wizard guides you through test selection, configuration, connection, execution, and results reporting • Supports 1000Base-T, 100Base-TX and 10Base-T standards • Supports 1000BASE-T disturbing signal measurements with the use of 33250A arbitrary waveform generators • Supports return loss measurements with most HP/Agilent vector network analyzers • Measurement connection setups are displayed when you must change the test setup • Oscilloscope setup is automatically configured for each test • Test results report formally documents your test configuration, measurements made, pass/fail status, and waveforms • Pass/fail margin analysis provides an indication of how close your device is to meeting a test specification • Fixtures available: N5395B Ethernet test fixtures and N5396A jitter test cable

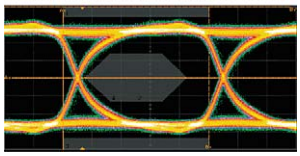
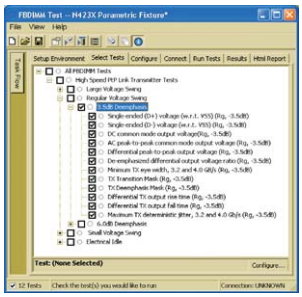
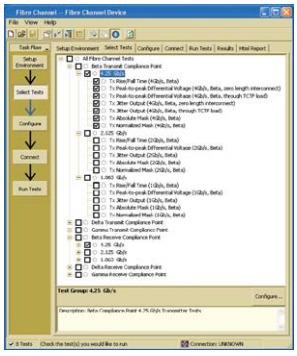
Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
N5393A	PCI Express electrical performance validation and compliance software
	The Agilent N5393A PCI Express electrical performance validation and compliance software provides you with a fast and easy way to verify and debug your PCI Express designs by automatically executing electrical checklist tests, and it displays the results in a flexible report format. N5393A utilizes the clock recovery method used in the official PCI-SIG Signal Quality Test Methodology ("SigTest") application, ensuring that your test results are consistent with results from the SigTest application. N5393A supports PCI Express 1.0a electrical specifications for add-in cards and motherboard systems as documented in section 4 of the base specification and section 4 of the card electromechanical specification. Features: • Test setup wizard guides you through entire compliance test • Wide-range of electrical tests are performed, significantly more than SigTest • PCI-SIG SigTest clock recovery algorithm • Measurement connection setups are displayed when you must change the test setup • Automatic HTML report generation • Pass/fail margin analysis • Requires the E2688A serial data analysis software • Compliance test fixtures available from PCI-SIG (CLB or CBB)
N5394A	DVI electrical performance validation and compliance software
	The Agilent N5394A DVI electrical performance validation and compliance software provides you with a fast and easy way to verify and debug your digital visual interface (DVI) designs for add-in cards, cables and motherboard systems. The software automatically configures the oscilloscope for each test, and provides the test result in HTML document including margin analysis. N5394A uses explicit clock recovery (10x) in order to evaluate every data eye pattern against the clock signal to provide the most accurate test result. Features: • Test setup wizard guides you entire compliance test • Automatic HTML report generation • Measurement connection setups are displayed when you must change the test setup • Pass/fail margin analysis • Test fixture available from Silicon Image (hardware clock recovery)

Ordering Information (continued)
Infiniium 80000B Series application software

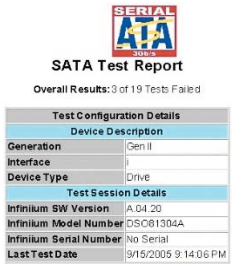
Infiniium 80000B Series application software (continued)

