PXIe System Modules and Adapters

PXIe and AXIe systems

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 system modules. Keysight's high performance Gen 2 and Gen 3 system 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.

KEYSIGHT

Remote PC PCIe Host Desktop Adapters for PXIe and AXIe Systems

- 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 M9048B 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 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 the mid-performance M9048B host adapter card. 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 10) for details.

Features and benefits

| Product feature	Test system benefit
PC host clock isolation	Provides superior computer compatibility
BCOM PCIe switch	Compatibility with PCs that have Gen 3 PCIe slots
Gen 3, x8 and x16 PCIe capability	Enables high-performance applications
Standard PCIe over cable	Connects a PXIe or AXIe chassis to PCs expansion slots
Transparent operation with application software	Delivers ease of installation

Product characteristics

Characteristics	M9048B	M9049A
Card format	Low profile	Standard profile
PCI bracket	Includes low and standard profile	Standard
Dimensions	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 x16 Gen 2 or Gen 3[1]	x16 Gen 2 or Gen 3
PCIe cable link[2]	x8 Gen 3	Dual x8, or single x16, Gen 3
Max data BW[3]	8 GB/s	16 GB/s (x16 mode)
Card indicators	Link status	Link status
Cable connectors	One x8 PCIe iPass	Two x8 PCIe iPass
Cable length	Up to 2-meter passive cable	Up to 2-meter passive cable, active optical cables also supported
Power consumption	9W (max) 0.68A at 12V, 0.33A at 3.3V	16.8W 1.4A at 12V
Operating temperature[4]	0° C – 55 °C	0° C – 55 °C
Storage temperature[4]	-40° C – 70 °C	-40° C – 70 °C
Operating altitude[4]	Up to 3048m	Up to 3048m
Storage altitude[4]	Up to 4572m	Up to 4572m
Humidity[4]	Type tested at 95% RH (non-condensing)	Type tested at 95% RH (non-condensing)

1. Designed to be compatible with most x16 computer slots but the link will be x8
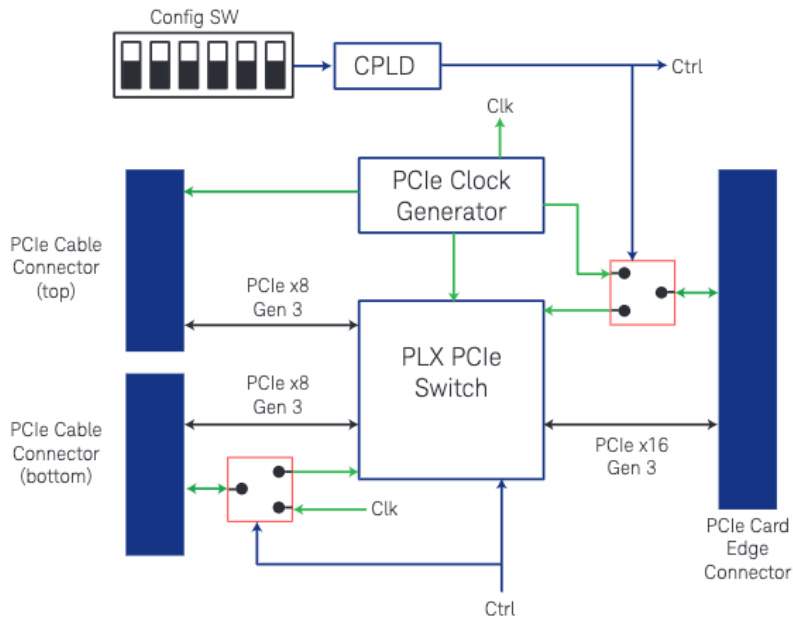2. Dependent on PXIe system slot capability
3. Dependent on PC slot capability and link speed
4. May be limited by the PC used
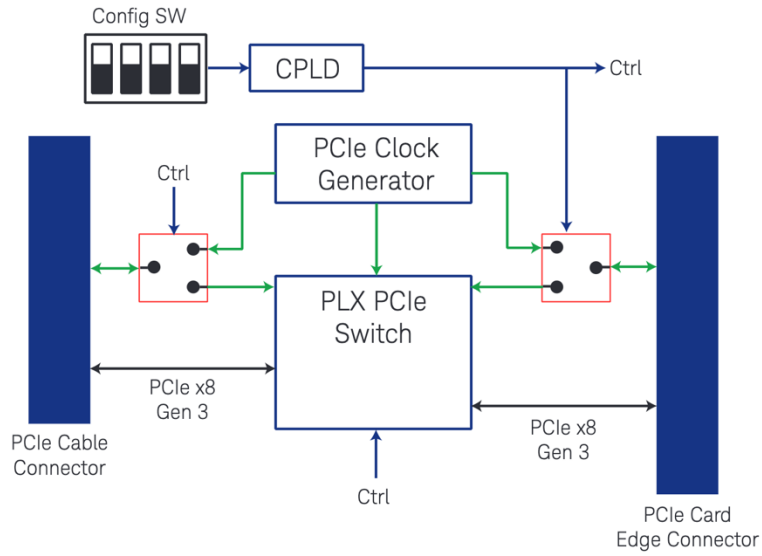
Figure 1. M9048B block diagram

