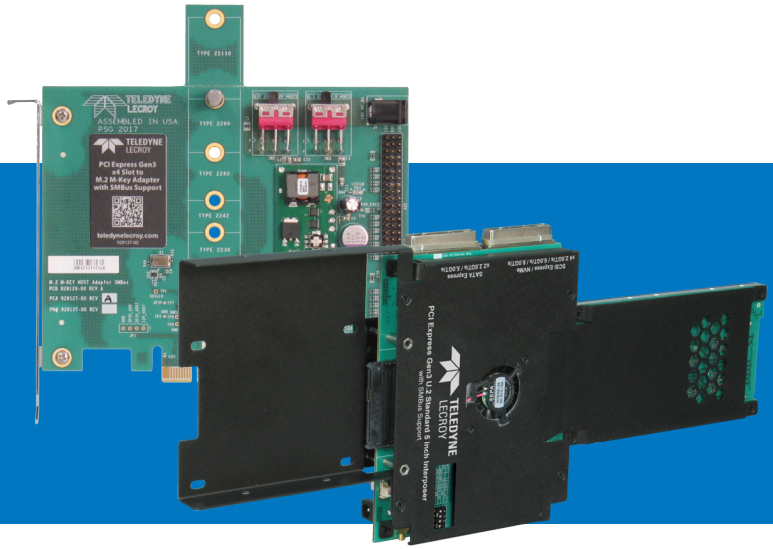
TELEDYNE LECROY
Everywhereyoulook™

Interposers, Probes and Adaptors for up to PCIe® 4.0

For Teledyne LeCroy PCI Express® Systems

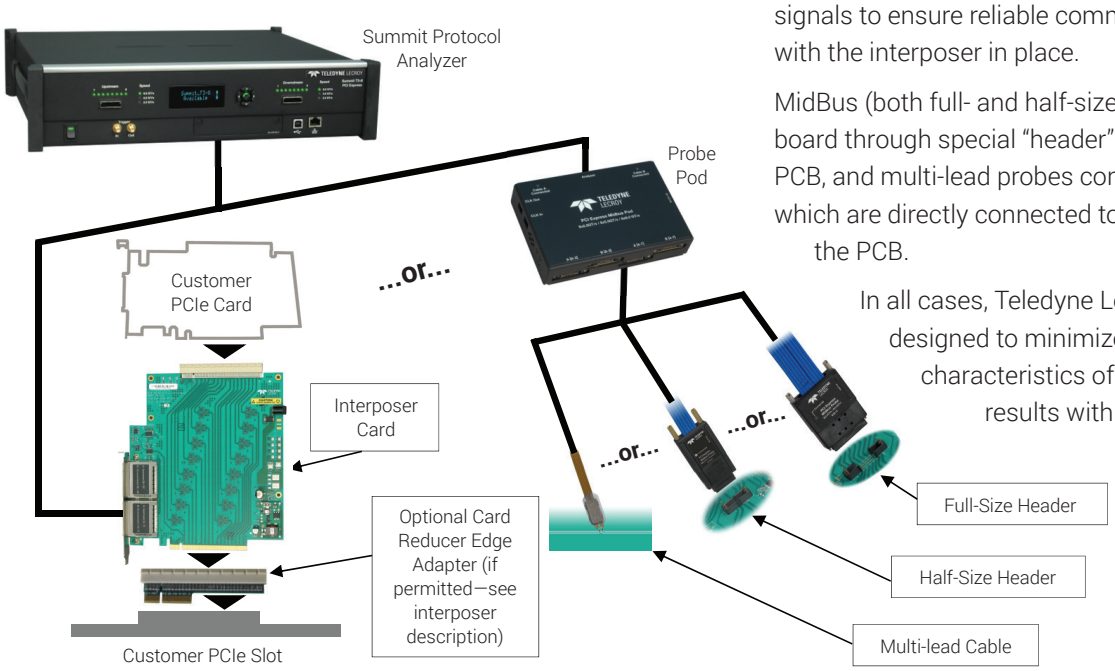


The Teledyne LeCroy PCI Express Product Line includes a wide variety of probe systems, designed to reliably capture serial data traffic while minimizing perturbations in the serial data stream. Probe systems include (a) interposers, designed to capture data traffic crossing a cardconnector interface, (b) MidBus probes, designed to capture traffic flowing between components on the same PCB through a special pad designed into the PCB surface, and (c) Multi-lead probes, which can be attached directly to exposed traces on the PCB surface.

Interposers are typically placed between the PCI Express expansion card and the PCI Express card slot on the motherboard. The interposer card plugs directly into the card slot, the expansion card plugs directly into the interposer, and a "tap" is provided for connection to the analyzer in order to capture traffic flowing through the connection. Specialty interposer probes are provided for connectors such as ExpressCard, ExpressModule, AMC and XMC Mezzanine Cards, VPX, Mini Card, CompactPCI Serial, HPE Blade Server systems, U.2 and M.2 modules. Interposers may be either passive or active: passive interposers simply pass through the PCI Express signals, while active interposers regenerate the signals to ensure reliable communication between the devices with the interposer in place.

MidBus (both full- and half-size) connect directly to the PCB board through special "header" connections designed into the PCB, and multi-lead probes connect through multiple leads which are directly connected to PCI Express surface traces on the PCB.

In all cases, Teledyne LeCroy probing systems are designed to minimize perturbations of the electrical characteristics of the interface, so that test results with the probe in place replicate as closely as possible the system performance without the probe.



Generic Protocol Analyzer Systems Interconnect Diagram

This diagram illustrates the three basic methods for introducing a protocol analyzer probe into a PCI Express system. The interposer solution, illustrated on the left side, introduces a card that is plugged into a standard PCI Express slot (or specialty slot), and then the PCI Express card under test is plugged into this interposer.

The MidBus probe solutions are designed for PCI Express data buses which are integrated into a PCB, and allow the probe to tap into the signals through direct attachment via a header pad integrated into the PCB design.

The multi-lead cable is connected to pins soldered to exposed traces to provide access to the PCI Express bus.

Overview of PCIe Probe Systems

Interposers | Multi-lead Probes | MidBus Probes | Test Platforms

Current Analyzers and Probes

Part Number	Description	Compatible Systems (currently sold)							For Details, See Page
		Summit T416	Summit T48	Summit T3-16	Summit T3-8	Summit T34	Summit T28	Summit T24	
Probes supporting data rates up to 5 GT/s									
PE075UIA-X	Gen2 x16 Passive Slot Interposer			✓	✓ᔓ		✓		4
PE074UIA-X	Gen2 x8 Passive Slot Interposer			✓	✓		✓		
PE073UIA-X	Gen2 x4 Passive Slot Interposer			✓	✓	✓❖	✓	✓❖	
PE072UIA-X	Gen2 x1 Passive Slot Interposer			✓	✓	✓❖	✓	✓❖	
PE018UIA-X	Gen2 Active Slot Interposer (up to x16)			✓	✓ᔓ				4
PE111UIA-X	Gen2 Active Slot Interposer (up to x8) [L1]			✓	✓	✓ᔓ❖	✓	✓❖	
PE060UIA-X	Gen2 AMC Interposer	✓★	✓★	✓	✓	✓❖	✓	✓❖	5
PE048UIA-X	Gen2 XMC Interposer	✓★	✓★	✓	✓	✓❖	✓	✓❖	5
PE070UIA-X	Gen2 VPX Interposer	✓★	✓★	✓	✓	✓❖	✓	✓❖	6
PE049UIA-X	Gen2 Mini Card Interposer (Mini-to-Mini)	✓★	✓★	✓	✓	✓❖	✓	✓❖	6
PE051UIA-X	Gen2 Mini Card Interposer (Mini-to-PCIe)	✓★	✓★						
PE050UIA-X	Gen2 External Cable Interposer	✓★	✓★	✓	✓	✓❖	✓	✓❖	6
PE061UIA-X	Gen2 CompactPCI Serial Interposer	✓★	✓★	✓	✓	✓❖	✓	✓❖	5
PE078ACA-X	Gen2 x16 Multi-lead Probe Kit			✓❖	✓ᔓ				11
PE083ACA-X	Gen2 x8 Multi-lead Probe Kit			✓❖	✓❖	✓ᔓ❖	✓❖		
PE084ACA-X	Gen2 x4 Multi-lead Probe Kit			✓	✓	✓❖	✓	✓❖	
PE085ACA-X	Gen2 x1 Multi-lead Probe Kit			✓	✓	✓❖	✓	✓❖	
PE072ACA-X	Gen2 x8 MidBus Probe Kit (Full Size)			✓	✓		✓		10
PE073ACA-X	Gen2 x4 MidBus Probe Kit (Half Size)			✓	✓	✓❖	✓		
PE081ACA-X	Gen2 x4 MidBus Probe Kit (Half Size)							✓❖	
Probes supporting data rates up to 8 GT/s									
PE104UIA-X	Gen3 x16 Slot Interposer	✓★	✓★	✓	✓ᔓ	✓❖●			4
PE130UIA-X	Gen3 x8 Slot Interposer	✓★	✓★	✓	✓	✓❖●			
PE131UIA-X	Gen3 x4 Slot Interposer	✓★	✓★	✓	✓	✓❖●			
PE107UIA-X	Gen3 x1 Slot Interposer	✓★	✓★	✓	✓	●			
PE058UIA-X	Gen3 Right 90 Degree Server Interposer	✓★	✓★	✓	✓	✓❖			7
PE059UIA-X	Gen3 Left 90 Degree Server Interposer	✓★	✓★	✓	✓				
PE062UIA-X	Gen3 x8 ExpressModule Interposer	✓★	✓★	✓	✓	✓ᔓ❖			7
PE063UIA-X	Gen3 x4 ExpressModule Interposer	✓★	✓★	✓	✓	✓❖			
PE064UIA-X	Gen3 x1 ExpressModule Interposer	✓★	✓★	✓	✓	✓❖			
PE091UIA-X	Gen3 SFF-8639 Single Port (SP) Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	7
PE088UIA-X	Gen3 SFF-8639 Dual Port (DP) Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	
PE112UIA-X	Gen3 SFF-8639 SP 12-inch Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	
PE113UIA-X	Gen3 SFF-8639 DP 12-inch Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	
PE089UIA-X	Gen3 M.2 M/B-M-Type (Socket 3) Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	4
PE090UIA-X	Gen3 M.2 B/B-M-Type (Socket 2) Interposer	✓★	✓★	✓	✓	✓❖●	✓	✓❖	
PE162UIA-X	Gen3 OCuLink Interposer	✓★	✓★	✓	✓	✓❖●			
PE092ACA-X	Gen3 Multi-lead Probe Pod	✓★	✓★	✓	✓	✓❖			10
PE080UIA-X	Gen3 x1 Multi-lead Probe Set	✓★	✓★	✓	✓	✓❖			
PE090ACA-X	Gen3 x8 MidBus Probe Kit (Full Size)	✓★	✓★	✓	✓				8
PE094ACA-X	Gen3 x4 MidBus Probe Kit (Half Size)	✓★	✓★	✓	✓				
PE091ACA-X	Gen3 x4 MidBus Probe Kit (Half Size)	✓★	✓★	✓	✓	✓❖			
PE052UEA-X	Gen3 PCI Express Test Platform	✓★	✓★	✓	✓	✓❖●	✓	✓❖	9
Probes supporting data rates up to 16 GT/s									
PE122UIA-X	Gen4 x16 Interposer	✓●	✓●						8
PE123UIA-X	Gen4 x8 Interposer	✓●	✓●						
PE124UIA-X	Gen4 x4 Interposer	✓●	✓●						
PE125UIA-X	Gen4 x1 Interposer	✓●	✓●						
PE163UIA-X	Gen4 OCuLink Interposer	✓●	✓●						8
PE164UIA-X	Gen4 x1 Multi-lead Probe Pod	✓●	✓●						
PE105ACA-X	Gen4 x8 MidBus Probe Kit	✓●	✓●						
PE053UIA-X	Gen4 Test Platform	✓●	✓●						9