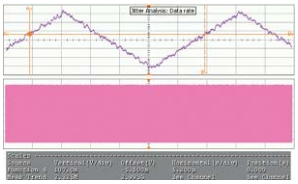
Accessories (continued)	Description
N5399A	HDMI electrical performance validation and compliance software
	The N5399A HDMI electrical performance validation and compliance software handles all the electrical waveform tests as specified in the HDMI compliance test specification. These include data eye, under-and overshoot, clock jitter, duty cycle and inter-and intra-pair skew. Features: • Test setup wizard guides you entire compliance test • Ultimate test execution speed supporting 4 probe testing • Automatic HTML report generation • SW clock recovery feature tailored to HDMI 1.2/1.3 • Supports HDMI 1.2/1.3 • Fixtures available: N1080A
N5409A	Fully buffered DIMM
	The Agilent N5409A fully buffered DIMM compliance application tool provides you with a fast and easy way to characterize and evaluate the signal integrity of both your high-speed FB-DIMM signals as well as your reference clock. The tests performed by the N5409A are based on the JEDEC high-speed point-to-point link specification. Requires E2688A serial data analysis and N5400A EZJIT Plus jitter analysis software. Three fixtures are available for testing AMBs, DIMMs and mother boards. Features: • Easy-to-use graphical test selection and setup • Automatic HTML report generation • RJ/DJ jitter analysis at 10^{-12} BER • Supports both JEDEC and Intel eye masks • Built-in AMB control for test setup (DIMM and AMB testing) • User configurable margin analysis • Debug mode allows changes in test parameters giving you better insight into problems
N5410A	Fibre Channel compliance application
	The Agilent N5410A Fibre Channel compliance application provides you with a fast and easy way to characterize and evaluate the signal integrity of your electrical Fibre-Channel devices. Supporting FC4, FC2, and FC1 speeds, the N5410A allows you to specify the measurement point at which you are probing your signal (delta, gamma, etc.). The tests performed by the N5410A are based on the FC-PH (ANSI X3.230-1994) and FC-PH-2 Fibre Channel - Physical and Signaling Interface Specification. Features: • Easy-to-use graphical test selection and setup • Supports 4.250 GBit/s, 2.125 GBit/s, and 1.0625 GBit/s speeds • Supports testing at beta, delta, and gamma compliance points • Automatic HTML report generation • RJ/DJ jitter separation analysis at 10^{-12} BER • Physical layer measurements for rise/fall time, jitter, differential voltage, and eye mask • Supports TCTF compliance load filter • Debug mode allows changes in test parameters giving you better insight into problems

Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
N5411A	SATA compliance test software



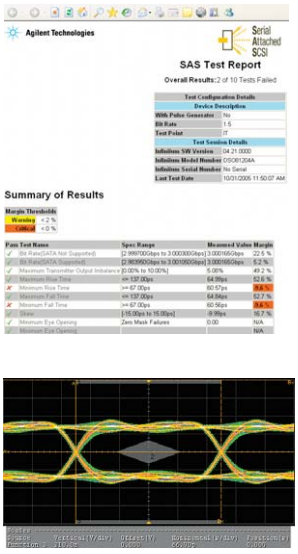


The N5411A SATA electrical performance validation and compliance software provides you with a fast and easy way to validate and debug your SATA 1.5 Gbps (Gen 1) and 3.0-Gbps (Gen 2) designs. N5411A allows you to automatically execute SATA II electrical checklist tests at each of the i, m and x interface points, and displays the results in a flexible report format. Agilent's DSO81204B real-time scope based method of implementation (MOI) document for serial ATA compliance testing, now available from SATA-IO Web site (**www.sata-io.org/moi.asp**), is based on N5411A.

For fixture solution, COMAX H303000202 iSATA test fixture is available from CRUZ System (**www.cruzsystems.com**).

Features:
- Available method of implementation (MOI) from SATA-IO
- Test setup wizard for ease-of-use
- Complete set of SATA transmitter electrical tests
- Measurement process configurability
- Automated scope measurement setup
- Test results report generation
- Debug mode provided
- Pass/fail margin analysis

N5412A	Serial attached SCSI (SAS)



