

Keysight M9393A

PXIe Performance Vector Signal Analyzer
9 kHz to 8.4 GHz, 14 GHz, 18 GHz or 27 GHz

Configuration Guide



Overview

This configuration guide contains information to help you configure your M9393A PXIe performance vector signal analyzer (PXIe performance VSA) and tailor a system to meet your requirements.

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A. Select options for M9393A PXIe performance VSA

Step 1. Start with M9393A PXIe performance VSA base configuration

- The M9393A PXIe performance VSA base configuration (occupies 4 slots) includes:

M9308A	PXIe synthesizer	- Frequency range 9 kHz - 8.4 GHz
M9365A	PXIe downconverter	- Analysis bandwidth 40 MHz
M9214A	PXIe IF digitizer	- Memory 128 MSa (512 MB)
		- One day start-up assistance
		- Modular interconnect cables
		- Software, example programs and product information on CD
		- Return to Keysight warranty - 3 years

Step 2. Choose a frequency range

- | | | |
|---|-----------------|--------------------------------|
| <input checked="" type="radio"/> M9393A-F08 | 9 kHz - 8.4 GHz | Included in base configuration |
| <input type="radio"/> M9393A-F14 | 9 kHz - 14 GHz | |
| <input type="radio"/> M9393A-F18 | 9 kHz - 18 GHz | |
| <input type="radio"/> M9393A-F27 | 9 kHz - 27 GHz | |

Step 3. Choose an analysis bandwidth

- | | | |
|---|---------|--------------------------------|
| <input checked="" type="radio"/> M9393A-B04 | 40 MHz | Included in base configuration |
| <input type="radio"/> M9393A-B10 | 100 MHz | |
| <input type="radio"/> M9393A-B16 | 160 MHz | |

Step 4. Choose memory size

- | | | |
|---|----------|--------------------------------|
| <input checked="" type="radio"/> M9393A-M01 | 128 MSa | Included in base configuration |
| <input type="radio"/> M9393A-M05 | 512 MSa | |
| <input type="radio"/> M9393A-M10 | 1024 MSa | |

Step 5. Add fast switching speed (optional)

Accelerates test throughput and stepped spectrum analysis

- | | |
|----------------------------------|-------------|
| <input type="radio"/> M9393A-UNZ | Fast tuning |
|----------------------------------|-------------|

Step 6. Add pre-amplifier (optional)

Enhances sensitivity to detect low-level signals

- | | |
|----------------------------------|-----------------|
| <input type="radio"/> M9393A-P08 | 9 kHz - 8.4 GHz |
| <input type="radio"/> M9393A-P14 | 9 kHz - 14 GHz |
| <input type="radio"/> M9393A-P18 | 9 kHz - 18 GHz |
| <input type="radio"/> M9393A-P27 | 9 kHz - 27 GHz |

B. Add M9300A PXIe frequency reference

Step 1. Add an M9300A PXIe frequency reference (occupies 1 slot)

One frequency reference required per chassis to meet data sheet specifications. It can support up to four M9393A PXIe VSAs

- | | | |
|----------------------------------|--------------------------------------|---|
| <input type="radio"/> M9393A-300 | Adds M9300A PXIe frequency reference | Five 100 MHz outputs
One 10 MHz output
Internal 10 MHz OCXO timebase output |
|----------------------------------|--------------------------------------|---|

C. Select controller (either embedded controller or via PC)

Step 1. If selecting an embedded controller, select either M9036A or M9037A¹

- M9036A-M04
Mid-performance embedded controller
Intel i5-520E dual-core, 2.4 GHz, 4 thread, 4GB RAM

Select the M9036A for mid-performance, lower cost or if your application requires XP operating system



- M9037A-M04
High-performance embedded controller
Intel i7-4700EQ quad-core processor, 2.4 GHz, 8 thread, 4GB RAM

