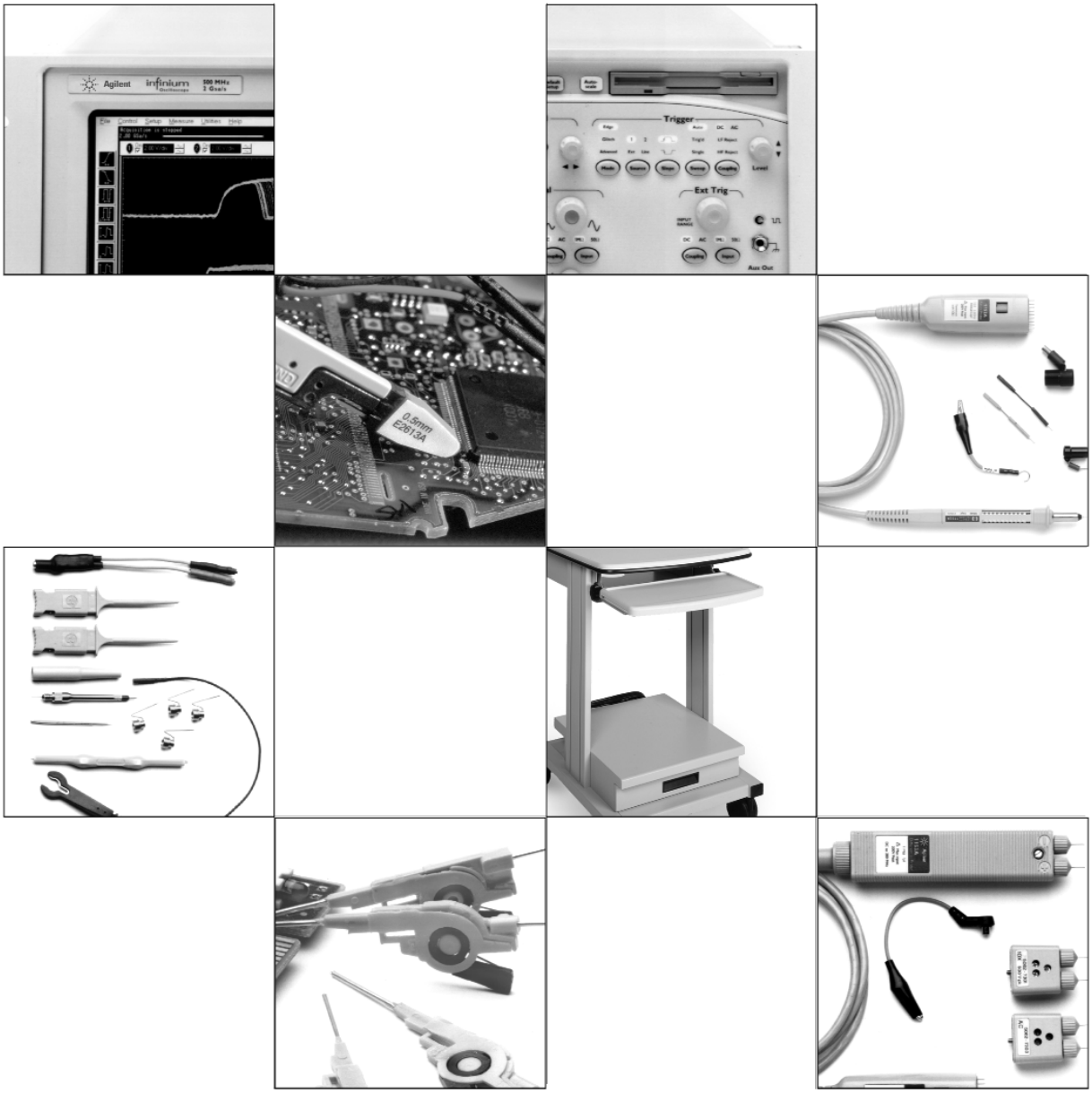
Agilent Technologies Infiniium 54800 Series Oscilloscope Probes and Accessories

Data Sheet

Tools to get your job done faster

- **Probes**
- **Accessories**
- **Input devices**

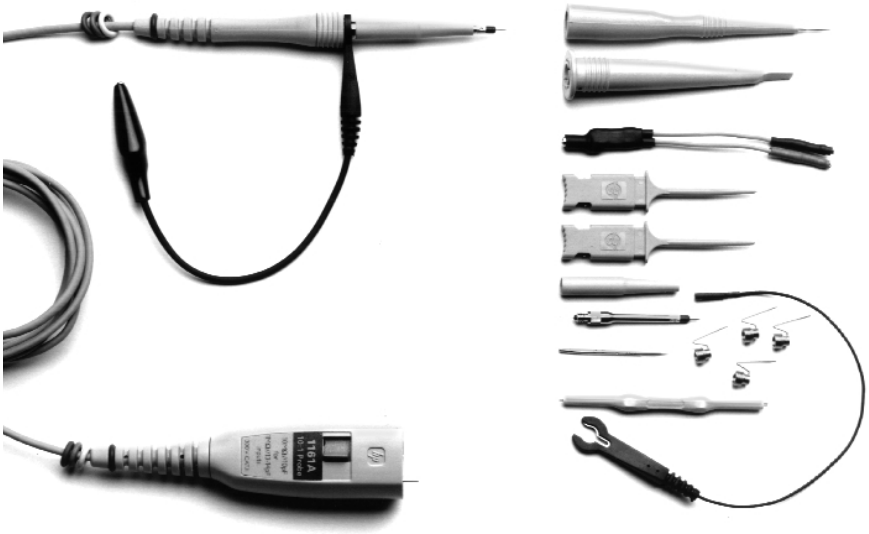


Agilent Technologies
Innovating the HP Way

The 1160 Family of Miniature Passive Probes

Rugged, general-purpose probes for Agilent Infiniium Oscilloscopes

Before we developed the 1160 family of miniature probes, we conducted extensive market research. We used focus groups, surveys, and interviews to learn about engineers' frustrations with probing. We heard that probes often slip off the test point being probed and short to adjacent leads. We heard that a variety of ground accessories are needed to connect to different points. We were told that reliability is always a concern. We used this feedback to guide our development team as we built the 1160 family of miniature probes.



1160 probes and accessories

No-slip browser

We developed a new browser with a crown point that digs into solder, and won't slip. Install the browser over the probe tip, and probe about the board while debugging your circuit. The pogo pin allows hand movement without losing contact.

Browser crown point

A variety of grounding accessories

The 1160 family probes come with an alligator lead for general purpose probing, 4 spring grounds for high frequency measurements, a socketed ground lead and SMD clips for probing 50 mil SMD. Also included is a dual lead adapter so that both the probe tip and ground can be connected to SMD devices. For connection to 0.5 mm-0.8 mm devices order the optional 10467-68701 0.5 mm IC clips.

Reliability

The 1160 family probes are built and tested for high reliability. The cable has a Kevlar® strengthener for added pulling strength. The general purpose retractable hook tip has a durable music wire hook. And probe tips are replaceable.

Miniature size

To miniaturize the probe, unscrew the handle and pull it back on the cable. The miniature probe has a narrow, sharp tip that is excellent for probing SMD.

AutoProbe Interface Compatible

The 1160 family probes are compatible with the AutoProbe Interface, which completely configures the Agilent Infiniium Oscilloscope for the probe. The snap-on BNC connector makes it easy to attach the probe to the scope.