Notes: Interposers and probes marked "●" for testing of SMBus, ClkReq#, SRIS; Systems marked "❖" use x4-to-x8 Straight iPass cable(s) PE015UCA-X to connect to analyzer; Summit T3-8 Analyzers marked "ᔓ" may be used in x16 applications by using two systems joined with an expansion cable; Summit T34 Analyzers marked "ᔓ" may be used in x8 applications by using two systems joined with an expansion cable; Systems marked ★ must use a iPass to Summit T4 Cable PE016UCA-X to connect to Summit T416

Overview of PCIe Probe Systems

Interposers | Multi-lead Probes | MidBus Probes | Test Platforms

Legacy Analyzers (no longer sold)

Part Number	Description	Compatible Systems (legacy Systems)		For Details, See Page
		Summit T2-16	PE*Tracer* ML	
Probes supporting data rate of 2.5 GT/s				
800-0110-00	Gen1 Passive Slot Interposer	✓★	✓	
PE007UIA-X	Gen1 AMC Interposer	✓★	✓	
PE036UIA-X	Gen1 XMC Interposer	✓★	✓	
PE006UIA-X	Gen1 ExpressCard Interposer	✓★	✓	
PE032UIA-X	Gen1 ExpressModule Interposer	✓★	✓	
PE005ACA-X	PETracer Multi-lead Probe	✓★	✓	
PE001UAA-X PE004ACA-X	Gen1 x8 MidBus Probe Kit (Full Size) Gen1 x4 MidBus Probe Kit (Half Size)	✓★ ✓★	✓ ✓	
Probes supporting data rates up to 5 GT/s				
PE075UIA-X PE074UIA-X PE073UIA-X PE072UIA-X	Gen2 x16 Passive Slot Interposer Gen2 x8 Passive Slot Interposer Gen2 x4 Passive Slot Interposer Gen2 x1 Passive Slot Interposer	✓ ✓ ✓ ✓		4
PE018UIA-X	Gen2 Active Slot Interposer (up to x16)	✓		4
PE111UIA-X	Gen2 Active Slot Interposer (up to x8)	✓		4
PE060UIA-X	Gen2 AMC Interposer	✓		5
PE048UIA-X	Gen2 XMC Interposer	✓		5
PE070UIA-X	Gen2 VPX Interposer	✓		6
PE049UIA-X PE051UIA-X	Gen2 Mini Card Interposer (Mini-to-Mini) Gen2 Mini Card Interposer (Mini-to-PCIe)	✓ ✓		6
PE055UIA-X	Gen2 ExpressCard Interposer	✓		5
PE050UIA-X	Gen2 External Cable Interposer	✓		6
PE061UIA-X	Gen2 CompactPCI Serial Interposer	✓		5
PE037UIA-X	Gen2 HP BladeServer Interposer	✓		6
PE078ACA-X PE083ACA-X PE084ACA-X PE085ACA-X	Gen2 x16 Summit Multi-lead Probe Gen2 x8 Summit Multi-lead Probe Gen2 x4 Summit Multi-lead Probe Gen2 x1 Summit Multi-lead Probe	✓ ✓ ✓ ✓		9
PE072ACA-X PE073ACA-X	Gen2 x8 MidBus Probe Kit (Full Size) Gen2 x4 MidBus Probe Kit (Half Size)	✓ ✓		8

Note: Systems marked with "★" use legacy connection cable PE012UCA-X.

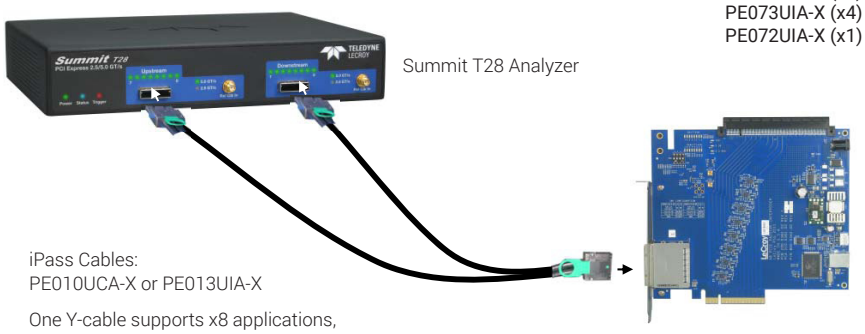
Legacy Probes (no longer sold)

Part Number	Description	Compatible Systems				
		Summit T3-16	Summit T3-8	Summit T34	Summit T28	Summit T24
Probes supporting data rates up to 5 GT/s						
PE012UIA-X PE013UIA-X PE014UIA-X PE015UIA-X	Gen2 x16 Passive Slot Interposer Gen2 x8 Passive Slot Interposer Gen2 x4 Passive Slot Interposer Gen2 x1 Passive Slot Interposer					✓ ✓ ✓ ✓
PE021UIA-X PE022UIA-X PE024UIA-X PE025UIA-X	Gen2 x16 Passive Slot Interposer Kit Gen2 x8 Passive Slot Interposer Kit Gen2 x4 Passive Slot Interposer Kit Gen2 x1 Passive Slot Interposer Kit					✓ ✓ ✓ ✓
PE022ACA-X PE019ACA-X PE010ACA-X PE026ACA-X	Gen2 x16 Multi-lead Probe Kit Gen2 x8 Multi-lead Probe Kit Gen2 x4 Multi-lead Probe Set Gen2 x1 Multi-lead Probe Set	✓ ✓ ✓ ✓	✓♋ ✓ ✓ ✓			✓ ✓ ✓ ✓
PE017ACA-X PE018ACA-X	Gen2 x8 MidBus Probe Kit (Full Size) Gen2 x4 MidBus Probe Kit (Half Size)	✓ ✓	✓ ✓			✓ ✓

Passive and Active Slot Interposers

Gen2 Passive Slot Interposer

Part Numbers:
PE075UIA-X (x16)
PE074UIA-X (x8)
PE073UIA-X (x4)
PE072UIA-X (x1)



Summit T28 Analyzer

iPass Cables:
PE010UCA-X or PE013UIA-X

One Y-cable supports x8 applications,
Two are required for x16 applications.

The Gen2 Passive Slot Interposers support link widths from x1 to x16 at rates of 2.5 GT/s or 5.0 GT/s.

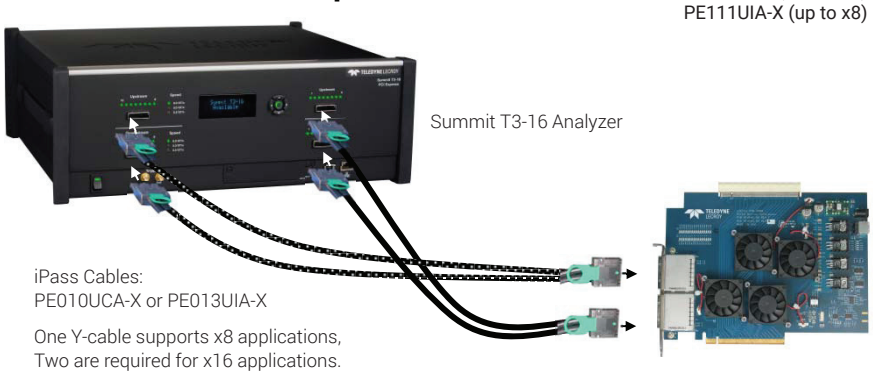
These cards CANNOT be used with card reducer edge adapters, and therefore must be purchased with the correct card slot width.

For Summit T24 and T34, use PE013UCA-X. For Summit T28, T3-8 and T3-16 at link widths up to x8, one iPass Y-cable (PE010UCA-X) is required. For x16 applications, two iPass Y-cables are required.

For convenience, these products are also sold in kits that include the required iPass cables (PE079UIA-X for x16, PE078UIA-X for x8, PE077UIA-X for x4, and PE076UIA-X for x1).

Gen2 Active Slot Interposer

Part Numbers:
PE018UIA-X (up to x16)
PE111UIA-X (up to x8)



Summit T3-16 Analyzer

iPass Cables:
PE010UCA-X or PE013UIA-X

One Y-cable supports x8 applications,
Two are required for x16 applications.

The Gen2 Active Slot Interposers are designed for use with the Summit Analyzers, and support link widths up to x16 (PE018UIA-X) or up to x8 (PE111UIA-X). For Summit T24 and T34, use PE013UCA-X. For Summit T28, T3-8 and T3-16 at link widths up to x8, one iPass Ycable is required (PE010UCA-X). For x16 applications, two iPass Y-cables are required.

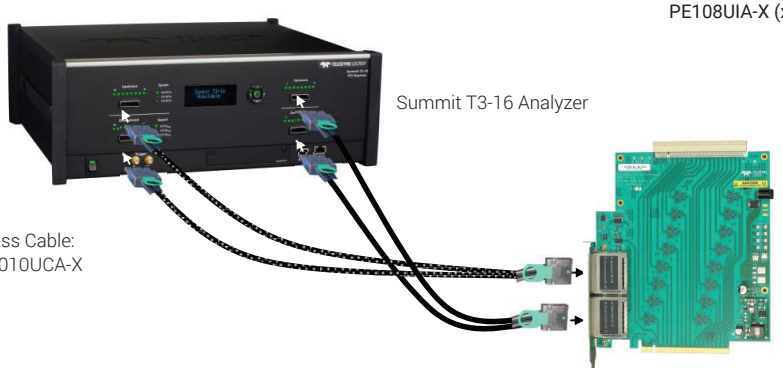
If you need to install these interposers into a smaller link width slot, use a card reducer edge adapter (PE002UIAX, PE003UIA-X, or PE004UIA-X).

For convenience, these products are also sold in kits that include the required iPass cables (PE019UIA-X for x16, PE110UIA-X for x8).

The PE111UIA-X supports testing of L1 Substates. [L1]

Gen3 Slot Interposer

Part Numbers:
PE104UIA-X (x16)
PE108UIA-X (x1)



Summit T3-16 Analyzer

iPass Cable:
PE010UCA-X

The Gen3 Slot Interposers are for use with the Summit T3-16,T3-8 and T34 Analyzers, and supports link widths to x16 (x8 for T3-8, x4 for T34) at data rates of 2.5, 5.0 and 8 GT/s. The interposer uses Teledyne LeCroy's T.A.P.3 technology to ensure complete data capture at Gen3 rates with minimal signal perturbation.

These cards CANNOT be used with card reducer edge adapters, and therefore must be purchased in the correct card slot width. For Summit T34, one straight iPass cable (PE013UIA-X) is required. For Summit T3-16 and T3-8, link widths up to x8 require one Y-cable (PE010UCA-X). For x16 applications using a Summit T3-16 (or two linked Summit T3-8 systems), two Y-cables are needed.

These interposers support testing of L1 Substates. [L1]

Gen2 External Cable Interposer

Part Number:
PE050UIA-X

The Gen2 External Cable Interposer provides a simple means to tap into the serial data traffic between any two system components which are connected using standard iPass cables.

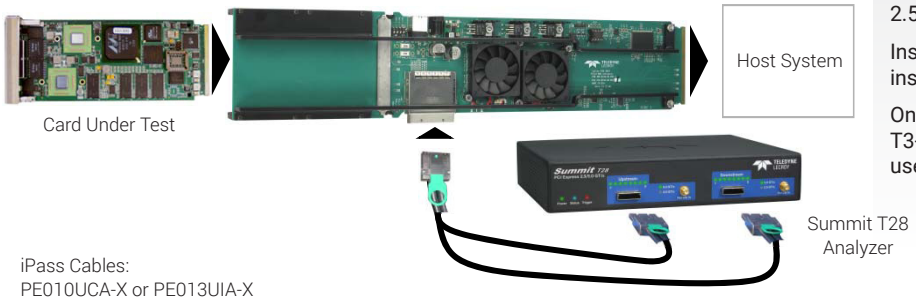
Simply connect the host to the interposer "Host" connector, connect the device to the "Device" connector, and then connect the analyzer to the "Analyzer" connector using a PE010UCA-X iPass Y-Cable. For Summit T24 and T34, use PE013UCA-X to connect to the analyzer.

The External Cable Interposer uses standard iPass x8 connectors. If your host and device use iPass x4 connectors, use the PE013UCA-X iPass Cables to connect to the interposer.