Select M9037A for the best performance if you have memory intensive applications, multiple applications running in parallel, or if a lot of data is sent to the PC from the PXIe chassis. Features removable SSD drive for security and x8 connector from front for connection to second chassis



Step 2. Upgrade from standard memory size (optional)

For M9036A

- M9036A-M08 Memory upgrade from 4 GB to 8 GB RAM

For M9037A

- M9037A-M08 Memory upgrade from 4 GB to 8 GB RAM
- M9037A-M16 Memory upgrade from 4 GB to 16 GB RAM

Step 3. Select an operating system

For M9036A

- M9036A-WE3 Microsoft Windows Embedded Standard 7 (32-bit)
- M9036A-WE6 Microsoft Windows Embedded Standard 7 (64-bit)

For M9037A

- M9037A-WE3 Microsoft Windows Embedded Standard 7 (32-bit)
- M9037A-WE6 Microsoft Windows Embedded Standard 7 (64-bit)

1. The M9018A 18-slot chassis includes empty space to the left of the 1st functional slot. The embedded controller occupies that empty space and the 1st functional slot.

C. Select controller (either embedded controller or via PC) (continued)

To use your Laptop PC as a controller

- M9045B PCIe ExpressCard adaptor



- Y1200B PCIe cable



- M9021A PCIe cable interface¹: 1 slot



To use your Desktop PC as a controller

- M9048A PCIe desktop adaptor



- Y1202A PCIe cable



- M9021A PCIe cable interface¹: 1 slot

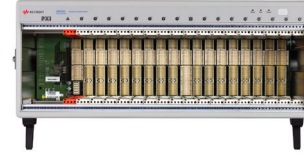


1. The M9021A is used for either PC control option and can only be used with the Keysight M9018A 18-slot chassis.

D. Select a chassis and accessories

Step 1. Select a chassis

- M9018A 18-slot PXIe chassis



Step 2. Choose enough slot blocker kits and EMC filler panels to fill every open slot

Recommended to achieve data sheet specifications

- Y1212A Slot blocker kit: 5 slots



- Y1213A PXI EMC filler panel kit: 5 slots



Step 3. Choose a rack mount kit (optional)

- Y1215A Rack mount kit for M9018A 18-slot PXIe chassis



Step 4. Choose an air inlet kit (optional)

Recommended for rack mounted systems with less than 1U space below chassis.