1160 Family Selection Guide

Model Number	Type of Probe	System Bandwidth (scope +probe)	Division Ratio	Input R	Input C	Scope Input R	Compensation Range	Length
1160A	High Impedance, Passive	500 MHz	10:1	10 MΩ	9 pF	1 MΩ	6 - 9 pF	1.5 m
1161A	High Impedance, Passive	500 MHz	10:1	10 MΩ	10 pF	1 MΩ	12 - 14 pF	1.5 m
1162A	High Impedance, Passive	25 MHz	1:1	1 MΩ	50 pF + scope capacitance	1 MΩ	n/a	1.5 m
1163A	500 Ω Resistive Divider	1.5 GHz with 54845A	10:1	500 Ω	1.5 pF	50 Ω	n/a	1.5 m
1164A	High Impedance, Passive	500 MHz	10:1	10 MΩ	10 pF	1 Ω	6 - 9 pF	2.0 m

Specifications for Agilent Technologies 1160 Family of Miniature Passive Probes

Compatibility

Scope	Probe
54810A	1160A, 1162A, 1163A, 1164A
54815A	1160A, 1162A, 1163A, 1164A
54820A	1160A, 1162A, 1163A, 1164A
54825A	1160A, 1162A, 1163A, 1164A
54835A	1161A, 1162A, 1163A
54845A	1161A, 1162A, 1163A

Characteristics

Approximate Propagation Delay	6.7 ns
Maximum Input Voltage	300 V (dc + peak ac), CAT II
Safety	Meets IEC1010-2-31
Pulling Strength (BNC to barrel)	≥ 12 lb static pull
Net Weight	2.6 oz

Environmental Characteristics

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

Ordering Information

1160A 10:1, 10 MΩ, 1.5 m, miniature passive probe

1161A 10:1, 10 MΩ, 1.5 m, miniature passive probe

1162A 1:1, 1.5 m, . miniature passive probe

1163A 10:1, 500 Ω, low C, 1.5 m, miniature passive probe

1164A 10:1, 10 MΩ, 2 m, miniature passive probe

Each 1160 family probe includes:
1 probe assembly,
1 general-purpose retractable hook tip, 1 browser,
2 barrel insulators,
4 spring grounds,
1 alligator ground lead,
1 socketed ground lead,
1 dual lead adapter,
2 SMD grabbers,
1 spare browser pogo pin,
1 spare probe tip, and 1 screw driver,
1 users' reference and a three-year warranty.

E9639A Probe tip to 5mm socket adapter

5063-2143 Probe tip to BNC (m)

Available Accessories

10467-68701 0.5 mm IC clips for connection to SMD with lead spacings of .5mm (.020") to .8mm (.032")

N2765A Horizontal mini probe socket, Qty. 5

N2766A Horizontal mini probe socket, Qty 25

N2767A Vertical mini. probe socket, Qty. 5

N2768A Vertical mini probe socket, Qty 25

Replacement Parts

5063-2135 General purpose retractable hook tip, Qty 2

5063-2140 Alligator ground lead, Qty 2

5063-2120 Socketed ground lead, Qty 1

5063-2115 Browser, Qty 1

5063-2147 Dual lead adapter, Qty 1

5063-2149 SMD clips, Qty 5

01160-68701 Accessory kit (includes 4 spring grounds, 4 browser pogo pins, 4 barrel insulators, 1 screw driver)

5063-2136 1160A probe tip, Qty 5

5063-2137 1161A probe tip, Qty 5

5063-2138 1162A probe tip, Qty 5

5063-2139 1163A probe tip, Qty 5

The 1170 Family of Low Mass Passive Probes and Fine-Pitch Probing Kits

Small, easy-to-connect probes for Agilent Infiniium Oscilloscopes

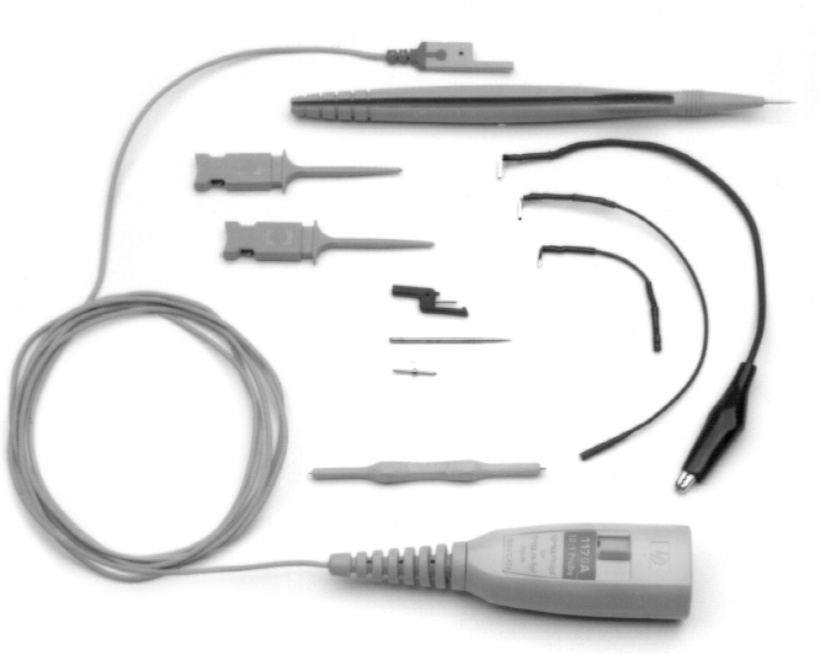
As ICs and components continue to shrink in size, probing has become increasingly difficult. Developed for easy connection to fine-pitch ICs, surface mount components and dense circuit boards, the 1170 family of low mass passive probes makes the job of probing and connecting less frustrating. With an exceptionally small, light probe tip (<1 gram), these passive probes provide the same high-performance and reliability you've come to expect from Agilent's high-performance passive probes. Add an ultra-thin, flexible cable, and the 1170 probes are not only easy to connect, they stay put on the test point.

Easy to connect, Easy to hold

You'd think a probe this small would be hard to hold, but the 1170-family of probes plug in to a browser accessory that makes them as easy to hold as a conventional probe. This patented browser concept utilizes a crown point pogo pin that digs in to solder and absorbs small hand movement, so doesn't slip. When used in conjunction with the Wedge, the 1170 probes provide a reliable hands-free solution for probing 0.5-mm and 0.65-mm IC packages and the probe tip also connect directly to board headers.

Low capacitive loading

Typical passive probes feature a 10:1 division ratio and a tip capacitance of approximately 10 pF or more. In sharp contrast, the 1172A and 1173A's 20:1 division ratio provides a low tip capacitance of less than 5 pF making these passive probes much better suited for the fast rise times of today's ICs.



Complements your standard passive probe

The 1170 probes' low mass and size, combined with the flexibility provided by the no-slip browser and the Wedge (see page 15) make it the ideal supplement to your standard passive probe. And that can really ease fine pitch frustrations. The 1170 family of probes include IC clips, miniature socketed leads and a complete selection of probing and grounding accessories.

E2652A and E2653A Fine-Pitch Probing Kits

A complete solution, with a bargain price!

The fine-pitch probing kits take the 1170-family of probes and add the most useful fine-pitch probing accessories to give you a versatile and complete probing solution. Each kit include 2 1170-family probes and its accessories, 2 of the 0.5 mm Wedge probe adapters, 4 of our 0.5 mm IC clips and 10 standard IC clips. All for a price substantially less than the individual parts.

