# PCI Express® Probes for Agilent E2960B PCI Express Analysis Systems

Version: 1.2

## Superior Signal Probing options to address diverse designs and form factors

As an industry leader in the innovation of non-intrusive, low load probe designs, Agilent contributes a wide range of probing solution for the E2960B PCI Express Analysis System for PCI Express Generation 1 or Generation 2. The probes from Agilent address a wide range of application needs as well as price points.

A key criteria for probe selection depends on the type of system you are trying to get insight into, add-in card, motherboard, or embedded design and also at the speed you are trying to probe.

If the design has a standard PCI Express card slot, then the easiest way to get visibility to the system is through a PCI Express Interposer probe. The interposer probe plugs in between the motherboard card slot and the add-in card. It is important to ensure that the interposer probe chosen is an analog or passive probe with good signal integrity, so that when the probe is in the system, it doesn't not change any of the electrical characteristics. The restrictions of a retiming interposer probe is that sometimes by having the probe in the system, issues are no longer visible to the system.

*Figure 1. E2960B Series PCI Express Analyzers*

If you need to probe the system where there is no predesigned card slot to plug into, then a mid-bus probe or flying leads probe could be an alternative. The mid-bus probe connects to the board through a designed in "header" connection. The flying lead on the other hand can be used to solder leads directly onto the board, to provide the physical connection to the bus.

In all cases and for all probe types, Agilent provides the industry's best signal integrity with minimal signal distortion and low jitter, so that you can probe with confidence ensuring that there is no change to the signal path.

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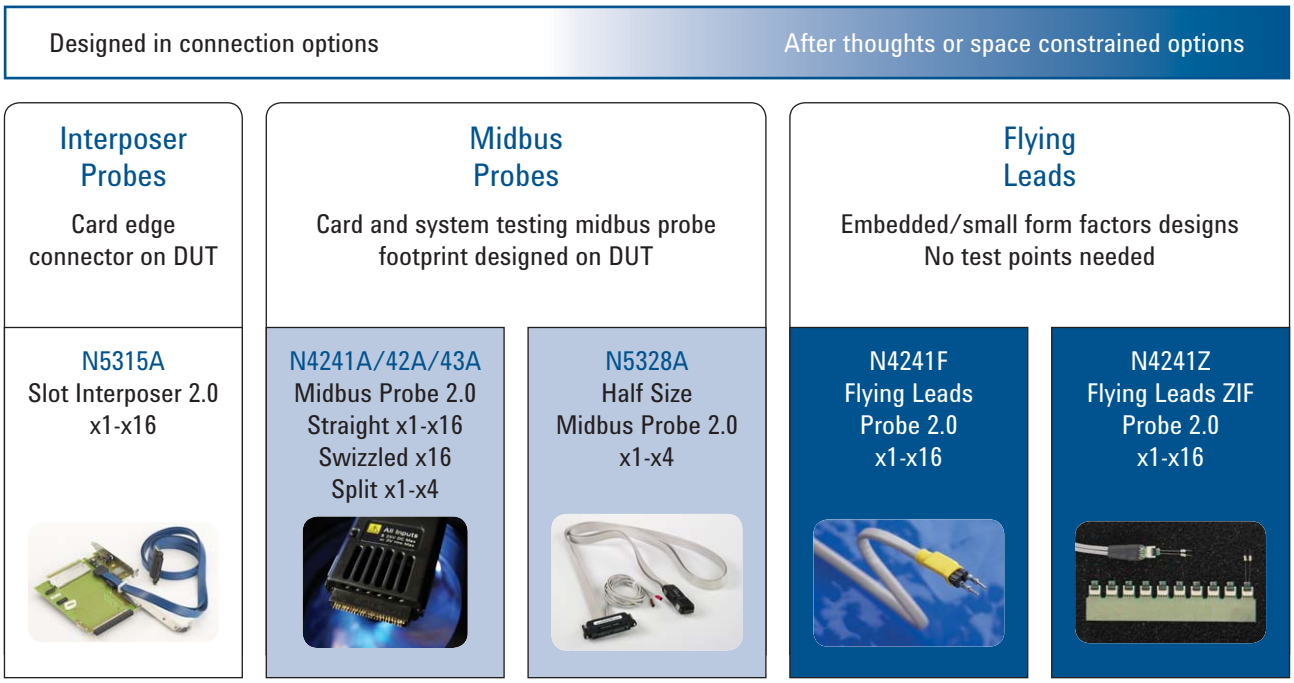


