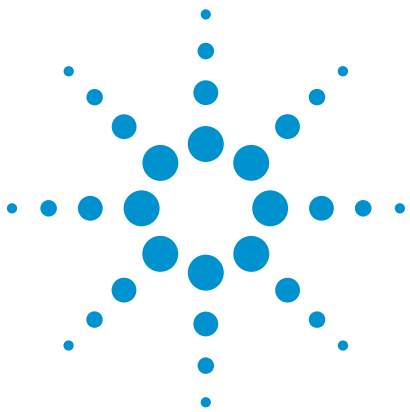
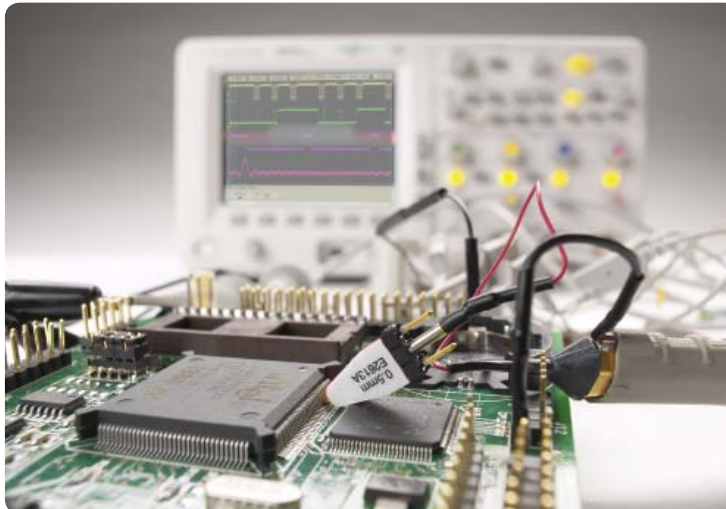




# InfiniiVision Oscilloscope Probes and Accessories

For Agilent Technologies 2000 X, 3000 X, 5000, 6000, and 7000 Series

Selection Guide Data Sheet



To get the most out of your scope, you need the right probes and accessories for your particular application. That's why Agilent Technologies offers a complete family of innovative probes and accessories for the 2000 X, 3000 X, 5000, 6000, and 7000 Series InfiniiVision oscilloscopes. For the most up-to-date and complete information about Agilent's accessories, please visit our Web site at:

[www.agilent.com/find/probes](http://www.agilent.com/find/probes)

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**Agilent Technologies**

# Probe Compatibility Table

For ordering information when replacing your probe or probe accessory: Refer directly to the page number listed in the table of contents for your probe model.

To assist you in selecting the proper probe for your application: Use our probe compatibility table below to find the probes that are recommended for use with your 2000 X, 3000 X, 5000, 6000, and 7000 Series InfiniiVision oscilloscope.

| Probe Type                             | Probe Model                                                                                                                                                              | MSO/DSO<br>2000 X-Series <sup>1</sup> | MSO/DSO<br>3000 X-Series |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------|
| Passive probes,<br>page 4              | N2862B 10:1 150 MHz<br>(included in 70/100 MHz models)<br>N2863B 10:1 300 MHz<br>(included in 200 MHz models)<br>N2890A 10:1 500 MHz<br>(included in 350/500 MHz models) | Recommended                           | Recommended              |
|                                        | N2889A 1:1/10:1 350 MHz                                                                                                                                                  | Recommended                           | Recommended              |
| High-voltage passive probes, page 6    | 10076D 4 kV                                                                                                                                                              | Recommended                           | Recommended              |
|                                        | N2771B 30 kV                                                                                                                                                             | Recommended                           | Recommended              |
| Differential active probes,<br>page 7  | 1130A 1.5 GHz                                                                                                                                                            | Incompatible                          | Compatible               |
|                                        | 1141A 200 MHz (use with 1142A)                                                                                                                                           | Incompatible                          | Recommended              |
|                                        | N2791A 25 MHz                                                                                                                                                            | Recommended                           | Recommended              |
|                                        | N2891A 70 MHz                                                                                                                                                            | Recommended                           | Recommended              |
|                                        | N2790A 100 MHz (with AutoProbe)                                                                                                                                          | Incompatible                          | Recommended              |
|                                        | N2792A 200 MHz                                                                                                                                                           | Recommended                           | Recommended              |
|                                        | N2793A 800 MHz                                                                                                                                                           | Recommended                           | Recommended              |
| Single-ended active probes,<br>page 11 | N2795A 1 GHz (with AutoProbe)                                                                                                                                            | Incompatible                          | Recommended              |
|                                        | N2796A 2 GHz (with AutoProbe)                                                                                                                                            | Incompatible                          | Recommended              |
|                                        | 1156A 1.5 GHz (with AutoProbe)                                                                                                                                           | Incompatible                          | Recommended              |
|                                        | 1144A 800 MHz (use with 1142A)                                                                                                                                           | Incompatible                          | Recommended              |
|                                        | 1145A 750 MHz (use with 1142A)                                                                                                                                           | Incompatible                          | Recommended              |
| MSO logic probes,<br>page 15           | 01650-61607 16-channel                                                                                                                                                   | Incompatible                          | Recommended              |
|                                        | N6459-60001 8-channel MSO cable<br>(included in 2000 X-Series MSOs)                                                                                                      | Recommended                           | Compatible               |
|                                        | N6450-60001 16-channel MSO cable<br>(included in 3000 X-Series MSOs)                                                                                                     | Incompatible                          | Recommended              |
| Current probes,<br>page 17             | 1146A 100 kHz                                                                                                                                                            | Recommended                           | Recommended              |
|                                        | N2780A 2 MHz (use with N2779A)                                                                                                                                           | Recommended                           | Recommended              |
|                                        | N2781A 10 MHz (use with N2779A)                                                                                                                                          | Recommended                           | Recommended              |
|                                        | N2782A 50 MHz (use with N2779A)                                                                                                                                          | Recommended                           | Recommended              |
|                                        | N2783A 100 MHz (use with N2779A)                                                                                                                                         | Recommended                           | Recommended              |
|                                        | 1147A 50 MHz (with AutoProbe)                                                                                                                                            | Incompatible                          | Recommended              |
|                                        | N2893A 100 MHz (with AutoProbe)                                                                                                                                          | Incompatible                          | Recommended              |

