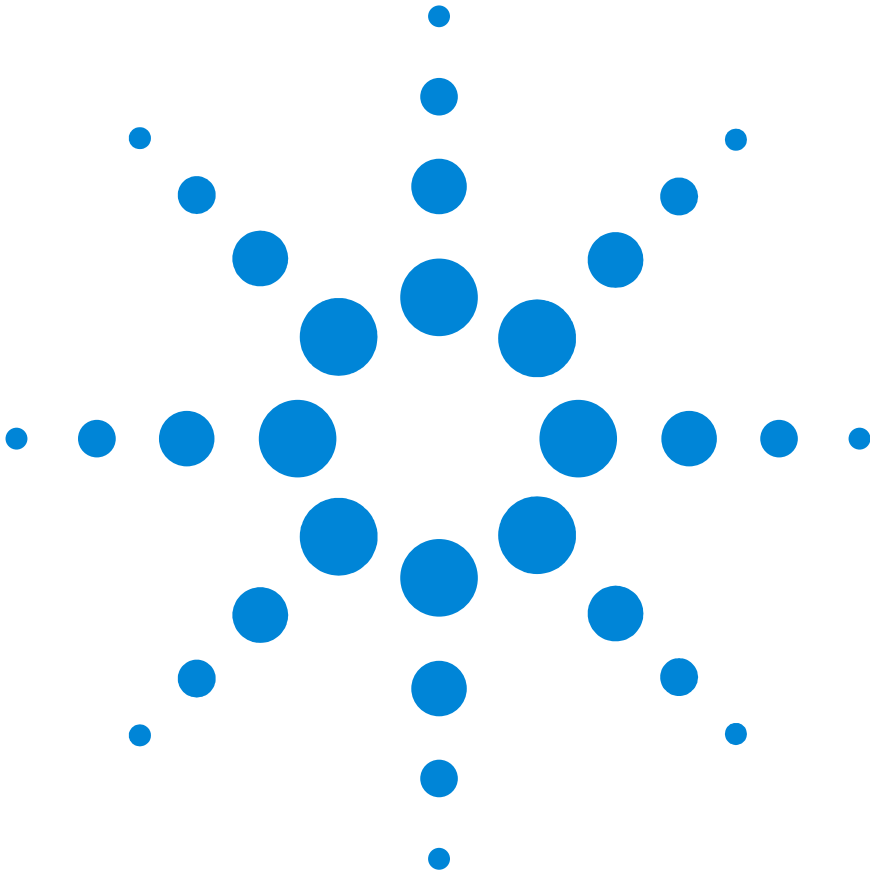

Agilent E2941A / E2941A-ASI
Soft Touch Midbus Probe

User Manual

Agilent Technologies

Important Notice

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Deutschland GmbH
Herrenberger Str. 130

71034 Boeblingen, Germany

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Safety Notices

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Specific Cautions

Do not use the Soft Touch Probe for any other purposes or in any other way than described in this manual.

Warning

To avoid electrical shock turn off power before connecting or disconnecting any cable.

Safety Symbols on the E2941A:

Indicates that antistatic precautions should be taken.

This product complies with the relevant legal directives.

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Introduction

The E2941A and the E2941A-ASI Soft Touch Midbus Probes increases the flexibility of the protocol analyzer by enabling a direct connection to the circuit board using a standard midbus footprint.

With the E2941A and E2941A-ASI Soft Touch Midbus Probe, you can analyze high-speed ASI and PCI Express chip-to-chip communications without interfering with the signals. The Soft Touch Probe uses micro spring-pin technology to provide a reliable connection to the signal pads without the need for special cleaning or special surface finishes.

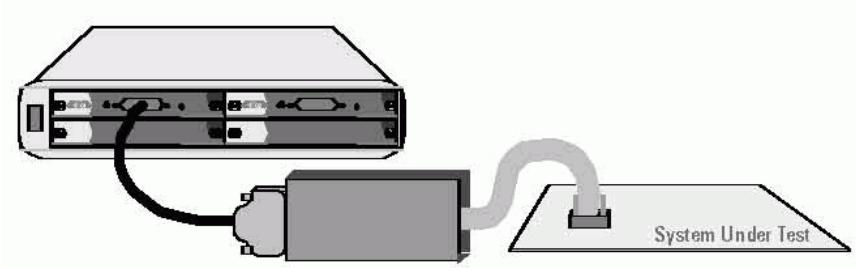
The E2941A is the midbus probe for PCI Express applications supporting Spread Spectrum Clocking (SSC) with the external reference clock.

The E2941A-ASI is the special ASI version also included in the E2944A passive ATCA probe. This version does not offer the external clock and SSC support, which is not required for ASI.

Key Features of the Soft Touch Midbus Probe

- Supports PCI Express x1, x2, x4, x8 (E2941A)
- Supports ASI x1, x2, x4, x8 (E2941A-ASI)
- Agilent Soft Touch Technology
- No slot connector required
- Reduced electrical load
- Eases routing of board traces
- Ease of use
- can be tightened manually
- Very reliable probing
- Passive probing runs cool
- Adjusts to uneven board surfaces

With the Soft Touch Midbus Probe it is possible to connect the Protocol Analyzer to a device under test without any available slot. The midbus probe can be connected to the standard footprint integrated on the individual board under test. It can be used to analyze links on a board from one chip to the other. The footprint must be implemented in the design phase of the board.