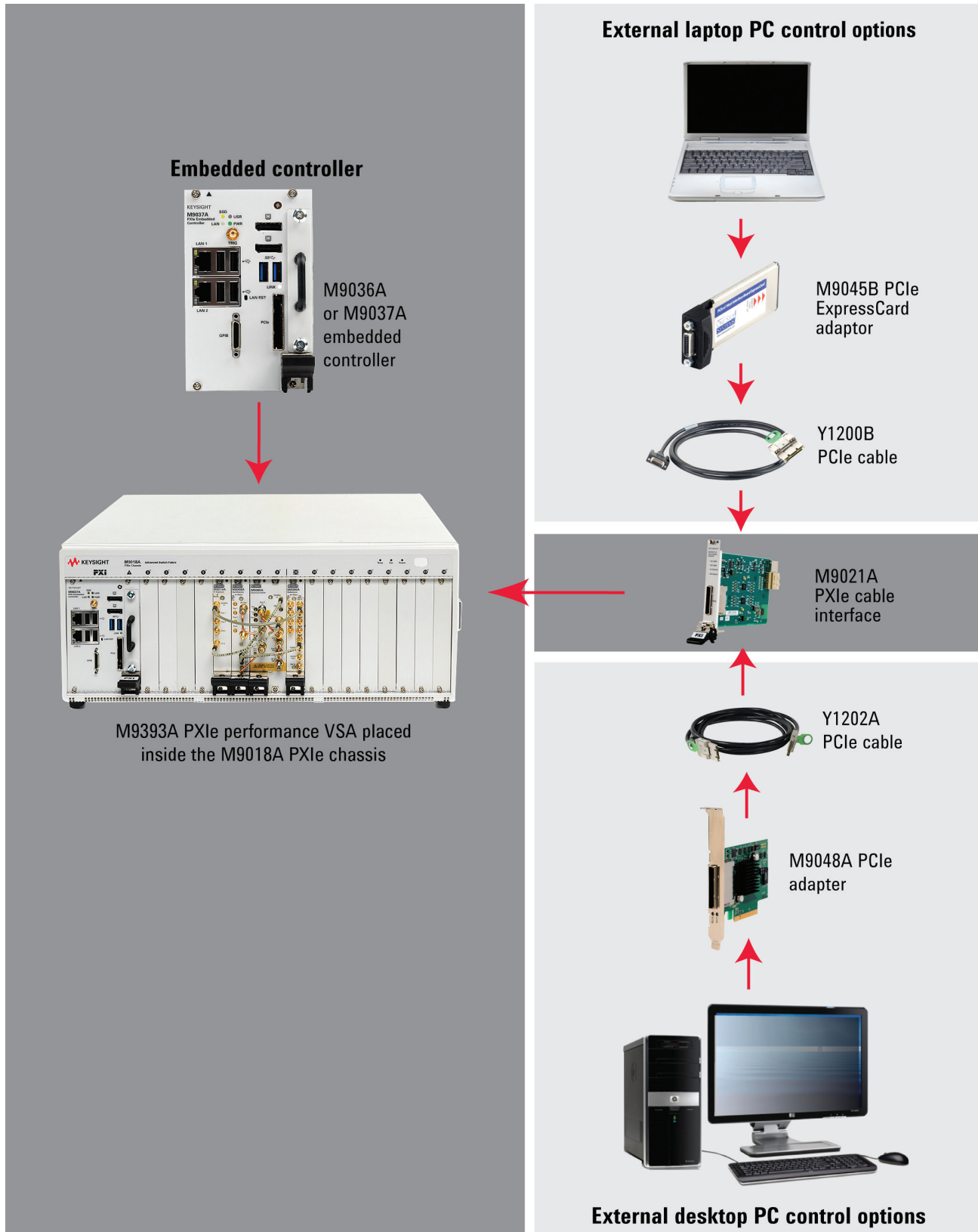
- Y1214A Air inlet kit: M9018A 18-slot chassis¹



1. Available in 1-slot, 2-slot or 3-slot options depending on the chassis configuration. For more information, please visit www.keysight.com/find/m9018a

Physical Connections

Physical connection diagram for controllers



E. Select software for M9393A PXIe performance VSA

Step 1. Start with M9393A base configuration

- The M9393A comes standard with the following software:
 - Keysight IO Libraries Suite including Connection Expert¹
 - Instrument software, soft front panel, drivers for use with MATLAB, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE²
 - Sample waveforms and programming examples

Step 2. Download free Keysight Command Expert software³ (optional)

FREE software that provides fast and easy instrument control for the PC. Command Expert combines instrument command sets, command sequences, documentation, syntax checking and command execution in one simple interface. Command Expert helps you to:

- Find instrument commands
- Access command documentation
- Verify command syntax
- Build instrument command sequences
- Execute instrument command sequences
- Integrate sequences in MATLAB, Visual Studio, Excel, LabVIEW, Keysight VEE or Keysight SystemVue PC application environment
- Generate code for command sequences in MATLAB, Visual C#, Visual Basic.NET and Visual C/C++
- Profile command execution time
- Debug command sequences using breakpoints and single stepping

Step 3. Add X-Series Measurement Applications for Modular Instruments⁴ (optional)

Provides essential RF conformance measurements and tasks for specific communications standards.

Transportable, perpetual licenses support up to 4 modular VSAs in one chassis.

