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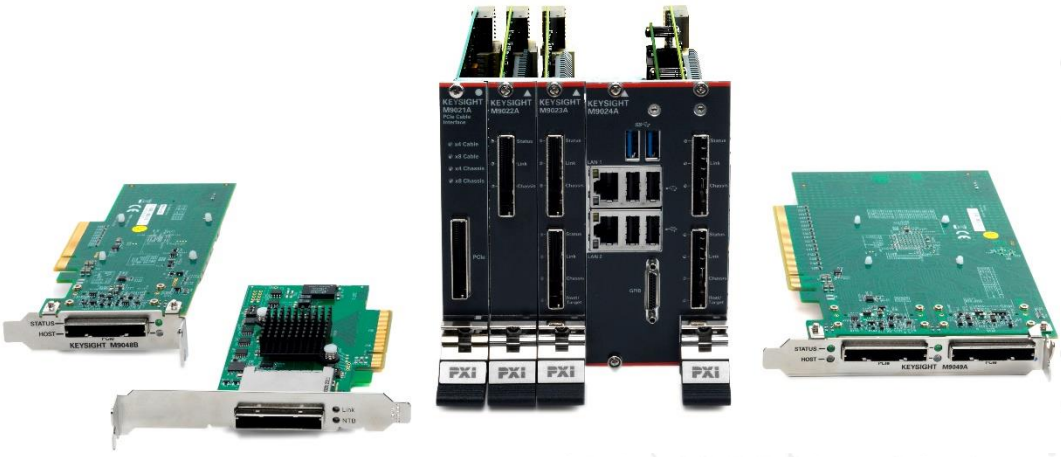
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Find the *Keysight / Agilent M9048B* at our website: ***Click HERE***

DATA SHEET

Interface Modules and Adapters

PXIe and AXIe systems



KEYSIGHT TECHNOLOGIES

Overview

Achieve a high performance and reliable connection from a remote or embedded computer to a single, or multiple chassis with the Keysight Technologies, Inc. PCIe and PXIe interface modules. Keysight's high performance Gen 2 and Gen 3 interface modules enable connections from your PC, remote or embedded, to a PXIe or AXIe test system or to multiple PXIe or AXIe chassis.

With the dual port system and host modules, you can achieve the highest performance (x16) connection from a remote PC to a PXIe chassis. The dual port modules can also be used in a dual x8 mode to connect two chassis to a single PC or to daisy-chain to a second chassis without using valuable instrument slots. Place LAN, USB and GPIB directly in the chassis using the connectivity expansion module for ease of test system integration in an instrument rack.

Remote PC PCIe Host Desktop Adapters for PXIe and AXIe Systems

- M9048A PCIe desktop PC adapter: x8, Gen 2
- M9048B PCIe Host Adapter: x8, Gen 3
- M9049A PCIe Host Adapter: dual x8 or x16, Gen 3

Product Description

The host desktop adapter cards plug into your remote computer's PCIe slot to provide a high performance link between the computer and a PXIe or AXIe chassis. The M9048A/B and M9049A host adapters include a PCIe switch and clock isolation for a high-quality clock source driven down the PCIe cable to the PXIe or AXIe chassis. This provides a consistent Gen 2 or Gen 3 link independent of the remote computer. The cards are compatible with desktop or rackmount computers with either x8 or x16 PCIe expansion slots. Use the Y1202A or Y1203A cables to connect the host adapter cards to any PXIe chassis or AXIe chassis. Refer to the example configuration section for details.



For a single x8 connection, choose from the standard performance M9048A and mid-performance M9048B host adapter cards. A high performance x16 connection to a chassis can be achieved using the M9049A which is equipped with dual PCIe x8 cable connectors. The M9049A's dual x8 connections can also be used to connect two chassis to an external PC. Refer to typical configurations (page 9) for details.