Specialty Interposer Systems

Gen2 AMC Interposer

Part Number: PE060UIA-X



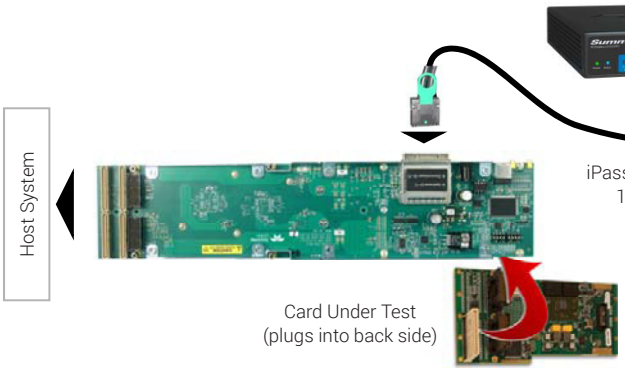
The Gen2 Advanced Mezzanine Card (AMC) Interposer is designed for use with the Summit Protocol Analyzers, and supports link widths from x1 up to x8 at data rates of 2.5 GT/s and 5 GT/s.

Insert the AMC Card being tested into the interposer, and insert the interposer into the host system.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16, T3-8 and T28 systems. For Summit T24 and T34, use a PE013UCA-X iPass x4-to-x8 cable.

Gen2 XMC Module Interposer

Part Number: PE048UIA-X



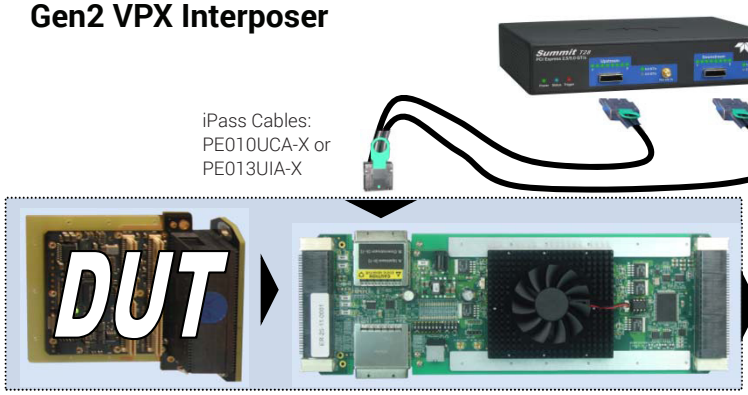
The Gen2 Switched Mezzanine Card (XMC) Interposer is designed for use with the Summit Protocol Analyzers, and supports link widths from x1 to x8 at data rates of 2.5 GT/s and 5 GT/s.

Connect the XMC Card being tested into the interposer, and connect the interposer into the host system.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16, T3-8 and T28 systems. For Summit T24 and T34, use a PE013UCA-X iPass x4-to-x8 cable.

Gen2 VPX Interposer

Part Number: PE070UIA-X



Carrier card inserts into host system

The Gen2 VPX Interposer is designed for use with the Summit Family of Protocol Analyzers and supports link widths from x1 to x16 at data rates of 2.5 GT/s and 5 GT/s.

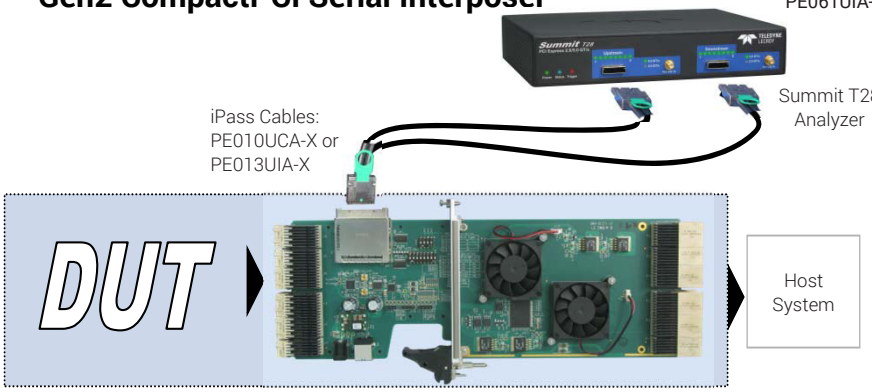
Insert the VPX Module into the interposer, and insert the interposer into the host system.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16, T3-8 and T28 systems. For Summit T24 and T34, use a PE013UCA-X iPass x4-to-x8 cable.

There are two iPass connectors on the VPX Interposer. Connect to the upper connector for link widths up to x8, and to both connectors (using two cables) for x16.

Gen2 CompactPCI Serial Interposer

Part Number: PE061UIA-X



The Gen2 CompactPCI Serial Interposer is designed for use with the Summit Family of Protocol Analyzers, and supports link widths from x1 to x8 at data rates of 2.5 and 5 GT/s.

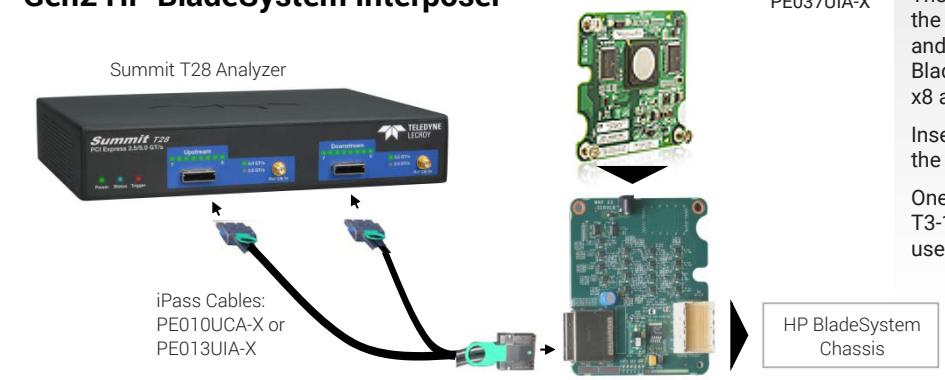
Insert the CompactPCI Serial card being tested into the interposer and insert the interposer into the host system.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16, T3-8 and T28 systems. For Summit T24 and T34, use a PE013UCA-X iPass x4-to-x8 cable.

Specialty Interposer Systems

Gen2 HP BladeSystem Interposer

Part Number:
PE037UIA-X



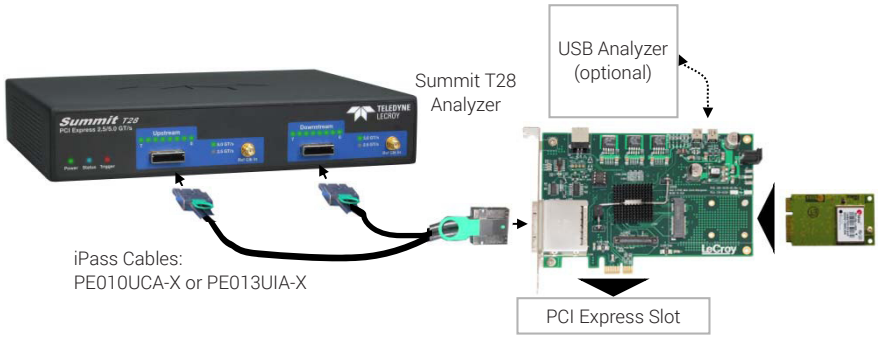
The HP BladeSystem Interposer is designed for use with the Summit T2-16 Protocol Analyzer and with Mezzanine and Adapter cards designed for the Hewlett-Packard BladeSystem. The Interposer supports link widths up to x8 at data rates of 2.5 GT/s or 5 GT/s.

Insert the Mezzanine card into the interposer, and insert the interposer into the HPSystem.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16, T3-8 and T28 systems. For Summit T24 and T34, use a PE013UCA-X iPass x4-to-x8 cable.

Gen2 Mini Card Interposer

Part Numbers:
PE049UIA-X (Mini-to-Mini)
PE051UIA-X (Mini-to-PCIe)



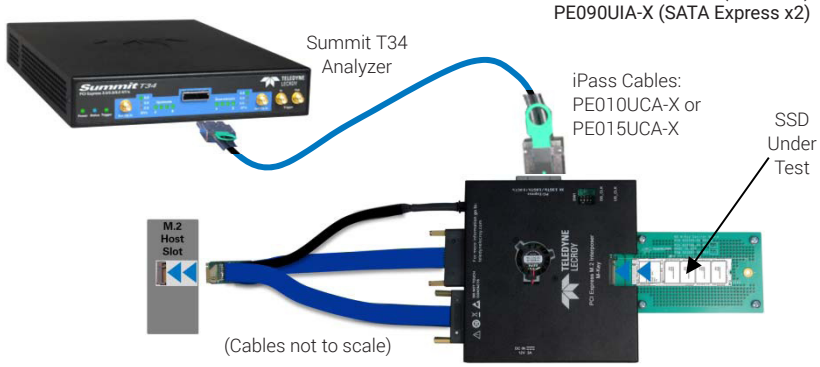
The Gen2 Mini Card Interposer is designed for use with the Summit Family of Protocol Analyzers. The interposer supports x1 link widths at data rates of 2.5 GT/s and 5 GT/s.

The Mini Card Interposer also provides a connection for a Teledyne LeCroy USB protocol analyzer.

There are two configurations of the Mini Card Interposers: (1) as an extender board plugged in (via a cable) to a host Mini Card slot (Mini-to-Mini, PE049UIA-X) or (2) with a standard PCI Express slot to connect the Mini Card directly to the slot (Mini-to-PCIe, PE051UIA-X, shown here).

Gen3 M.2 Interposer

Part Numbers:
PE089UIA-X (NVMe x4)
PE090UIA-X (SATA Express x2)



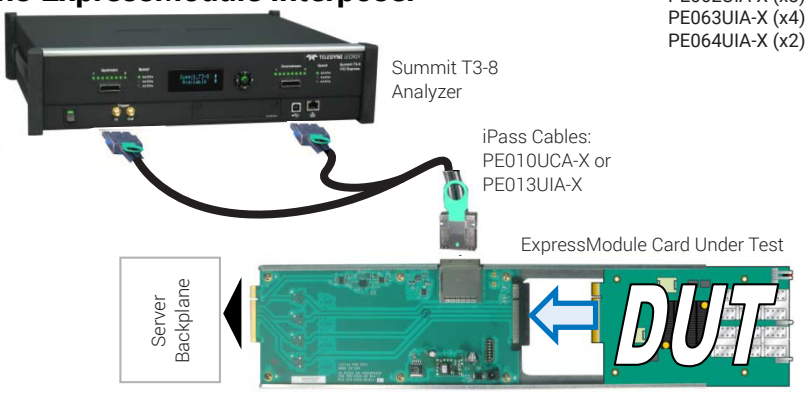
The Gen3 M.2 Interposer is designed for testing SSD modules designed to M.2 specifications. PE089UIA-X is designed to support socket 3 memory modules using NMVe x4. PE090UIA-X is designed for socket 2 memory modules using SATA Express x2.

Both interposers support M.2 memory modules in lengths of 42mm x 22mm, 60mm x 22mm, 80mm x 22mm and 110mm x 22mm. The device under test is mounted on the interposer, and the cables provide a connection to the host M.2 slot.

One iPass straight cable (PE015UCA-X) is required and is only for use with the Summit T34.

Gen3 ExpressModule Interposer

Part Numbers:
PE062UIA-X (x8)
PE063UIA-X (x4)
PE064UIA-X (x2)



The ExpressModule Interposer is designed for use with the Summit T3-16 and T3-8 Protocol Analyzers. The interposer is an active slot interposer designed with Teledyne LeCroy's T.A.P.3 technology, and has three configurations, for x8, x4 and x1 ExpressModule configurations.

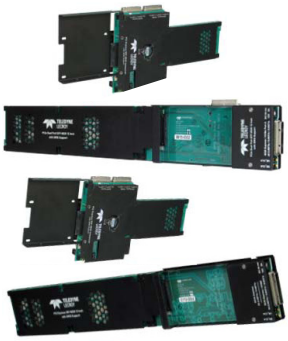
Insert the interposer into the PCIe slot of the motherboard, then insert the PCIe card into the slot connector mounted on the surface of the board.