1170 Family Selection Guide

Model Number	Type of Probe	System Bandwidth	Division Ratio (scope +probe)	Input R	Input C	Scope Input R	Compensation Range	Length
1170A	High Impedance,	500 MHz Passive	10:1	10 MΩ	9pF	1 M	6 - 9 pF	1.5 m
1171A	High Impedance,	500 MHz Passive	10:1	10 MΩ	10 pF	1 M	12 - 14 pF	1.4 m
1172A	High Impedance,	500 MHz Passive	20:1	10 MΩ	< 5 pF	1 M	6 - 9 pF	1.3 m
1173A	High Impedance,	500 MHz Passive	20:1	10 MΩ	< 5 pF	1 M	12 - 14 pF	1.2 m

Compatibility

Scope	Probe
54810A	1170A, 1172A
54815A	1170A, 1172A
54820A	1170A, 1172A
54825A	1170A, 1172A
54835A	1171A, 1173A
54845A	1171A, 1173A

Characteristics

Approximate Propagation Delay
7 ns, 6.5, 6.0, 5.5

Maximum Input Voltage
40V (dc + peak ac), CAT I

Safety
Meets IEC1010-2-31

Pull Strength (BNC to probe tipl)
≤ 12 lb static pull

Net Weight
2.6 oz

Probe Tip Weight
< 1 gram

Environmental Characteristics

Temperature (Operating)
0° C to +55° C

Humidity (Operating)
Up to 95% relative humidity at 40° C

Altitude (Operating)
Up to 4,600 meters (15,000 ft.)

Shock
50 g (400 g tip only)

Ordering Information

Low Mass Passive Probes

1170A 10:1, 10 MΩ , 1.5 m,
low mass passive probe

1171A 10:1, 10 MΩ , 1.4 m,
low mass passive probe

1172A 20:1, 10 MΩ , 1.3 m, .
low mass passive probe

1173A 20:1, 10 MΩ , 1.2 m, .
low mass passive probe
Each 1170A family probe includes:
1 probe assembly,
1 browser, 2 probe pins,
2 pogo pins, 2 IC clips,
1 screwdriver,
1 alligator ground,
1 socketed ground,
1 walking stick ground,
1 ground extender and a user's guide.

Fine Pitch Probing Kits

E2652A Fine-pitch probing kit
for 54810/15/20/25A

E2653A Fine-pitch probing kit .
for 54835A and 54845A

Each kit includes:
2 1172A (E2652A) or
1173A (E2653A) low mass probes
and their accessories,
2 x 0.5 mm Wedge Probe Adapters,
4 x 0.5 mm IC clips, 10 x std IC clips.

Fine Pitch IC Probing Accessories

E2613B Wedge probe adapter, .
5 mm, 3-signal, Qty 2

E2614A Wedge probe adapter, .
5 mm, 8-signal, Qty 1

E2615B Wedge probe adapter, .
65 mm, 3-signal, Qty 2

E2616A Wedge probe adapter, .
65 mm, 8-signal, Qty 1

10467-68701 0.5 mm IC clips
for surface SMT parts with leg
spacing of .5 mm (.020") to
.8 mm (0.32 "), Qty 4

Other Accessories

E9638A Probe tip to
BNC (m) adapter

Replacement Parts

E2642A Accessory replacement kit

Agilent 1152A 2.5 GHz Active Probe for Infiniium Oscilloscopes

Nonintrusive, reliable probing provides faithful reproduction of signals

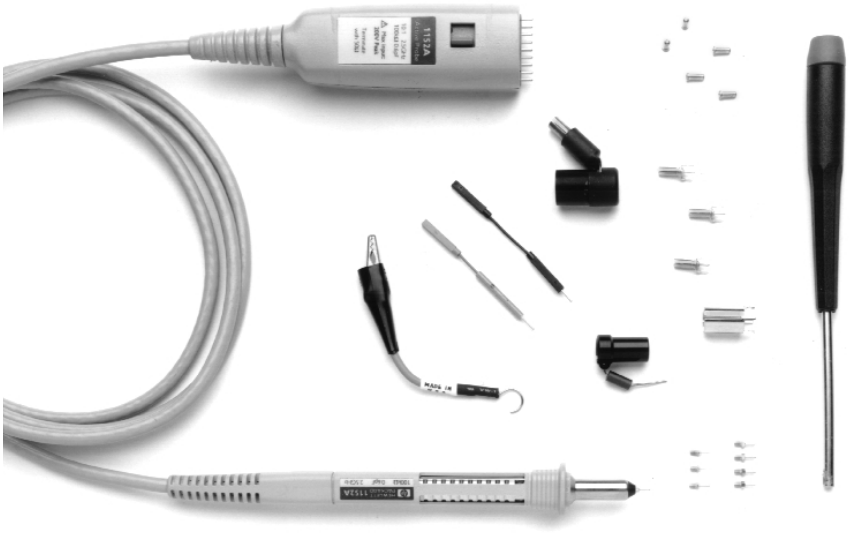
The 1152A's bandwidth, superior accuracy, and reliability make it an ideal companion for the 54845A 1.5 GHz bandwidth oscilloscope.

Nonintrusive

The low input capacitance of the active probe eliminates distortion caused by excessive loading. As frequency increases, probe tip capacitance decreases the impedance of the probe by Xc = $1/(2\pi fC)$, resulting in measurement error, depending on the source impedance of the output device. The 1152A's low tip capacitance becomes a distinct advantage as frequency increases.

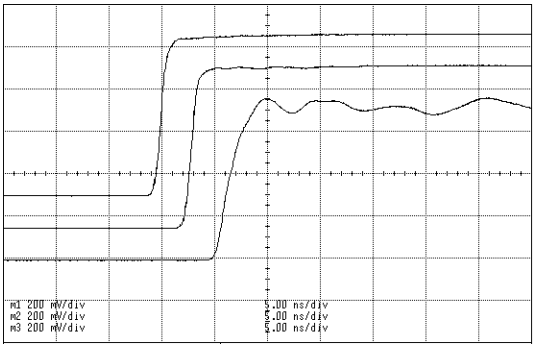
Compare Active and Passive Probe Performance

See how the 1152A active probe compares to a 50 Ω coaxial cable and an 1161A passive probe when probing a 1 ns edge. The higher bandwidth and nonintrusiveness of the active probe result in faithful reproduction of the signal.



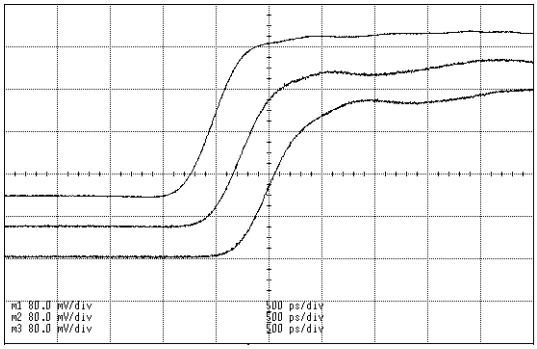
Agilent 1152A probe and accessories

See how well the 1152A reproduces this 600 ps edge - even with no ground lead attached.



50 Ω cable
1152A probe
1161A probe

Faithful Reproduction of high frequency edges... even with no ground lead



50 Ω cable
1152A probe
1152A probe with no ground lead

Faithful reproduction

- 2.5-GHz bandwidth
- 140-ps rise time
- 1% long-term flatness
- ±0.5% dc gain accuracy

The 1152A active probe offers digital designers 2.5 GHz of bandwidth for extending measurement response, along with 140-ps rise time for accurate measurement of fast signals. Adding 1% long-term flatness, and ±0.5% dc gain accuracy, results in a clearer representation of the input signal than ever before possible.

Superior reliability

- 200-Vac max input tolerance
- ±12-kV ESD tolerance
- Pliable, replaceable probe tips
- ±5-V dc + peak ac

The 1152A's microcircuits are protected by their ability to withstand damage from high-input voltage, ESD pulses, and shock to the probe tips. The 1152A's probe tips are rigid enough for probing, yet pliable enough to bend if dropped, protecting the microcircuits from damage. In addition, the probe tips are easy and inexpensive to replace. You'll appreciate the reliability and ruggedness of the 1152A.