<input type="radio"/> M9080A/B	LTE FDD, LTE-Advanced FDD
<input type="radio"/> M9082A/B	LTE TDD, LTE-Advanced TDD
<input type="radio"/> M9073A	W-CDMA/HSPA+
<input type="radio"/> M9071A	GSM/EDGE/EVO
<input type="radio"/> M9079A	TD-SCDMA/HSPA
<input type="radio"/> M9076A	1xEV-DO
<input type="radio"/> M9072A	cdma2000®/cdmaOne
<input type="radio"/> M9077A	WLAN 802.11a/b/g/n/ac
<input type="radio"/> M9063A	Analog modulation
<input type="radio"/> M9064A	VXA vector signal analysis
<input type="radio"/> M9081A	Bluetooth®

1. Both IO library (version 16.3 or newer) and Connection Expert software need to be installed on the PC controlling the equipment. To download, visit www.keysight.com/find/iosuite
2. Find latest versions of this software at www.keysight.com/find/m9393a
3. To download or get more information on Command Expert, visit www.keysight.com/find/commandexpert
4. For more information, see “Accelerate PXI VSA Measurements with X-Series Measurement Applications”, literature number_5991-2604EN.

E. Select software for M9393A PXIe performance VSA (continued)

Step 4. Add 89600 VSA Software¹ (optional)

Provides time, spectrum and stepped spectrum measurements, powerful displays, data recording and playback, links to MATLAB and more.

- | | | |
|-----------------------|------------|--|
| <input type="radio"/> | 89601B-200 | Base 89600 VSA software |
| <input type="radio"/> | 89601B-300 | Hardware connectivity to over 40 Keysight instruments, including the M9393A PXIe VSA |

Measurement options

- | | | |
|-----------------------|------------|--|
| <input type="radio"/> | 89601B-SSA | Spectrum analysis ² |
| <input type="radio"/> | 89601B-AYA | General purpose vector modulation analysis with over 30 types of presets |
| <input type="radio"/> | 89601B-BHF | Custom OFDM modulation analysis of propriety and pre-standard OFDM formats |
| <input type="radio"/> | 89601B-B7R | WLAN 802.11a/b/g/j/p |
| <input type="radio"/> | 89601B-B7Z | WLAN 802.11n MIMO |
| <input type="radio"/> | 89601B-BHJ | WLAN 802.11ac MIMO (requires 89601B-B7Z) |
| <input type="radio"/> | 89601B-BHD | LTE FDD |
| <input type="radio"/> | 89601B-BHG | LTE-Advanced FDD |
| <input type="radio"/> | 89601B-BHE | LTE TDD |
| <input type="radio"/> | 89601B-BHH | LTE-Advanced TDD |
| <input type="radio"/> | 89601B-B7T | cdma2000@/cdmaOne |
| <input type="radio"/> | 89601B-B7U | W-CDMA/HSPA+ |
| <input type="radio"/> | 89601B-B7W | 1xEV-DO |
| <input type="radio"/> | 89601B-B7X | TD-SCDMA |
| <input type="radio"/> | 89601B-B7R | 3G Bundle (includes cdma2000@, W-CDMA/HSPA+, 1xEV-DO & TD-SCDMA options) |
| <input type="radio"/> | 89601B-BHC | RFID |
| <input type="radio"/> | 89601B-BHK | Custom IQ modulation analysis |

1. For more information, see 89600 VSA software configuration guide literature number 5990-6386EN.

2. For best speed, M9393A-UNZ and -B16 are recommended.

F. Select services: Warranty, calibration, start-up assistance

<input checked="" type="radio"/>		One day start-up assistance	Included in base configuration
<input checked="" type="radio"/>		Return to Keysight warranty - 3 years	Included in base configuration
<input type="radio"/>	R-51B-001-5Z	Return to Keysight warranty - 5 years	
<input type="radio"/>	M9393A-UK6	Commercial calibration certificate with test data for M9393A (M9308A, M9365A, M9214A)	Calibration certificate with measurement results available only at time of purchase.
<input type="radio"/>	M9300A-UK6	Commercial calibration certificate with test data for M9300A	Calibration certificate with measurement results available only at time of purchase.
<input type="radio"/>	R-51B-001-3X	Express warranty - 5 day turnaround For 3 years	Available in the US, Japan, China and many EU countries
<input type="radio"/>	R-51B-001-5X	Express warranty - 5 day turnaround For 5 years	Available in the US, Japan, China and many EU countries
<input type="radio"/>	N7800A	Calibration and adjustment software	