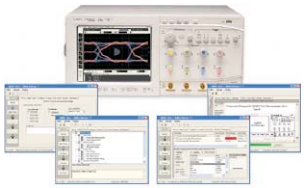
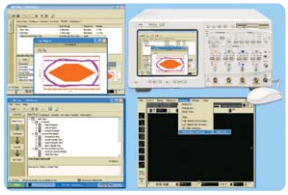
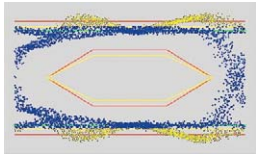
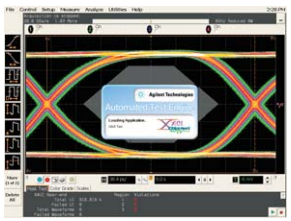
Agilent's N5412A serial attached SCSI (SAS) electrical performance validation and compliance software provides you with a fast and easy way to validate and debug your SAS 1.5-Gbps (SAS 150) and 3.0-Gbps (SAS 300) designs. N5412A allows you to automatically execute SAS electrical checklist tests at each of the IT, CT, IR and CR interface points, and displays the results in a flexible report format. In addition to the measurement data, the report provides a margin analysis.

Additionally, Agilent currently provides a full set of compliance test fixtures, N5421A, for the SFF-8482, SAS x2 internal drive/backplane connector interfaces. The N5421A kit also includes the TX and RX transient circuit test loads.

Features:
- User configurable test setup wizard for ease of use
- Complete set of SAS IT/CT and IR/CR transmitter electrical tests
- Time-saving oscilloscope test setup automation
- Graphical HTML test results report generation
- Trials test capability for quick comparison of multiple port configurations
- Pass/fail margin analysis for simple characterization

Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
U7233A/N5413A/U7231A	DDR1/DDR2/DDR3 compliance test application
	The Agilent U7233A DDR1 compliance test application tool, N5413A DDR2 compliance test application tool, and U7231A DDR3 compliance test application tool provides you with a fast and easy way to characterize and evaluate your DDR1/DDR2/DDR3 design. The tests performed are based on the Intel DDR2 667/800 JEDEC Specification Addendum Rev 1.1 (DDR2/N5413A), JESD79-3 DDR3 SDRAM Specification (DDR3/U7231A), and JESD79E DDR SDRAM Specification (DDR1/U7233A). Features: • Industry's only automated test executive saves you time and ensures you get accurate repeatable results • Automatic HTML report generation speeds the documentation of worst-case conditions • Compliance mode provides you the clock jitter tests and the electrical test • Advance debug mode provides you with eye diagram analysis, mask test, and ringing test
N5416A	USB compliance test software
	The N5416A USB 2.0 compliance test software makes USB signal integrity testing as simple as capturing the signals with your oscilloscope, eliminating the need to transfer scope waveforms to a PC. Features: • Uses the USB-IF organization developed MATLAB scripts • User friendly/comprehensive test setup wizard and reports • Fast execution speed • The USB-IF certified solution, support for hosts, devices, hubs and OTG • Compatible with Infiniium 8000A Series MSOs and DSOs and 80000B Series DSOs • Available fixtures: For USB 2.0 high-speed testing, order the N5416A test software as well as the E2649A USB 2.0 high-speed test fixtures. For low/full-speed testing, order the E2646A SQiDD board
QP-SIGKit / QP-SIGKit4B	IEEE-1394a/b electrical test tools
	A pre-compliance test solution is available from Quantum Parametrics for use in conjunction with Agilent 80000B Series oscilloscopes. This test solution automates the compliance test process for the IEEE-1394 standard. See **http://www.quantumparametrics.com** for additional information.
N5431A	XAUI electrical validation with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO support
	The XAUI electrical validation application improves your efficiency by providing fast and accurate XAUI validation. With the superior signal integrity and probing provided by the Agilent 80000 Series oscilloscopes, you will have confidence that devices that pass testing with the N5431A are in conformance to the XAUI specifications as described in IEEE 802.3-2005. You also have the flexibility of testing to the XAUI-derived 10GBASE-CX4, CPRI, OBSAI RP3 and Serial Rapid IO standards. Features: • Fast setup, configuration, and test with wizard driven framework • Powerful characterization capability through MultiTrial feature • Flexibility to test to other XAUI derived standards • Accurate measurements with the Agilent 80000 Series oscilloscope with superior signal integrity and probing • Unmatched probing flexibility with the InfiniiMax probing system

Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
U7232A	DisplayPort electrical performance validation and Compliance software
	Verify and debug your DisplayPort designs more easily with industry's only solution for DisplayPort. Agilent U7232A provides you with a fast and easy way to verify and debug your DisplayPort interface designs for sink and source ICs, motherboard systems, computers and graphics cards. The DisplayPort electrical test software is designed for use in DisplayPort authorized compliance test houses, so you can confidently use it to execute DisplayPort electrical checklist tests as well as employ it as a development tool. Features: • DUT definition setup wizard for defining DUT capability • Wide range of electrical tests • Measurement process configurability • Automated scope measurement setup • Test results reports with pass/fail margin analysis
N5403A	Noise reduction and bandwidth control option DSP noise reduction capability to reduce noise for a given measurement bandwidth as shown in the tables below. Included standard for DSO81304B.

RMS noise floor (scope only)

Volts/div	1 GHz	2 GHz	3 GHz	4 GHz	6 GHz	8 GHz	10 GHz	12 GHz	13 GHz
5 mV	92 µV	131 µV	161 µV	188 µV	241 µV	294 µV	342 µV	387 µV	419 µV
10 mV	110 µV	153 µV	186 µV	217 µV	274 µV	329 µV	382 µV	438 µV	498 µV
20 mV	164 µV	224 µV	270 µV	314 µV	390 µV	460 µV	529 µV	612 µV	737 µV
50 mV	384 µV	521 µV	628 µV	732 µV	904 µV	1.06 mV	1.218 mV	1.39 mV	1.71 mV
100 mV	765 µV	1.01 mV	1.22 mV	1.42 mV	1.76 mV	2.07 mV	2.34 mV	2.71 mV	3.34 mV
200 mV	1.4 mV	1.99 mV	2.39 mV	2.77 mV	3.42 mV	4.01 mV	4.55 mV	5.26 mV	6.55 mV
500 mV	3.9 mV	5.26 mV	6.36 mV	7.39 mV	9.20 mV	10.8 mV	12.3 mV	14.2 mV	17.3 mV
1 V	7.6 mV	10.2 mV	12.3 mV	14.4 mV	17.8 mV	21.0 mV	23.9 mV	27.6 mV	33.9 mV

80000B scope with 1169A InfiniiMax II probe (typical in mV rms)

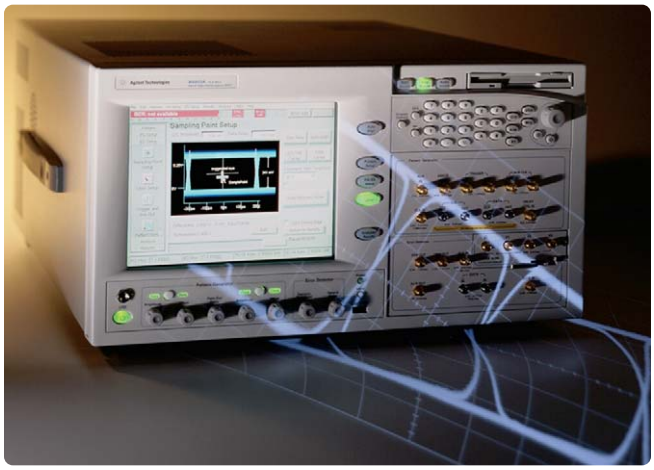
Volts/div	1 GHz	2 GHz	4 GHz	6 GHz	8 GHz	10 GHz	12 GHz	13 GHz
20 mV	2.2 mV	2.3 mV	2.4 mV	2.5 mV	2.7 mV	2.7 mV	2.9 mV	3.0 mV
50 mV	2.3 mV	2.4 mV	2.5 mV	2.6 mV	2.8 mV	2.9 mV	3.1 mV	3.4 mV
100 mV	2.5 mV	2.6 mV	2.9 mV	3.0 mV	3.3 mV	3.5 mV	3.8 mV	4.6 mV
200 mV	3.0 mV	3.4 mV	3.9 mV	4.4 mV	4.9 mV	6.6 mV	7.1 mV	8.5 mV
500 mV	6.6 mV	7.2 mV	8.7 mV	10 mV	12 mV	13 mV	14 mV	17 mV
1 V	11 mV	13 mV	16 mV	19 mV	22 mV	24 mV	27 mV	34 mV

Agilent offers the industry's only noise reduction capability that allows you to reduce the noise in your measurement to match the required bandwidth of the measurement so you don't include any more noise in your measurements than you have to.