1. The 2000 X-Series does not support AutoProbe interface active probes.

| Probe type                                                           | Probe model                                                                                       | DSO5000A<br>100 MHz | DSO5000A<br>300 - 500 MHz | MSO/DSO6000A <sup>5</sup><br>100 MHz | MSO/DSO6000A <sup>5</sup><br>300 MHz - 1 GHz<br>MSO/DSO7000A/B<br>100 MHz - 1 GHz |
|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------|---------------------------|--------------------------------------|-----------------------------------------------------------------------------------|
| Passive probes<br>page 3                                             | N2863A 10:1 300 MHz<br>(included in 5000 Series<br>100/300 MHz)                                   | Recommended         | Compatible                | Compatible                           | Compatible                                                                        |
|                                                                      | 10070C 1:1 20 MHz                                                                                 | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | 10073D 10:1 500 MHz (included in<br>6000/7000 Series 300 MHz to<br>1 GHz and 5000 Series 500 MHz) | Compatible          | Recommended               | Compatible                           | Recommended                                                                       |
|                                                                      | 10074D 10:1 150 MHz<br>(included in 6000 Series 100 MHz)                                          | Recommended         | Compatible                | Recommended                          | Compatible                                                                        |
|                                                                      | N2873A 10: 1 500 MHz<br>(optional to 7000B)                                                       | Recommended         | Recommended               | Compatible                           | Recommended                                                                       |
| High-voltage<br>passive probes<br>page 5                             | 10076D 4 kV                                                                                       | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2771B 30 kV                                                                                      | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
| Differential<br>active probes<br>page 6                              | 1130A 1.5 GHz <sup>1</sup>                                                                        | Compatible          | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | 1141A 200 MHz (use with 1142A)                                                                    | Compatible          | Recommended               | Compatible                           | Recommended                                                                       |
|                                                                      | N2791A 25 MHz                                                                                     | Recommended         | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | N2891A 70 MHz                                                                                     | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2790A 100 MHz (with AutoProbe)                                                                   | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2792A 200 MHz                                                                                    | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2793A 800 MHz                                                                                    | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
| Single-ended<br>active probes<br>page 10                             | N2795A 1 GHz (with AutoProbe)                                                                     | Recommended         | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | N2796A 2 GHz (with AutoProbe)                                                                     | Recommended         | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | 1156A 1.5 GHz <sup>2</sup> (with AutoProbe)                                                       | Compatible          | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | 1144A 800 MHz (use with 1142A)                                                                    | Incompatible        | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | 1145A 750 MHz 2-ch (use with 1142A)                                                               | Incompatible        | Recommended               | Incompatible                         | Recommended                                                                       |
| Mixed signal<br>oscilloscope<br>logic probes <sup>3</sup><br>page 14 | 01650-61607 16-channel                                                                            | Incompatible        | Incompatible              | Recommended                          | Recommended                                                                       |
|                                                                      | 54620-68701 2x8-channel<br>(included in MSO6000A,<br>MSO7000A/B)                                  | Incompatible        | Incompatible              | Recommended                          | Recommended                                                                       |
| Current probes<br>page 16                                            | 1146A 100 kHz                                                                                     | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2780A 2 MHz (use with N2779A)                                                                    | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2781A 10 MHz (use with N2779A)                                                                   | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2782A 50 MHz (use with N2779A)                                                                   | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | N2783A 100 MHz (use with N2779A)                                                                  | Recommended         | Recommended               | Recommended                          | Recommended                                                                       |
|                                                                      | 1147A 50 MHz (with AutoProbe)                                                                     | Recommended         | Recommended               | Incompatible                         | Recommended                                                                       |
|                                                                      | N2893A 100 MHz (with AutoProbe)                                                                   | Recommended         | Recommended               | Incompatible                         | Recommended                                                                       |

1. The 1130A probe amplifier supports both single- and differential-ended measurements. Higher bandwidth InfiniiMax probe model 1131A, 1132A, and 1134A are also supported by 5000, and 6000 300 MHz - 1 GHz models and, 7000 Series.

2. The 1157A and 1158A are also supported by all 5000, and 6000 300 MHz - 1 GHz models, and 7000 Series.

3. Recommended for MSO6000A and MSO7000A, MSOs only.

4. These Infiniium active probes are not supported by InfiniiVision Series scopes – 1152A, 1153A, 1154A, 1155A, 1159A, 1168A, 1169A, N2800A, N2801A, N2802A, and N2803A.

5. MSO/DSO6000A 100-MHz models do not support any Agilent active probes with AutoProbe interface.

## Passive Probes

- Designed for optimal performance with your Agilent InfiniiVision Series oscilloscopes
- 1:1 and 10:1 attenuation
- 20 to 500 MHz

### Rugged, high-quality probes at a reasonable price

Agilent 10070-family passive probes are a great choice if you're looking for high quality at a very reasonable price. These general-purpose probes are designed specifically to give you optimal performance with your InfiniiVision Series oscilloscopes. Ruggedized for general-purpose measurements, they feature a durable cable and a solid stainless steel probe body encased with a hard, fracture-resistant plastic. They're designed and tested to ensure the probes operate in the toughest of conditions

The N2862B, N2863B, N2889A, and N2890A low-cost, general-purpose passive probes provide up to 500 MHz bandwidth and feature a high input resistance of 10 M $\Omega$  for low probe loading. These probes provide a 10:1 attenuation ratio except for the N2889A which provides a switch in the probe handle for switching the attenuation ratio between 1:1 and 10:1.

The N2873A is a 500-MHz, 10:1 miniature passive probe that can be used with all InfiniiVision Series. Compact 2.5-mm probe head diameter, low input capacitance, and various fine-pitch probe tip accessories make the N2873A passive probe ideal for probing densely populated IC components or surface-mount devices used in today's high-speed digital applications. For more information about N2870A Series passive probes and accessories, check out Agilent's literature number, 5990-3930EN.

### Accessories available for 10070C/73D/74D passive probes

|           |                                                                                                           |
|-----------|-----------------------------------------------------------------------------------------------------------|
| 5081-7705 | Probe-tip-to-BNC (m) adapter                                                                              |
| 5081-7697 | Retractable hook tip for 1007xC/D (not compatible with 10076A/B)                                          |
| 5081-7690 | Replacement parts accessory kit                                                                           |
| 8710-2063 | Dual-lead adapter provides easy connection from probe signal and ground to fine-pitch probing accessories |
| 10072A    | Fine-pitch probing kit includes 10 SMT clips and 2 dual-lead adapters                                     |
| 10075A    | 0.5 mm IC probing kit. Contains four 0.5 mm IC clips and 2 dual-lead adapters                             |

### Accessories available for N2862B, N2863B, N2889A, and N2890A passive probe

|           |                                             |
|-----------|---------------------------------------------|
| 0960-2900 | Retractable hook tip for N2862B/63B/89A/90A |
| 0960-2922 | PCB socket adapter for N2862B/63B/89A/90A   |
| 0960-2923 | Dual-lead adapter for N2862B/63B/89A/90A    |

### Accessories available for N2873A (and other N287xA Series passive probes)

|           |                                                           |
|-----------|-----------------------------------------------------------|
| 0960-2905 | Sprung hook adapter 2.5 mm for N2870A, 71A, 72A, 73A, 75A |
| 0960-2906 | Ground lead 15 cm for N2870A Series probes                |
| 0960-2908 | 10 self-adhesive copper pads 2x2 for N2870A Series probes |
| 0960-2898 | Dual lead-adapter for N2870A Series probes                |

### Standard accessories that come with each probe

| 10070C/10073D/10074D                           | N2862B/N2863B/<br>N2889A/N2890A                                   | N2873A                                                      |
|------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------|
| Retractable hook tip, qty 1                    | Retractable hook tip, qty 1                                       | Spring loaded probe tips, qty 2                             |
| Colored identification tag, 2 each of 4 colors | Colored identification tag, 2 each of 4 colors                    | Rigid probe tips, qty 2                                     |
| Ground bayonet, qty 1                          | Spring ground, qty 1                                              | Ground blade, qty 1                                         |
| IC insulation cap, qty 1                       | IC insulation cap, qty 1                                          | Ground spring, qty 1                                        |
| Adjustment tool, qty 1                         | Insulation cap, qty 1                                             | Sprung hook, qty 1                                          |
| Ground lead, qty 1                             | Adjustment tool, qty 1 (with N2862B/63B), qty 2 (with N2889A/90A) | Ground lead, qty 1                                          |
| BNC adapter, qty 1                             | Ground lead, qty 1                                                | Copper pads, qty 2                                          |
|                                                | BNC adapter, qty 1                                                | IC cap – 0.5 mm, 0.65 mm, 0.8 mm, 1 mm, 1.27 mm, qty 1 each |
|                                                | Probe tip, qty 1                                                  | BNC adapter, qty 1                                          |
|                                                |                                                                   | Insulating cap, qty 1                                       |
|                                                |                                                                   | Protection cap, qty 1                                       |
|                                                |                                                                   | Trimmer tool, qty 1                                         |
|                                                |                                                                   | Color coded rings, 3x4 colors                               |

## Passive Probes (continued)

### Ordering information for Agilent passive probes

|        |                                      |
|--------|--------------------------------------|
| 10070D | 1:1 20 MHz passive probe             |
| N2862B | 10:1 150 MHz passive probe           |
| 10074D | 10:1 150 MHz passive probe           |
| N2863B | 10:1 300 MHz passive probe           |
| N2889A | 10:1/1:1 350 MHz passive probe       |
| 10073D | 10:1 500 MHz passive probe           |
| N2890A | 10:1 500 MHz passive probe           |
| N2873A | 10:1 500 MHz miniature passive probe |