AutoProbe Interface Compatible

The 1152A is compatible with the AutoProbe Interface which completely configures the Infiniium Oscilloscope for the probe. The interface recognizes the probe, and automatically sets up the proper power, 50 Ω impedance and offset range.

Characteristics

Bandwidth (-3dB)*	>2.5 GHz
System Bandwidth	54845A 1.3 GHz 54835A 930 MHz 54810A/15A/20A/25A 500 MHz
Risetime (10% to 90%)	<140 ps calculated from tr = (0.35/bandwidth)
Attenuation Factor*	10:1
dc Input Resistance*	100 kΩ±1%
dc Gain Accuracy*	±0.5% (with 50 ± 0.1 Ω load)
Input Capacitance	0.6 pF (typical)
Flatness (with input edge ≥170 ps)	
< 3 ns from rising edge	±6%
> 3 ns from rising edge	±1%
Dynamic Range (< 1.5% gain compression)	±5 V dc + peak ac
dc Offset Accuracy	±1% of offset ±1 mV
Offset Adjustment Range	±20 V at the probe tip
Offset Gain	4.6 V/mA
RMS Output Noise (dc to 2.5 GHz with input loaded in 50 Ω)	< 300 µV
Propagation Delay	7.5 ns (approximately)
Maximum Input Voltage	±40 V (dc + peak ac (< 20 MHz)), CAT I
ESD Tolerance (150 Ω/150 pF)	±12 kV
Power Requirements from AutoProbe Interface	+12 V @ 5 mA max -12 V @ 95 mV max +4 V @ 90 mA max
Net Weight	4.9 oz
Safety	Meets IEC1010-2-31

Environmental Characteristics

Temperature (Operating)	0° C to +55° C
Humidity (Operating)	Up to 95% relative humidity at 40° C

* Denotes specified parameters. All others are characteristics.

Ordering Information

1152A Active Probe.

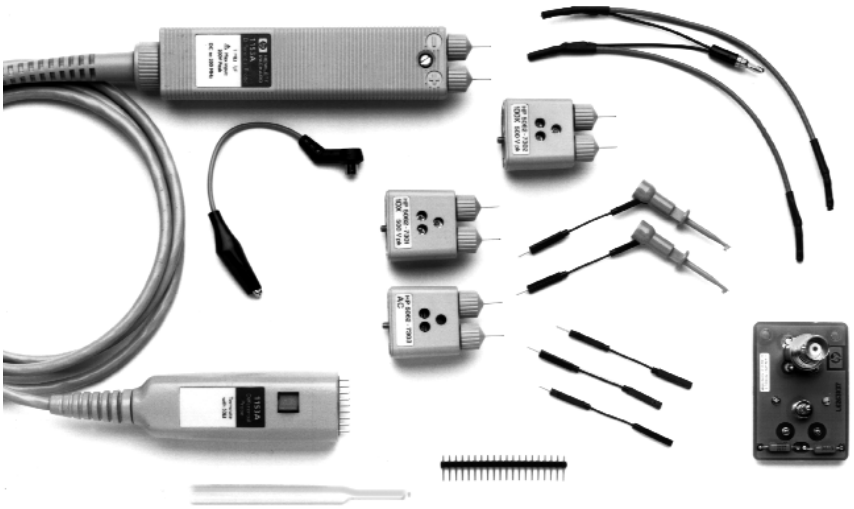
Each 1152A includes:
1 walking stick ground (5960-2491),
5 single-contact sockets (1251-5185),
1, 2-inch ground wire, attachable to walking stick 01650-82103),
1, 4-inch alligator ground wire, attachable to probe tip ground (01123-61302),
1 standard replacement tip (54701-26101),
2 sharp probe tips (5081-7734),
1 200-Ω signal lead (54701-81301),
1 User and Service Guide,
and a one-year warranty.

A great combination of high CMRR, high input voltage and 200-MHz bandwidth

High-bandwidth probing for differential signals

- dc to 200-MHz bandwidth
- AutoProbe Interface compatible
- ±200 V (dc + peak ac) maximum allowable input without attenuators
- 3000:1 CMRR at 1 MHz
- Low frequency reject
- Superior tolerance to ESD
- Low dc thermal drift
- Rugged construction
- Easy-to-attach, snap-on BNC

The Agilent 1153A is a 1:1 FET differential probe with 200 MHz bandwidth and 3000:1 CMRR (Common Mode Rejection Ratio) at 1 MHz. The probe has an input resistance of 1 MΩ and low input capacitance of 7 pF to minimize circuit loading.



1153A probe and accessories

AutoProbe Interface Compatible

The 1153A is compatible with the Agilent AutoProbe Interface which completely configures the Agilent Infiniium Oscilloscope for the probe. The probe interface recognizes the probe and automatically sets up the proper power, coupling modes, 50 Ω impedance and offset range.

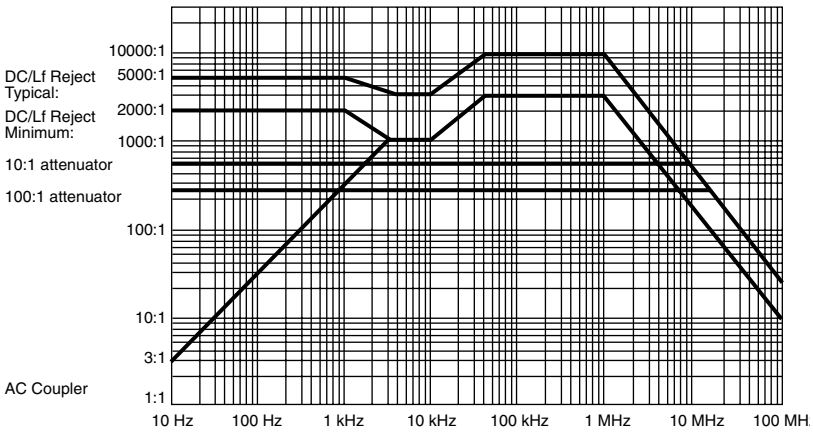
Reliability

The 1153A is designed for reliability through use of over-voltage protection circuitry which decreases the probe's susceptibility to damage from electrostatic discharge and other accidental exposure to excessive voltage.

We have also designed the 1153A to be rugged. We paid special attention to isolating critical parts from shock. With a shell molded of tough ABS-polycarbonate, the 1153A is built for long life and dependability.

Low dc Thermal Drift

The probe's dual-path amplifier design provides superior dc stability by reducing dc drift to less than 50 µV dc per °C.



Attenuators, ac Coupling

Two attenuators, 10:1 and 100:1, are provided to expand the dynamic range of the inputs up to ±30 V. It also comes with an ac coupling adapter for those cases where input dc voltage level prevents you from using low frequency reject.

Low Frequency Reject

LF reject, like ac coupling, blocks the dc component in a signal without degrading low-frequency CMRR, which occurs when you use blocking capacitors to accomplish ac coupling (see the graph above).

Characteristics

Bandwidth (-3dB)*
dc to 200 MHz[1]

Risetime
1.75 ns calculated from tr = (0.35/bandwidth)

dc Gain Accuracy*
2%(with 50 ± 0.1 Ω load)

dc Attenuator Accuracy
2%

Linear Differential Input Range
±0.3 V (1:1)
±3.0 V (10:1)
±30 V (100:1)

dc Offset
±18 V (1:1)
±180 V (10:1)
±500 V (100:1)

Common Mode Operating Range
dc: ±18 V (1:1); ±180 V (10:1)
±500 V (100:1)

dc to 30 Hz:
linearly decreased to 30 Hz value.