One iPass Y-cable (PE010UCA-X) is required for Summit T3-16 and T3-8 systems. For Summit T34, use a PE013UCA-X iPass x4-to-x8 cable.

Gen3 U.2 (SFF-8639) Interposers

Configuration	Max Bay Depth	Standards Supported	Part Numbers:
Standard	5" (13 cm)	x2 SATA Express x4 NVM Express x4 SCSI Express	PE154UIA-X
Standard	12" (30 cm)		PE156UIA-X
Dual-port	5" (13 cm)	x2 SATA Express x2 SCSI Express	PE155UIA-X
Dual-port	12" (30 cm)		PE157UIA-X

Note: There are two analyzer connectors on the 5" interposers. One is used only for SATA Express, the second supports NVMe and SCSI Express.

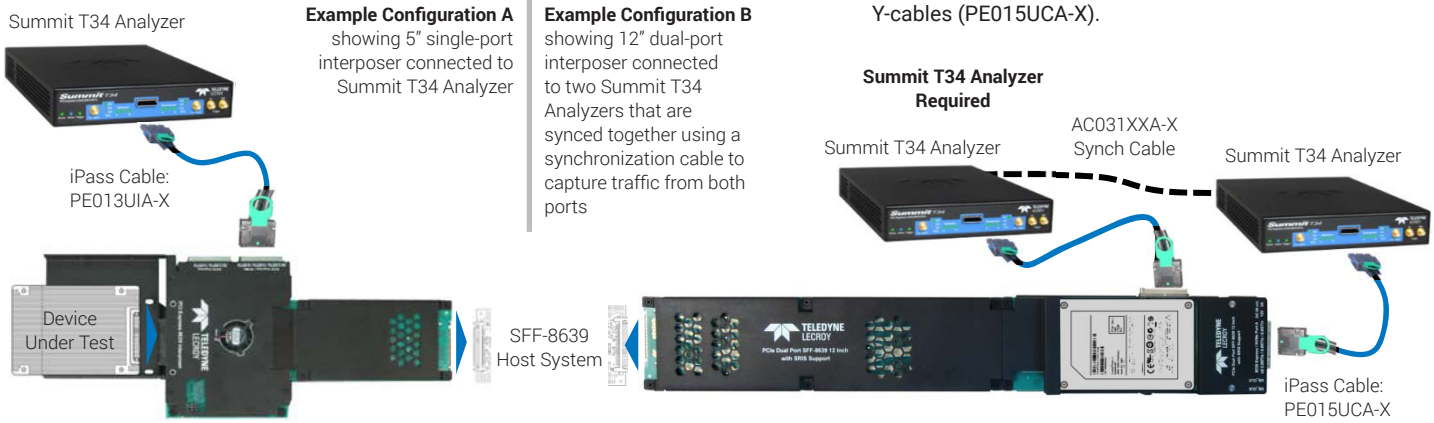


Teledyne LeCroy manufacturers a series of four interposers to support developers of SFF-8639 devices. The interposers are available in both single-port and dual-port versions, and with either 5" (13 cm) or 12" (30 cm) extensions to fit into the test system bay. The table to the left provides part numbers for each of these configurations. The 5" interposers support both 2.5" and 3" SFF-8639 SSD drives, in drive bays 2.5" wide and up to 5" deep.

The 12" interposers support 2.5" SFF-8639 SSD drives, in drive bays up to 3.5" wide (using carrier extension) and up to 12" deep.

For Summit T24 and T34, use PE015UCA-X iPass x4-to-x8 cables to connect to analyzer.

For Summit T3-16, T3-8 and T28 systems use iPass Y-cables (PE015UCA-X).



Example Configuration A showing 5" single-port interposer connected to Summit T34 Analyzer

Example Configuration B showing 12" dual-port interposer connected to two Summit T34 Analyzers that are synced together using a synchronization cable to capture traffic from both ports

Summit T34 Analyzer Required

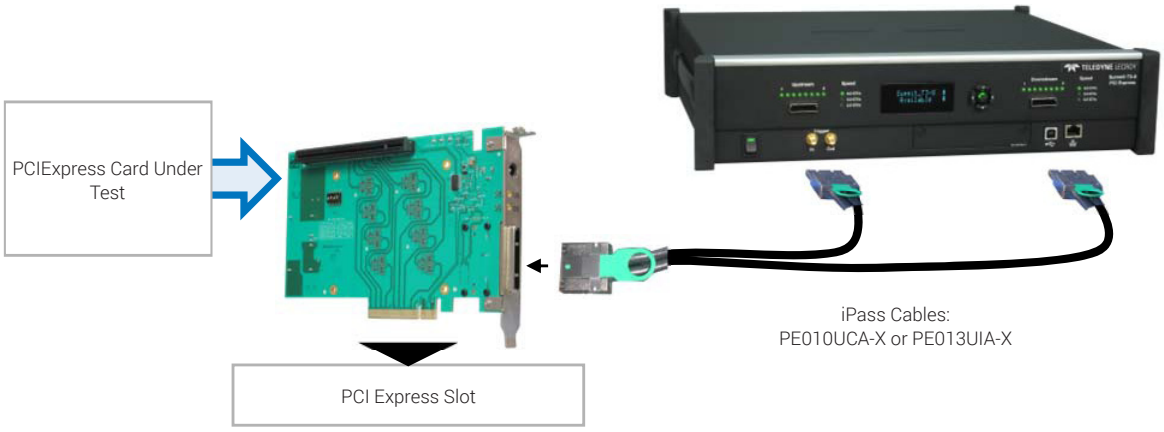
Gen3 x8 90 Degree Server Interposer

Part Numbers:
PE058UIA-X (Right)
PE059UIA-X (Left)

The Gen3 90 Degree Server Interposer is designed for use with the Summit T3-16, T3-8 and T34 Analyzers. The interposer is an active slot interposer with a 90 degree change in direction (either left or right—select correct part number as shown on the left), and is useful when testing PCIe cards in enclosed environments, such as 1U and 2U server enclosures.

Insert the interposer into the PCIe slot of the motherboard, then insert the PCIe card into the slot connector on the surface of the board.

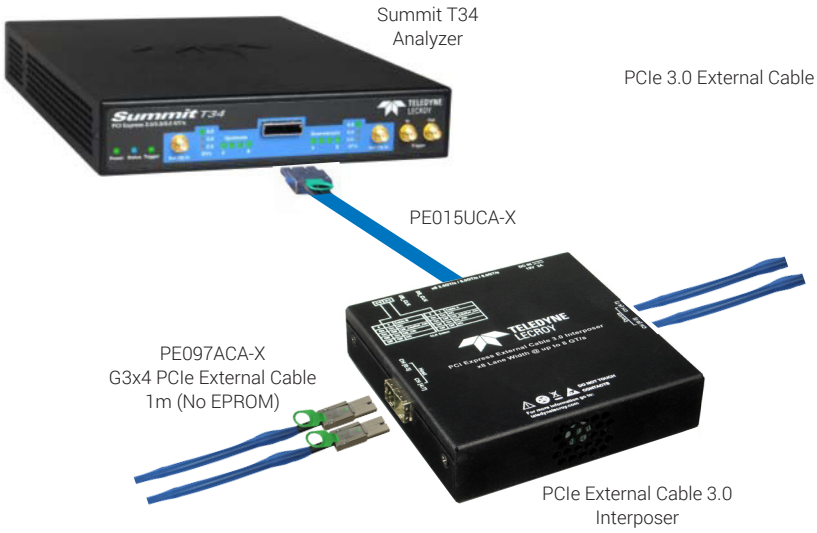
To connect the analyzer, use the PE010UCA-X 1 meter Y-cable. For Summit T34, use the PE013UIA-X cable.



Specialty Interposer Systems

Gen3 External Cable Interposer

Part Numbers:
PE120UIA-X

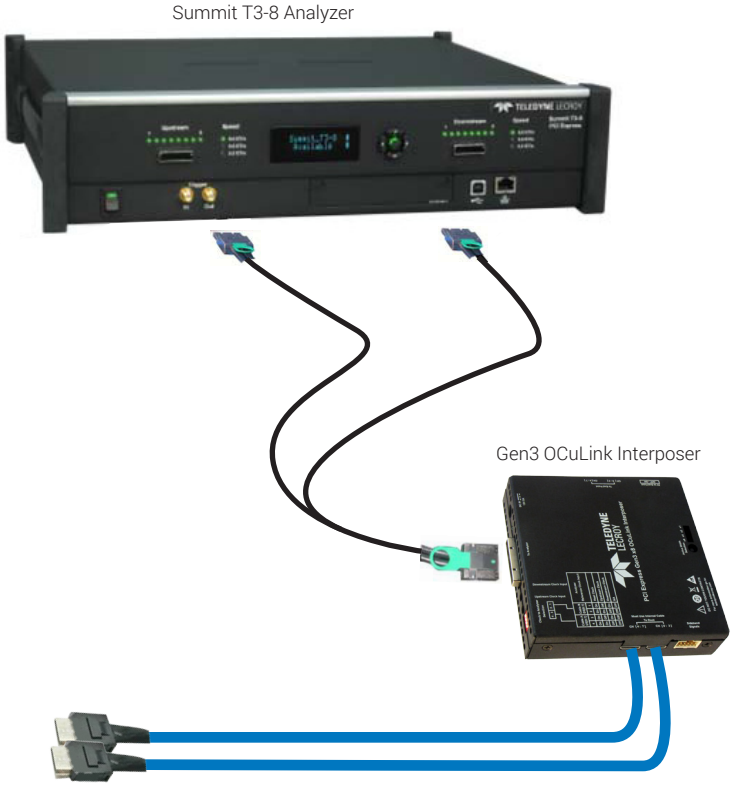


The Gen3 External Cable Interposer provides a simple means to tap into the serial data traffic between any two system components which are connected using cables based on the PCI Express External Cabling Specification Revision 3.0.

Simply connect the host to the interposer "Host" connector, connect the device to the "Device" connector, and then connect the "Analyzer" connector using a PE015UCA-X blue iPass Y-Cable. One side(host or device) on the interposer setup must use the Teledyne LeCroy 1m G3x4 PCIe External Cable. This interposer supports recording of SMBus if used with Summit T34 or T416.

Gen3 OCuLink Interposer

Part Number:
PE162UIA-X



Teledyne LeCroy's PCI Express PCIe Gen3 OCuLink Cable Interposer for the Summit™ PCI Express Protocol Analyzer makes it easy to capture and analyze data traffic between a host and device that are connected using a PCIe® OCuLink type cable based on the PCI Express OCuLink specification.

The PCIe OCuLink Interposer, which is used with Summit™ Protocol Analyzers, enables PCIe bus traffic between a system board and storage devices using PCIe OCuLink cables to be monitored, captured and recorded for protocol analysis. The PCIe OCuLink Cable interposers will support protocol analysis for PCIe at data rates from 2.5 GT/s up to 8.0 GT/s, and link widths from x1 to x8. For x16 link widths two PCIe OCuLink interposers can be used together for one link.

Specialty Interposer Systems

Gen4 OCuLink Interposer

Part Numbers:
PE163UIA-X

Summit T48 Analyzer

PCIe OCuLink 4.0 Interposer

Teledyne LeCroy's PCI Express PCIe Gen4 OCuLink Cable Interposer for the Summit™ PCI Express Protocol Analyzer makes it easy to capture and analyze data traffic between a host and device that are connected using a PCIe® OCuLink type cable based on the PCI Express OCuLink specification.

The PCIe OCuLink Interposer, which is used with Summit™ Protocol Analyzers, enables PCIe bus traffic between a system board and storage devices using PCIe OCuLink cables to be monitored, captured and recorded for protocol analysis. The PCIe OCuLink Cable interposers will support protocol analysis for PCIe at data rates from 2.5 GT/s up to 16.0 GT/s, and link widths from x1 to x8. For x16 link widths two PCIe OCuLink interposers can be used together for one link.