Figure 2. M9049A block diagram

System and Cable Modules for PXIe Systems

- 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: two Gigabit LAN, two USB 3.0, four USB 2.0, GPIB, dual x8 or x16, Gen 3
- M9025A PXIe Thunderbolt™ System Module

Product description

The PXIe system 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 a 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 10) for details

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.

The M9025A PXIe Thunderbolt system module offers an alternative to PCIe for chassis and computer link with two Thunderbolt 3.0 USB-C, PD-capable ports.

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

Characteristics	M9022A	M9023A	M9024A	M9025A
Module size	1 slot 3U PXI	1 slot 3U PXI	1 slot 3U PXI	1 slot 3U PXI
PCIe cable link	x8, Gen 3	Dual x8 or single x16, Gen 3	Dual x8 or single x16, Gen 3	Thunderbolt 3.0
PXIe backplane link[1]	4x4 or x8 x16, Gen 3	4x4 or x8 x16, Gen 3	4x4 or x8 x16, Gen 3	4x4 or 2x8, Gen 3

Maximum data BW
  To external PC
  To PXIe backplane
  Between chassis
	8 GB/s
	8 GB/s
	N/A
		16 GB/s
		16 GB/s
		8 GB/s
			16 GB/s
			16 GB/s
			8 GB/s
				22 Gb/s[2]
				22 Gb/s[6]
				N/A

Front panel indicators	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	Module status, host connection status
Front panel connectors	One x8 PCIe iPass	Two x8 PCIe iPass	Two x8 PCIe iPass, GPIB, four USB 2.0, two USB 3.0, and two RJ45	Two Thunderbolt 3.0 USB-C PD-capable[3]
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	27.5W (max)	33.5W (max)	67.7W (max)	36.61W[4]
Operating temperature	0 ºC – 55 ºC	0 ºC – 55 ºC	0 ºC – 55 ºC	0 ºC – 55 ºC
Storage temperature	-40 ºC – 70 ºC	-40 ºC – 70 ºC	-40 ºC – 70 ºC	-40 ºC – 70 ºC
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

