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Keysight Technologies

M9005A PXIe Chassis

Integrated System Module, 5-slots, 3U

Data Sheet



KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

Introduction

The Keysight Technologies, Inc. M9005A PXIe 5-slot chassis is the smallest footprint family member of Keysight's PXIe chassis product line. It has been designed as a low cost, bench friendly solution while still enabling PXIe compatibility and performance. The integrated system module enables a solution that is fast and easy to setup. The combination of footprint, cost, and performance make it a perfect entry-level chassis for many applications.

Key Features

- Small footprint, bench friendly, 4U PXIe chassis
- 5 peripheral slots: 3 PXIe hybrid slots, 2 PXIe-only slots
- Integrated PXIe Gen1 x1 system module for use with desktop host adapter
- Up to 250 MB/s total system bandwidth
- Up to 250 MB/s per-slot data bandwidth
- Specified up to 50 °C and 2000 m operating conditions



Hardware Overview

Backplane configuration

The M9005 PXIe chassis provides 5 peripheral slots: 3 hybrid-compatible slots and 2 PXI Express for a combination of measurement flexibility and performance. Each slot has a PCIe® x1 Gen 1 link to the upstream PC. Each hybrid peripheral slot can accept a PXI Express peripheral module, a CompactPCI Express Type-2 peripheral, or a PXI-1 module which has the J2 connector replaced with the XJ4 connector. The hybrid slots provide full PXI Express and 32-bit PXI functionality.

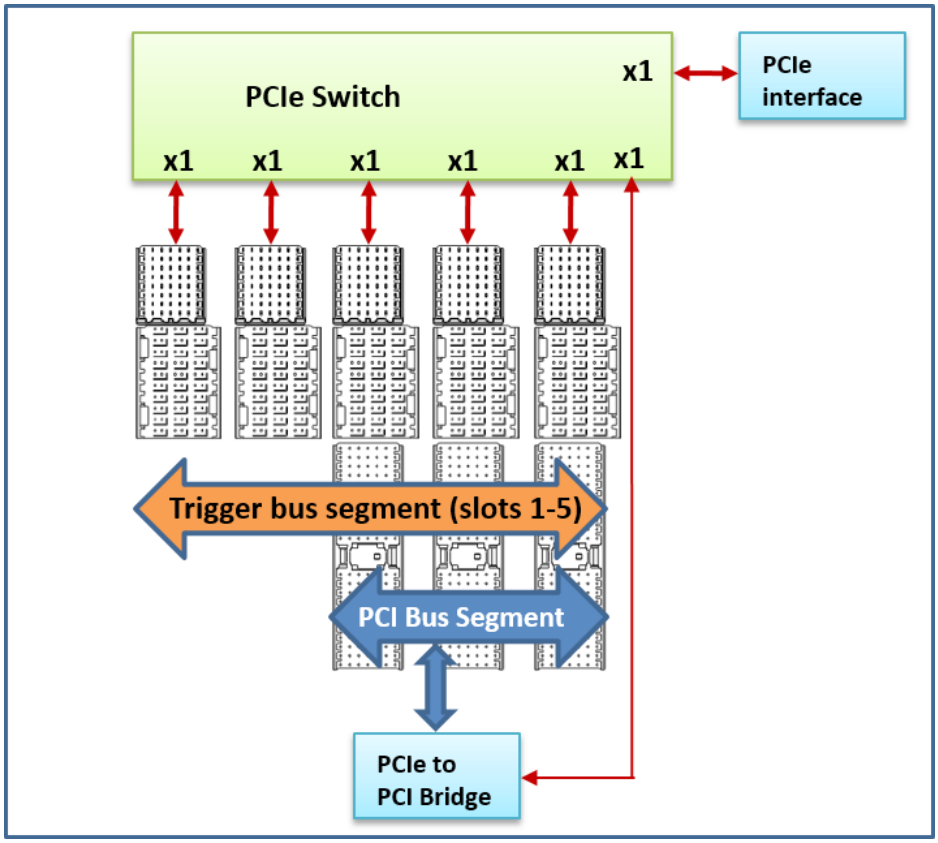


Figure 1. Backplane configuration diagram of the M9005A PXIe 5-slot chassis.

Software Overview

The M9005A provides a simple use model. The only necessary software is low level chassis driver which allows the system PXI resource manager to enumerate the M9005A chassis and the installed modules.

Keysight Standard Warranty

With Keysight's standard warranty, your investment is protected by Keysight's global reach in more than 100 countries (either directly or through distributors). The warranty gives you convenient standard coverage for the country in which the product is used, eliminating the need to ship equipment back to the country of purchase. Keysight's warranty service provides:

- All parts and labor necessary to return your investment to full specified performance
- Recalibration for products supplied originally with a calibration certificate
- Return shipment

Definitions

Specifications

Warranted performance. Specifications include guardbands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions. All specifications and characteristics apply over the operating environment outlined in the "Environmental and Regulatory" section of this data sheet. In addition, the following conditions must be met:

- Instrument is within its calibration cycle if calibration is required.
- Instrument has been stored for a minimum of 1 hour within the operating temperature range prior to turn-on and after a 30 minute warm-up period.