Features and Benefits

Product Feature	Test System Benefit
PC host clock isolation	Provides superior computer compatibility
IDT or PLX PCIe switch	Compatibility with PCs that have Gen 3 PCIe slots
Gen 3, x8 and x16 PCIe capability[1]	Enables high-performance applications
Standard PCIe over cable	Connects a PXIe or AXIe chassis to PCs with expansion slots
Transparent operation with application software	Delivers ease of installation

Product Characteristics

Characteristic	M9048A	M9048B	M9049A
Card format	Low profile	Low profile	Standard profile
PCI bracket	Includes low and standard profile	Includes low and standard profile	Standard
Dimensions	55 mm (2.2 in) x 114 mm (4.5 in)	56.15 mm (2.2 in) x 141 mm (5.5 in)	111.15 mm (4.4 in) x 167.65 mm (6.6 in)
Computer slot compatibility	x8 Gen 2 or Gen 3[2] x16 Gen 2 or Gen 3[2,3]	x8 Gen 2 or Gen 3 x16 Gen 2 or Gen 3[3]	x16 Gen 2 or Gen 3
PCIe cable link[4]	x8, Gen 2	x8 Gen 3	Dual x8, or single x16, Gen 3
Max data BW[5]	4 GB/s	8 GB/s	16 GB/s (x16 mode)
Card indicators	Link status and transport mode	Link status	Link status
Cable connectors	One x8 PCIe iPass	One x8 PCIe iPass	Two x8 PCIe iPass
Cable length	Up to 2-meter passive cable	Up to 2-meter passive cable	Up to 2-meter passive cable, active optical cables also supported
Power consumption	7 W (typical) 2.1A at 3.3V	9W (max) 0.68A at12V, 0.33A at 3.3V	16.8W 1.4A at 12V
Operating temperature[6]	0° C – 55° C	0° C – 55° C	0° C – 55° C
Storage Temperature[6]	-40° C – 70° C	-40° C – 70° C	-40° C – 70° C
Operating altitude[6]	up to 3048m	up to 3048m	up to 3048m
Storage altitude[6]	up to 4572m	up to 4572m	up to 4572m
Humidly[6]	Type-tested at 95% RH (non-condensing)	Type-tested at 95% RH (non-condensing)	Type-tested at 95% RH (non-condensing)

[1] Does not apply to the M9048A

[2] The M9048A is designed to be compatible with most Gen 3 PCIe computer slots but the link will train to Gen 2.

[3] Designed to be compatible with most x16 computer slots but the link will be x8