Ordering Information (continued)
Infiniium 80000B Series application software

Infiniium 80000B Series application software (continued)

Accessories (continued)	Description
E2625A	Communication mask test kit
	Take the frustration out of communications testing and prove your designs conform to industry standards with the E2625A communications mask test kit option. Infiniium's familiar Windows interface makes it easy for you to access the masks you need and configure your tests. In addition, the E2625A communication mask test kit comes with a set of electrical communication adapters to ensure convenient, reliable and accurate connections to your device under test. Included are more than 20 industry standard-ANSI T1.102 and ITU-T G.703 communication signal mask templates.
E2682A	VoiceControl option
	If you're making measurements on target systems with densely packed ICs, your hands are tied up holding probes, making it difficult to turn knobs and press buttons on the front panel of your scope. Infiniium's award-winning VoiceControl option solves this problem. Just speak into the collar-mounted microphone to operate your Infiniium's front-panel controls without using your hands. Simply tell the scope what you want it to do, using natural English-language commands, such as "set channel one to 1 volt per division." The VoiceControl system does not require the scope to be trained to understand a particular user.



The Agilent J-BERT generator N4903A provides high-speed digital stimulus and jitter testing to your device with PRBS or memory-based patterns from 150 Mb/s up to 13.5 Gb/s. The J-BERT is the only solution in the world where the user can add specified and controlled amounts of deterministic and random jitter. For more information, see www.agilent.com/find/pulse-generators.

Ordering Information (continued)

Related literature

Publication title	Publication type	Publication number
N5400 EZJIT Plus Jitter Analysis Software	Data sheet	5989-0109EN
E2681A EZJIT Jitter Analysis Software	Data sheet	5989-0109EN
E2690B Advanced Time Interval & Jitter Analysis Software	Data sheet	5989-3525EN
E2688A High-Speed Serial Data Analysis Software	Data sheet	5989-0108EN
InfiniiScan Event Identification Software for Infiniium 80000 and 8000 Series Oscilloscopes (N5414A and N5415A)	Data sheet	5989-4605EN
N5391A I^2C and SPI Analysis Software	Data sheet	5989-1250EN
N5402A CAN Analysis Software	Data sheet	5989-3632EN
89601A Vector Signal Analysis Software	Data sheet	5989-0947EN
N5392A Ethernet Compliance Test Package	Data sheet	5989-1527EN
N5393A PCI-Express Test Package	Data sheet	5989-1240EN
N5394A DVI Compliance Test Software	Data sheet	5989-1526EN
N5399A HDMI Compliance Test Software	Data sheet	5989-3047EN
N5409A FBD Compliance Test Software	Data sheet	5989-4128EN
N5410A Fibre Channel Compliance	Data sheet	5989-4209EN
N5411A SATA Compliance Test Software	Data sheet	5989-3662EN
N5412A SAS Compliance Test Software	Data sheet	5989-4208EN
N5413A DDR2 Clock Characterization	Data sheet	5989-3195EN
N5416A USB Compliance Test Software	Data sheet	5989-4044EN
E2699A My Infiniium Integration Package	Data sheet	5988-9934EN
N5430A Infiniium User-Definable Functions	Data sheet	5989-5632EN
N5431A XAUI Electrical Validation with 10GBASE-CX4, CPRI, OBSAI, and Serial RapidIO Support	Data sheet	5989-6151EN
N5435A Infiniium Application Server License	Data sheet	5989-6937EN
U7231A DDR3 Compliance Test Application	Data sheet	5989-7243EN
U7232A DisplayPort Compliance Test Software	Data sheet	5989-7198EN
U7233A DDR1 Compliance Test Application	Data sheet	5989-7366EN

Product Web site

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