Literature

General and detailed information of PCI Express can be obtained from Intel http://www.intel.com/technology and the PCI-SIG web site http://www.pcisig.com.

Information on Advanced Switching Interconnect (ASI) can be obtained from http://www.asi-sig.org.

Footprint design integration information for the midbus probe can be found in the *PCI Express Logic Analyzer Probing Design Guide* (publication number 5989-1172EN). You can download this guide from *http://www.agilent.com/find/E2960_series*.

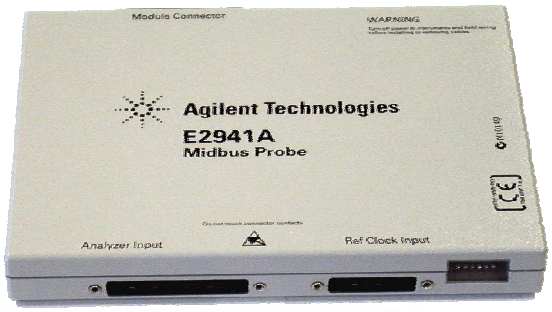
For any information regarding your Agilent E2960 or E2980 Series Protocol Exerciser and Protocol Analyzer please refer to the documentation coming with the product.

Updated Product Information

For updated product information please visit also http://www.agilent.com/find/spt

System Overview

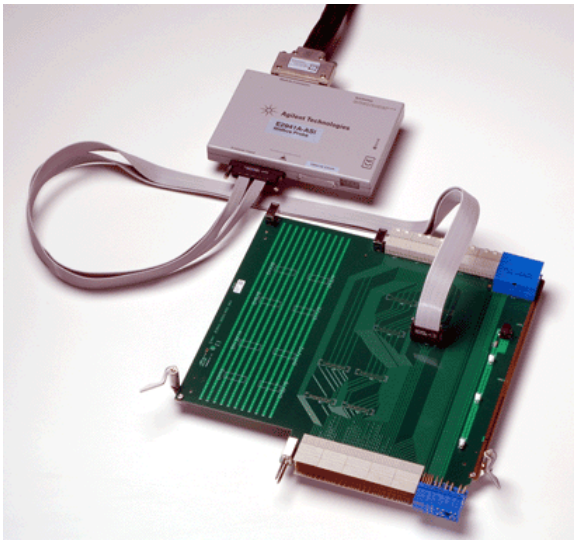
The following equipment is supplied with the E2941A midbus probe as shown below:



E2941A Midbus Probe

Reference clock cable

The E2941A-ASI is delivered without the Reference Clock cable.



The required N4221A must be ordered separately and will be delivered separately.

N4221A

Midbus connector cable set using soft touch technology (comes with set of 5 retention modules and loopback board for probe self-test)

Device Under Test Electrical Requirements

See the *Agilent PCI Express Logic Analyzer Probing Design Guide* for detailed information on preparing your PCI Express system for measurements. Take the differences listed under *"Midbus probes" on page 1-6* into account when working with the E2941A or E2941A-ASI Midbus Probe.

Reference clock (E2941A only)

Each system must provide means of delivering a reference clock (for each PCI Express reference clock domain) for specific cases:

NOTE This clock can be a dedicated clock, in which case appropriate terminators must be provided on the board. Alternately, the signals may be a tap off an existing clock, since the probes are designed to not significantly load the signals.

The E2941A-ASI does not need the external clock and provides the reference clock from internal sources. Therefore SSC is not supported.

Midbus probes

To use a midbus probe, you must route signals to a set of pads on the circuit board. See the *Agilent PCI Express Logic Analyzer Probing Design Guide*.

The above-mentioned guide provides system designers a mechanical and electrical solution space for Logic Analyzer Interface placement for the PCI Express bus.

If used with the Midbus Probe please take the following differences into your account:

- The probing of the Midbus Probe is limited to one link at a time.
- The measured link can be x1, x4 or x8. There cannot be two x4 instead of one x8.
- The PCI Express Logic Analyzer Probing Guide refers to multi-link probing. This is not correct for the E2941A, only one link at a time that is always link 1 can be probed.
- Link configuration support changes to:
  - upstream and downstream of one x8 or one x4 or one x1 link.
- There is no x16 analyzer possibility with the E2941A or E2941A-ASI.
- Table 6 shows the typical x8 setup. Table 7 and the following tables contain multiple links. The E2941A only observes downstream / upstream link 1 of these links.