[4] Dependent on PXIe system slot capability

[5] Dependent on PC slot capability and link speed

[6] May be limited by the PC used

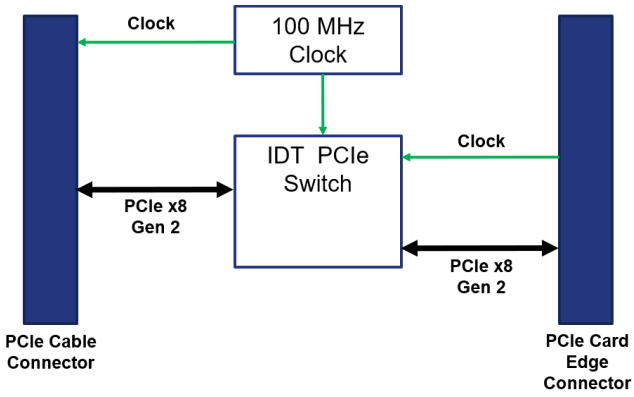


Figure 1. M9048A Block Diagram

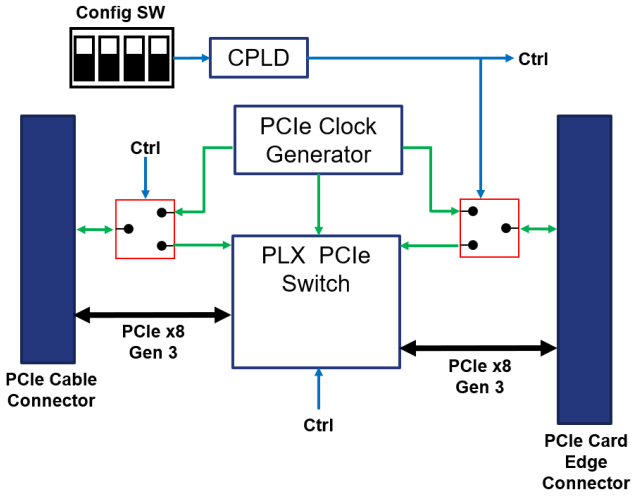


Figure 2. M9048B Block Diagram

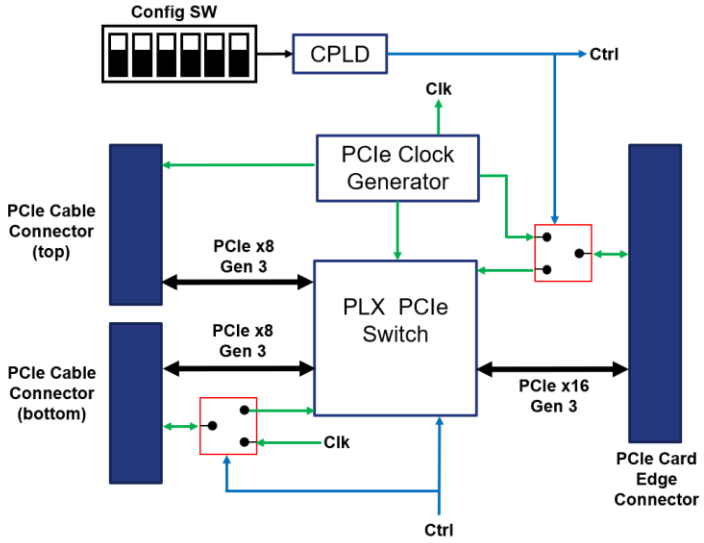


Figure 3. M9049A Block Diagram

System and Cable Modules for PXIe Systems

- M9021A PCIe Cable Interface: x8, Gen 2
- M9022A PXIe Single Port Performance System Module: x8, Gen 3
- M9023A PXIe Dual Port System Module: dual x8 or x16, Gen 3
- M9024A PXIe Dual Port System Module with Connectivity Expansion: twoGigabit LAN, two USB 3.0, four USB 2.0, GPIB, dual x8 or x16, Gen 3

Product Description

The PXIe interface modules are installed in the system slot and can be combined with a host adapter to provide a high data BW connection between the host PC and the chassis. They can also be used together (or with an M9037A PXIe embedded controller) to interconnect chassis in a multi-chassis system without using an instrument slot. The chassis module connections are transparent to software applications and allow direct control of PXIe and AXIe modules. Refer to typical configurations (page 9) for details.



The M9021A PCIe cable interface provides a standard performance (x8 Gen 2) link between the M9018B PXIe 18-slot chassis and an external computer. The M9021A utilizes special features built into the M9018B PXIe chassis and is not compatible with the PXIe system slot in other PXIe chassis.

Use the mid-performance M9022A single port, x8 PXIe system module in a controller slot of any PXIe chassis.

The high performance M9023A PXIe dual port system module, installed in the chassis system slot, offers two possibilities for connection:

- x16 connections from an external computer to a PXI chassis
- Dual x8 connection for multi-chassis systems (one x8 to remote PC, one x8 to second chassis). They can also be used to connect an AXIe chassis to a PXIe chassis.

The M9024A PXIe dual port system module with connectivity expansion provides the same dual (x8) ports as the M9023A plus 2 LAN ports, 4 USB 2.0 ports, 2 USB 3.0 ports and GPIB connections for easy system integration connections directly in the chassis. Only a single M9024A can be used in a multi-chassis system.

Features and Benefits

Product Feature	Test System Benefit
High performance speeds with your choice of x8 or x16 PCIe links	Large data rate supports high-performance applications
Standard PCIe over cable	Use with any computer an x8 or x16 PCIe interface
Transparent operation with application software	Delivers ease of installation
Target and host modes	Enables large PXIe systems or mixed PXIe/AXIe system with a single controller

