

Keysight Technologies

# M9420A VXT PXIe Vector Transceiver 60 MHz to 3.8 GHz or 6 GHz

## Configuration Guide



# Overview

This configuration guide contains information to help you configure your M9420A VXT PXle vector transceiver to meet your requirements. Ordering optional capabilities at time of purchase provides the lowest overall cost.

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# HARDWARE

## A. Select Options for M9420A VXT PXle vector transceiver

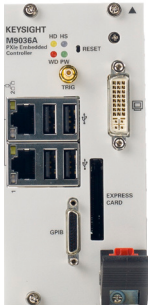

Step 1. Choose a frequency range for the VXT PXle vector transceiver (required option; frequency range not upgradeable)			
<input checked="" type="radio"/>	M9420A-504	60 MHz to 3.8 GHz	
<input type="radio"/>	M9420A-506	60 MHz to 6 GHz	
Step 2. Choose modulation and analysis bandwidth			
<input checked="" type="radio"/>	M9420A-B40	40 MHz	Included in base configuration
<input type="radio"/>	M9420A-B85	80 MHz	
<input type="radio"/>	M9420A-B1X	160 MHz	
Step 3. Choose memory size			
<input checked="" type="radio"/>	M9420A-M02	256 MSa	Included in base configuration
<input type="radio"/>	M9420A-M05	512 MSa	
Step 4. Add high output power			
<input type="radio"/>	M9420A-1EA	High output power	
Step 5. Add duplex port			
<input type="radio"/>	M9420A-HDX	Half duplex port	
<input type="radio"/>	M9420A-FDX	Full duplex port	

## B. Add M9300A PXle frequency reference

Step 1. Add an M9300A PXle frequency reference (occupies 1 slot) One frequency reference required per chassis to meet data sheet specifications. It can support up to four M9420A VXTs			
<input checked="" type="radio"/>	M9300A	Adds PXle 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)<sup>1</sup>

Step 1. If selecting an embedded controller, select either M9036A or M9037A <sup>2</sup>

<div><div></div><div>M9036A-M04</div><div>Mid-performance embedded controller</div><div>Intel i5-520E dual-core, 2.4 GHz, 4 thread, 4GB RAM</div><div>Select the M9036A for mid-performance and lower cost</div></div>	
<div><div></div><div>M9037A-M04</div><div>High-performance embedded controller</div><div>Intel i7-4700EQ quad-core processor, 2.4 GHz, 8 thread, 4GB RAM</div><div>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 PXle chassis. Features removable SSD drive for security and x8 connector from front for connection to second chassis</div></div>	

Step 2. Upgrade from standard memory size (optional)

For M9036A		
<div><div></div><div>M9036A-M08</div></div>		Memory upgrade from 4 GB to 8 GB RAM
For M9037A		
<div><div></div><div>M9037A-M08</div></div>		Memory upgrade from 4 GB to 8 GB RAM
<div><div></div><div>M9037A-M16</div></div>		Memory upgrade from 4 GB to 16 GB RAM

Step 3. Select an operating system




For M9036A		
<div><div></div><div>M9036A-WE3</div></div>		Microsoft Windows Embedded Standard 7 (32-bit)
<div><div></div><div>M9036A-WE6</div></div>		Microsoft Windows Embedded Standard 7 (64-bit)
For M9037A		
<div><div></div><div>M9037A-WE3</div></div>		Microsoft Windows Embedded Standard 7 (32-bit)
<div><div></div><div>M9037A-WE6</div></div>		Microsoft Windows Embedded Standard 7 (64-bit)

1. For list of qualified external controllers, please see Tested Computer List Technical Note literature no. 5990-7632EN. The M9021A is used for both PC controllers and can only be used in the M9018A chassis.




2. 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)<sup>1</sup> (continued)

To use your laptop PC as a controller

○	M9045B	PCIe ExpressCard adaptor	
○	Y1200B	PCIe cable	
○	M9021A	PCIe cable interface <sup>2</sup> : 1 slot	

To use your desktop PC as a controller

○	M9048A	PCIe desktop adaptor	
○	Y1202A	PCIe cable	
○	M9021A	PCIe cable interface <sup>2</sup> : 1 slot	

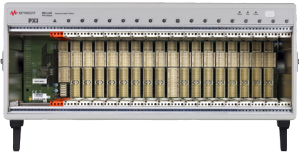




Multi-chassis configurations

Quantity of components required depends on controller selected and number of chassis supported. The M9037A embedded controller is recommended for multi-chassis configurations. The M9036A embedded controller or standalone PC are both supported.