Setting Up the Midbus Probe

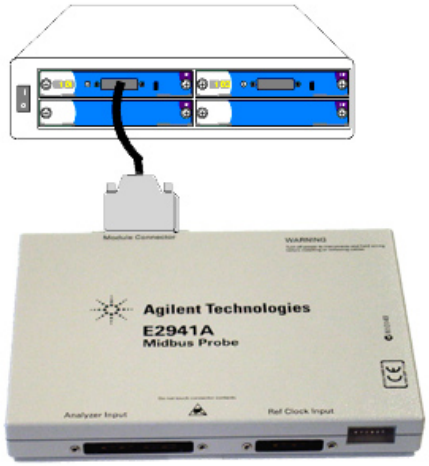
NOTE The E2941A or E2941A-ASI Midbus Probe can only be used with the Agilent Technologies System Protocol Tester.

Before setting up the midbus probe, you should have already setup the platform and installed and configured the appropriate software for the Agilent Protocol Analyzer.

If that is not the case please refer to the System Protocol Tester Installation Guide first.

WARNING In order to avoid electrical shock turn off power before connecting or disconnecting any cable.

How to connect the Midbus Probe to the I/O Module



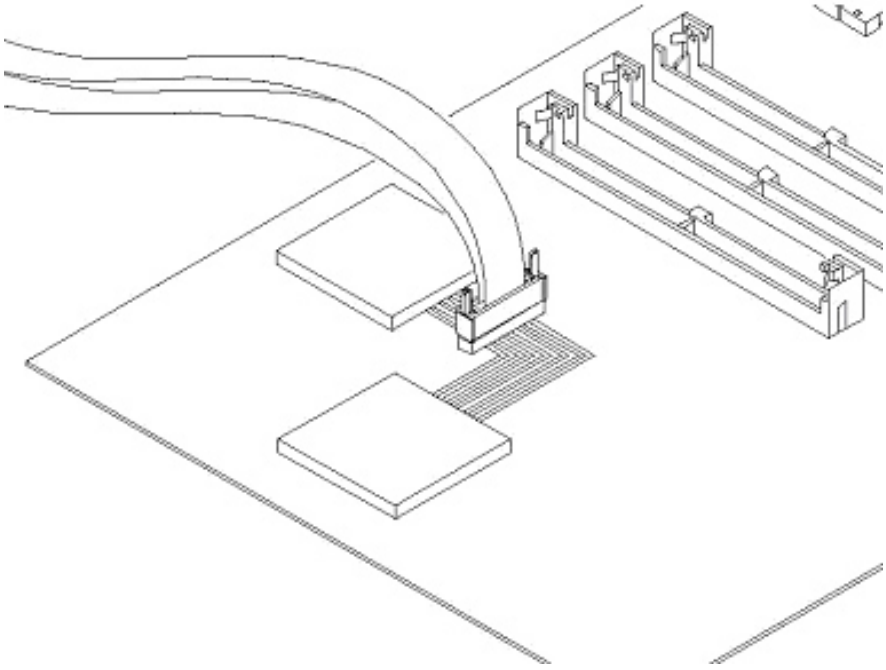
NOTE The probe board is powered from the I/O module.

Connect the midbus probe with the I/O module using the black cable that comes with the I/O module, and fasten the screws tightly.

NOTE The open application and the low level of test signals make the test system sensitive against electro-magnetic radiation. In order to prevent from irregular test results we recommend operating the test system in a low-level electro-magnetic radiation environment.

To connect the Midbus Cable to the device under test

Information on designing hardware to be used with the midbus cable set may be found in the *Agilent PCI Express Logic Analyzer ProbingDesign Guide*.



Plug the N4221A Midbus connector cable into the Analyzer Input of the Midbus Probe, and fasten the screws tightly.

Plug the other end into the retention located on your device under test and fasten the screws tightly.

To connect the reference clock (E4941A only)

In order to setup the required reference clock signal, connect the cable to the Ref Clock Input connector on the front of the analysis probe.

The midbus probe only uses Reference Clock Input 1, which is the yellow marked cable.

Midbus Probe Display Codes

When the module is ready for use, it displays its number followed by an “m”.

Specification

Absolute Maximum Ratings

Amplitude Data signal: 2 V_{ppdiff}

Amplitude Ref CLK: 5 V_{ppdiff}

Recommended Operating Conditions

All specifications are valid at room temperature.

Table 1 Data Signals

Parameter	Min.	Max.
Amplitude (at eye width of 0.85 UI)	450 mV_{ppdiff}	1600 mV_{ppdiff}
Frequency	2.5 GHz-50 ppm [1)] 2.5 GHz-300 ppm [2)]	2.5 GHz+50 ppm [1)] 2.5 GHz +300 ppm [2)]

Table 2 Ref. CLK (E2941A only)

Parameter	Min.	Max.
Amplitude	800 mV_{ppdiff}	2000 mV_{ppdiff}
DC-Offset	0 mV	500 mV
Frequency	100 MHz-50 ppm [1)] 100 MHz-300 ppm [2)]	100 MHz+50 ppm [1)] 100 MHz+300 ppm [2)]

[1)] When Analyzer is operated in internal CLK Mode

[2)] When Analyzer is operated in external CLK Mode

Environmental Characteristics

Temperature	Operating: +5° to +55° C
	Storage: -40° to +70° C
Installation category	II
Polution degree	2

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