Product Characteristics

Characteristic	M9021A[7]	M9022A	M9023A	M9024A
Module size	1 slot 3U PXI	1 slot 3U PXI	1 slot 3U PXI	3 slot 3U PXI (includes 2 controller expansion slots)
PCIe cable link	x8, Gen 2	x8, Gen 3	Dual x8, or single x16, Gen 3	Dual x8, or single x16, Gen 3
PXIe backplane link[8]	x8, Gen 2	4x4 or x8, x16 Gen 3	4x4 or x8, x16 Gen 3	4x4 or x8, x16 Gen 3
Maximum data BW To external PC To PXIe backplane Between chassis	 4 GB/s 4 GB/s 2 GB/s	 8 GB/s 8 GB/s (Gen 3 chassis) NA	 16 GB/s (x16 mode) 16 GB/s (to Gen 3 chassis) 8 GB/s (Dual x8 mode)	 16 GB/s (x16 mode) 16 GB/s (to Gen 3 chassis) 8 GB/s (Dual x8 mode)
Front panel indicators	Link status and link size	Module status, host and backplane connection status	Module status, host and backplane connection status and second port transport mode	Module status, host and backplane connection status, and second port transport mode
Front panel connectors	One x8 PCIe iPass	One x8 PCIe iPass	Two x8 PCIe iPass	Two x8 PCIe iPass, GP-IB, four USB 2.0, two USB 3.0, and two RJ45
Cable length	Up to 2-meter passive cable	Up to 2-meter passive cable	Up to 2-meter passive cable	Up to 2-meter passive cable
Power consumption	5W (typical)	27.5W (max) 2A at12V, 1A at 3.3V, 0.05A at 5Vaux	33.5W (max) 2.5A at 12V, 1A at 3.3V, 0.05A at 5Vaux	67.7W (max) 4.4A at 12V, 2.5A at 3.3V, 1.3A at 5V, 0.05A at 5Vaux
Operating temperature	0° C – 55° C	0° C – 55° C	0° C – 55° C	0° C – 55° C
Storage temperature	-40° C – 70° C	-40° C – 70° C	-40° C – 70° C	-40° C – 70° C
Operating altitude	up to 3048m	up to 3048m	up to 3048m	up to 3048m
Storage altitude	up to 4572m	up to 4572m	up to 4572m	up to 4572m
Humidity (non-condensing)	Type-tested at 95% RH	Type-tested at 95% RH	Type-tested at 95% RH	Type-tested at 95% RH