*Figure 2. Agilent PCI Express 2.0 Probes Overview*

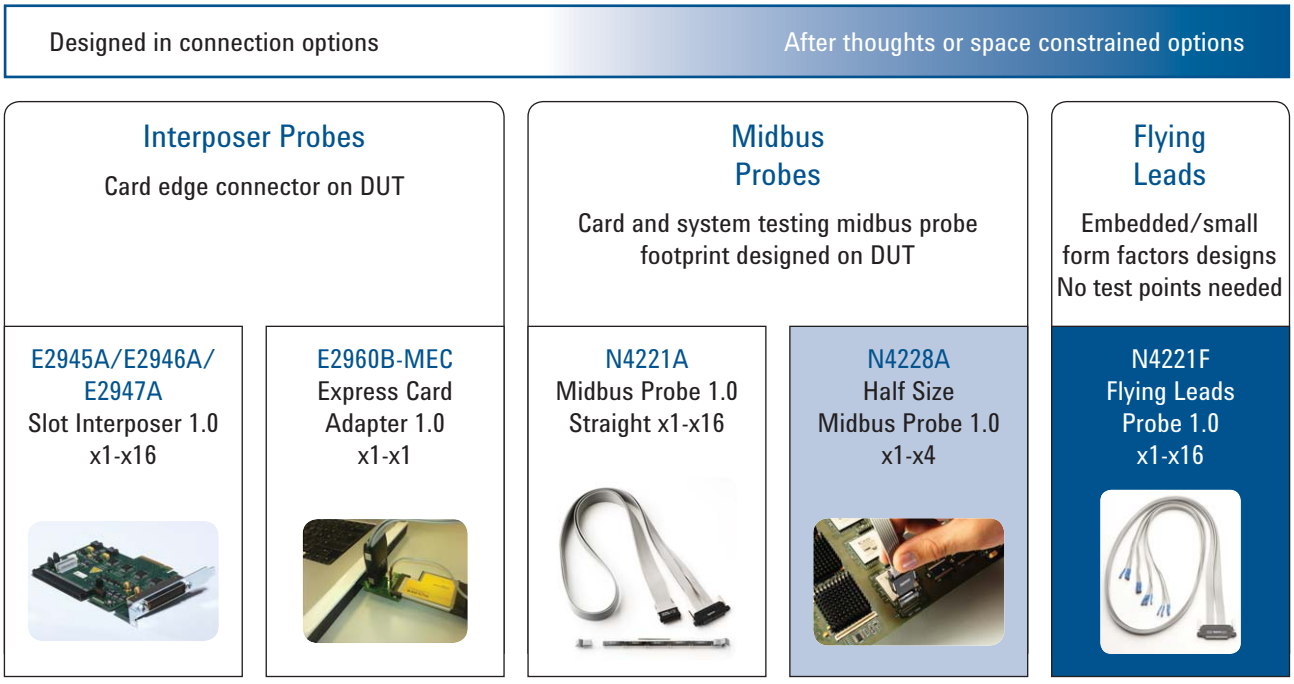


*Figure 3. Agilent PCI Express 1.0 Probes Overview*

# Agilent PCI Express 2.0 Probes Overview

| Product | Link widths | 2.5 Gb/s Gen1 | 5.0 Gb/s Gen2 | Description |
|---|---|---|---|---|
| N5315A : Slot Interposer 2.0 | x1 (N5315A-A01),<br>x4 (N5315A-A04)<br>x8 (N5315A-A08)<br>x16 (N5315A-A16) | yes | yes | Agilent's N5315A slot interposer uses an analog repeating design delivering a faithful representation of the signal on the bus at 5.0 Gb/s data rates of the PCI Express Gen2 Bus.<br><br>There are 4 options for the N5315A, that supports from link width x1 through x16. For link width x1 through x8, a single N5306A analyzer module is required, for x16 analysis, 2 N5306A analyzer modules are required. |
| N4241A : Mid-bus Probe 2.0 Straight x8 | x1, x4, x8, x16<br>(2 required at x16) | yes | yes | Agilent's mid-bus 2.0 family of probes use the soft touch technology to give critical design insight without influencing it.<br><br>The N4241A straight x8 mid-bus supports designs up to x8 link width, and two N4241A probes can be combined to probe a x16 design (two N5306A modules are required for x16 analysis). |
| N4242A : Mid-bus Probe 2.0 Swizzled x16 | x16 | yes | yes | In certain designs, the board layout constraint is such that it is not possible to layout the x16 footprint to use the straight x8 mid-bus probe from Agilent. The N4242A swizzled mid-bus probe supports the design where an x16 link is separated into 2 x8 bi-directional headers.<br><br>The N4242A has the same soft touch technology with minimal capacitive loading. |
| N4243A :<br>Mid-bus Probe 2.0 Split x4 | 2 x4 link on one footprint | yes | yes | The N4243A split x4 probe allows the designer to route 2 x4 PCI Express links into one x8 bi-directional footprint on the board. This probe splits out the signal into two analyzers, so each x4 link can be analyzed independently.<br><br>The N4243A has the same soft touch technology with minimal capacitive loading. |
| N5328A Half Size<br>Mid-bus Probe 2.0 | x1, x4 | yes | yes | As designs shrink in size, space constraints force designers to minimize the space allocation for test points. The N5328A half size mid-bus probe allows access to the signal in ½ the space of the full size probe. This probe would be a good fit in low link width applications, where space is a major constraint.<br><br>The N5328A uses the same soft touch technology with minimal capacitive loading. |
| N4241F :<br>Flying Leads Probe 2.0 | x1, x4,x8, x16<br>(2 required at x16) | yes | yes | The N4241F flying leads probe allows access to PCI Express 2.0 signals without any designed in connectors. This allows insight to debug customer systems where no built-in test point is available, and embedded designs where space is constrained.<br><br>As all Agilent probes, the N4241F has very low capacitive loading and it enables insight without influencing the monitored signals. |
| N4241Z :<br>Flying Leads Probe 2.0 with ZIF connector | x1, x4, x8, x16<br>(2 required at x16) | yes<br>yes | yes<br>yes | The N4241Z flying leads probe allows access to PCI Express 2.0 signals without any designed connectors. This allows insight to debug systems where no built-in test point is available. The N4241Z flying leads probe uses a zero insertion force (ZIF) tip, that allows easy connection and detachment from the probe head. The probe tip (long or short wire) can also be used with a Agilent Infiniimax probe, allowing you to make both protocol and electrical measurements from the same probing point. |