1. Dependent on chassis capability
2. Limited by Thunderbolt 3 data bandwidth
3. Supported USB-PD profiles: 5V @ 3A, 9V @ 3A, 12V @ 3A, 15V @ 2.5A
4. Not including USB-PD output power
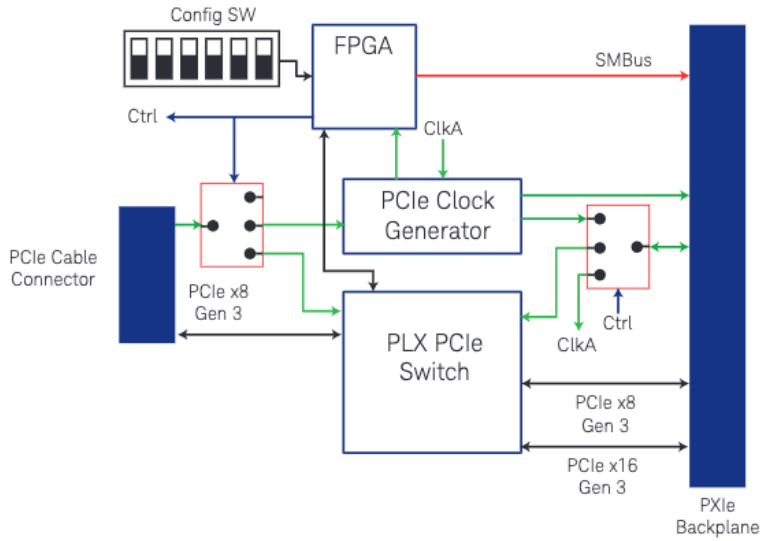
Figure 3. M9022A block diagram
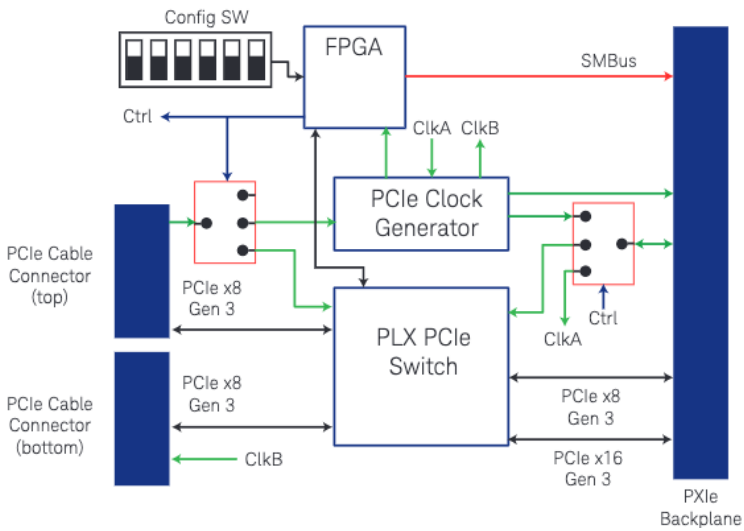
Figure 4. M9023A block diagram
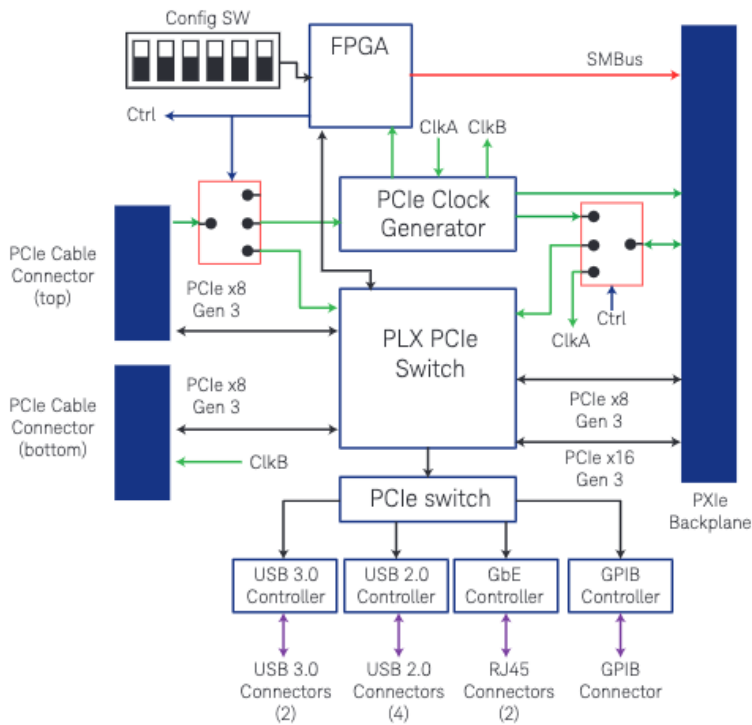
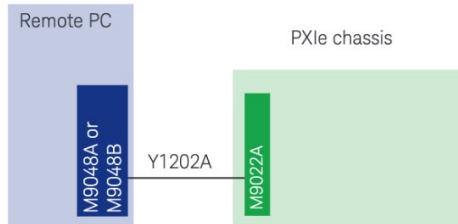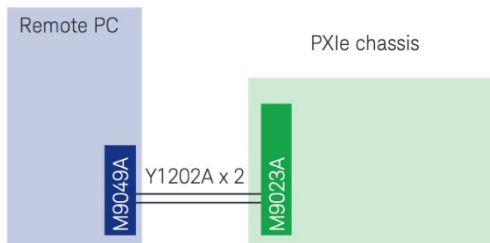**Figure 5.** M9024A block diagram
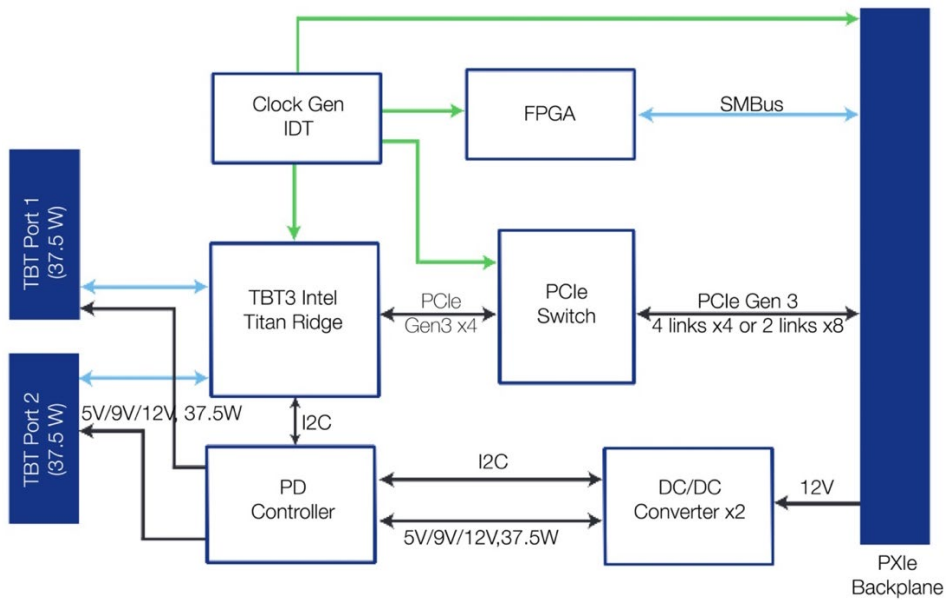
Figure 6. M9025A block diagram
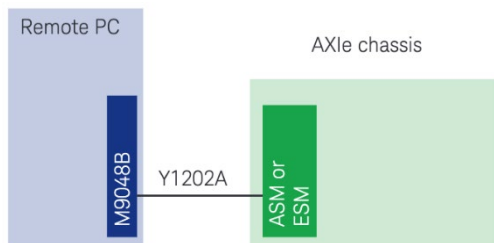
Typical Configurations