Gen4 Slot Interposer

Part Numbers:
PE122UIA-X (x16)
PE123UIA-X (x8)
PE124UIA-X (x4)
PE125UIA-X (x1)

Summit T416
Protocol Analyzer

Gen4 PCIe Interposer

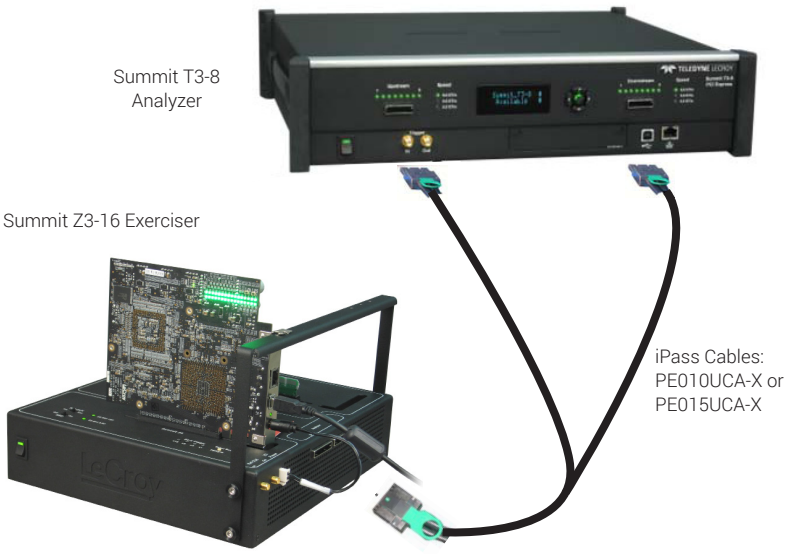
The Gen4 Slot Interposers are for use with the Summit T416 Analyzers, and supports link widths up to x16 at data rates of 2.5, 5.0, 8.0 GT/s and 16 GT/s. The interposer uses Teledyne LeCroy's T.A.P.4 technology to ensure complete data capture at Gen4 rates with minimal signal perturbation.

The interposer CANNOT be used with card reducer edge adapters, and therefore must be purchased in the correct card slot width. Each of the different types of interposers (x1, x4, x8, x16) come with high speed interconnect cables attached. All Gen4 interposers support recording of SMBus traffic.

Gen3 Test Platform

Part Numbers:
PE072ACA-X (x8)
PE073ACA-X (x4)
PE081ACA-X (x4) Summit T24 only

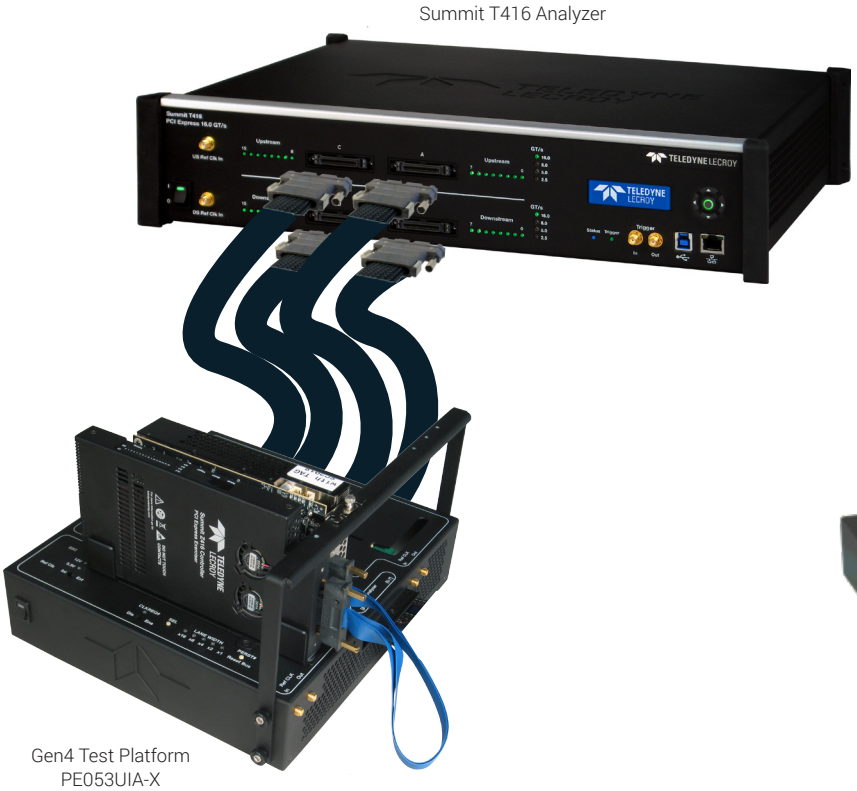
The Gen3 Test Platform is for use with the Summit Z3-16 Exerciser, and supports link widths up to x16 at data rates of 2.5, 5.0, and 8 GT/s. The PCIe Gen3 Test Platform contains an internal interposer that supports Teledyne LeCroy's T.A.P.3 technology to ensure complete data capture at the 8.0GT/s rate with minimal signal perturbation. The Gen3 Test Platform uses the PE015UCA-X blue iPass Y-Cable with the Summit T34 analyzer . The Gen3 Test Platform supports recording of L1 Substates and SMBus traffic with the Summit Z3-16 analyzer and T34 exerciser.



Gen4 Test Platform

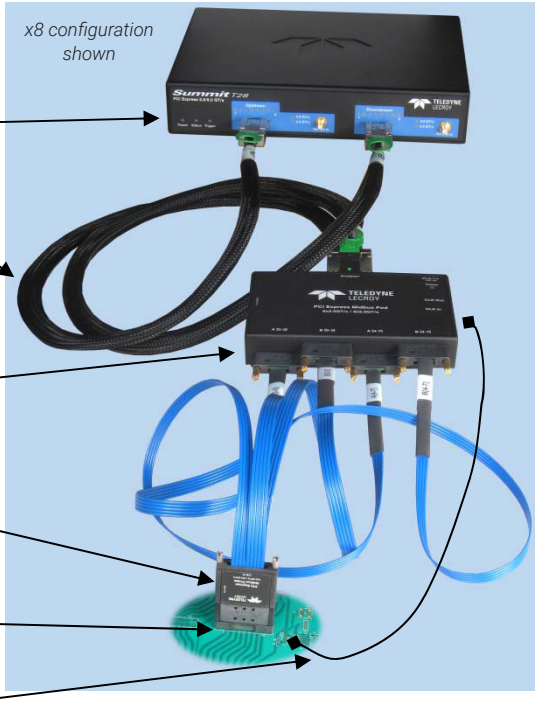
Part Numbers:
PE053UEA-X

The Gen4 Test Platform and PXP-400 DVT Platform are for use with the Summit Z416 Exerciser, and supports link widths up to x16 at data rates of 2.5, 5.0, 8.0 and 16 GT/s. The PCIe Gen4 Test Platform contains an internal interposer that supports Teledyne LeCroy's T.A.P.4 technology to ensure complete data capture at the 16GT/s rate with minimal signal perturbation. The Gen4 Test Platform comes with high speed interconnect cables attached. The Gen4 Test Platform supports recording of L1 Substates and SMBus traffic with the Summit Z416 analyzer and T416 exerciser/analyzer. The PXP-400 DVT Platform does not contain a interposer and must use either the Summit Z416 or a PCIe Gen4 interposer with Summit T416 as the recording tool.



Gen2 MidBus Probe Kits

Part Numbers:
PE072ACA-X (x8)
PE073ACA-X (x4)
PE081ACA-X (x4) Summit T24 only



The Gen2 MidBus Probe Kits support link widths from x1 to x16 at data rates of 2.5 GT/s and 5.0 GT/s.

To prepare a PCB for use with the Gen2 MidBus Probe, an attachment pad is designed into the layout, and a retention module is mounted to this pad. A header cable attaches from this header to the MidBus Probe Pod, and a reference clock cable (PE014UCA-X) also connects from the PCB to the pod. The pod then attaches to the Summit analyzer using a iPass Y-cable.

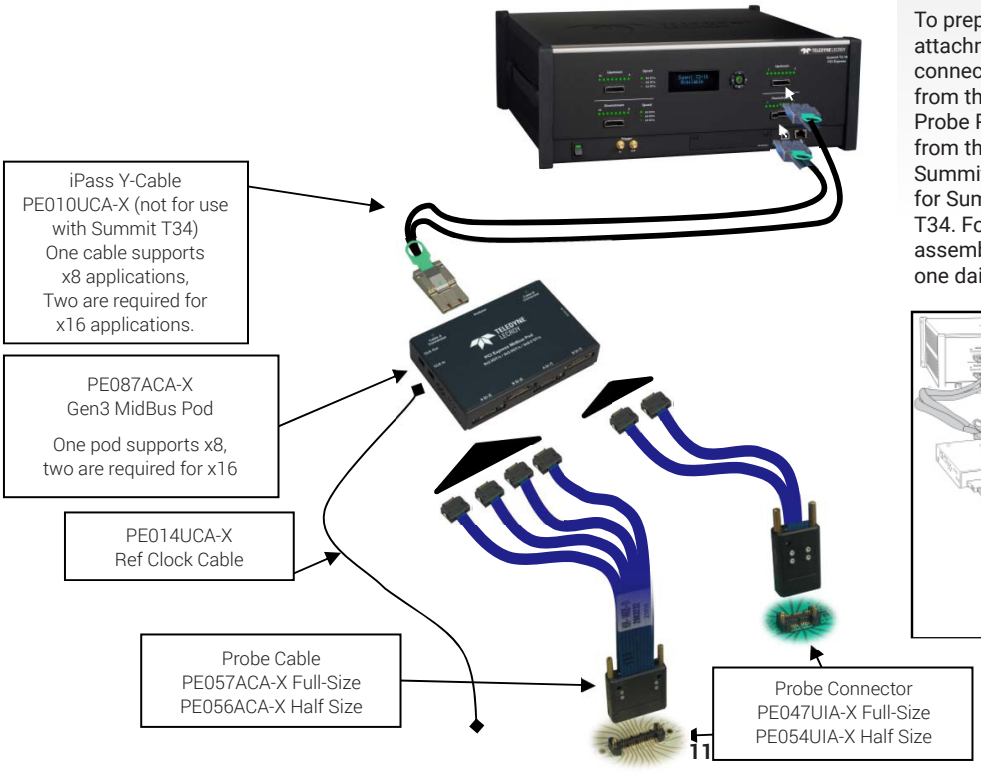
External power supplies (12V DC) are supplied with both kits, but are only required in the case of the Summit T24 Analyzer. For all other analyzers, the probe pods receive power from the analyzer via the iPass cable.

For x16 applications, use the Summit T3-16 or two Summit T3-8 Analyzers connected together with the x16 Expansion Cable. Two pods and two Full-size MidBus probe heads are required, and the pods attach to the analyzer(s) using two iPass Y-Cables. One pod is connected to the PCB using the Ref Clock Cable, and the second is connected to the first using the Daisy-Chain Clock Cable (PE009UCA-X).

Note: The Summit T24 and Summit T34 use a straight x4-to-x4 iPass cable (PE013UCA-X). The Summit T24 has a special MidBus probe kit (including this cable) under P/N: PE081ACA-X.

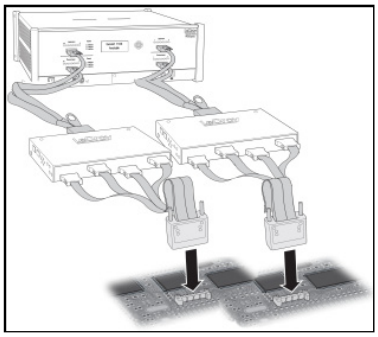
Gen3 MidBus Probe Kit

Part Numbers:
PE090ACA-X (Full Size)
PE091ACA-X (Half Size)
PE094ACA-X (Half Size) Summit T34 only



The Gen3 MidBus Probe is designed for use with the Summit T3-16, T3-8 and T34 Analyzers, and supports link widths from x1 to x16 at data rates of 2.5 GT/s, 5.0 GT/s and 8.0 GT/s.

To prepare a PCB for use with the MidBus probe, an attachment pad is designed into the layout, and a probe connector is mounted to this pad. A probe cable attaches from this connector to the PE087UIA-X Gen3 MidBus Probe Pod, and a reference clock cable also connects from the PCB to the pod. The pod then attaches to the Summit analyzer using an iPass Y-cable (PE010UCA-X) for Summit T3-16 and T3-8, or straight cable for Summit T34. For x16, use two pods and two probe cable assemblies, plus one reference clock cable (to PCB) and one daisy-chain cable (between pods).



x16 Configuration (shown here) uses two pods, two cable assemblies, and two headers.