Quantity required	2-chassis configurations with			4-chassis configurations with		
	M9037A	M9036A	PC	M9037A	M9036A	PC
M9021A PCIe cable interface	1	2	3	5	6	7
Y1202A PCIe cable	1	1	2 <sup>3</sup>	3	3	4 <sup>3</sup>

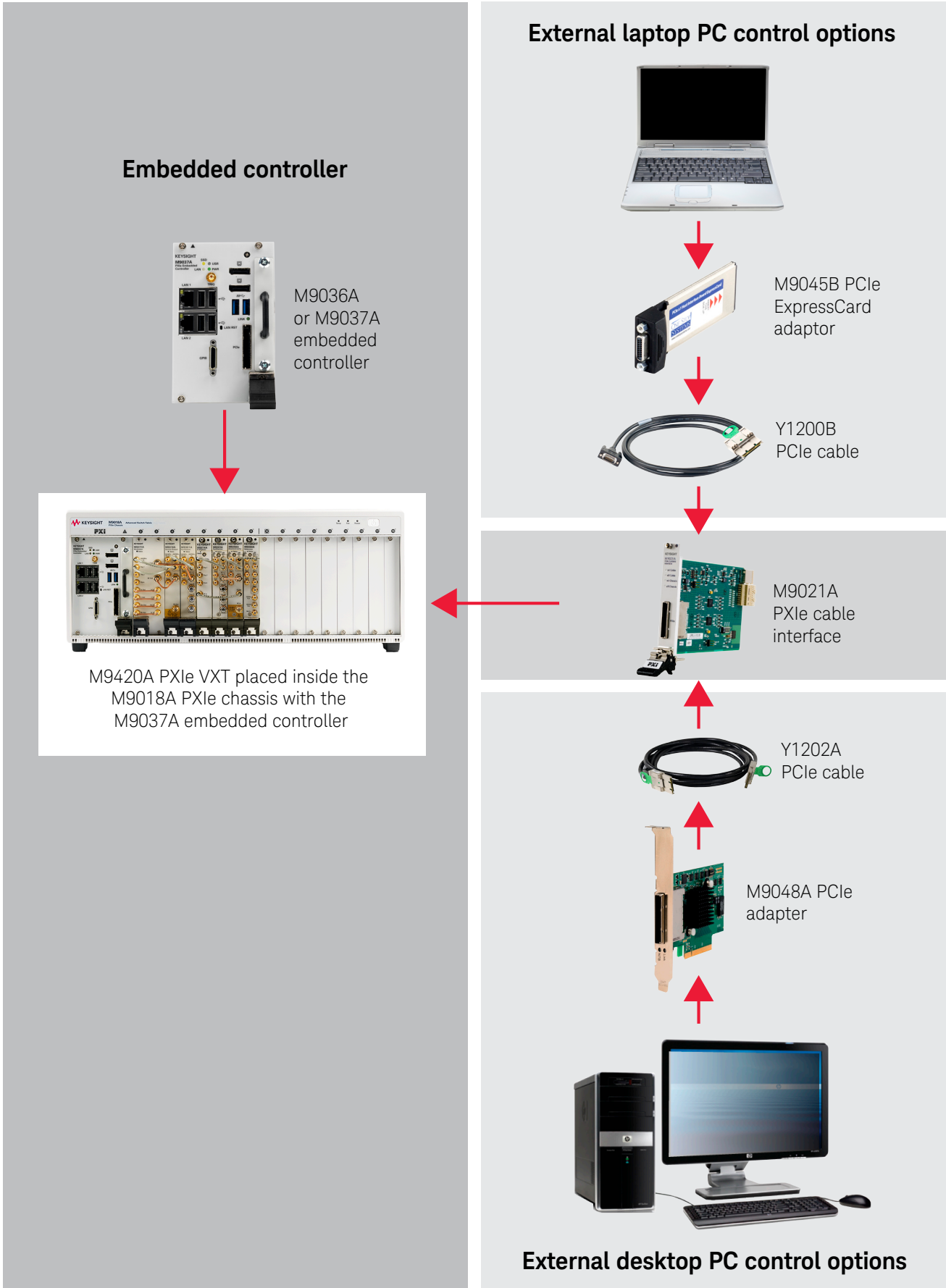
1. For list of qualified external controllers, please see Test Computer List Technical Note literature no. 5990-7632EN. See physical connections diagram on page 7.  
2. The M9021A is used for either PC control option and can only be used with the Keysight M9018A 18-slot chassis.  
3. Depending on the PC used, one of the PCIe cables may be Y1200B.