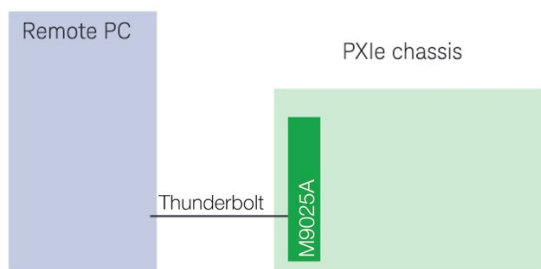## External PC configurations

Figure 7. Use the M9048B with the M9022A in all PXIe chassis (x8 Gen 3 cable link). Chassis link depends on chassis capability

Figure 8. Use the M9048B with M9023A for the highest- performance. Cable link is x16 Gen 3, chassis link depends on chassis capability
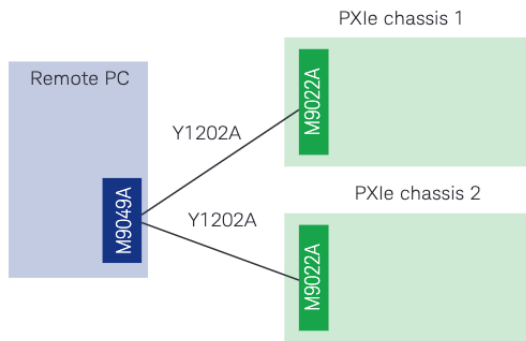

Figure 9. Use the M9048B with the M9521A/M9514A (x8 Gen 2)

Figure 10. Use the M9025A with remote PC with a Thunderbolt 3 port.