30 Hz to 200 MHz:
±0.5 V (1:1);
±5 V (10:1);
±50 V (100:1)
(voltages are peak voltage)

Maximum Allowable Input Voltage*
200 V (dc + peak ac) CAT I, 1:1
500 V (dc + peak ac) CAT I, with attenuators common or differential modes

Input Coupling
dc, lf reject, and ac.
Ac coupling is provided via an adapter that attaches to the probe. Lf reject response (-3dB) is selectable independent of attenuators at 1.7 Hz (LFR1) and 0.14 Hz (LFR2)

CMRR*
See graph on previous page

ac Coupling
15 Hz (1:1); 1.5 Hz (10:1)
Low-Frequency Response (-3dB) w/ac coupling adapter and input 1.5 Hz (100:1) coupling set to dc

dc Thermal Drift
≤ 50 µV dc/°C

Input RC	R	C
1:1	1 MΩ	7 pF
10:1	9 MΩ	3.5 pF
100:1	10 MΩ	2.0 pF

Output Termination Impedance
50 Ω

Power Requirements from the AutoProbe Interface
+12 V @ 33 mA max
-12 V @ 16 mA max
+6 V @ 80 mA max
-6 V @ 130 mA max

Safety
Meets IEC 1010-2-31

Environmental Characteristics

Temperature
Operating 0° C to +55° C
Non-operating
-40° C to +70° C

Humidity
Operating 95% relative humidity at 40° C
Non-operating
90% relative humidity at 65° C

Altitude
Operating up to 4,600 m (15,000 ft)
Non-operating
up to 15,300 m (50,000 ft)

* Denotes specified parameters. All others are characteristics.

[1] For maximum signal fidelity, above 100 MHz, limit probe output into 50 Ω to ≤ 300 mV peak to peak.

Ordering Information

1153A Differential probe
Each 1153A includes:
2 voltage attenuators, 10:1 and 100:1,
ac coupling adapter,
5 probe leads,
2 probe clips,
Operating and Service Manual,
calibration adapter,
ground lead,
and one-year warranty.

Accessories

5959-9335 Long (5.5") test lead, Qty. 5

5090-4356 SMD clips, Qty. 20

10467-68701 0.5 mm IC clips for surface SMT parts with leg spacing of 0.5mm (.020") to 0.8mm (.032"), Qty. 4

Agilent Technologies 1154A and 1159A 500-MHz and 1-GHz Differential Probes

High-bandwidth probing for differential signals

- Choice of models: 1 GHz and 500 MHz with 10X gain
- 1:1 attenuation for low amplitude signals
- External attenuators and ac coupler
- Small size and rugged construction
- Autoprobe Interface compatible

The Agilent 1154A and 1159A high-bandwidth differential probes help you get a better look at the small, fast signals prevalent in today's designs. The 1159A gives you 1 GHz bandwidth and 1:1 attenuation, making it ideal for fast, low-voltage signals. The 500-MHz 1154A gives you the added flexibility of 10X gain and 10:1 attenuation for a broader range of applications.

Agilent 1154A 500-MHz Differential Probe

This high-performance general-purpose probe has a great combination of bandwidth and features to help you get your job done. You'll appreciate its versatility, with selectable 10X gain and 10:1 attenuation built directly into the probe, as well as a 10:1 external attenuator for a maximum of 100:1 attenuation. This 500-MHz probe also features external ac coupling to eliminate dc for simplified measurement of ac voltages.

Agilent 1159A 1-GHz Differential Probe

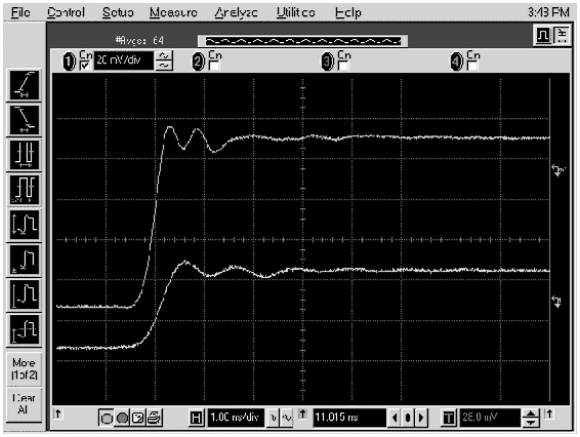
You don't have to attenuate the signal when you're looking at high-speed, low-level signals with the 1159A differential probe. Because it's a 1:1 probe, the 1159A has TEN times the gain of a typical 10:1 active or passive probe. That makes it an essential tool for dealing with today's fast, low-voltage differential logic.

This probe is the best choice for viewing differential clocks and other low-voltage, high-bandwidth differential signals. The isolation provided by the differential probe makes it easier to characterize these signals, so finding noise spikes, ground noise problems and cross coupling is easier than ever before.

Both probes connect directly to the Agilent Wedge probe adapter (see page 15) to make probing fine-pitch devices easier and more reliable than ever.

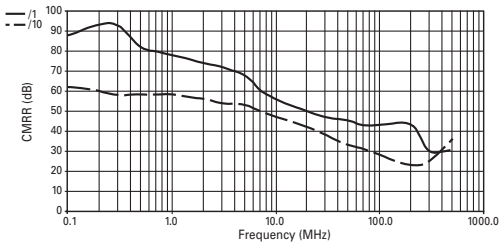
AutoProbe Interface Compatible

Both probes are compatible with the Agilent AutoProbe Interface, which completely configures your Infiniium oscilloscope for the probes. The probe interface recognizes the probe and automatically sets up the proper power, 50 Ω impedance, and probe control on the scope (i.e. Coupling, Offset, internally selectable attenuation and gain).

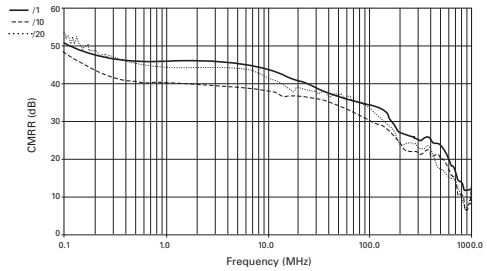


See how well the 1159A differential probe displays this 40 mV signal, compared to a typical passive probe.

1154A Typical CMRR



1159A Typical CMRR



Typical Characteristics

1154A 500-MHz probe

Electrical Characteristics	
Probe Bandwidth (-3dB)	
	dc to <500MHz
Rise time	
Probe only. 10:1 attenuation.	
	< 700 ps
Probe only. 1:1*	
	< 875 ps
Input resistance	
Each side to ground	
	1 MΩ
Input Capacitance	
Between inputs10:1*	
	< 1.6 pF
Between inputs 1:1*	
	< 3.1 pF
Each side to ground 10:1*	
	< 3 pF
Each side to ground 1:1*	
	< 6 pF
Gain and Attenuation	
	Internal 10X, 1:1, 10:1
	External 10:1
Linear Differential Input Range	
10x	<± 40 mV
1:1	<± 400 mV
10:1	<± 4 V
100:1	<± 40 V
Common Mode Operating Range	
1:1	± 4.2 V
10:1 and 100:1	
	± 42 V
Maximum allowable input voltage	
	42 V (dc + peak ac)
Offset	
10x	0.4V
1:1	0.4 V
10:1	4 V
100:1	40 V
Input Coupling	
	dc
	ac coupling provided by external adapter LF cutoff frequency at 16 Hz
CMRR	See graph on previous page.
Output termination impedance	
	50 Ω
Safety	
	Meets IEC 1010-2-31