Gen4 MidBus Probe Kits

Configuration Needed to Support "STANDARD MODE" (without MultiPort)		
Using Internal Clock and No Side Bands	**T416**	**T48**
x1, x4 or x8	2 MidBus Cables	2 MidBus Cables
x16	4 MidBus Cables	NA
Using Internal Clock plus Side Bands		
x1, x4 or x8	2 MidBus Cables/ 1 Sideband Cable	2 MidBus Cables/ 1 Sideband Cable
x16	4 MidBus Cables/ 1 Sideband Cable	NA
Using External Common Clock		
x1, x4 or x8	2 MidBus Cables/ 1 Sideband Cable/ 1 Clock Pod	2 MidBus Cables/ 1 Sideband Cable
x16	4 MidBus Cables / 1 Sideband Cable / 1 Clock Pod	NA
Using External Clock SRIS		
x1, x4 or x8	2 MidBus Cables / 2 Sideband Cables	2 MidBus Cables / 2 Sideband Cables
x16	4 MidBus Cables / 2 Sideband Cables	NA

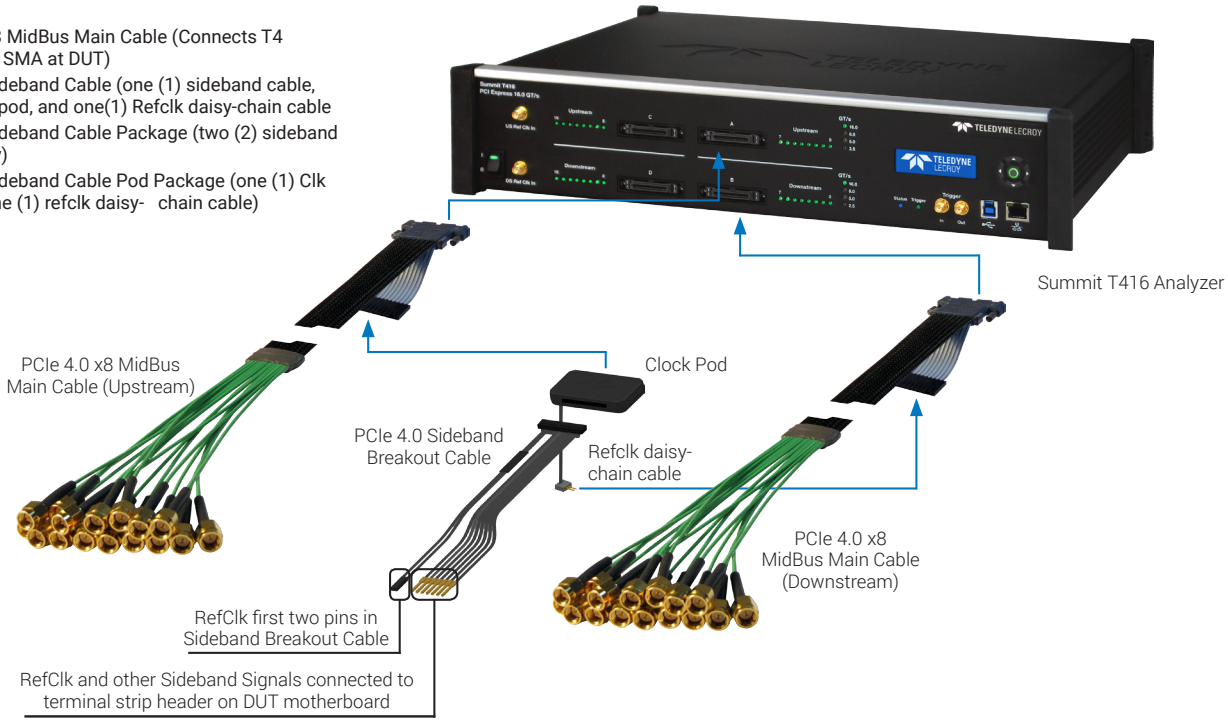
The PCIe 4.0 MidBus probe supports quick and easy probing through direct SMA connections or through user selected adapters to other connection types. MidBus probes attached to the protocol analyzer are used by system designers to probe embedded bus signals (e.g., for serial data buses that run between chips on a single circuit board) or simply as a convenient means to access bus signals.

A single MidBus probe can support link widths of x8 unidirectional or x4 bi-directional using MultiPort mode at up to 16GT/s speeds, while multiple probes can be used to simultaneously capture up to x16 bi-directional traffic. Sideband signals are also supported on a separate cable attachment. Both probe types support SRIS clocking but access to host and device clock must be made available.

Configuration Needed to Support "MULTIPORT MODE"						
	Using 1 recording port only		Using All Ports / Independent Links		Using All Ports / Bifurcated Links	
Using Internal Clock and No Side Bands	**T416**	**T48**	**T416**	**T48**	**T416**	**T48**
x1, x2 or x4	1 MidBus Cable	1 MidBus Cable	4 MidBus Cables	2 MidBus Cables	4 MidBus Cables	2 MidBus Cables
x8	2 MidBus Cables	NA	4 MidBus Cables	NA	4 MidBus Cables	NA
Using Internal Clock plus Side Bands						
x1, x2 or x4	1 MidBus Cable / 1 Sideband Cable	1 MidBus Cable / 1 Sideband Cable	4 MidBus Cables / 4 Sideband Cables	2 MidBus Cables / 2 Sideband Cables	4 MidBus Cables / 1 Sideband Cable	2 MidBus Cables / 1 Sideband Cable
x8	2 MidBus Cables / 1 Sideband Cable	NA	4 MidBus Cables / 2 Sideband Cables	NA	4 MidBus Cables / 1 Sideband Cable	NA
Using External Common Clock						
x1, x2 or x4	1 MidBus Cable / 1 Sideband Cable	1 MidBus Cable / 1 Sideband Cable	4 MidBus Cables / 4 Sideband Cables	2 MidBus Cables / 2 Sideband Cables	4 MidBus Cables / 1 Sideband Cable / 1 Clk Pod	2 MidBus Cables / 1 Sideband Cable
x8	2 MidBus Cables / 1 Sideband Cable	NA	4 MidBus Cables / 2 Sideband Cables	NA	4 MidBus Cables / 1 Sideband Cable / 1 Clk Pod	NA
Using External Clock SRIS						
x1, x2 or x4	1 MidBus Cable / 1 Sideband Cable	1 MidBus Cable / 1 Sideband Cable	4 MidBus Cables / 4 Sideband Cables	2 MidBus Cables / 2 Sideband Cables	4 MidBus Cables / 1 Sideband Cable / 1 Clk Pod	2 MidBus Cables / 1 Sideband Cable
x8	2 MidBus Cables / 1 Sideband Cable	NA	4 MidBus Cables / 2 Sideband Cables	NA	4 MidBus Cables / 1 Sideband Cable / 1 Clk Pod	NA

Part Numbers:

PE105ACA-X	PCIe 4.0 x8 MidBus Main Cable (Connects T4 analyzer to SMA at DUT)
PE101ACA-X	PCIe 4.0 Sideband Cable (one (1) sideband cable, one(1) Clk pod, and one(1) Refclk daisy-chain cable
PE102ACA-X	PCIe 4.0 Sideband Cable Package (two (2) sideband cables only)
PE103ACA-X	PCIe 4.0 Sideband Cable Pod Package (one (1) Clk Pod and one (1) refclk daisy- chain cable)



Gen2 Multi-lead Probe

Part Numbers:
PE085ACA-X for x1 link width (for Summit T24, T28, T3-8 or T3-16)PE073ACA-X (x4)
PE084ACA-X for x4 link width (for Summit T24, T28, T3-8 or T3-16)
PE083ACA-X for x8 link width (for Summit T28, T3-8 or T3-16)
PE078ACA-X for x16 link width (for Summit T3-16 or two T3-8 systems)

The Summit Gen2 Multi-lead Probe is designed for use with all Summit Analyzers. The probe consists of 1 to 4 probe pods which are connected to the analyzer using either iPass Y-Cables or straight x4-to-x8 iPass cables. Each lane requires two Flex Tips, each Flex Tip is connected to the probe pod using two coaxial cables, and each probe pod supports up to x4 link width.

The Flex Tips are soldered directly to exposed bus traces located anywhere on the PCB within approximately 40 cm (16") of the probe pod, and provide a high impedance connection to maintain the signal integrity of the PCI Express bus.

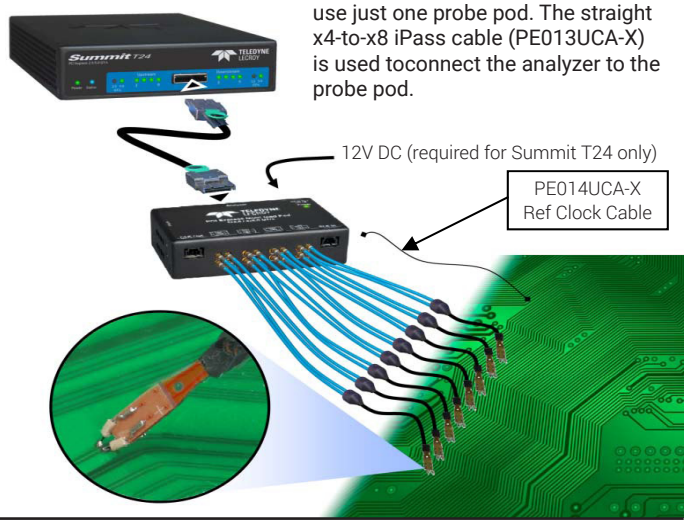
Link Width	x1	x4	x8	x16
Part Number(1)	085	084	083	078
iPass Y-Cable (2) PE010UCA-X	1(2)	1(2)		
Straight iPass Cables PE013UCA-X	1(2)	1(2)	2	4
x4 Probe Pods PE083UIA-X	1	1	2	4
Coax Cables PE036ACA-X	4	16	32	64
Flex Tips (470Ω) PE037ACA-X	2	8	16	32
Optional Ref Clock Cable PE014UCA-X	1	1	1	1
Optional Daisy-chain Cables PE009UCA-X			1	3

(1) Full part number is PExxxACA-X with the 3-digit number shown here replacing the "xxx".

(2) For Summit T24 and T34, the straight x4-to-x8 iPass Cable (PE013UCA-X) is required but not included in the kit. For all other systems, the iPass Y-Cable (PE010UCA-X) is required but not included in kit.

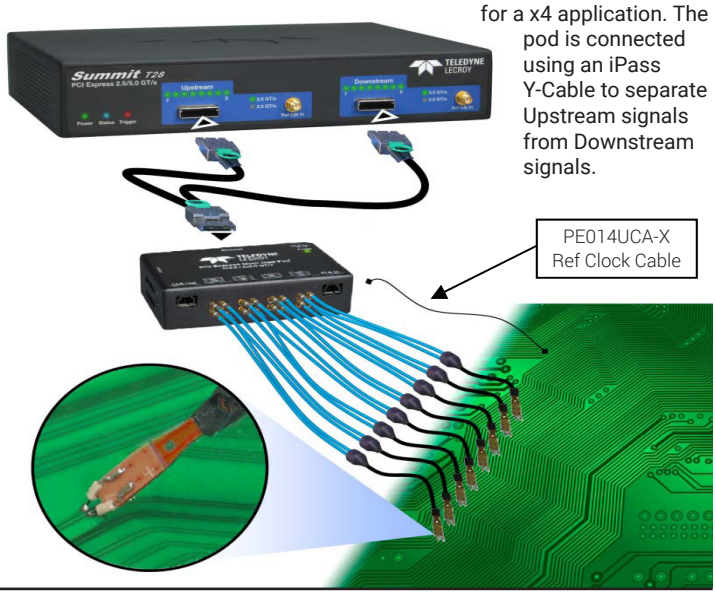
Summit T24 in a x4 Configuration

The Summit T24/T34 can support up to x4 link width, and therefore can use just one probe pod. The straight x4-to-x8 iPass cable (PE013UCA-X) is used toconnect the analyzer to the probe pod.