Multi-chassis external PC configurations

Figure 10. 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).
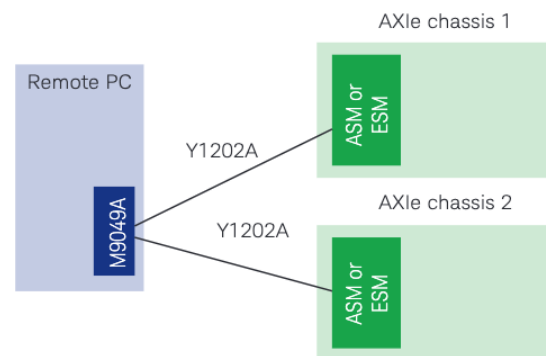
Figure 11. The M9049A can also be used for mid-performance (x8) connections from a remote PC to two AXIe Chassis. PXIe and AXIe chassis can also be combined. Cable and chassis link depends on chassis capability (up to Gen 3).
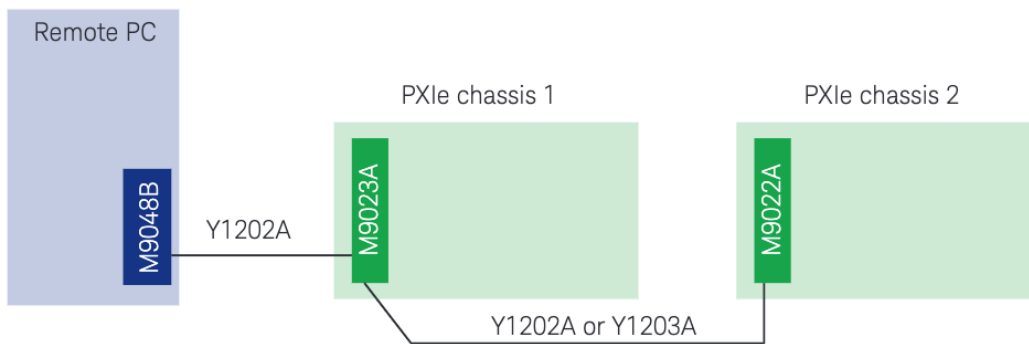
Figure 12. Combine the M9048B, M9022A, and M9023A for mid-performance (x8) connections from a remote PC for multiple PXIe chassis (up to a total of four), depending on PC capability. Cable link is Gen 3, chassis link depends on chassis capability (up to Gen 3).
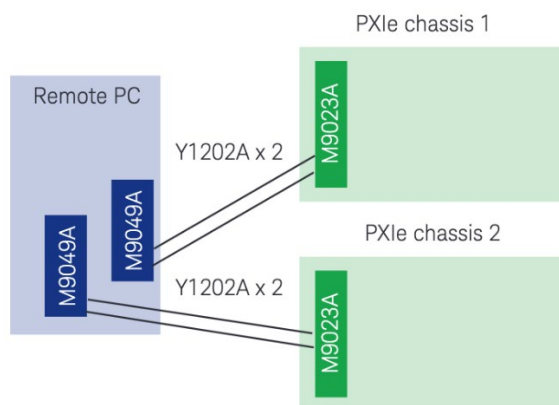
Figure 13. Use multiple M9049A and M9023A for the highest performance with multiple PXIe chassis. Cable link is x16 Gen 3, chassis link depends on chassis capability (up to Gen 3).