Characteristic

Characteristics describe product performance that is useful in the application of the product, but that is not covered by the product warranty. Characteristics are often referred to as Typical or Nominal values.

Typical

Expected performance of an average unit when operated over a 20 to 30 °C temperature range. Typical performance is not warranted. The instrument must be within its calibration cycle if calibration is required.

Nominal

Nominal describes representative performance that is useful in the application of the product when operated over a 20 to 30 °C temperature range. Nominal performance is not warranted.

Module specifications and configuration

Some module specifications may be affected by chassis characteristics. Refer to module datasheet to determine the configuration used when specifications were set and to ensure module power and cooling requirements are met.

Additional information

All data are measured from multiple units at room temperature and are representative of product performance within the operating temperature range unless otherwise noted.

The specifications contained in this document are subject to change.

Technical Characteristics

Chassis characteristics				
Standards compliance				
PXI-5 PXI Express hardware specification				
PXI-1 hardware specification rev 2.2				
PICMG® EXP.0 R1.0 specification				
Backplane characteristics				
Module size	3U			
Total number of slots	5			
Hybrid compatible slots	3			
PXIe only slots	2			
System slot	Integrated system module. PCIe Revision 1 x1 connection to external controller			
PXIe timing slot	Feature not available in M9005A. Consider M9010A, M9018B, M9019A chassis if required			
Module compatibility (depending on slot)	PXIe, PXI-hybrid, PXI-1 (J1-only), and cPCI (J1-only)			
Backplane speed	PCIe Revision 1.0 (Gen 1). x1 to each instrument slot			
Mechanical characteristics				
Size	257.1 mm W x 189.7 mm H x 212.8 mm D (with feet installed)			
	257.1 mm W x 177 mm H x 212.8 mm D (with feet removed)			
	6U x 1 rack width			
Weight (without modules)	5 kg (11.0 lbs)			
Power supply				
AC input				
Input voltage range	100-240 VAC, nominal			
Input frequency range	50/60 Hz			
Input current rating	4-2 A			
Over current protection	All outputs protected from short circuit			
Available DC output power (for module slots)				
Total DC power				
Maximum total power	150 W			
Per slot power, for each of 5 slots	30 W			
DC supplies				
Voltage	**Maximum current**			
+3.3 V	15 A			
+5 V	7.5 A			
+12 V	15 A			
-12 V	0.75 A			
5 V_{AUX}	1.0 A			
Over-voltage protection				
	Active range			
Over-voltage at	**Minimum**	**Maximum**		
+3.3 V	3.76 V	4.3 V		
+5 V	5.75 V	7.0 V		
+12 V	13.4 V	15.6 V		
Backplane pin current capacity				
Slot	**+3.3 V**	**+5 V**	**+ 12 V**	**-12 V**
PXIe slot	6 A	0 A	4 A	0 A
Hybrid slot	6 A	6 A	4 A	1 A

Technical Characteristics, continued

Chassis cooling and power dissipation	
Slot airflow direction	Bottom of module to top of module
Chassis cooling intake	Bottom of chassis
Chassis cooling exhaust	Along rear, right side, and top of chassis
Chassis cooling fan	One 126 cfm fan on bottom of chassis with High/Auto speed selector
Power dissipation, peripheral slot	38 W
Power supply cooling	Forced air circulation through integrated fan
Power supply cooling intake	Front side of chassis
Power supply cooling exhaust	Rear side of chassis

When placed into an instrument rack or on a bench, maximum per slot power dissipation requires that the chassis bottom and top is not blocked. In an instrument rack, provide 1U rack space below and above the chassis. On the bench, the instrument feet provide the necessary bottom clearance. Slot blockers and EMC filler panels are recommended to be used in empty slots. Module cooling is affected by the module's resistance to air flow.

Clocks and triggers **10 MHz system clock (PXI_CLK10)**	
Maximum slot-to-slot skew	250 ps
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Duty factor	45%-55%
Unloaded signal swing	3.3 V ±0.3 V

External 10 MHz clock output feature is not available in M9005A. Consider M9010A, M9018B, M9019A chassis if required

100 MHz system clock (PXIe_CLK100)	
Maximum slot-to-slot skew	100 ps
Accuracy	±25 ppm max. (guaranteed over the operating temperature range)
Duty factor	45% - 55%
Absolute single-ended voltage swing (when each line in the differential pair has 50 Ω termination to 1.30 V or Thevenin equivalent)	400 to 1000 mV

External 10 MHz clock source input requirements

Feature not available in M9005A. Consider M9010A, M9018B, M9019A chassis if required for synchronization.

PXI star trigger

Feature not available in M9005A. Consider M9010A, M9018B, M9019A chassis if required for synchronization.