10073D/74D passive probe



N2873A passive probe with standard accessories



N2862B/63B passive probe



N2889A 10:1/1:1 passive probe



N2890A passive probe

### Characteristics for Agilent passive probes

|                                 | 10070C                      | 10073D                      | 10074D                      | N2862B/63B              | N2889A                                                  | N2890A            | N2873A                       |
|---------------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------|---------------------------------------------------------|-------------------|------------------------------|
| Bandwidth                       | 20 MHz                      | 500 MHz                     | 150 MHz                     | 150 MHz/<br>300 MHz     | 350 MHz (at 10:1),<br>10 MHz (at 1:1)                   | 500 MHz           | 500 MHz                      |
| Risetime (calculated)           | < 17.5 ns                   | < 700 ps                    | < 2.33 ns                   | < 2.33 ns/<br>< 1.16 ns | < 1 ns (at 10:1),<br>< 35 ns (at 1:1)                   | < 700 ps          | < 700 ps                     |
| Attenuation ratio               | 1:1                         | 10:1                        | 10:1                        | 10:1                    | 1:1/10:1 switchable                                     | 10:1              | 10:1                         |
| Input resistance                | 1 M $\Omega$                | 2.2 M $\Omega$              | 10 M $\Omega$               | 10 M $\Omega$           | 10 M $\Omega$ (at 10:1)<br>1 M $\Omega$ (at 1:1)        | 10 M $\Omega$     | 10 M $\Omega$                |
| Input capacitance               | Approx 70 pF                | Approx 12 pF                | Approx 15 pF                | Approx 12 pF            |                                                         |                   | Approx 9.5 pF                |
| Maximum input<br>(dc + peak ac) | 500 V CAT I<br>400 V CAT II | 500 V CAT I<br>400 V CAT II | 500 V CAT I<br>400 V CAT II | 300 Vrms<br>CAT I/II    | 300 V CAT I/II (at<br>10:1), 150 V CAT I/II<br>(at 1:1) | 300 V<br>CAT I/II | 400 V CAT I,<br>300 V CAT II |
| Compensation range              | None                        | 6 to 15 pF                  | 9 to 17 pF                  | 5 to 30 pF              | 5 to 30 pF (at 10:1)                                    | 5 to 30 pF        | 10 to 25 pF                  |
| Probe readout                   | Yes                         | Yes                         | Yes                         | Yes                     | No                                                      | YES               | Yes                          |
| Cable length                    | 1.5 m                       | 1.5 m                       | 1.5 m                       | 1.2 m                   | 1.3 m                                                   | 1.3 m             | 1.2 m                        |

# High-voltage Passive Probes

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

## 10076B high-voltage probe

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

### Characteristics 10076B

|                       |                                                      |
|-----------------------|------------------------------------------------------|
| Bandwidth             | 250 MHz (-3 dB)                                      |
| Risetime (calculated) | < 1.4 ns                                             |
| Attenuation ratio     | 100:1                                                |
| Input resistance      | 66.7 M $\Omega$ (when terminated into 1 M $\Omega$ ) |
| Input capacitance     | Approx 3 pF                                          |
| Maximum input         | 4000 Vpk                                             |
| Compensation          | 6 to 20 pF range                                     |
| Probe readout         | Yes                                                  |
| Cable length          | 1.8 m                                                |



10076B passive probe

## N2771A high-voltage probe

The N2771A is a 1000:1 divider probe for the measurement of fast high voltage signals up to 30 kV dc + peak ac, 10 kV rms.

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

### Characteristics for N2771A

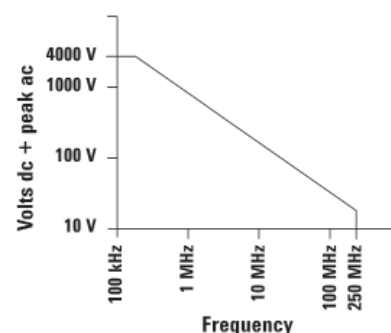
|                       |                                                                                                         |
|-----------------------|---------------------------------------------------------------------------------------------------------|
| Bandwidth             | 50 MHz (-3 dB)                                                                                          |
| Risetime              | < 7 ns                                                                                                  |
| Attenuation ratio     | 1000:1                                                                                                  |
| Input resistance      | 100 M $\Omega$ (when terminated into 1 M $\Omega$ )                                                     |
| Input capacitance     | 1 pF                                                                                                    |
| Compensation range    | 6 to 20 pF                                                                                              |
| Max. voltage          | 15 kV dc, 10 kV rms, 30 kV dc + peak ac                                                                 |
| Operating temperature | 0 to +50°C, 80% RH                                                                                      |
| Storage temperature   | -20 to +70°C, 90% RH                                                                                    |
| Dimensions            | 2 cm (max width of probe stem after handle) x 33 cm<br>7.5 cm (max probe width at probe handle) x 33 cm |



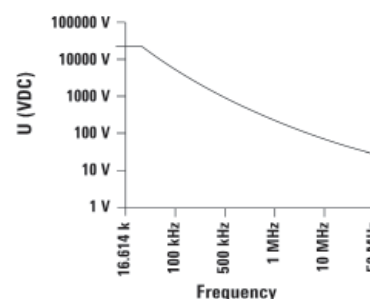
N2771A high-voltage probe

## Ordering information for Agilent high-voltage probe

|        |                                                                                                                                                         |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10076B | High-voltage probe: includes one retractable hook tip, one-ground-bayonet, one IC probing tip, one-alligator ground lead and a compensation screwdriver |
| N2771A | High-voltage probe: includes alligator ground lead, 1-sharp-probe tip                                                                                   |
| 10077A | Accessory kit for 10076A/B: includes one retractable pincher tip, one ground lead, one insulation cap, two measuring pins and two colored tags          |



10076A derating curve



N2771A derating curve

## InfiniiMax Active Probes and Accessories

### Agilent 1130A InfiniiMax high-performance active probe system

- 1.5 GHz InfiniiMax probe system
- InfiniiMax probe amplifier supports both differential- and single-ended measurements for a more cost-effective solution
- Unrivaled InfiniiMax probing accessories support browsing, solder-in, and socketed use models at the maximum performance available
- Compatible with 5000, 6000, and 7000 Series oscilloscopes (except for 6000 Series 100-MHz models)

The 1.5-GHz 1130A InfiniiMax probe amplifier is a perfect complement to the InfiniiVision 1 GHz models. Its 1.5-GHz bandwidth, extremely low input capacitance (0.32 pF), high common mode rejection, and the patented resistor probe tip technology provide ultra low loading of the DUT and superior signal fidelity. Agilent's innovative InfiniiMax 1130A differential probe is the easiest-to-use, and highest performance probing system available for high-speed digital design, and represents a new industry standard for accuracy, flexibility, and reliability. Designers can achieve 1-GHz system bandwidth in conjunction with 1-GHz 6000 and 7000 Series oscilloscopes even when manually browsing with the probe or making hands-off measurements. Optional solder-in probe heads and solder-in sockets, as well as browser configuration provide full bandwidth at the probe tip.