Typical Characteristics

1159A 1-GHz probe

Electrical Characteristics	
Probe Bandwidth (-3dB)	
	Dc to 1GHz
Rise time	
Probe only. 1:1*	
	< 350 ps
Input resistance	
Each side to ground	
	1 MΩ
Input Capacitance	
Between inputs 1:1*	
	< 0.85 pF
Each side to ground 1:1*	
	< 1.5 pF
Gain and Attenuation	
	External 10:1; 20:1
Linear Differential Input Range	
1:1	<± 400 mV
10:1	<± 4 V
20:1	<± 8 V
Common Mode Operating Range	
1:1	± 4.2 V
10:1; 20:1	
	± 42 V
Maximum allowable input voltage	
	42 V (dc + peak ac)
Offset	
1:1	1.6 V
10:1	16 V
20:1	32 V
100:1	N/A
Input Coupling	
	dc
	ac coupling provided by external adapter
	LF cutoff frequency at 16 Hz
CMRR	
	See graph on previous page.
Output termination impedance	
	50 Ω
Safety	
	Meets IEC 1010-2-31

Environmental Characteristics	
Temperature	
Operating	
	0°C to +50°C
Non Operating	
	– 40°C to +70°C
Humidity	
Operating	
	80% relative humidity
Non-operating	
	80% relative humidity at 65°C
Altitude	
Operating	
	Up to 4600 m (15,000 ft)
Non-Operating	
	Up to 15,300 m (50,000 ft)

Ordering Information

1154A 500 MHz
Differential probe includes:
10:1 attenuator, ac coupler,
offset pins, ground leads,
SMT leads, wire leads, IC clips.

1159A 1 GHz Differential probe
Includes10:1 and 20:1 attenuator,
ac coupler, offset pins,
ground leads, SMT leads,
wire leads and IC clips.

Accessories

01154-82101
1154A/1159A ac coupler

01154-82102
1154A 10:1 attenuator

01159-82104
1159A 10:1 attenuator

01159-82105
1159A 20:1 attenuator

01154-60004 connector kit
contains:
1 header,
4 offset pins,
2 0.5 and
3 0.8 mm IC clips,
1 ground wire,
4 smt leads,
1 wire lead

*No external attenuator

The 1155A Low Mass Active Probe

- Small and light probe tip (< 1 gram)
- < 2pF input capacitance and 1 MΩ impedance
- 750 MHz bandwidth
- 2 channels
- Autoprobe interface

Small, low mass probe tip for surface mount devices

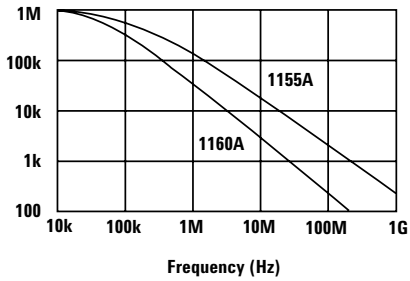
Talk about big performance in a small package! The two-channel 1155A low-mass active probe for Infiniium oscilloscopes combines a probe tip that weighs less than 1 gram with the superior performance of an active probe. It's a powerful combination ideal for attaching to fine-pitch ICs and probing surface mount components.

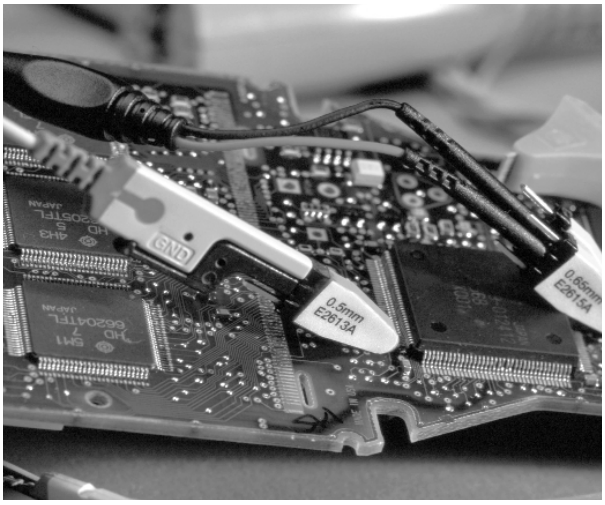
More power to you

The 1155A probe couples high band-width (750 MHz), low input capacitance (2 pF), and high resistance (1 MΩ). It's a combination superior to passive divider probes with higher input capacitance, because it provides minimal circuit loading at high and low frequencies.

Includes the Agilent Wedge. Provides hands-free probing.

The 1155A comes complete with the Wedge Probe Adapter for hands-free probing of 0.5 mm ICs. The Wedge provides accurate, mechanically non-invasive and reliable electrical contact with little chance of shorting. It's easy to insert and it stays put.





Characteristics

Bandwidth (-3dB)	dc to ≥ 750 MHz
System Bandwidth with 54800 Family	750 MHz
Risetime	≤ 470 ps
Attenuation Factor	10:1 ± 3%
dc Input Resistance	1 MΩ ± 2%
Input Capacitance	2 pF (typical)
Flatness	Less than ± 10% for first 6ns, ± 4% from 6ns to 20 µs, ± 1.5% thereafter
Input Dynamic Range	0 to 6.0 V
Maximum Input Voltage	±40 V (dc + peak ac), CAT I

Environmental Characteristics

Temperature (Operating)	0° C to +55° C
Humidity (Operating)	Up to 95% relative humidity at 40° C

* Denotes specified parameters.
All others are characteristics.

Ordering Information

Fine Pitch IC Probing Accessories

1155A Low mass, 2-channel active probe. Each includes:
4 probe pins,
5 SMT clips,
2 flexible leads,
2 spacing ground adapters,
2 red and black SMT leads,
1 BNC-to-probe tip adapters,
2 0.5 mm Wedge Probe adapters

E2613B Wedge probe adapter, .5mm, 3-signal, Qty 2.

E2614A Wedge probe adapter, .5mm, 8-signal, Qty 1

E2615B Wedge probe adapter, .65mm, 3-signal, Qty 2

E2616A Wedge probe adapter, .65mm, 8-signal, Qty 1

10467-68701 0.5mm IC clips for surface SMT parts with leg spacing of .5mm (.020") to .8mm (0.32 "), Qty 4

Other Accessories

E9638A Probe tip to BNC (m) adapter

Agilent 1147A 50-MHz Current Probe

Accurate current measurements without breaking the circuit

The 1147A is a wide bandwidth, DC-50MHz active current probe that fills the need for today's high bandwidth current probing. Designed for use with Infiniium 54800-series oscilloscopes, the probe offers flat frequency response (DC – 50MHz), low noise (<2.5mArms) and low circuit insertion loss, making it ideal for general purpose high frequency current probing for lab and bench environment. This probe is the best choice for measuring steady state or transient current of motor drive, switching power supplies, inverters, controllers, disk drives, LCD displays, and current amplifiers driving inductive loads.

Hybrid technology

The probe uses 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. Using the split core construction, the probe easily clips on and off of a conductor up to 5mm (or 0.2 inches) in diameter.