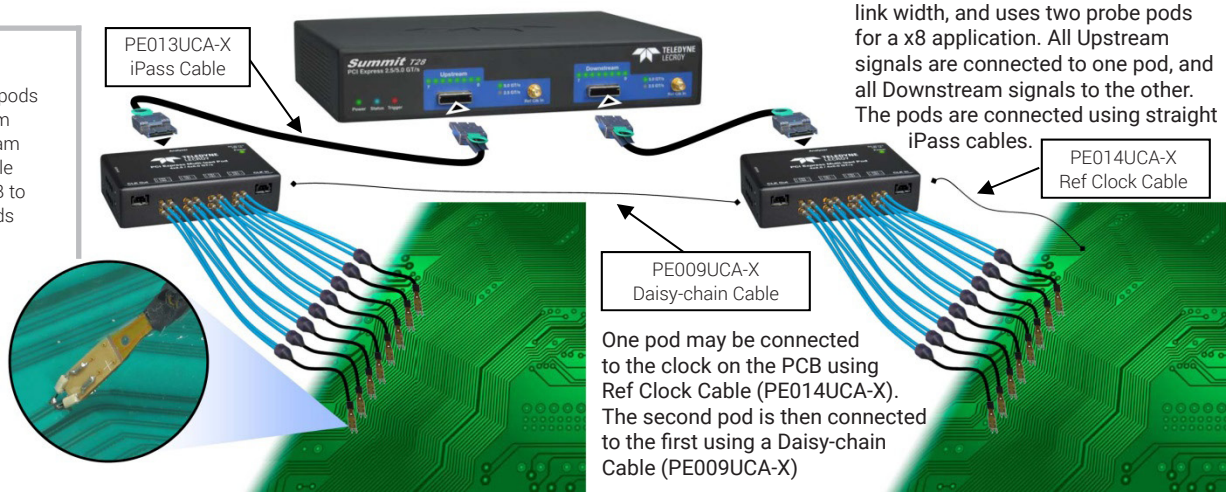
Summit T28 in a x4 Configuration

The Summit T28 can support up to x8 link width, and uses one probe pod for a x4 application. The pod is connected using an iPass Y-Cable to separate Upstream signals from Downstream signals.



Summit T28 in a x4 Configuration

The Summit T28 can support up to x8 link width, and uses two probe pods for a x8 application. All Upstream signals are connected to one pod, and all Downstream signals to the other. The pods are connected using straight iPass cables.



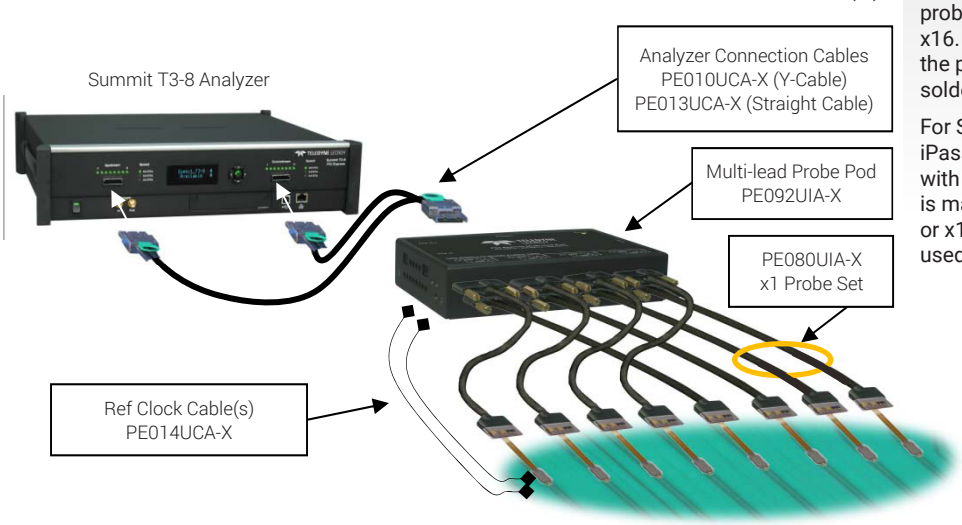
One pod may be connected to the clock on the PCB using Ref Clock Cable (PE014UCA-X). The second pod is then connected to the first using a Daisy-chain Cable (PE009UCA-X)

About x16 Configurations

For x16 applications, four pods are used (two for Upstream signals, two for Downstream signals The Ref Clock Cable is connected from the PCB to one pod, and the other pods are connected with Daisy-chain Cables. The pods are connected to the analyzer(s) using straight iPass cables.

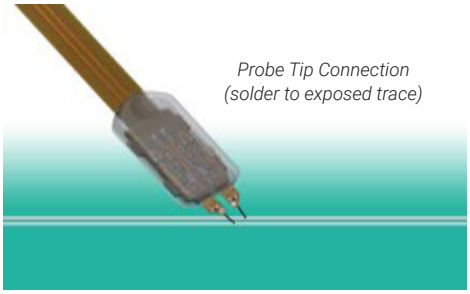
Gen3 Multi-lead Probe

Part Numbers:
PE092ACA-X Gen3 Multi-lead Probe Pod
PE080UIA-X G3x1 Multi-lead Probe Kit (6")

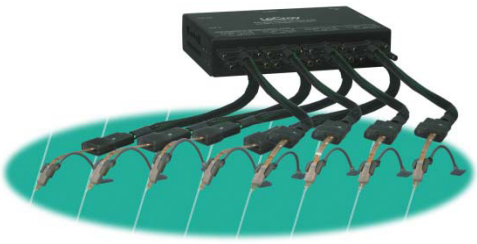


The Gen3 Multi-lead Probe consists of one to four probe pods (PE092UIA-X), each of which can support four x1 probe sets (PE080UIA-X) to allow probing link widths to x16. Each x1 probe set includes two cables to attach to the probe pod, two flexible tips and two probe wires to solder to traces on the PCB under test.

For Summit T34, the analyzer connection is a straight iPass cable (PE013UIA-X). For Summit T3-8 or T3-16 with designs of x4 or less, the connection to the analyzer is made using an iPass Y-cable (PE010UCA-X). For x8 or x16 designs, straight iPass cables (PE013UCA-X) are used to connect to multiple probe pods.



Probe Tip Connection (solder to exposed trace)



x4 Probe Pod setup, showing support brackets (included in Probe Sets) that assist in holding probe tips in place.

Required Components for Different Link Widths					
Link Width		x1	x4	x8	x16
Item	Part Number	Qty	Qty	Qty	Qty
Y-Cable	PE010UCA-X	1	1		
iPass Cables	PE013UCA-X	(T34 only)	(T34 only)	2	4
x4 Probe Pods	PE092UIA-X	1	1	2	4
x1 Probe Sets	PE080UIA-X	1	4	8	16
Ref Clock Cable	PE014UCA-X	2 (1)	2 (1)	2 (1)	2 (1)
Daisy-chain Cables	PE009UCA-X			2 (1)	6 (1)

(1) Use of external clock cables is optional. If used, cables needed for separate US and DS clocks (SRIS applications) are shown. If using a single external Ref Clock, divide the number of cables by two.

Gen4 Multi-lead Probe

Configuration Needed to Support "STANDARD MODE" (without MultiPort)		
Using Internal Clock and No Side Bands	**T416**	**T48**
x1, x4 or x8	2 Multi-lead Cables	2 Multi-lead Cable
x16	4 Multi-lead Cables	NA
Using Internal Clock plus Side Bands		
x1, x4 or x8	2 Multi-lead Cable / 1 Sideband Cables	2 Multi-lead / 1 Sideband Cable
x16	4 Multi-lead Cables / 1 Sideband Cable	NA
Using External Common Clock		
x1, x4 or x8	2 Multi-lead Cables / 1 Sideband Cable / 1 Clock Pod	2 Multi-lead Cable / 1 Sideband Cable
x16	4 Multi-lead Cables / 1 Sideband Cable / 1 Clock Pod	NA
Using External Clock SRIS		
x1, x4 or x8	2 Multi-lead Cables / 2 Sideband Cables	2 Multi-lead cables / 2 Sideband Cables
x16	4 Multi-lead / 2 Sideband	NA

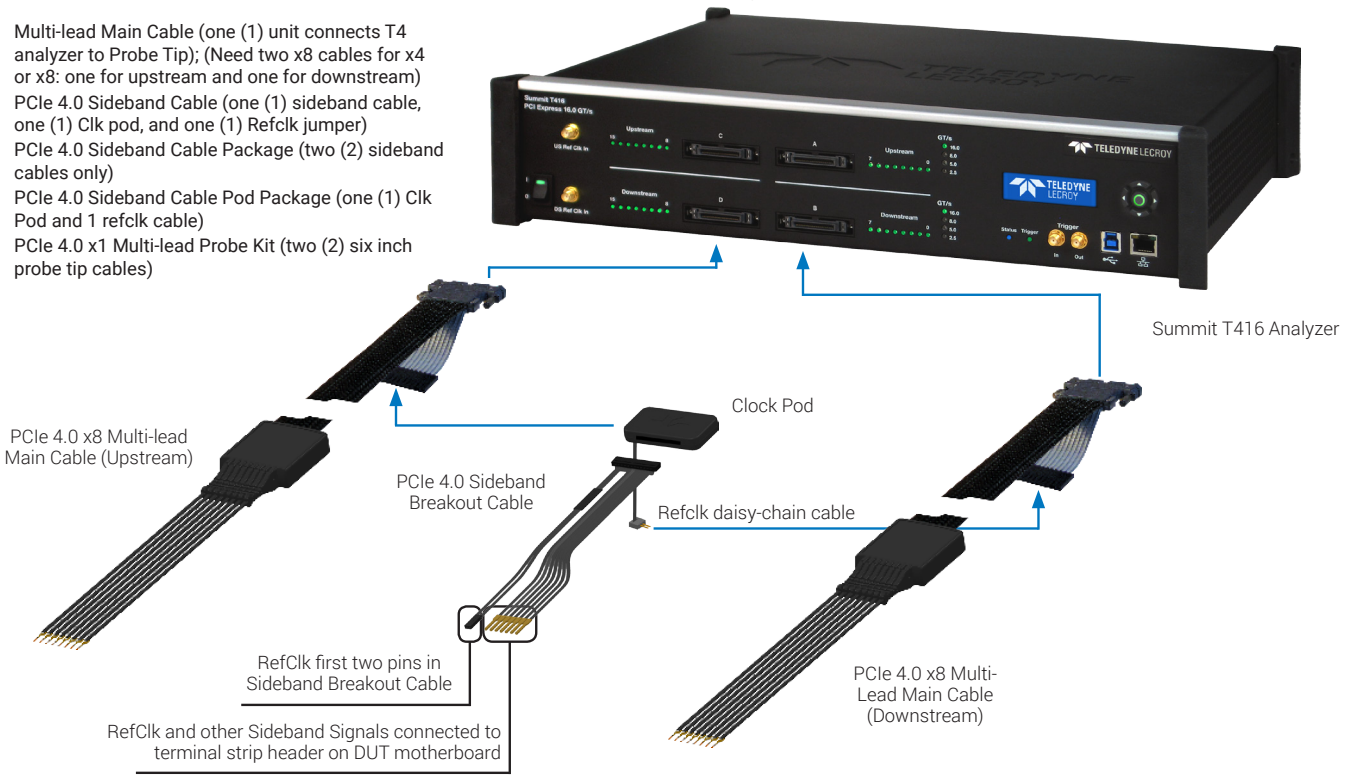
Teledyne LeCroy's Multi-lead probes use a precision probe tip for receiver- pair or transmitter-pair probing. The probe tip is attached to the multi-lead probe cable that connects to the protocol analyzer. Each Probe can support link widths of up to x8 unidirectional or x4 bi-directional using MultiPort mode at up to 16GT/s speeds. Multiple probes can also be used to simultaneously capture up to x16 bi-directional traffic. The probe will connect to a Teledyne LeCroy Summit™ T48 or T416 protocol analyzer via a multi-lead probe cable.

Support is provided for PCI Express data rates including 2.5 GT/s, 5.0 GT/s, 8.0 GT/s, and 16GT/s at link widths. Sideband signals are supported on a separate cable attachment. The probes support SRIS clocking but access to host and device clock must be made available.