[7] M9021A supported only in the M9018B

[8] Dependent on chassis capability

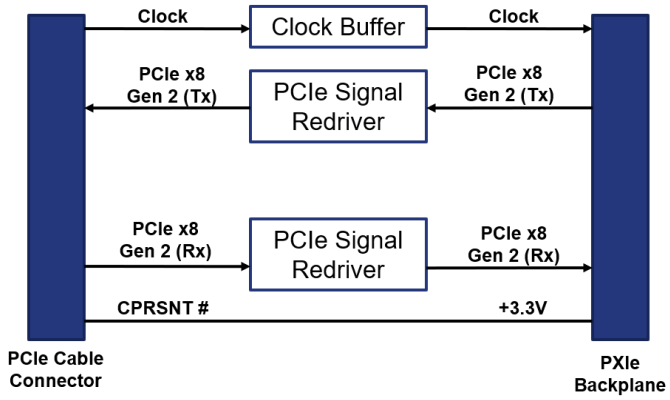


Figure 4. M9021A Block Diagram

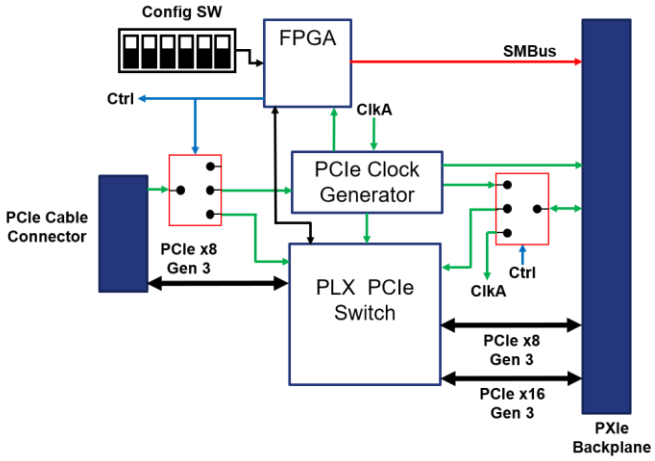


Figure 5. M9022A Block Diagram

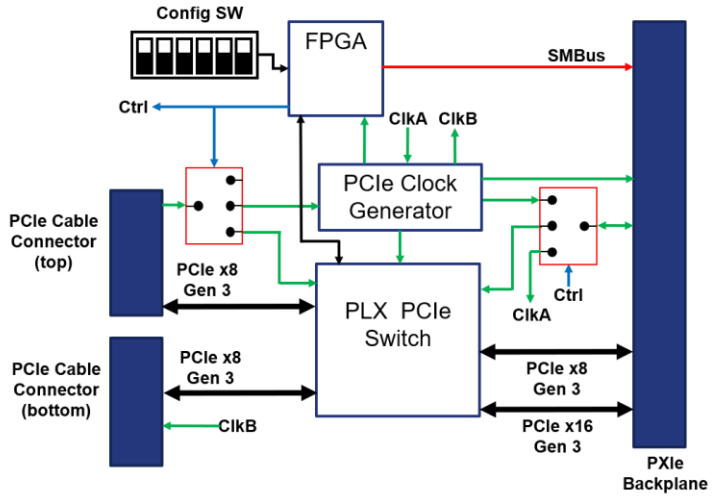


Figure 6. M9023A Block Diagram

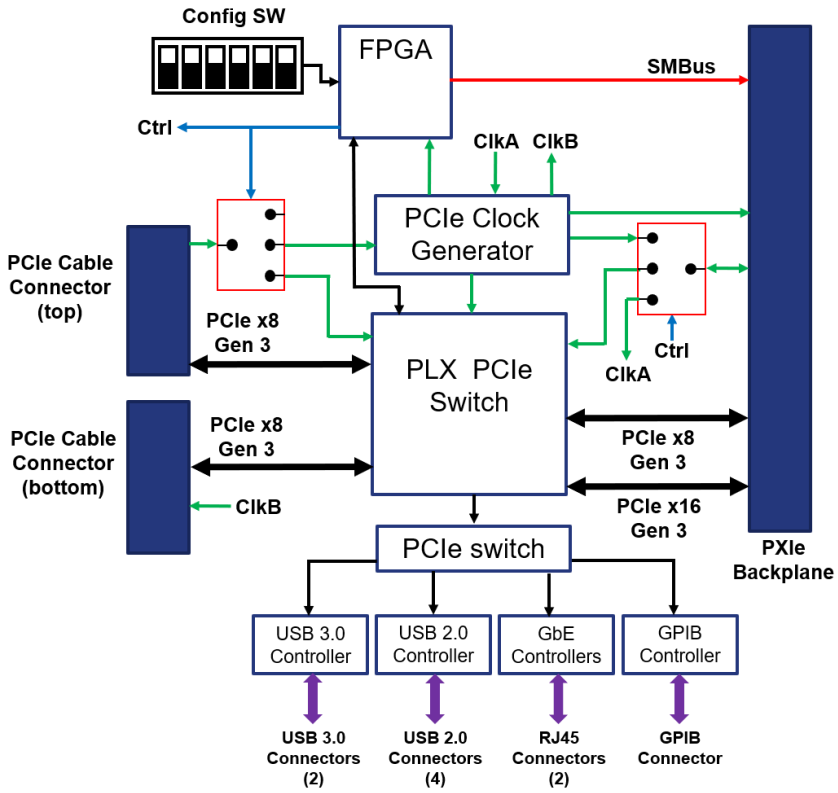


Figure 7. M9024A Block Diagram

Typical Configurations

External PC configurations

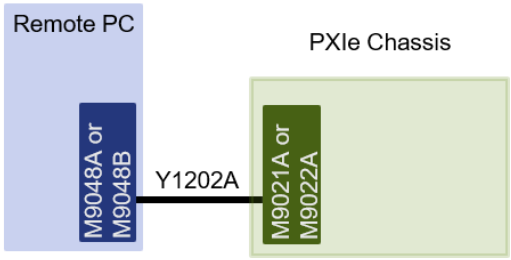


Figure 8. Use the M9048A with the M9021A in the M9018B (x8 Gen 2) or M9048B with the M9022A in all PXIe chassis (x8 Gen 3 cable link). Chassis link depends on chassis capability