Degauss function

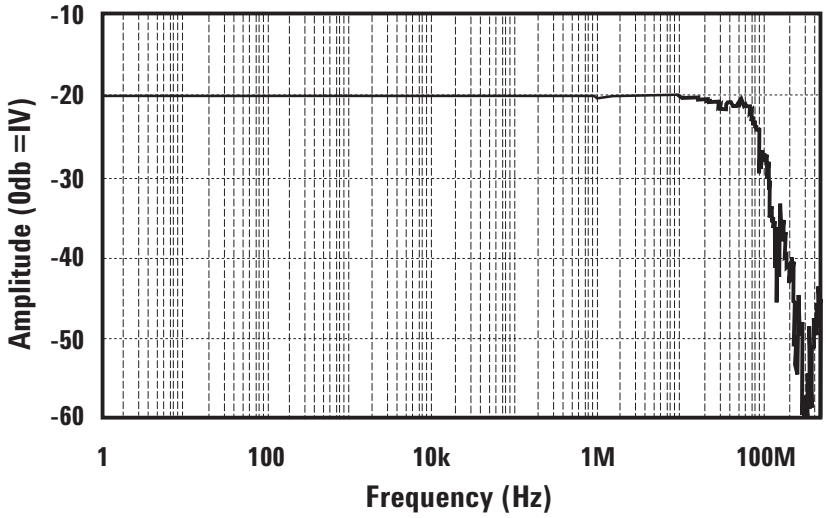
Degauss function allows removing any residual magnetism that has built up in the magnetic core due to power on/off switching or excessive input. In addition, voltage offset or temperature drift on the probe can be easily corrected by using zero adjustment dial.

AutoProbe interface compatible

The 1147A is compatible with AutoProbe interface, which completely configures your Infiniium oscilloscope for the probe. Probe power is provided by Infiniium, so there is no need for external amplifier or power supply.

Agilent 1147A 50-MHz Current probe

- **DC-50MHz bandwidth**
- **Hybrid technology to measure ac and dc simultaneously**
- **15A continuous, 50A peak dc + ac pulse current**
- **AutoProbe interface compatible**



Frequency characteristic chart

Characteristics

Bandwidth (-3dB)	DC to 50MHz
Risetime	7 ns or less
Rated current	15A peak (AC+DC components)
Maximum peak current	30A peak; Non-continuous 50A peak; at pulse width ± 10us
Output voltage rate	0.1V/A
Amplitude accuracy	±0.5% rdg, ±1mV (DC and 45 to 66Hz, rated current)
Noise	Equivalent to 2.5mArms or less (for 20MHz band width measuring instrument)
Temperature coefficient for sensitivity	± 2% or less (within a range of 0 °C to 40 °C or 32 °F to 104 °F)
Effect of external magnetic fields	Equivalent to a maximum of 20mA (in a DC to 60Hz, 400A/m magnetic field)
Maximum rated power	3VA (with rated current)
Diameter of measurable conductors	5mm dia. (0.2" dia.)
Cable lengths	Sensor cable: Appox. 1.5m (59.0")

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

Ordering Information

1147A 50 MHz Current Probe
Includes User's Guide and a one-year warranty
This probe requires Infiniium software rev. 4.0 or later.

Agilent Wedge Probe Adapter

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

Make the inaccessible accessible with this non-invasive, problem-free probing solution

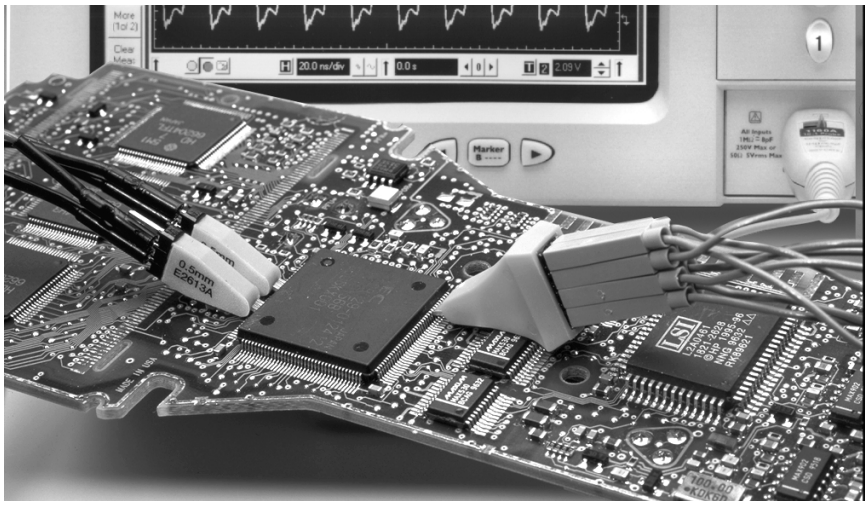
If you've ever tried to probe a surface mount component, you've probably experienced one or more of the following frustrating situations: Accidentally shorting IC pins together; electrical and/or mechanical problems with soldering small wires onto leads; and/or holding multiple probes and trying to use your scope at the same time. The Agilent Wedge Probe Adapter provides a solution to these frustrations.

Problem-free probing

There's no need to worry about accidentally 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. And that makes testing them hassle-free.

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. In the Wedge's low capacitance and inductance provides superior performance to many other alternatives.



Making the inaccessible accessible

The Wedge easily attaches to Infiniium probes. It connects directly to the 1155A and the 1170A-family of low mass probes and the dual lead adapter provided with the 1160A-family of miniature passive probes.

For more information on how the Wedge Probe Adapter works with your Infiniium scope, please refer to application note 5966-4179.

Characteristics

Operating Voltage	<40 V dc + peak ac
Operating Current	0.5 A maximum
Capacitance Between Contacts	2 pF (typical)(4.3 pf at 1 MHz, E2643/44A)
Self-Inductance	15 nH (typical)(37 nH at 1 MHz, E2643/44A)
Contact Resistance	<0.1 Ohm

Ordering Information

Wedge Probe Adapter

E2613B 0.5 mm, 3 signal, qty 2

E2614A 0.5 mm, 8 signal, qty 1

E2615B 0.65 mm, 3 signal, qty 2

E2616A 0.65 mm, 8 signal, . qty 1

E2643A 0.5 mm, 16 signal, qty 1

E2644A 0.65 mm, 16 signal, qty 1

Each Wedge includes: 1 user's guide and 1 magnifying lens

Accessories

The 1160-family of oscilloscope probes come with a dual lead adapter. Additional adapters can be ordered. Use the 5063-2147 dual lead adapter for 116x probe family.

0.5 mm IC clips
General Purpose BNC Adapters and Feedthrough Terminations

10467-68701 0.5 mm IC Clips

- Smallest IC clips in the industry to date
- Probe PQFP and SOIC SMT packages from 0.5 mm to 0.8 mm (0.020" to 0.032") lead pitch
- Thin clip body allows many IC clips to be mounted side-by-side

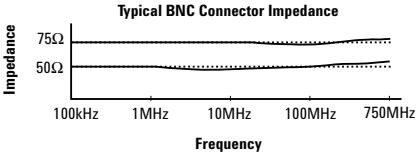
The 0.5 mm IC clips easily attaches to Infiniium probes. They connect directly to the 1155A and the 1170A-family of low mass probes and the dual lead adapter provided with the 1160A-family of miniature passive probes.

10467-68701 Characteristics

Length	31.75 mm (1.25 in.)
Tip diameter	.75 mm (.029 in.)
Pin diameter	.75 mm (.029 in.)