PXI differential star triggers

Feature not available in M9005A. Consider M9010A, M9018B, M9019A chassis if required for synchronization.

Host adapter characteristics	
Card format	Low profile
PCI bracket	Includes low and standard profile
Dimensions	6.7 cm x 7.1 cm (2.6 in x 2.8 in)
Computer slot compatibility	PCIe x1, x8, or x16
Maximum cable length	3 m
Sustained data throughput	Up to 215 MB/s
Power consumption	1.2 W (typ), 360 mA @ 3.3 V

Technical Characteristics, continued

Environmental characteristics [1, 2]		
	Operating	**Storage**
Temperature	0 to 50 °C	–40 to 70 °C
Altitude	Up to 6,562 ft (2,000m) at 25 °C ambient	
Humidity	Type-tested 20 to 80%, non-condensing	Type-tested 10 to 95%, non-condensing
Vibration		
Operating random vibration	5 to 500 Hz, 0.3 g rms	
Survival random vibration	5 to 500 Hz, 2.4 g rms	
Acoustical emissions (referenced to 1pW)	**Auto fan (25°C ambient)**	**High fan**
Sound pressure level [3]	43 dBA	58 dBA
Sound power	51 dBA	65 dBA

1. Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use. Those stresses include but are not limited to temperature, humidity, shock, vibration, altitude and power line conditions.
2. Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3
3. At operator position

Regulatory characteristics

Safety

Complies with the essential requirements of the European LVD Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61010-1
- Canada: CSA C22.2 No. 61010-1
- USA: UL std no. 61010-1

Acoustic statement (European Machinery Directive)

- Acoustic noise emmission
- LpA <70 dB
- Operator position
- Normal position Per ISO 7779

EMC

Complies with the essential requirements of the following applicable European Directives, and carries the CE marking accordingly:

Complies with European EMC Directive 2014/30/EU of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61326-1 Basic Immunity
- CISPR pub 11 group 1, class A
- AS/NZS CISPR 11
- ICES/NMB-001

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada

Recommended Configuration

Configure the Keysight M9005A PXIe chassis as follows:

- Add the PC interface card
- The host adapter comes preconfigured with a 3 m PCIe cable.
- Use slot blockers and EMC filler panels in empty module slots to ensure proper module operating temperatures.
- Chassis fan may need to be set at high in order to provide required module cooling at targeted environment cooling.
- Module cooling can be impacted by each module's resistance to air flow, therefore, refer to each module data sheet for information regarding power and cooling to ensure proper configurations.
- Place modules which have high cooling requirements in the center slots of the M9005A. For high power modules, contact your local Keysight office regarding compatibility of the M9005A with your desired modular configuration.

Software information

Supported operating systems	Microsoft Windows 7 SP1 (32/64-bit) Microsoft Windows 8.1 Update 1 (32/64-bit) Microsoft Windows 10 (32/64-bit)
Standard compliant drivers	No IVI drivers required for this chassis
Supported application development environments (ADE)	LabVIEW, LabWindows/CVI, MATLAB, VEE, Visual Basic, VisualStudio.NET (C/C++, C#, VB.NET)
Keysight IO Libraries	Supported versions: 17.2 (or later). Use of latest version recommended. Includes: VISA Libraries, Keysight Connection Expert, IO Monitor

Hardware

Model	Description
M9005A	5-slot, PXIe chassis with integrated system module
M9005A-002	PCIe Desktop adapter for M9005A + 3m cable
Includes	Standard PXI filler panels, getting started guide, drivers, and Keysight I/O libraries

Accessories

Model	Description
Y1212A	Slot blocker kit: 5 single-slot
Y1213A	PXI EMC filler panel kit: 5 single-slot filler panels
Y1274A	Rack mount kit

Services

Advantage Services: Calibration
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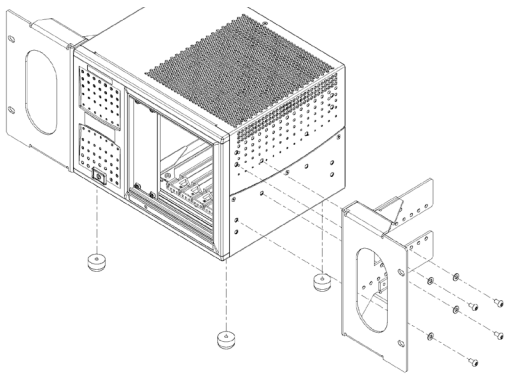
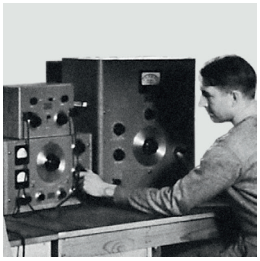
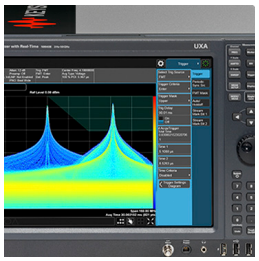


Figure 2. Y1274A M9005A Rack Mount Kit.

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