## D. Select a Chassis and Accessories

<b>Step 1. Select a chassis</b>		
<input type="radio"/>	M9018A	18-slot PXIe chassis
		
<b>Step 2. Choose enough slot blocker kits and EMC filler panels to fill every open slot</b>		
Recommended to achieve data sheet specifications		
<input type="radio"/>	Y1212A	Slot blocker kit: 5 slots
		
<input type="radio"/>	Y1213A	PXI EMC filler panel kit: 5 slots Non-EMC filler panels are included with the M9018A PXIe 18-slot chassis.
		
<b>Step 3. Choose a rack mount kit (optional)</b>		
<input type="radio"/>	Y1215B	Rack mount kit for M9018A 18-slot PXIe chassis For more information on the rack mount kit, see the M9018A data sheet, literature number 5990-6583EN.
		
<b>Step 4. Choose an air inlet kit<sup>1</sup> (optional)</b>		
Recommended for rack mounted systems with less than 1U space below chassis.		
<input type="radio"/>	Y1214A	Air inlet kit: M9018A 18-slot chassis <sup>1</sup>
		

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](http://www.keysight.com/find/m9018a).

Physical Connection Diagram for Controllers



## SOFTWARE

### E. Select Software for M9420A VXT PXIe vector transceiver

#### Step 1. Start with M9420A base configuration

- The M9420A comes standard with the following software:
  - Keysight IO Libraries Suite including Connection Expert <sup>1</sup>
  - Soft front panel, drivers for use with Matlab, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE <sup>2</sup>
  - Sample waveforms and programming examples

#### Step 2. Add Signal Studio software <sup>3</sup> (optional)

Generate standard-compliant test signals validated by Keysight for receiver and component test.

Perpetual licenses available in fixed (option 9FP) and transportable (option 9TP), or 5 pack and 50 pack waveforms

##### Cellular communications

<input type="radio"/>	N7600B	W-CDMA / HSPA+
<input type="radio"/>	N7601B	cdma2000® / 1xEV-DO
<input type="radio"/>	N7602B	GSM / EDGE / EVO
<input type="radio"/>	N7612B	TD-SCDMA / HSDPA
<input type="radio"/>	N7624B	LTE / LTE-Advanced FDD
<input type="radio"/>	N7625B	LTE / LTE-Advanced TDD

##### Wireless connectivity

<input type="radio"/>	N7606B	Bluetooth®
<input type="radio"/>	N7615B	Mobile WiMAX™
<input type="radio"/>	N7617B	WLAN 802.11a/b/g/n/ac
<input type="radio"/>	N7610B	Short Range Communications

##### Detection, positioning, tracking, and navigation

<input type="radio"/>	N7609B	Global Navigation Satellite Systems (GNSS)
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##### General purpose

<input type="radio"/>	N7608B	Custom Modulation
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1. Both IO library (version 17.0 or newer) and Connection Expert software need to be installed on the PC controlling the PXI instruments. To download, visit [www.keysight.com/find/iosuite](http://www.keysight.com/find/iosuite).
2. Find latest versions of this software at [www.keysight.com/find/VXT](http://www.keysight.com/find/VXT).
3. For more information, see Signal Studio brochure, literature number 5989-6448EN or Signal Studio configuration assistant at [http://rfmw.em.keysight.com/wireless/helpfiles/all-in-one\\_config\\_asst/ssconfig.html](http://rfmw.em.keysight.com/wireless/helpfiles/all-in-one_config_asst/ssconfig.html).

### F. Select Software for M9420A VXT PXIe vector transceiver

#### Step 1. Add MATLAB software <sup>1</sup> (optional)

Create arbitrary waveforms, customize measurement and data analysis routines, create your own instruments applications and test systems, automate measurements, signal generation, and report generation

<input type="radio"/>	N6171A-M01	MATLAB basic package
<input type="radio"/>	N6171A-M02	MATLAB standard package
<input type="radio"/>	N6171A-M03	MATLAB advanced package

1. For more information on MATLAB software, visit [www.keysight.com/find/n6171a](http://www.keysight.com/find/n6171a).



**Step 1. Add X-Series Measurement Applications (optional)**

**Provides essential RF conformance measurements and analysis for specific communications standards and formats. The last two letters of the ordering numbers indicate the license type, FP stands for fixed perpetual, TP for transportable perpetual. Licenses support up to 4 VXTs in one chassis.**