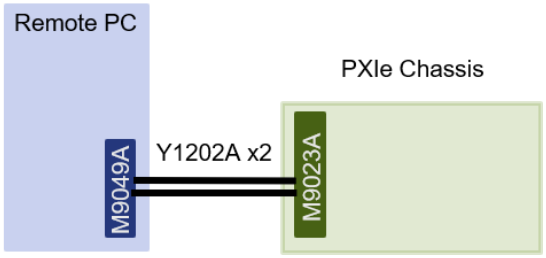


Figure 9. Use the M9048B with M9023A for the highest-performance. Cable link is x16 Gen 3, chassis link depends on chassis capability

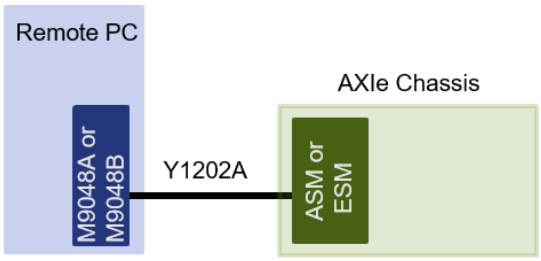


Figure 10. Use either the M9048A with the M9502A/05A (x8 Gen 2) and M9048B with the M9521A/M9514A (x8 Gen 2)

Multi-chassis external PC configurations

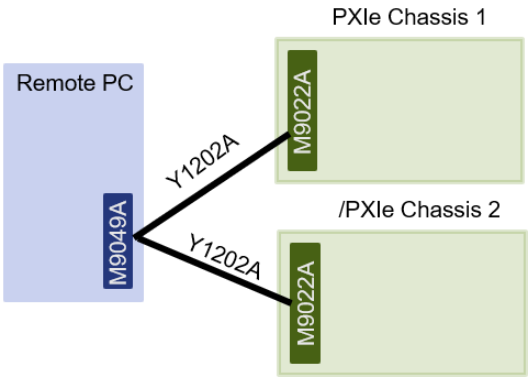


Figure 11. Use the M9049A for mid-performance (x8) connections from a remote PC to two PXIe Chassis. Cable and chassis link depends on chassis capability (up to Gen 3).

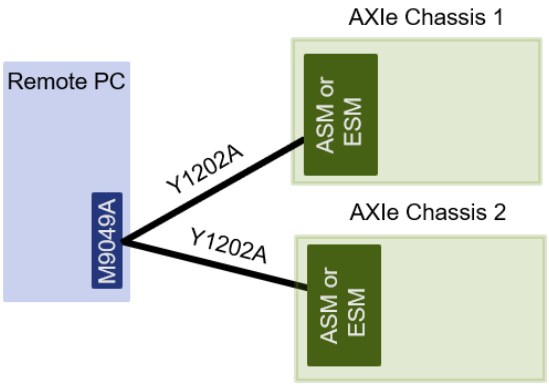


Figure 12. The M9049A can also be used for mid-performance (x8) connections from a remote PC to two AXIe Chassis. PXIe and AXIe chassis can also be combined. Cable and chassis link depends on chassis capability (up to Gen 3).

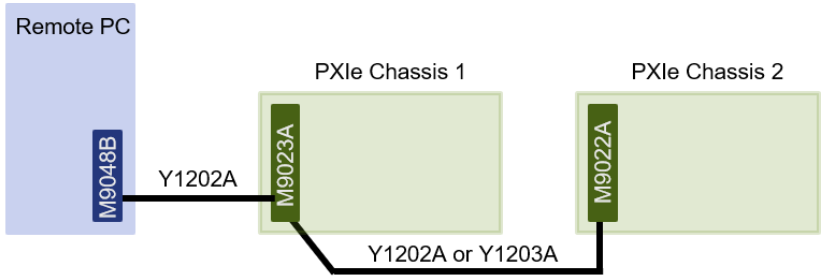


Figure 13. Combine the M9048B, M9022A, and M9023A for mid-performance (x8) connections from a remote PC for multiple PXIe chassis (up to a total of four), depending on PC capability. Cable link is Gen 3, chassis link depends on chassis capability (up to Gen 3).