Global warranty

Keysight Technologies, Inc. provides the peace of mind that today's high tech industry requires. 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

Product Information:

www.keysight.com/find/contactus
Or call: 1 800 829-4444 US

Repair and Calibration:

www.keysight.com/find/infoline

Parts and Accessories:

www.parts.keysight.com

For all modular products:

www.keysight.com/find/modular

Express warranty

Reduce downtime with the fastest repair service in the industry. The express warranty upgrades the global warranty to provide:

- 5 day typical turnaround repair service in the US, Japan, China and many EU countries or up to a 10 day improvement in turnaround time in the rest of the world
- Priority return shipment

One day start-up assistance

A Keysight Technologies applications engineer will get you started quickly by helping you install the modules in a chassis, configure the controller, load software and start making measurements.

Calibration services

The modular products are factory calibrated and shipped with an ISO-9002, NIST-traceable calibration certificate. A one year calibration cycle is recommended. The M9393A PXIe performance VSA is supported by the Keysight N7800A calibration software to perform calibrations that test all product specifications and is compliant with ISO 17025:2005, ANSI/NCSL Z540.3-2006 and measurement uncertainty per ISO Guide to Expression of Measurement Uncertainty 1995.

N7800A calibration & adjustment software

The M9393A PXIe performance VSA is supported by Keysight's calibration and adjustment software. This is the same software used at Keysight's service centers to automate calibration. The software offers compliance tests for ISO 17025:2005, ANSI/NCSL Z540.3-2006, and measurement uncertainty per ISO Guide to Expression of Measurement Uncertainty.

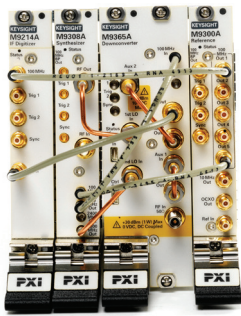
Configuration

In the base configuration shown below, the M9300A PXIe frequency reference is ordered as an option to the M9393A PXIe performance VSA.

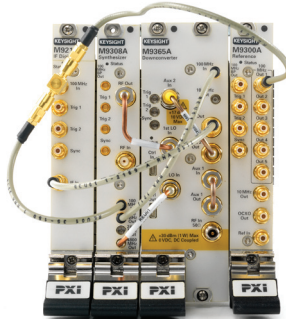
Cables for module to module connections are shipped with the product. Additional cables for external connections shipped with the product are listed below.

Please see the M9393A startup guide for detailed cabling diagram and parts list.

Single M9393A PXIe performance VSA



M9393A with standard cabling



M9393A with alternative cabling to maximize M9300A 100 MHz outputs

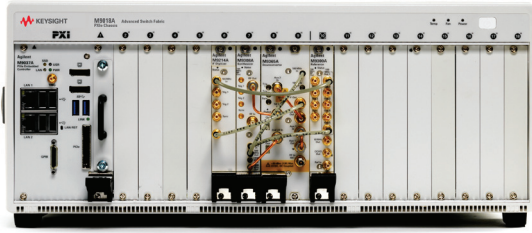
Additional cables shipped:

- One 8121-2063 (BNC Male-SMB Female 1200mm) for external reference connection
- One 8120-5091 (SMB Female-SMB Female 120mm) for shorter connection from M9300A 100 MHz Out to M9214A 100 MHz In
- One 8121-2636 (SMB Female-SMP Female 240mm) for longer connection from M9300A 100 MHz Out to M9308A 100 MHz In

The M9393A includes the adapter listed below to connect the M9214A 100 MHz IN and the M9308A 100 MHz IN to the M9300A 100 MHz OUT to maximize the frequency reference outputs.