| Operating characteristics                                          |                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Probe bandwidth (-3 dB)                                            | > 1.5 GHz                                                                                                                                                                                                                                                                                                               |
| Rise and fall time (10 to 90%)                                     | 233 ps                                                                                                                                                                                                                                                                                                                  |
| System bandwidth (-3 dB)                                           | 1130A with MSO/DSO610xA, and MSO/DSO7104A/B: 1 GHz                                                                                                                                                                                                                                                                      |
| Input capacitance                                                  | C <sub>m</sub> = 0.1 pF C <sub>m</sub> is between tips<br>C <sub>g</sub> = 0.34 pF C <sub>g</sub> is ground for each tip<br>C <sub>diff</sub> = 0.27 pF Differential mode capacitance = C <sub>m</sub> + C <sub>g</sub> /2<br>C <sub>se</sub> = 0.44 pF Single-ended mode capacitance = C <sub>m</sub> + C <sub>g</sub> |
| Input resistance                                                   | Differential mode resistance = 50 kΩ ± 1%<br>Single-ended mode resistance = 25 kΩ ± 1%                                                                                                                                                                                                                                  |
| Input dynamic range                                                | ±2.5 V                                                                                                                                                                                                                                                                                                                  |
| Input common mode range                                            | ±6.75 Vdc to 100 Hz; ±1.25 V > 100 Hz                                                                                                                                                                                                                                                                                   |
| Maximum signal slew rate                                           | 18 V/ns when probing a single-ended signal<br>30 V/ns when probing a differential signal                                                                                                                                                                                                                                |
| DC attenuation                                                     | 10:1 ± 3% before calibration on oscilloscope<br>10:1 ± 1% after calibration on oscilloscope                                                                                                                                                                                                                             |
| Offset range                                                       | ±12.0 V when probing single-ended                                                                                                                                                                                                                                                                                       |
| Maximum input voltage                                              | 30 V <sub>peak</sub> , CAT I                                                                                                                                                                                                                                                                                            |
| ESD tolerance                                                      | > 8 kV from 100 pF, 300 Ω HBM                                                                                                                                                                                                                                                                                           |
| Maximum number of probes supported by 3000 X/5000/6000/7000 Series | 2                                                                                                                                                                                                                                                                                                                       |



*Agilent 1130A InfiniiMax probe offers you the highest performance available for measuring differential and single-ended signals*

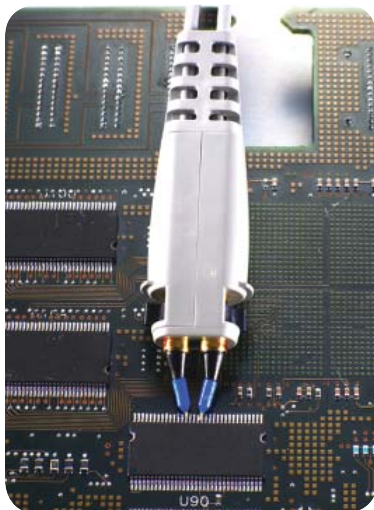
# InfiniiMax Active Probes and Accessories (continued)

## Agilent 1130A InfiniiMax high-performance active probe system

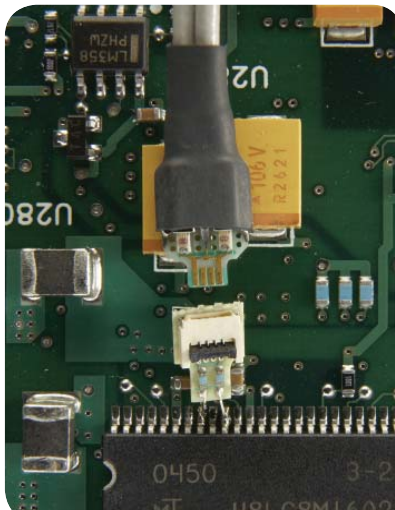
Ordering information for Agilent InfiniiMax 1130A probe and accessories

| Probe amplifier        |                                                                                                              |
|------------------------|--------------------------------------------------------------------------------------------------------------|
| 1130A                  | 1.5 GHz InfiniiMax probe amplifier (order one or more probe heads or connectivity kits per amplifier)        |
| Connectivity kits      |                                                                                                              |
| E2669A                 | InfiniiMax connectivity kit for differential/single-ended measurements                                       |
| E2668A                 | InfiniiMax connectivity kit for single-ended measurements                                                    |
| Individual probe heads |                                                                                                              |
| E2675A                 | InfiniiMax differential browser probe head and accessories                                                   |
| E2676A                 | InfiniiMax single-ended browser probe head and accessories                                                   |
| E2677A                 | InfiniiMax differential solder-in probe head and accessories                                                 |
| E2678A                 | InfiniiMax single-ended/differential socketed probe head and accessories                                     |
| E2679A                 | InfiniiMax single-ended socketed probe head and accessories                                                  |
| E2695A                 | Differential SMA probe head                                                                                  |
| N5425A/N5426A          | 12-GHz differential ZIF solder-in probe head and ZIF probe tips                                              |
| N5451A                 | InfiniiMax long-wire ZIF probe tips (for use with N5425A ZIF probe head)                                     |
| N5450A                 | InfiniiMax extreme temperature extension cable (that allows for probing in environments from –55 to +150 °C) |
| N2880A                 | InfiniiMax in-line attenuator kit (pairs of 6 dB, 12 dB and 20 dB attenuator in a kit)                       |
| N2881A                 | InfiniiMax DC blocking caps (a pair of 30 Vdc blocking cap)                                                  |

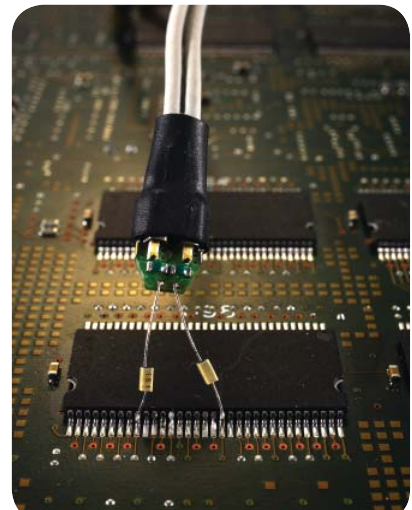
For more comprehensive information about the 1130A InfiniiMax probe amplifier and its accessories, refer to the Agilent Infiniium Oscilloscope Probes, Accessories, and Options data sheet with Agilent literature number 5968-7141EN.



*InfiniiMax browser head on board*



*InfiniiMax ZIF tip soldered on board*



*InfiniiMax solder-in probe head with long wires*

# High-voltage Differential Active Probes

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

## N2790A/91A and N2891A high voltage differential probes

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

Each probe offers user-selectable attenuation settings that make it highly versatile, allowing it to be used for a broad range of applications. The probe comes with probe tip accessories for use with small and large components in tight spaces. The N2791A and N2891A are compatible with any oscilloscope with 1 MΩ BNC input. The N2791A and N2891A probe power is supplied by included 4x AA batteries or USB host port of the scope or PC via a supplied USB power cable. The N2790A is compatible with the Agilent's AutoProbe interface where the probe power is supplied by the Agilent oscilloscope's probe interface.

### Characteristics for N2790A, N2791A and N2891A differential probe

|                                                                | <b>N2790A</b>                                            | <b>N2791A</b>                         | <b>N2891A</b>                          |
|----------------------------------------------------------------|----------------------------------------------------------|---------------------------------------|----------------------------------------|
| Bandwidth                                                      | 100 MHz                                                  | 25 MHz                                | 70 MHz                                 |
| Risetime                                                       | 3.5 ns                                                   | 14 ns                                 | 5 ns                                   |
| Attenuation ratio                                              | 50:1 / 500:1                                             | 10:1 / 100:1                          | 100:1 / 1000:1                         |
| CMRR                                                           | -80 dB at 50/60 Hz<br>-50 dB at 1 kHz<br>-50 dB at 1 MHz | -80 dB at 50/60 Hz<br>-40 dB at 1 MHz | -80 dB at 50/60 Hz<br>-60 dB at 20 kHz |
| Max input voltage to ground                                    | ±1000 V (CAT II)<br>±600 V (CAT III)                     | ±700 V at 100:1<br>±70 V at 10:1      | ±7000 V at 1000:1<br>±700 V at 100:1   |
| Max input voltage between two inputs                           | ±1400 V at 500:1<br>±140 V at 50:1                       | ±700 V at 100:1<br>±70 V at 10:1      | ±7000 V at 1000:1<br>±700 V at 100:1   |
| Max number of probes supported by 3000 X/5000/6000/7000 Series | 4                                                        | 4                                     | 4                                      |

## 1141A 200 MHz differential probe

The 1141A is a 1x FET differential probe with 200-MHz bandwidth and a 3000:1 CMRR. The probe has a high-input resistance and low-input capacitance of 7 pF to minimize circuit loading. The 1141A must be used with 1142A probe control and power module, which controls input coupling modes dc, dc with variable offset, and dc reject. Two attenuators, 10x and 100x are provided to expand the linear differential input range to ±30 V. This probe works with any 50-Ω input oscilloscope including 3000 X, 5000, 6000 300 MHz - 1 GHz, and 7000 Series.