Multi-chassis embedded PC configurations
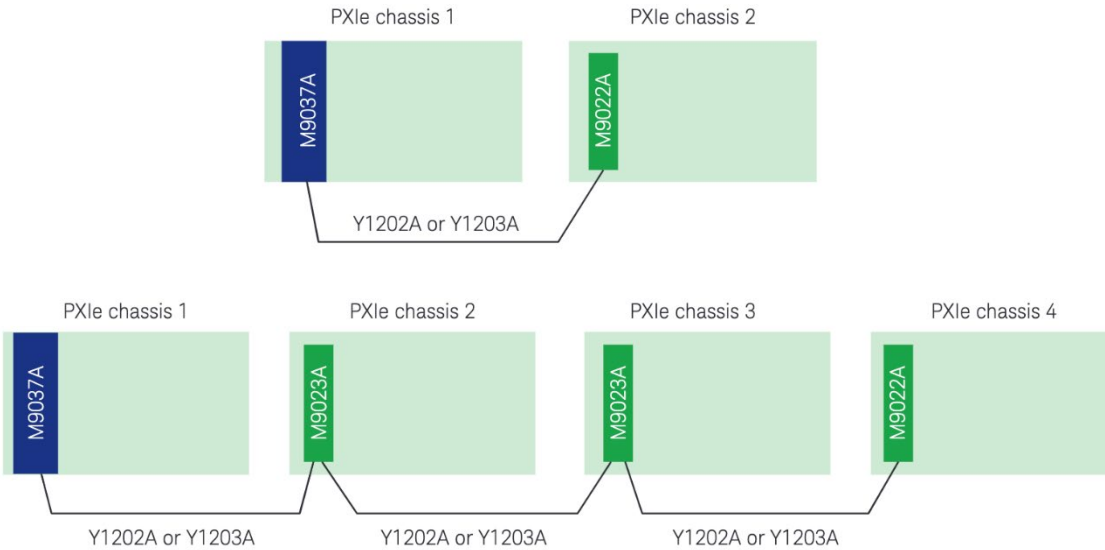
Figure 14. Combine an M9037A PXIe Embedded Controller with the M9022A for x8 connections from the embedded PC for multiple PXIe chassis (up to a total of four). Controller cable link depends on the serial number of the M9037A (Gen 3 starting with SN TW57240011 and Gen 1 or 2 before. Contact Keysight 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
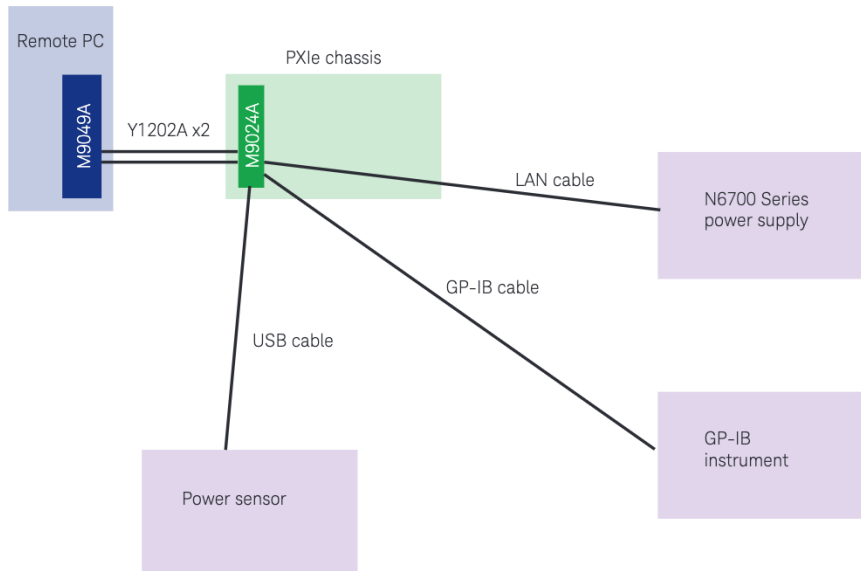
Figure 15. Use the M9024A to connect to multiple instruments from a PXIe chassis. These instruments are connected to the remote PC via the x16 Gen 3 PCIe link. Only a single M9024A can be used in a multi-chassis system.

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

Review www.keysight.com/find/PXIAXIeTestedPC for the supported computers list.
Review www.keysight.com/find/ResolvePXIAXIeComProblems for diagnostic procedures on chassis communication issues.

Software

Supported software components

Supported Operating systems (pre-installed)	Microsoft Windows 7 (32/64-bit) or Windows 10 Enterprise LTSC (64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabView
Driver support	Requires M902x PXIe system module driver
Keysight IO libraries Suite (pre-installed)	Version 2018 (or greater)

Hardware

Model	Description
M9048B	PCIe host adapter: single port (x8), Gen 3
M9049A	PCIe host adapter: dual port (x16), Gen 3
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
M9025A	PXIe Thunderbolt system module

Accessories	Description
Y1202A	PCIe cable: x8, 2.0m
Y1203A	PCIe cable: x8, 0.5m
Y1205A	USB-C Cable with Screw Lock

Related products	Description
M9019A	18-slot PXIe Chassis, Gen 3
M9046A	18-slot PXIe High Performance, Gen 3
M9010A	10-slot PXIe Chassis, Gen 3
M9502A	2-slot AXIe Chassis
M9505A	5-slot AXIe Chassis
M9506A	5-slot AXIe High Performance Chassis

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