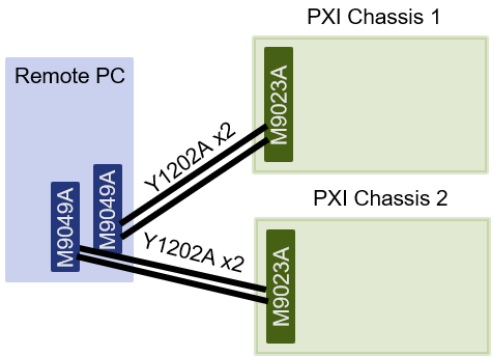


Figure 14. Use multiple M9049A and M9023A for the highest performance with multiple PXIe chassis. Cable link is x16 Gen 3, chassis link depends on chassis capability (up to Gen 3).

Multi-chassis embedded PC configurations

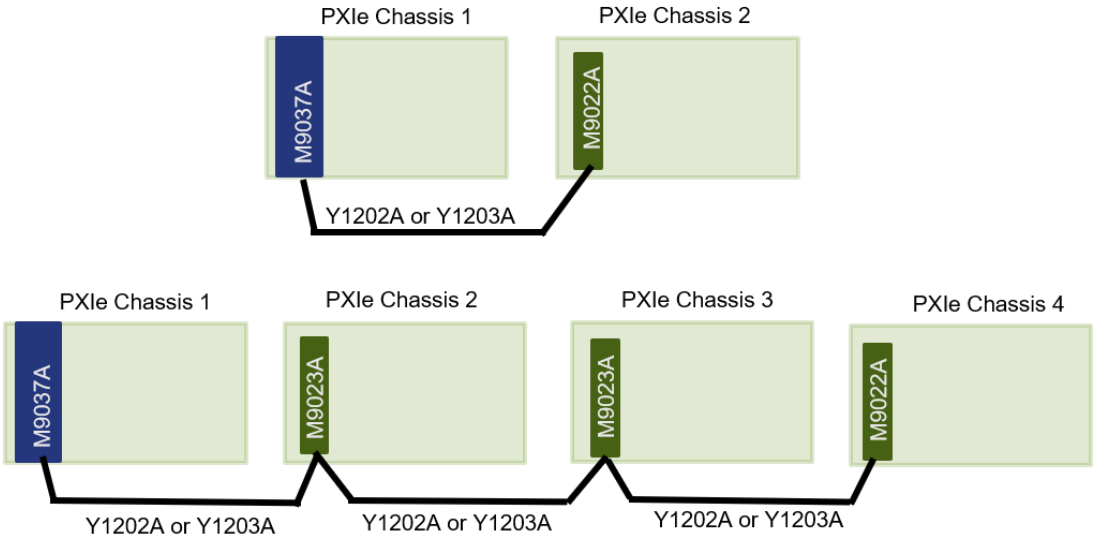


Figure 15. Combine the M9037A with the M9022A for x8 connections from the embedded PC for multiple PXIe chassis (up to a total of four). M9037A cable link depends on the serial number of the M9037A (Gen 3 starting with SN TW57240011 and Gen 1 or 2 before. Contact Keysight for units before TW57240011, for more information). Other cable links are Gen 3. Chassis link depends on chassis capability (up to Gen 3).