1141A 200-MHz differential probe with 1142A probe control and power module

### Characteristics for 1141A differential probe

|                                                                | <b>1141A</b>                                                           |
|----------------------------------------------------------------|------------------------------------------------------------------------|
| Bandwidth                                                      | 200 MHz                                                                |
| Risetime                                                       | 1.75 ns                                                                |
| Attenuation ratio                                              | 10:1 and 100:1 with attenuator                                         |
| High CMRR                                                      | 3000:1 at 1 MHz<br>10:1 at 100 MHz                                     |
| Input impedance                                                | Between inputs:<br>1 MΩ, 7 pF                                          |
| Max input voltage                                              | 200 Vdc + peak ac (probe alone)<br>500 Vdc + peak ac (with attenuator) |
| Max number of probes supported by 3000 X/5000/6000/7000 Series | 4                                                                      |

## High-voltage Differential Active Probes (continued)

### N2792A 200-MHz and N2793A 800-MHz general-purpose differential probe

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

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

Both probes are compatible with any oscilloscope with 50  $\Omega$  BNC input. The probe can be powered by any USB port on a scope or computer, or by an internal battery.

#### Characteristics for N2792A and N2793A differential probes

|                                                                | N2792A                                | N2793A                                  |
|----------------------------------------------------------------|---------------------------------------|-----------------------------------------|
| Bandwidth                                                      | 200 MHz                               | 800 MHz                                 |
| Risetime                                                       | 1.75 ns                               | 437 ps                                  |
| Attenuation ratio                                              | 10:1                                  | 10:1                                    |
| CMRR                                                           | 80 dB at 50/60 Hz<br>-50 dB at 10 MHz | -60 dB at 50/60 Hz<br>-15 dB at 500 MHz |
| Max input voltage to ground                                    | $\pm 60$ V                            | $\pm 40$ V                              |
| Max input voltage between two inputs                           | $\pm 20$ V                            | $\pm 15$ V                              |
| Max number of probes supported by 3000 X/5000/6000/7000 Series | 4                                     | 4                                       |

#### Ordering information for Agilent differential probes and power supply

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



N2890A 100-MHz, 1.4-kV differential probe with AutoProbe interface



N2791A 25-MHz, 700-V differential probe



N2792A 200-MHz, 20-V differential probe



N2793A 800-MHz, 15-V differential probe

# Single-ended Active Probes

## Agilent N2795A/96A low-cost single-ended active voltage

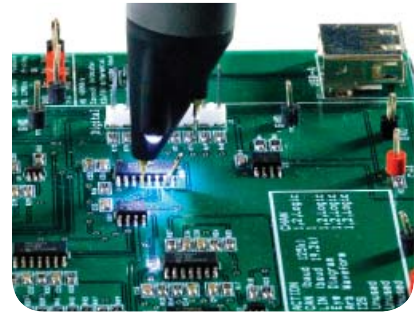


- High resistance (1M $\Omega$ ) and low capacitance (1 pF) input for low loading
- Wide input dynamic range ( $\pm 8$  V) and offset range ( $\pm 12$  V for N2796A,  $\pm 8$  V for N2795A)
- Built-in headlight
- Direct connection to AutoProbe interface (no power supply required)
- Provides full system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

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

For high signal integrity probing, the N2795A 1 GHz and N2796A 2 GHz active probes are perfect complements to Agilent's 500 to 600 MHz and 1 GHz bandwidth scopes, respectively.

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



| Model number                                    | N2795A                                                                                                                                          | N2796A     |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Probe bandwidth* (-3 dB)                        | 1 GHz                                                                                                                                           | 2 GHz      |
| Risetime                                        | 350 ps                                                                                                                                          | 175 ps     |
| System bandwidth                                | 500/600 MHz (with Agilent's 500/600 MHz InfiniiVision/Infiniium oscilloscope) 1 GHz (with Agilent's 1 GHz InfiniiVision/Infiniium oscilloscope) |            |
| Attenuation ratio (at dc)                       | 10:1 $\pm$ 0.5%                                                                                                                                 |            |
| Input dynamic range                             | -8 to +8 V (DC or peak AC)                                                                                                                      |            |
| Non-destructive input voltage                   | -20 to +20 V                                                                                                                                    |            |
| Offset range                                    | $\pm 8$ V                                                                                                                                       | $\pm 12$ V |
| DC offset error (output zero)                   | $\pm 1$ mV                                                                                                                                      |            |
| Low frequency accuracy                          | 0.5% at 70 Hz, 1 Vpp                                                                                                                            |            |
| Input resistance*                               | 1 M $\Omega$                                                                                                                                    |            |
| Input capacitance                               | 1 pF                                                                                                                                            |            |
| Output impedance                                | 50 $\Omega$                                                                                                                                     |            |
| Max number of probes supported by InfiniiVision | 4                                                                                                                                               |            |

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

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



## Single-ended Active Probes (continued)

### Agilent 1156A single-ended active voltage

- 1.5 GHz probe bandwidth;  
< 233 ps rise/fall time
- 100 k $\Omega$ , 0.8 pF non-resonant input impedance
- Small size for easier probing
- Compatible with 5000, 6000, and 7000 Series (except for 6000 Series 100 MHz models)

The Agilent 1156A is a 1.5-GHz active probe for use with Agilent InfiniiVision or Infiniium oscilloscopes. Its high bandwidth (1.5 GHz), low input capacitance (< 0.8 pF) and high input resistance (100 k $\Omega$ ) input minimizes ultra low loading of the DUT, making it ideal for the companion for the InfiniiVision Series oscilloscopes. When used with the InfiniiVision 3000 X, 5000, 6000, or 7000 Series, the 1156A offers you a full bandwidth of the scope to the probe tip, giving you the accurate insight into your high-speed device.

Incorporating the most advanced mechanical and electrical design technologies, the 1156A provides smaller, lighter, and more rugged probe tip that enables direct and easy access to fine pitch ICs and components. With the 1156A probe, a damping resistor is placed as close as possible to the point being probed, which keeps the input impedance from resonating low, and it also allows a flat frequency resonance across the entire bandwidth of the probe. The 1156A is designed to withstand 40-V peak AC input and > -5 kV of ESD, so it will function reliably in adverse condition.

| Key characteristics                                                             |                                                                       |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Probe bandwidth (-3 dB)                                                         | > 1.5-GHz                                                             |
| Rise and fall time (10 to 90%)<br>calculated from $t_r = 0.35/\text{bandwidth}$ | 233 ps                                                                |
| System bandwidth (-3 dB)                                                        | 1156A 1 GHz InfiniiVision 6000/7000 scope: 1 GHz                      |
| Input capacitance                                                               | 0.8 pF                                                                |
| Input resistance                                                                | 100 k $\Omega \pm 1\%$                                                |
| Input dynamic range <sup>1</sup>                                                | 5 Vp-p                                                                |
| DC attenuation                                                                  | 10:1 $\pm 3\%$ before calibration<br>10:1 $\pm 1\%$ after calibration |
| Offset range                                                                    | $\pm 15.0$ V                                                          |
| Offset accuracy                                                                 | < 3% of setting before calibration<br>1% of setting after calibration |
| Maximum input voltage                                                           | 40 Vpeak, CAT I                                                       |
| ESD tolerance                                                                   | > 5 kV from 100 pF, 300 $\Omega$ HBM                                  |
| Maximum number of probes supported by 3000 X/5000/6000/7000 Series              | 4                                                                     |

Note <sup>1</sup>: for waveforms with edges > 3 ns, dynamic range is > 12 Vp-p.