Configuration Needed to Support "MULTIPORT MODE"						
	Using 1 recording port only		Using All Ports / Independent Links		Using All Ports / Bifurcated Links	
Using Internal Clock and No Side Bands	**T416**	**T48**	**T416**	**T48**	**T416**	**T48**
x1, x2 or x4	1 Multi-lead Cable	1 Multi-lead Cable	4 Multi-lead Cables	2 Multi-lead Cables	4 Multi-lead Cables	2 Multi-lead Cables
x8	2 Multi-lead Cables	NA	4 Multi-lead Cables	NA	4 Multi-lead Cables	NA
Using Internal Clock plus Side Bands						
x1, x2 or x4	1 Multi-lead Cable / 1 Sideband Cable	1 Multi-lead Cable / 1 Sideband Cable	4 Multi-lead Cables / 4 Sideband Cables	2 Multi-lead Cables / 2 Sideband Cables	4 Multi-lead Cables / 1 Sideband Cable	2 Multi-lead Cables / 1 Sideband Cable
x8	2 Multi-lead Cables / 1 Sideband Cable	NA	4 Multi-lead Cables / 2 Sideband Cables	NA	4 Multi-lead Cables / 1 Sideband Cable	NA
Using External Common Clock						
x1, x2 or x4	1 Multi-lead Cable / 1 Sideband Cable	1 Multi-lead Cable / 1 Sideband Cable	4 Multi-lead Cables / 4 Sideband Cables	2 Multi-lead Cables / 2 Sideband Cables	4 Multi-lead Cables / 1 Sideband Cable / 1 Clk Pod	2 Multi-lead Cables / 1 Sideband Cable
x8	2 Multi-lead Cables / 1 Sideband Cable	NA	4 Multi-lead Cables / 2 Sideband Cables	NA	4 Multi-lead Cables / 1 Sideband Cable / 1 Clk Pod	NA
Using External Clock SRIS						
x1, x2 or x4	1 Multi-lead Cable / 1 Sideband Cable	1 Multi-lead Cable / 1 Sideband Cable	4 Multi-lead Cables / 4 Sideband Cables	2 Multi-lead Cables / 2 Sideband Cables	4 Multi-lead Cables / 1 Sideband Cable / 1 Clk Pod	2 Multi-lead Cables / 1 Sideband Cable
x8	2 Multi-lead Cables / 1 Sideband Cable	NA	4 Multi-lead Cables / 2 Sideband Cables	NA	4 Multi-lead Cables / 1 Sideband Cable / 1 Clk Pod	NA

Part Numbers:

PE100ACA-X	Multi-lead Main Cable (one (1) unit connects T4 analyzer to Probe Tip); (Need two x8 cables for x4 or x8: one for upstream and one for downstream)
PE101ACA-X	PCIe 4.0 Sideband Cable (one (1) sideband cable, one (1) Clk pod, and one (1) Refclk jumper)
PE102ACA-X	PCIe 4.0 Sideband Cable Package (two (2) sideband cables only)
PE103ACA-X	PCIe 4.0 Sideband Cable Pod Package (one (1) Clk Pod and 1 refclk cable)
PE164UIA-X	PCIe 4.0 x1 Multi-lead Probe Kit (two (2) six inch probe tip cables)



Specifications for Multi-lead and MidBus Probes

MidBus Probe	Gen2 Multi-lead Probe	Gen3 Multi-lead Probe	Gen2 MidBus Probe	Gen3 MidBus Probe
Part Number(s)	PE083ACA-X (see table page 9)	PE092UIA-X Pod PE080UIA-X Probe Sets	PE072ACA-X (x8) PE073ACA-X (x4) PE081ACA-X (x4 for T24)	PE090ACA-X (x8 kit) PE091ACA-X (x4 kit)
Link Widths	x1, x4, x8, x16	x1, x4, x8, x16	x1, x4, x8, x16	x1, x4, x8, x16
Data Rates	2.5 GT/s, 5 GT/s	2.5 GT/s, 5 GT/s, 8 GT/s	2.5 GT/s, 5 GT/s	2.5 GT/s, 5 GT/s, 8 GT/s
Power Source	iPass from analyzer (or ext 12V DC–T24 only)	iPass from analyzer	iPass from analyzer (or ext 12V DC–T24 only)	iPass from analyzer
Analyzer Connector	x4-to-x8 iPass or Y-Cable (see page 9)	x4-to-x8 iPass or Y-Cable (see page 10)	iPass Y-Cable(s) (or Straight – T24 only)	iPass Y-Cable(s)
Pod Required	x4 PE083UIA-X	x4 PE092UIA-X	x8 PE082UIA-X	x8 PE087UIA-X

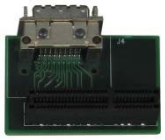
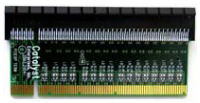
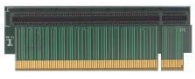
Specifications for Interposers

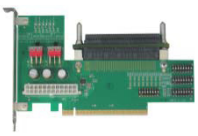
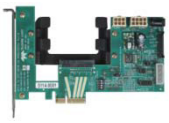
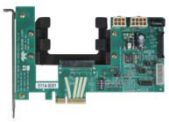
Interposer Probe System	Gen2 Passive	Gen2 Active	Gen3 Active	Gen2 AMC	Gen2 XMC	Gen2 Express Card	Gen2 VPX	Gen2 Compact PCI Serial
Part Number	PE072UIA-X to PE075UIA-X	PE018UIA-X (x16) PE111UIA-x(x8)	PE104UIA-X to PE107UIA-X	PE060UIA-X	PE048UIA-X	PE055UIA-X	PE070UIA-X	PE061UIA-X
Form Factor	PCIe CEM*	PCIe CEM*	PCIe CEM*	Custom	Custom	Custom	Custom	Custom
Dimension	5.75" x 6.6"	6.9" x 8.6"	7.9" x 6.5"	15" x 3.1"	7" x 14"	4.25" x 9"	3.9" x 11.9"	3.9" x 11.9"
Link Width	x1, x2, x4, x8, x16	x1, x2, x4, x8, x16	x1, x2, x4, x8, x16	x1, x2, x4, x8	x1, x2, x4, x8	x1	x1, x2, x4, x8, x16	x1, x2, x4, x8
Data Rates	2.5 GT/s & 5 GT/s	2.5 GT/s & 5 GT/s	2.5 ,5 and 8 GT/s	2.5 GT/s & 5 GT/s	2.5 GT/s & 5 GT/s	2.5 GT/s & 5 GT/s	2.5 GT/s & 5 GT/s	2.5 GT/s & 5 GT/s
Power Source	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External
Impedence (Differential)	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm
Analyzer Connector**	iPass Y-cable (2 for x16)	iPass Y-cable (2 for x16)	iPass Y-cable (2 for x16)	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable

Interposer Probe System	Gen2 Mini Card	Gen2 External Cable	Gen2 HP Blade System	Gen3 90 Degree Server	Gen3 Express Module	Gen3 SFF-8639 Single-Port	Gen3 SFF-8639 Dual-Port	Gen3 M.2
Part Number	PE049UIA-X PE051UIA-X	PE036UIA-X	PE037UIA-X	PE058UIA-X PE059UIA-X	PE062UIA-X PE063UIA-X PE064UIA-X	PE091UIA-X PE112UIA-X	PE088UIA-X PE113UIA-X	PE089UIA-X PE090UIA-X
Form Factor	Custom	Custom	Custom	Custom	Custom	Custom	Custom	Custom
Dimension	4" x 5.9"	2.9" x 13.8"	4.5" x 5.3"	3.75" x 6.6"	4.4" x 16.2"	5.6" x 13.4" 2.75" x 18.7"	5.6" x 13.4" 2.75" x 18.7"	5.1" x 9.0"
Link Width	x1, x2, x4, x8	x1, x2, x4, x8	x1, x2, x4, x8	x1, x2, x4, x8	x1, x4, x8	x2 SATA Exp, x4 NVMe, & x4 SCSI Exp.	x2 NVMe & x2 SCSI Express	x4 SCSI Exp. OR x2 SATA Exp.
Data Rates	2.5 GT/s & 5 GT/s	2.5 GT/s	2.5 GT/s & 5 GT/s	2.5 ,5 and 8 GT/s	2.5, 5 and 8 GT/s	2.5, 5 and 8 GT/s	2.5, 5 and 8 GT/s	2.5, 5 and 8 GT/s
Power Source	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External	12V DC External
Impedence (Differential)	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm	85 ohm
Analyzer Connector**	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable	iPass Y-cable

*Card meets PCIe CEM requirements except for physical dimensions, as noted immediately below.
**Summit T24 always uses iPass x4-to-x8 cable (PE013UCA-X).
***Summit T34 Systems always use iPass x4-to-x8 cable (PE015UCA-X). All other systems use iPass Y-Cable (PE010UCA-X).
See product datasheets for complete specification information.

General Purpose Adapters and Extenders

Product	Part Number	Image
ExpressCard to ExpressCard Slot Passive Extender	EXP2EXP	
PCI Express x4 to Infiniband x4 Adapter	IB2X4	
PCI Express x4 Edge Connector to Infiniband x4 Adapter	IB2X4E	
PCI Express x16 to x1 Adapter	PEA1621	
PCI Express x16 to x4 Adapter	PEA1624	
PCI Express x16 to x8 Adapter	PEA1628	
PCI Express x16, 50 ohm Bus Termination Adapter	PETERMX	
PCI Express Loop Back Adapter (Tx to Rx Bus for Link Training Verification)	PELOOP-BACK	
PCI Express x16 Right Angle Adapter (A Side Up)	PEART16A	
PCI Express x16 Right Angle Adapter (B Side Up)	PEART16B	

Product	Part Number	Image
PCI Express Card to ExpressCard Slot Adapter	PCIE2EXP	
PCI Express MINI Card to ExpressCard Slot Adapter	MINI2EXP	
PCI Express MINI to PCI Express Slot, Passive Adapter	MINI2PCIE	
ExpressCard to PCI Express Slot, Passive	EXP2PCIE	
VPX Host Side Adapter (connects VPX Expansion Card to PCIe Card Slot)	PE-VPX-2-X16SLOT	
VPX Device Side Adapter (connects PCIe Expansion Card to VPX Backplane)	PE-X16SLOT-2-VPX	
Gen3 SFF-8639 to x4 Slot PCI Express Socket Adapter, for NVMe x4, SCSI Express x2, SATA Express x2	PE-8639-2-x4SLOT-01-X	
Gen3 SFF-8639 x2 Port B to x4 PCI Express Adapter for Dual Port Drives	PE-8639BP-2-X2SLOT-01-X	
Gen3 M.2 M-Key to x4PCI Express Slot Adapter, supports PCIe x1, x2 and x4 (Socket 3)	PE-M-2M-2-X4SLOT-X	
Gen3 M.2 B-Key to x4PCI Express Slot Adapter, supports PCIe x1 and x2 (Socket 2)	PE-M-2B-2-X2SLOT-X	

General Purpose Adapters and Extenders

Product	Part Number	Image
PCIe U.2. Dual Port Transposer, Set of 4	PE-U2-DUAL-PORT-TRANSPOSER-X	
Gen3 M.2 B-Key to x4 PCI Express Slot Socket Adapter, supports PCIe x1 and x2 (socket 2)	PE-M.2B-2-X2SLOT-X	
Gen3 M.2 M-Key to x4 PCI Express Slot Socket Adapter, supports PCIe x1, x2 and x4 (socket 3)	PE-M.2M-2-X4SLOT-X	

Product	Part Number	Image
Gen3/Gen2 Interposer to Gen4 High Speed Connector Adapter Cable, 1 meter *All interposers can be used by the Summit T416 analyzer if the G3/G2 to G4 adapter cable is used as the cable that connects between the analyzer and the interposer.*	PE016UCA-X	
PCIe External Cable 3.0 Adapter; supports up to x16 linkwidth	PE=ExtCables3.0-X16SLOT-X	
PCI Express Gen4 xOCuLink Adapter	PE-OCU4.0-2-X16SLOT-X	

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