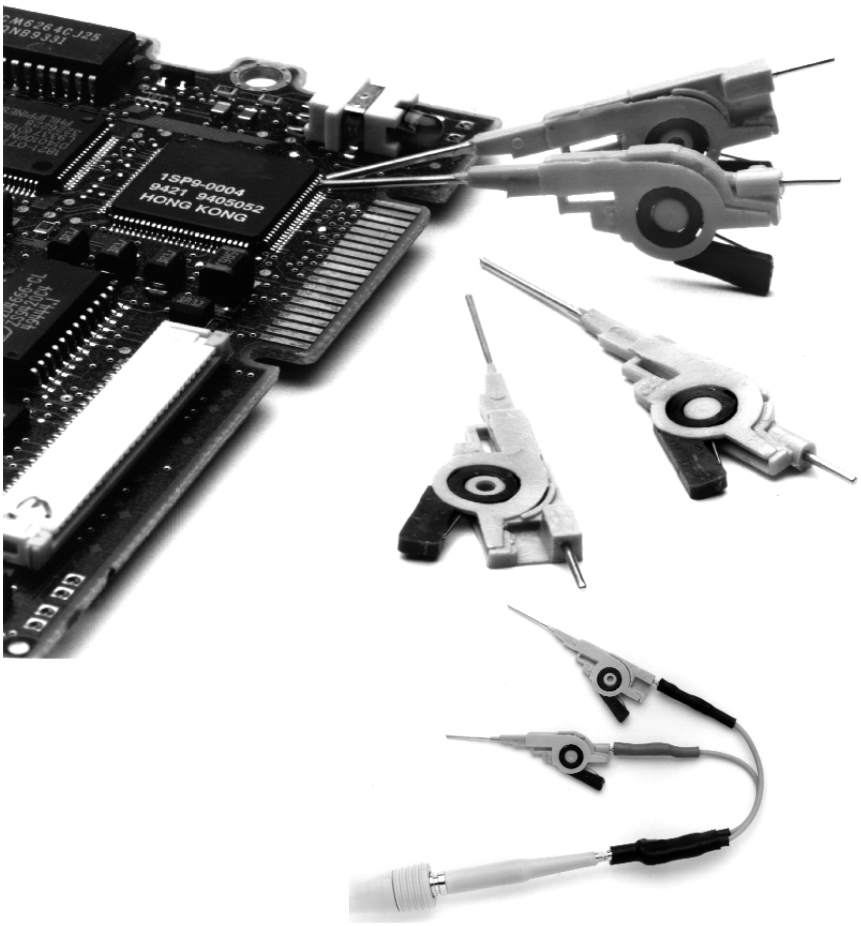
BNC Adapters and Feedthrough terminations

Not all BNC adapters and feedthrough terminations are the same and making a bad choice can have a big impact on your measurement. That's why adapters and connectors are the choice of many professionals the world over who demand excellence in their measurement set up.



Accuracy:

1 MHz to 100 MHz	50Ω/75Ω ± 1%
100 MHz to 300 MHz	50Ω/75Ω ± 3%
300 MHz to 500 MHz	50Ω/75Ω ± 5%



Ordering Information

10467-68701 0.5 mm IC clips, ... pkg of 4

Feedthrough terminations

10100C BNC (m) to BNC (f) 50 Ohm high performance feedthrough

11094B BNC (m) to BNC (f) 75 Ohm feedthrough

BNC to BNC adapters (50 Ohm)

E9620A BNC (m) to BNC (f) Ohm . . right angle

E9622A BNC (f) to BNC (f) Ohm .

E9624A BNC (m) to BNC (m) Ohm ..

E9625A Tee BNC (m) (f) (f)

BNC to BNC adapters (75 Ohm)

E9628A BNC (f) to BNC (f)

E9629A BNC (m) to BNC (m)

Between series adapters (50 Ohm)

E9621A Type N (f) to BNC (m)

E9623A Type N (m) to BNC (m)

E9635A Type N (m) to BNC (f)

E9631A SMA (m) to BNC (f)

E9632A SMA (f) to BNC (m)

E9633A SMA (m) to BNC (m)

E9634A SMA (f) (gold plated) to BNC (m)

E9636A SMC (m) to BNC (m)

E9626A SMC (f) to BNC (f)

E9627A Banana (f) to BNC (m)

E9637A BNC (f) to dual banana (m)

Input devices for Agilent Infiniium Oscilloscopes

E2611A Clip-on Trackball

If you don't have the benchspace for a standard mouse, a clip-on trackball is available for Infiniium. The trackball clips into holes on the instrument. The driver for the clip-on trackball is pre-installed.

E2610A Keyboard

The E2610A is the keyboard included with Agilent Infiniium Oscilloscopes. The small size of this keyboard occupies less space on your bench or test cart and it fits neatly into the Infiniium accessory pouch.

E2612A Touchpad

The E2612A Touchpad has a touch surface that gives you complete control of your scope with just the tip of your finger. The driver for the Touchpad is pre-installed.

Ordering Information

E2611A Clip-on Trackball

E2610A Keyboard

E2612A Touchpad

Rack or Pack Your Agilent Infiniium Oscilloscopes.

E2609A Rackmount Kit

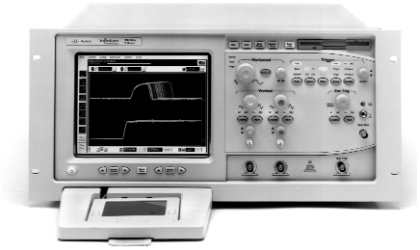
The rackmount kit provides a support shelf and hardware for mounting Infiniium into EIA standard [19-in (487-mm)] rack cabinets. When installed, the instrument occupies 5 vertical increments [8.75 in (222 mm)].

1182B Testmobile

The 1182A is a testmobile for use with Agilent Infiniium Oscilloscopes. Large, easy-to-maneuver wheels let you move your scope with ease from place to place. Supports monitor and printer with sliding drawer for accessories.

1184A Testmobile

Made tough for years of sturdy performance, the 1184A Testmobile features large wheels that get you where you want to go in no time - with no tipping. Includes bottom drawer for accessories, slide-out mouse tray for right- or left-handed operation, and support for monitor and printer.



E2617A Transit Case

The E2617A Infiniium Oscilloscope Transit Case is one heavy-duty, hard cover carrying case. Ideal for transporting oscilloscopes away from the lab, it's constructed from rugged A.B.S. with rubber-grip, steel handles and steel latches. Pull-out handles and smooth-rolling wheels make moving your instrument easy. The case can also be padlocked (not included).

Ordering Information

Rackmount Kit

E2609A Rackmount kit

Each kit includes: a support shelf, 2 rackmount rails, 1 Touchpad (E2612A), 2 brackets, hardware, and a user's reference.

Rackmount Accessories

1494-0015 Rackmount slide kit

Testmobile

1182B Testmobile

1184A Testmobile

Testmobile Accessories

35181H Printer/plotter stand

35181K Work surface (550 x 305 mm)

35181E Antistatic mat for 35181D

35181J 89 mm (3.5 in) high . Storage drawer, support shelf

35181M 133 mm (5.25 in) high Storage drawer, support shelf

92199B Power strip (U.S.) . (5 receptacles)

92199E Power strip (IEC 320) (4 receptacles)

International use of 92199E requires one or more of the cable assemblies below:

8120-1575 Cable, 762 mm (30 in)

8120-2191 Cable, 1.5 m (60 in) with right angle plug

5181-8707 IEC-320 Male Power cable adapter

Transit Case

E2617A Infiniium transit case

Other Probes Compatible with Agilent Infiniium Oscilloscopes

1144A 800-MHz Active probe
Request Technical Data Sheet 5091-7935
(requires 1142A power supply)

01144-61604 Probe power extender (required when using more than 2 1144A active probes)

1146A Oscilloscope AC/DC current probe
Request Technical Data Sheet 5965-5689

10076A 250 MHz, 100:1, 4 kV peak passive probe

N2771A 1000:1 high voltage probe 50 MHz, 30 kV peak

Related Literature

Agilent Technologies Infiniium 54800 Series Oscilloscopes Product Overview	5980-2397E
Agilent Technologies Infiniium 54800 Series Oscilloscopes Color Brochure	5980-2388E

Agilent Technologies'
Test and Measurement Support

Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

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(fax) (305) 269 7599

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(fax) (61 3) 9210 5947

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(fax) 64 4 495 8950

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