#### Ordering information for Agilent 1156A active probe

|       |                                   |
|-------|-----------------------------------|
| 1156A | 1.5 GHz single-ended active probe |
|-------|-----------------------------------|

| Accessories |                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------|
| E2637A      | Precision measurement kit (includes 2 solderable ground sockets with 2 green resistive signal pins) |
| E2638A      | Solderable-tip 5 cm resistive signal leads (10) with ground leads (3)                               |
| E2639A      | Micro clips, qty. 4                                                                                 |
| E2640A      | Resistive signal tips, qty. 8                                                                       |
| E2641A      | Ground blade assembly, qty. 8                                                                       |



Agilent 1156A active probe with accessories

For more comprehensive information about the 1156A active probe, refer to the Agilent 1156/57/58A Active Probes Product Overview, literature number 5988-3361EN.

## Single-ended Active Probes (continued)

- Up to 800-MHz bandwidth
- 10:1 attenuation
- Compatible with 3000 X, 5000, 6000 300 MHz - 1 GHz, and 7000 Series oscilloscopes

### Agilent 1144A active probe

The 1144A features 800-MHz bandwidth, 1-M $\Omega$  input resistance, 2-pF input capacitance, 10:1 attenuation, and  $\pm 40$  Vdc + peak ac maximum input voltage. An FET at the input allows a high input resistance and low input capacitance which minimizes the loading of the circuit under test. The output impedance of the probe is 50  $\Omega$  which allows the probe cable to be extended with a 50- $\Omega$  coaxial cable. To use this probe with 5000, 6000, or 7000 Series oscilloscope, the 1142A power supply is required. The 01144-61604 adapter can be used with the power supply to provide power for two channels of active probing.

#### Characteristics for 1144A active probe

|                                                                    |                                                                                                 |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Bandwidth                                                          | $\geq 800$ MHz                                                                                  |
| Risetime (calculated)                                              | $\leq 440$ ps                                                                                   |
| Attenuation ratio                                                  | 10:1, $\pm 2\%$ (when connected to an instrument input of 50 $\Omega$ , $\pm 0.5\%$ )           |
| Input resistance                                                   | 1 M $\Omega$ , $\pm 5\%$                                                                        |
| Maximum input voltage                                              | $\pm 40$ V (dc + peak ac)                                                                       |
| Input capacitance*                                                 | 2 pF (typical)                                                                                  |
| Input dynamic range*                                               | 0 to $\pm 7.0$ V                                                                                |
| Power requirements                                                 | dc $\pm 12$ V to $\pm 15$ V $\pm 5\%$ (at approximately 75 mA each supply)                      |
| Weight                                                             |                                                                                                 |
| Net                                                                | Approximately 180 g (6.5 oz)                                                                    |
| Probe body                                                         | 35 g (~1.25 oz)                                                                                 |
| Shipping                                                           | Approximately 0.8 kg (1.75 lb)                                                                  |
| Temperature                                                        |                                                                                                 |
| Operating                                                          | 0 to 55 $^{\circ}\text{C}$ (32 to 131 $^{\circ}\text{F}$ )                                      |
| Non-operating                                                      | -40 to +70 $^{\circ}\text{C}$ (-40 to +158 $^{\circ}\text{F}$ )                                 |
| Humidity                                                           |                                                                                                 |
| Operating                                                          | Up to 95% relative humidity (non-condensing) at 40 $^{\circ}\text{C}$ (104 $^{\circ}\text{F}$ ) |
| Non-operating                                                      | Up to 90% relative humidity at 65 $^{\circ}\text{C}$ (149 $^{\circ}\text{F}$ )                  |
| Altitude                                                           |                                                                                                 |
| Operating                                                          | Up to 4,600 m (15,000 ft)                                                                       |
| Non-operating                                                      | Up to 15,300 m (50,000 ft)                                                                      |
| Maximum number of probes supported by 3000 X/5000/6000/7000 Series | 4                                                                                               |



1144A active probe

\* Operating characteristics

## Single-ended Active Probes (continued)

### Agilent 1145A 2-channel active probe

The two-channel 1145A low-mass active probe has a probe tip that weighs less than 1 gram making it ideal for attaching to find pitch ICs and probing surface mount components. The probe combines high bandwidth (750 MHz), low input capacitance (2 pF) and high input resistance (1 M $\Omega$ ). A versatile set of accessories are provided and when used in conjunction with the Wedge adapter, the 1145A provides a hands-free solution for probing 0.5-mm and 0.65-mm IC packages. To use this probe with 3000 X, 5000, 6000, or 7000 Series oscilloscopes, the 1142A power supply is required.

#### Characteristics for 1145A active probe

|                                                                    |                          |
|--------------------------------------------------------------------|--------------------------|
| Bandwidth                                                          | 750 MHz                  |
| Risetime (calculated)                                              | 470 ps                   |
| Attenuation ratio                                                  | 10:1, $\pm 3\%$          |
| Input resistance                                                   | 1 M $\Omega$ , $\pm 2\%$ |
| Maximum input voltage                                              | $\pm 40$ Vdc + peak ac   |
| Input capacitance*                                                 | 2 pF (typical)           |
| Input dynamic range*                                               | 0 to $\pm 6.0$ V         |
| Maximum number of probes supported by 3000 X/5000/6000/7000 Series | 2                        |

#### Ordering information for Agilent active probes

|             |                                  |
|-------------|----------------------------------|
| 1144A       | 800 MHz active probe             |
| 1145A       | 2-channel 750 MHz active probe   |
| 1142A       | Power supply for 1144A and 1145A |
| 01144-61604 | Splitter cable assy              |



1145A active probe

\* Operating characteristics

## Mixed Signal Oscilloscope Logic Probes

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

### MSO probes offer great value and performance

These logic probes for the MSO6000A, MSO7000A/B, 5462xD, and 5464xD mixed signal oscilloscopes (MSOs) are the same ones used with Agilent industry-leading high-performance logic analyzers. This means we can offer the best performance, great value and access to the industry's broadest range of logic probing accessories.

The 54620-68701 and N6450-60001 2 x 8-signal logic probes are divided into two sets of eight channels so you can probe pins that are far apart and work conveniently with only one set if that's all you require. For optimal signal fidelity, connect ground at each logic probe, in addition to taking a common ground to all eight signals via a separate ground connector on the probe pod. This probe is included with 3000 X, 6000, and 7000 Series MSOs.

The N6459-60001 is an 8-channel MSO logic probe designed to work with the 2000 X-Series MSOs.

### Characteristics for Agilent 54620-68701, N6450-60001, N6459-60001 logic probes

|                   |                |
|-------------------|----------------|
| Input impedance   | 100 k $\Omega$ |
| Input capacitance | 8 pF           |

The 01650-61607 is the 40-pin (F) to 40-pin (F) logic probe cable for Agilent's 6000/7000 Series and 54600 Series MSOs. This cable gives the MSO the standard 40-pin female input connector that many Agilent logic analyzers have. With this cable, a user can connect a wide variety of logic analyzer probes such as Mictor, Samtec, and Soft Touch probes.

### Characteristics for Agilent 01650-61607 logic probe

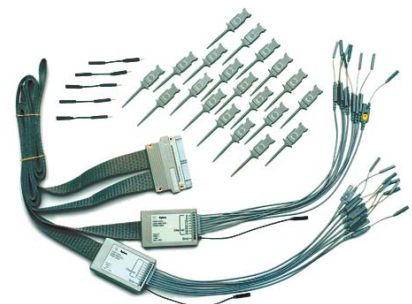
|                   |                |
|-------------------|----------------|
| Input impedance   | 100 k $\Omega$ |
| Input capacitance | 12 pF          |



01650-61607 logic probe

### Ordering information for Agilent logic probes

|                             |                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------|
| 54620-68701 and N6450-68701 | Logic probe with 2 x 8 flying leads. Includes 20 IC clips and 5 ground extension leads |
| N6459-60001                 | Logic probe with 1 x 8 flying leads. Includes 10 IC clips and 3 ground extension leads |
| 01650-61607                 | 40-pin (F) to 40-pin (F) logic probe cable                                             |



54620-68701 logic probe

## Mixed Signal Oscilloscope Logic Probes (continued)

The 6000 and 7000 Series MSO digital channels were architected to be compatible with a wide variety of probing accessories developed over 20 years for logic analyzers. There's a good chance that the logic analyzer accessories you already own work with your MSO. With the addition of an optional 40-pin cable, 01650-61607, the MSO accepts numerous logic analyzer accessories:

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

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

- Route up to 16 signals to the probe and don't use the additional probe channels.
- Route up to 32 signals to the probe and measure  $\frac{1}{2}$  of them at a time. Simply plug the 40-pin cable to the other side of the probe to see the other  $\frac{1}{2}$  of the signals.