1250-3807 (Adapter, T-type, SMB Male-SMB Male-SMB Female)

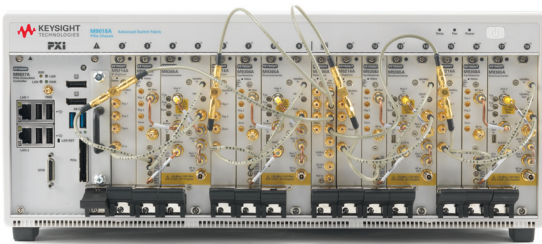
Single PXIe performance VSA (M9393A) in chassis



Single M9393A PXIe performance VSAs in a single chassis

Multiple PXIe performance VSAs in a single PXIe chassis

Up to four M9393As can be installed in a single M9018A 18-slot PXIe chassis. The M9393As also share a single M9037A PXIe embedded controller or external PC.



Cable connections for four M9393As in a single M9018A chassis.

It is recommended that you install the M9393A modules entirely in consecutive slots beginning with slot 2 when using the M9018A chassis. Additional instructions for configuring M9018A PXI backplane triggers are included in the M9393A startup guide, literature number M9393-90002.

The 1250-3807 T-type adapter is required when connecting more than 2 PXI VSAs to the M9300A frequency reference.

A Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.

Upgrading your system

Your product can be easily upgraded after the initial purchase. All PXIe VSA options are controlled by a licensing key and can be quickly upgraded by the user.

How to upgrade your M9393A PXIe performance VSA:

1. Contact your Keysight representative to place an order for an option upgrade.
2. You will receive your hardware entitlement certificate via email.
3. Redeem the certificate online by following the instructions provided to receive a license key file.
4. Install the license key file using the Keysight License Manager.
5. Begin using the new capability.

Using a non-Keysight chassis

The M9393A (with M9300A frequency reference) can be successfully installed in a non-Keysight PXI chassis. Please use the following guidelines.

- Ensure that the chassis has 5 consecutive PXIe or PXI-H slots which can be used by the M9393A and M9300A.
- Ensure that the chassis and controller supports peer-to-peer PXI Express I/O switch topology.
- Ensure that controller selected is compatible with chassis.

Please contact your Keysight representative for more detailed information. For technical assistance with non-Keysight equipment, please refer to the equipment manufacturer's website.

PC requirements for M9393A PXIe performance VSA control¹

Windows 7	
Operating system	Windows 7 (32 & 64 bit)
Processor speed	1.5 GHz dual core (x86 or x64) minimum, 2.4 GHz recommended No support for Itanium64
Available memory	4 GB minimum 8 GB recommended
Available disk space ¹	1.5 GB available hard disk space includes: 1 GB for Microsoft.NET framework 4.0 100 MB for Keysight IO libraries suite
Video	Support for DirectX 9 graphics with 128 MB graphics recommended (SuperVGA supported)
Browser	Microsoft Internet Explorer 7.0 or greater

1. For a list of computers compatible with the Keysight PXIe M9018A chassis, refer to Tested Computer Technical Note (literature no. 5990-7632EN)

Related literature

For more detailed product and specification information refer to the following literature and web pages:

- M9018A PXIe 18 slot Chassis Data Sheet (literature no. 5990-6583EN)
- M9037A PXIe High Performance Embedded Controller Data Sheet (literature no. 5991-3661EN)
- M9036A PXIe Embedded Controller Data Sheet (literature no. 5990-8465EN)
- X-Series Measurement Applications for Modular Instruments Brochure (literature no. 5991-2604EN)

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www.pxisa.org



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www.keysight.com/find/ThreeYearWarranty

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www.keysight.com/find/M9393A

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United States	(800) 829 4444

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Hong Kong	800 938 693
India	1 800 112 929
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Singapore	1 800 375 8100
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