M9024A configuration

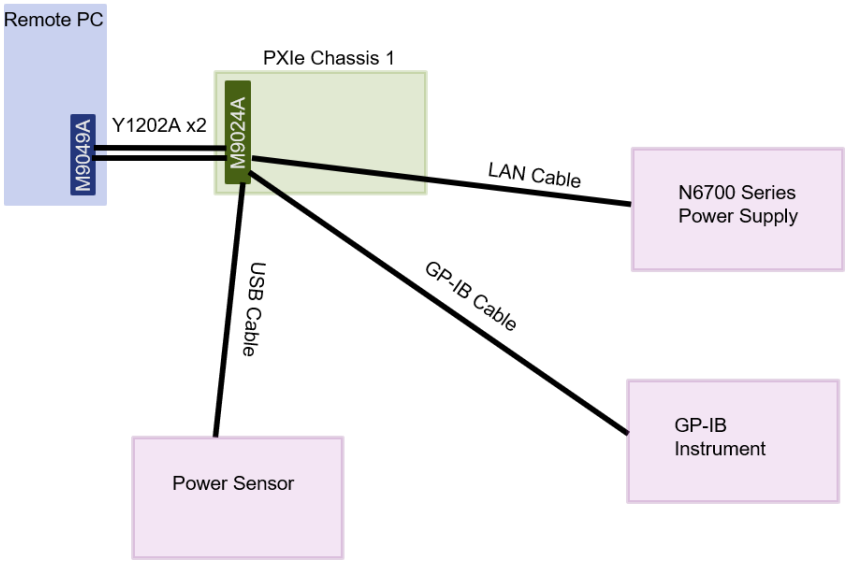
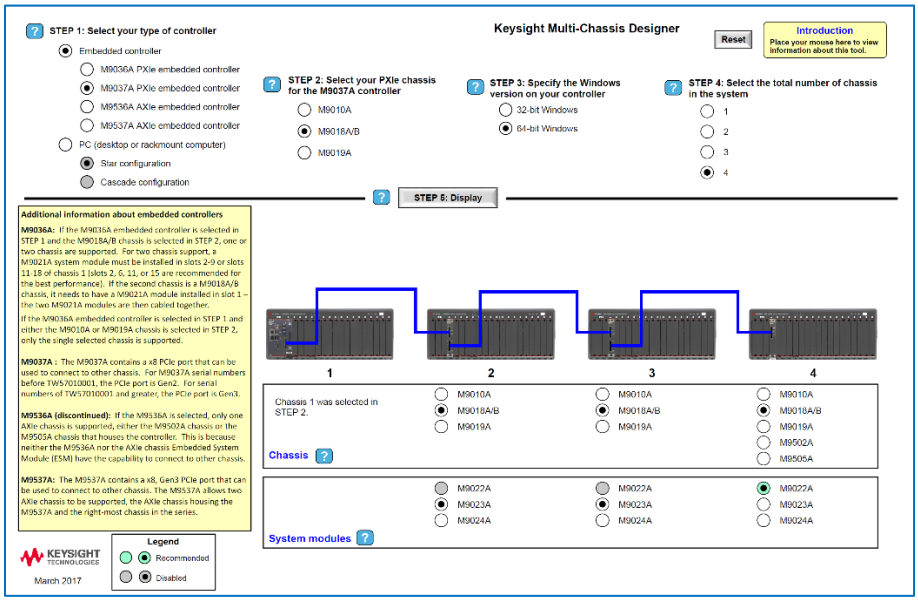


Figure 16. Use the M9024A to connect to multiple instruments from a PXIe chassis. These instruments are connected to the remote PC via the x16 Gen 3 PCIe link. Only a single M9024A can be used in a multi-chassis system.

Multi-chassis Designer

For more information about multi-chassis configurations, download the Keysight Multi-Chassis Designer by going to www.keysight.com/find/pxie-multichassis. This tool can be used to design a system consisting of up to four PXIe and AXIe chassis connected to either an embedded controller (installed in the chassis) or an external PC connected by cable(s) to the chassis. The Multi-Chassis Designer allows you to interactively specify your system parameters, and then it will design a multi-chassis system according to your specifications.



Ordering Information

Software

Supported Software Components	
Supported Operating systems	Microsoft Windows 7 (32/64-bit) or Windows 10 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW
Driver Support	Requires M902x PXIe system module driver (no driver is required for M904xA PCIe interfaces)
Keysight IO libraries	Version 2018 (or greater)

Hardware

Model	Description
M9048A	PCIe host adapter: single port (x8), Gen 2
M9048B	PCIe host adapter: single port (x8), Gen 3
M9049A	PCIe host adapter: dual port (x16), Gen 3
M9021A	PCIe cable interface: single port (x8), Gen 2
M9022A	PXIe system module: single port (x8), Gen 3
M9023A	PXIe high performance system module: dual port (x16) Gen 3
M9024A	PXIe high performance system module with connectivity expansion: dual port (x16) Gen 3
Accessories	
Y1202A	PCIe cable: x8, 2.0m
Y1203A	PCIe cable: x8, 0.5m
Related Products	
M9018B and M9019A	18-slot PXIe chassis Gen 2 or Gen 3
M9010A	10-slot PXIe chassis, Gen 3
M9502A and M9505A	AXIe chassis, 2- and 5-slot

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