*E5346A 34-channel Mictor connector probe*



*E5385A 34-channel Samtec connector probe*



*E5396A 16-channel soft touch connectorless probe*

## Current Probes

- Up to 100 MHz bandwidth and 500 Arms current
- Hybrid technology to measure ac and dc
- Compatible with 1 M $\Omega$  scope input

### Accurate current measurements without breaking the circuit

Compatible with any scope or voltage measuring instruments with BNC input, the 1146A and N2780A Series current probes offer accurate and reliable solutions for measuring dc and ac currents. The probes use a hybrid technology that includes a Hall effect sensor, which senses the dc current and a current transformer, which senses the ac current, making it unnecessary to make an electrical connection to the circuit.

#### 1146A 100 kHz current probe

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



1146A 100-kHz current probe

#### 1147A/N2893A 50-MHz/100-MHz current probe with AutoProbe interface

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

The 1147A/N2893A probe is compatible with the AutoProbe interface, which completely configures the oscilloscope for the probe when used with the 3000 X, 5000, 6000 300 MHz - 1 GHz, 7000 Series scopes. Probe power is provided by the scope, so there is no need for an external power supply. The N2893A uniquely provides auto demagnetization and offset



1147A 50-MHz current probe with AutoProbe interface

elimination feature when used in conjunction with InfiniiVision or Infiniium scopes.

#### N2780A/81A/82A/83A 2-MHz/10-MHz/50-MHz/100-MHz current probe

The N2780A Series current probes are high bandwidth, active current probes, featuring flat bandwidth, low noise (2.5 mArms) and low circuit insertion loss. In conjunction with the power supply (model N2779A), this probe can be used with any oscilloscope having a high-impedance BNC input. The companion power supply N2779A (3 x 12 Vdc output) lets you connect up to any three N2780A-83A current probes to a single power supply.



N2893A 100-MHz current probe with AutoProbe interface



N2780A Series current probes with N2779A power supply

## Current Probes (continued)

### Characteristics of the 1146A current probe

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

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

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

### Characteristics of the 1147A/N2893A current probe

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

Note: The above specifications are guaranteed at  $23 \pm 3$  °C (or  $73 \pm 5$  °F)

### Characteristics of N2780A Series current probes

|                                       |                                                                                                                                                                |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bandwidth (-3 dB)                     | dc to 2 MHz (N2780A)<br>dc to 10 MHz (N2781A)<br>dc to 50 MHz (N2782A)<br>dc to 100 MHz (N2783A)                                                               |
| Maximum current (continuous)          | 500 A (N2780A)<br>150 A (N2781A)<br>30 A (N2782A/N2783A)                                                                                                       |
| Maximum peak current (non-continuous) | 700 A peak (N2780A)<br>300 A peak (N2781A)<br>50 A peak (N2782A/N2783A)                                                                                        |
| Maximum input voltage                 | 300 V CAT I (N2782A, 83A)<br>300 V CAT II, 600 V CAT III (N2780A, 81A)                                                                                         |
| Output voltage rate                   | 0.01 V/A (N2780A/N2781A)<br>0.1 V/A (N2782A/N2783A)                                                                                                            |
| Amplitude accuracy                    | $\pm 1.0\%$ rdg $\pm 500$ mA (N2780A)<br>$\pm 1.0\%$ rdg $\pm 100$ mA (N2781A)<br>$\pm 1.0\%$ rdg $\pm 10$ mA (N2782A)<br>$\pm 1.0\%$ rdg $\pm 10$ mA (N2783A) |

### Ordering information for Agilent current probes

|        |                                                |
|--------|------------------------------------------------|
| 1146A  | 100-kHz current probe                          |
| 1147A  | 50-MHz current probe with AutoProbe interface  |
| N2893A | 100-MHz current probe with AutoProbe interface |
| N2780A | 2-MHz current probe                            |
| N2781A | 10-MHz current probe                           |
| N2782A | 50-MHz current probe                           |
| N2783A | 100-MHz current probe                          |
| N2779A | 3-channel power supply for N2780A/81A/82A/83A  |

For more information about the N2780A Series current probes, refer to the Agilent N2780A Series current probe data sheet, literature number 5989-6432EN.

# Wedge Probe Adapters

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

## Problem-free probing

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

## Make the inaccessible accessible

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

## Electrical reliability

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

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

## IC clip kits

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

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

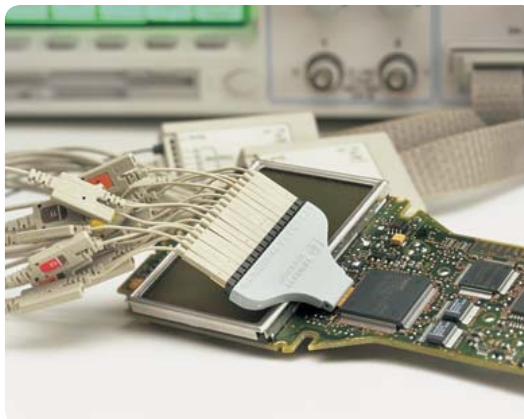
## Agilent Wedge electrical characteristics

|                              |                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------|
| Operating voltage            | < 40 Vdc + peak ac                                                                            |
| Operating current            | 0.5 A maximum                                                                                 |
| Capacitance between contacts | 2 pF typical (all except Agilent-E2643A/44A)<br>4.33 pF typical at 1 MHz (Agilent-E2643A/44A) |

|                    |                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------|
| Self-inductance    | 15 nH typical (all except Agilent E2643A/44A)<br>37 nH typical at 1 MHz (Agilent E2642A/44A) |
| Cross coupling     | -31 dB typical at 100 MHz (Agilent E2643A/44A)                                               |
| Contact resistance | < 0.1 $\Omega$                                                                               |

## Ordering information

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



## PC Connectivity

### Get scope data into your PC with Agilent IntuiLink without programming

- Ideal for documentation and archiving
- Works in familiar Microsoft® Excel and Word environments
- Leverage the power of Excel for data analysis and advanced graphing
- ActiveX controls provided for more flexible scope programming
- Compatible with 5000, 6000, and 7000 Series

To simplify the task of transferring images and waveform data to your PC, Agilent IntuiLink software is offered free for all 5000, 6000, and 7000 Series scopes. IntuiLink Toolbar provides easy access to the scope data and images from within your standard PC applications. You work in a familiar environment at all times, using PC applications such as Microsoft Excel or Word to analyze, interpret, display, print, and document the data you get from the scope. The IntuiLink toolbar makes it easy, providing a simple way to download data and screenshots into a spreadsheet or document. You can also save the scope settings and retrieve them later to reproduce difficult setups like glitch capture and complex triggering.