# Agilent PCI Express 1.0 Probes Overview

| Product | Link widths | 2.5 Gb/s Gen1 | 5.0 Gb/s Gen2 | Description |
|---|---|---|---|---|
| E2945A/E2946A/E2947A : Slot Interposer 1.0 | x1 (E2945A)<br>x4 (E2946A)<br>x8 (E2947A) | yes | no | The E2945A/E2946A/E2947A are passive interposer probes that give a faithful representation of the signal at Gen1 (2.5 Gb/s) speeds. For current Gen1 testing, these probes are a good low cost alternative interposer probe.<br><br>All three slot interposer probes should be connected through the N5317A probe adapter cable to the N5306A analyzer module. |
| E2960B-MEC : Express Card Probe 1.0 | x1 | yes | no | The E2960B-MEC allows access to PCI Express, express card slots at PCI Express 1.0 (Gen1) speeds.<br><br>To connect the express card probe, plug the express card probe into the express card slot, and connect the express card on the other side. Monitor the signals on the express card bus through a mid-bus probe connected to the analyzer. |
| N4221A : Mid-bus Probe 1.0 straight x8 | x1, x2, x4, x8 | yes | no | The N4221A Mid-bus probe 1.0 uses Agilent's soft touch technology to minimize the interference and loading on the bus. For current Gen1 testing, this is a good cost alternative mid-bus probe, and the probing footprint is compatible to the Gen2 footprint.<br><br>To connect the N4221A to the N5306A analyzer module, you must use the N5317A probe adapter cable and the E2941B midbus adaptor. |
| N4228A : Half Size Mid-bus Probe 1.0 | x1, x2, x4, x8 | yes | no | The N4228A Mid-bus probe 1.0 uses Agilent's soft touch technology to minimize the interference and loading on the bus.<br><br>To connect the N4228A to the N5306A analyzer module, you must use the N5317A probe adapter cable and the E2941B midbus adaptor. |
| N4221F : Flying Lead Probe 1.0 | x1, x2, x4, x8 | yes | no | The N4221F flying leads probe allows access to PCI Express 1.0 signals without any designed in connectors. This allows insight even when no built-in test point is available, such as in embedded designs where space is constrained.<br><br>As all Agilent probes, the N4221F has very low capacitive loading and it enables insight without influencing the monitored signals.<br><br>To connect the N4221F to the N5306A analyzer module, you must use the N5317A probe adapter cable and the E2941B midbus adaptor. |

# Related Agilent Literature

| Literature title | Literature number |
|---|---|
| *The Agilent Test Portfolio for PCI Express 2.0 Brochure* | 5989-5594EN |
| *Agilent E2960B Series for PCI Express 2.0x1 through x16 Gen 2 Ready Program Photo Card* | 5989-6395EN |
| *Agilent E2969B Protocol Test Card for PCI Express 2.0 Photo Card* | 5988-7594EN |
| *Agilent E2969A Protocol Test Card for PCI Express Photo Card* | 5989-9520EN |
| *Agilent PCI Express Jammer Brochure* | 5990-3222EN |
| *Agilent E2960B Series for PCI Express 2.0 Data Sheet* | 5989-5660EN |

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