### Minimum operating system requirements:

- Windows 95/98, or Me
- Windows NT 4.0 (with Service Pack 4 or greater, obtain at [www.microsoft.com](http://www.microsoft.com))
- Windows 2000
- Windows XP

### Minimum MS Office application requirements:

- Microsoft Office 2000 (Word or Excel) or
- Microsoft Office XP
- Microsoft Office 2003

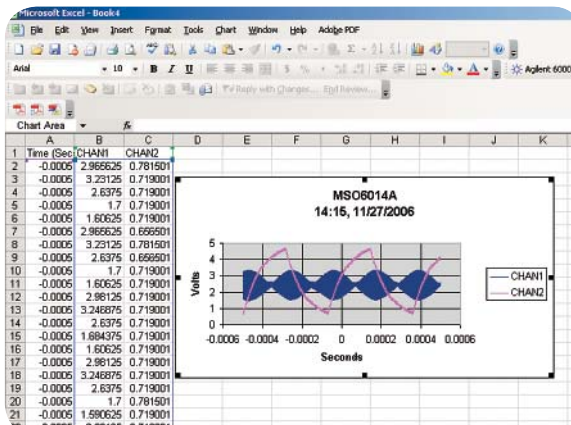
### IntuiLink data capture software for transferring megabytes of data to PC

The IntuiLink data capture is a standalone software for downloading waveform data and screen image from 5000, 6000, or 7000 oscilloscopes to the PC via USB, LAN,

or GPIB (for 5000 and 6000 only) interface. It provides the capability to transfer full deep memory data out of the scope. The IntuiLink Toolbar application limits the size of acquisition data available to a maximum of 50,000 points regardless of actual number of acquisition points on the screen. With IntuiLink data capture, the amount of points transferred will be the actual number of acquisition points currently displayed or you may select the number of points to download.

Unlike the IntuiLink Toolbar, it is not based on Microsoft Excel or Word. However you may still copy and paste the data on to the Microsoft applications for manipulating or charting the data.

For more information or free download of the software, visit [www.agilent.com/find/intuilink](http://www.agilent.com/find/intuilink)



Simple transfer of images and data with IntuiLink Toolbar

## Miscellaneous Accessories

### Testmobile

The sturdy Agilent 1180CZ Testmobile for use with 6000 Series oscilloscopes makes sharing your scope easy. Its large wheels make it easy to roll from place to place. For use with the Agilent 6000 Series scope, the 1180CZ Testmobile scope cart with the N2919A bracket provides convenient mobility and secure mounting of your scope.

#### Specifications for the Agilent Testmobiles

| 1180CZ              |                                                       |
|---------------------|-------------------------------------------------------|
| Total load capacity | 59 kg (130 lbs)                                       |
| Tilt tray           | 45.7 cm wide x 45.7 cm deep (18 in Wide x 18 in Deep) |

### Carrying cases

The Agilent N2760A soft carrying case and N2917B hard carrying case make transporting and shipping your 5000 and 6000 Series oscilloscope safe and simple. A scope and other accessories fit neatly inside the padded shell for shipment. For use with the 7000 Series, order N2733A, soft carrying case.

Order N6457A to receive a soft carrying case with hard front panel cover for 2000 and 3000 X-Series.

#### Specifications for the Agilent carrying cases

| N2917B for 5000 and 6000 Series |                                                     |
|---------------------------------|-----------------------------------------------------|
| Dimensions (W x H x D)          | 45 cm x 42 cm x 31 cm (17.7 in x 16.5 in x 12.2 in) |
| Material                        | Tough ABS plastic                                   |

| N2760A for 5000 Series only |                                                                        |
|-----------------------------|------------------------------------------------------------------------|
| Dimensions (W x H x D)      | 39 cm x 27 cm x 22 cm (15.4 in x 10.6 in x 8.7 in)                     |
| Material                    | 600 Denier Polyfoam with Tricot Foam laminate with interior pack cloth |

### Rackmount Kit

The Agilent N2916B rackmount kit positions your 5000 and 6000 Series scope in the center of the rack. Each kit includes a custom shelf with rails, 6 BNC pass-throughs and all necessary screws. For mounting the 7000 Series in the rack, order N2732A. For mounting all 2000 and 3000 X-Series in a rack, order N6456A.

#### Ordering information

|        |                                                     |
|--------|-----------------------------------------------------|
| 1180CZ | Testmobile (6000 Series)                            |
| N2919A | Bracket for 1180CZ Testmobile and 6000 Series scope |
| N2917B | Hard carrying case (5000 and 6000 Series)           |
| N6457A | Soft carrying case for 2000 X and 3000 X-Series     |
| N2760A | Soft carrying case (5000 Series)                    |
| N2733A | Soft carrying case (7000 Series)                    |
| N2916B | Rackmount kit (5000 and 6000 Series)                |
| N2732A | Rackmount kit (7000 Series)                         |
| N6456A | Rackmount kit (for 2000 and 3000 X-Series)          |



N2760A soft carrying case for the 5000 Series



N2917B hard carrying case for the 5000 and 6000 Series



N2916B rackmount kit for 5000/6000 Series

## Miscellaneous Accessories (continued)

### Probe positioners

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

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

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

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

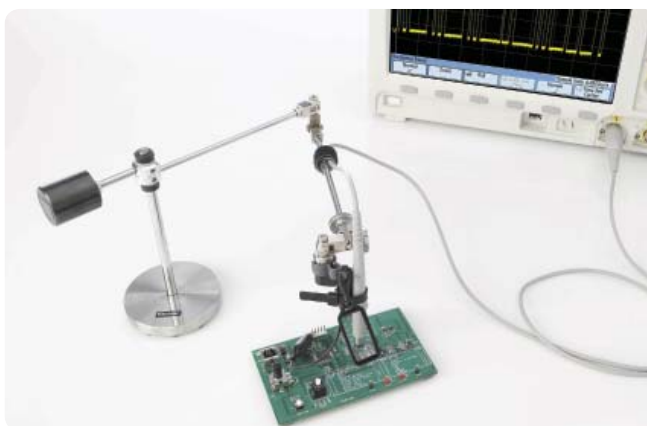
The N2787A is a 3D probe positioner with a flexible, articulating arm that can be quickly positioned in a variety of configurations.

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

### Ordering information

| Product number      | Description            |
|---------------------|------------------------|
| N2784A <sup>1</sup> | 1-arm probe positioner |
| N2785A <sup>1</sup> | 2-arm probe positioner |
| N2786A              | 2-leg probe positioner |
| N2787A              | 3D probe positioner    |

Note<sup>1</sup> Includes 3x magnifying glass, arm strap, cable tie, probe rest, and manual.



*N2784A one-arm probe positioner*



*N2786A 2-leg probe positioner*



*N2787A 3D probe positioner*

# N2744A T2A Probe Interface Adapter

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



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

## Tek probe compatibility

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

### AC/DC current probe

|        |                            |
|--------|----------------------------|
| TCP202 | 50-MHz AC/DC current probe |
|--------|----------------------------|

## Single-ended active probes

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

## Differential active probes

|       |                                       |
|-------|---------------------------------------|
| P6246 | 400 MHz, 10:1/1:1 with offset control |
| P6247 | 1 GHz, 10:1/1:1 with offset control   |
| P6248 | 1.5 GHz, 10:1/1:1 with offset control |
| P6250 | 500 MHz, 50:1/5:1 with offset control |
| P6251 | 1 GHz, 50:1/5:1 with offset control   |

## Agilent scope compatibility

- Agilent InfiniiVision 3000 X-Series
- Agilent InfiniiVision 5000, 6000, and 7000 Series and future revisions (except 6000 100-MHz) with software version 06.15 or higher
- Agilent Infiniium 8000, 9000, 80000, 90000 Series with software version 03.10 or higher

## Ordering information

|        |                             |
|--------|-----------------------------|
| N2744A | T2A probe interface adapter |
|--------|-----------------------------|



## Agilent Technologies Oscilloscopes

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|                    |                |
|--------------------|----------------|
| Australia          | 1 800 629 485  |
| China              | 800 810 0189   |
| Hong Kong          | 800 938 693    |
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| Korea              | 080 769 0800   |
| Malaysia           | 1 800 888 848  |
| Singapore          | 1 800 375 8100 |
| Taiwan             | 0800 047 866   |
| Other AP Countries | (65) 375 8100  |

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|----------------|----------------------|
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|                | *0.125 €/minute      |
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| Ireland        | 1890 924 204         |
| Israel         | 972-3-9288-504/544   |
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| Spain          | 34 (91) 631 3300     |
| Sweden         | 0200-88 22 55        |
| United Kingdom | 44 (0) 118 9276201   |

*For other unlisted Countries:*

**[www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)**

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