Description	Fixed license	Transportable license	Additional information
LTE/LTE-Advanced FDD	N9080B-1FP	N9080B-1TP	Standard-based LTE-FDD measurements
	N9080B-2FP	N9080B-2TP	Standard-based LTE-Advanced FDD measurements; requires 1FP/1TP
LTE/LTE-Advanced TDD	N9082B-1FP	N9082B-1TP	Standard-based LTE-TDD measurements
	N9082B-2FP	N9082B-2TP	Standard-based LTE-Advanced TDD measurements; requires 1FP/1TP
GSM/EDGE/EVO	N9071A-2FP	N9071A-2TP	Standard-based GSM/EDGE measurements
	N9071A-3FP	N9071A-3TP	Adds EDGE Evolution and VAMOS measurements; requires 2FP/2TP
	N9071A-XFP	N9071A-XTP	Adds single acquisition combined measurement, a SCPI-command-based measurement optimized for high-volume, high-throughput manufacturing; requires 2FP/2TP
cdma2000®/cdmaOne	N9072A-2FP	N9072A-2TP	Standard-based cdma2000 and cdmaOne measurements
W-CDMA/HSPA+	N9073A-1FP	N9073A-1TP	Standard-based W-CDMA measurements
	N9073A-2FP	N9073A-2TP	Adds HSPA measurements; requires 1FP/1TP
	N9073A-3FP	N9073A-3TP	Adds HSPA+ measurements; requires 1FP/1TP, 2FP/2TP
	N9073A-XFP	N9073A-XTP	Adds single acquisition combined measurement, a SCPI-command-based measurement optimized for high-volume, high-throughput manufacturing; requires 1FP/1TP
1xEV-DO	N9076A-1FP	N9076A-1TP	Standard-based 1xEV-DO Rel 0, Rev A, and Rev B measurements
TD-SCDMA/HSPA	N9079A-1FP	N9079A-1TP	Standard-based TD-SCDMA measurements
	N9079A-2FP	N9079A-2TP	Adds HSPA/8PSK measurements, requires 1FP/1TP
Mobile WiMAX™	N9075A-2FP	N9075A-2TP	Standard-based Mobile WiMAX measurements
WLAN 802.11a/b/g/n/ac/ah	N9077A-2FP	N9077A-2TP	Standard-based 802.11a/b/g measurement
	N9077A-3FP	N9077A-3TP	Adds 802.11n; requires 2FP/2TP
	N9077A-4FP	N9077A-4TP	Adds 802.11ac; requires 2FP/2TP, 3FP/3TP
	N9077A-6FP	N9077A-6TP	Adds 802.11ah; requires 2FP/2TP
Bluetooth®	N9081A-2FP	N9081A-2TP	Standard-based Bluetooth version 2.1+ EDR and Low Energy (LE) measurements
VXA vector signal analysis	N9064A-1FP	N9064A-1TP	Vector signal analysis; high-resolution, FFT-based spectrum and time-domain measurements, time gating, AM/FM/PM demodulation, statistical measurements
	N9064A-2FP	N9064A-2TP	Adds flexible digital modulation analysis; general purpose digital modulation for 2-16FSK, 2-8PSK, and 16-1024QAM, as well as more than 15 additional formats; requires 1FP/1TP
89600 VSA software	Not available	89601B (transportable license is standard)	Industry-leading measurement software for evaluating and troubleshooting signals in R&D; PC-based software supporting more than 40 measurement platforms, plus more than 75 signal standards and modulation types including MIMO analysis; <a href="http://www.keysight.com/find/89600vsa">www.keysight.com/find/89600vsa</a>

## SERVICES

### G. Calibration, Start-Up Assistance

○	M9420A-UK6	Commercial calibration certificate with test data	Calibration certificate with measurement results available only at time of purchase.
○	M9300A-UK6	Commercial calibration certificate with test data for M9300A	Calibration certificate with measurement results available only at time of purchase.
○	PS-S20-01	Service: 1-day start-up assistance	Training on how to operate your instrument effectively
○	N7800A	Calibration and adjustment software	

#### Global warranty

Keysight 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

#### 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 M9420A VXT PXle vector transceiver 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.

## Upgrading Your System

Your product can be easily upgraded after the initial purchase. Fast license-key upgrades for performance options that do not require additional hardware:

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.<sup>1,2</sup>

Installation and testing information is available at:

[www.keysight.com/find/VXT\\_upgrades](http://www.keysight.com/find/VXT_upgrades)

Description	Upgrade number
Upgrade from 40 MHz to 80 MHz	M9420AU-B85
Upgrade from 80 MHz to 160 MHz	M9420AU-B1X
Upgrade from 40 MHz to 160 MHz	M9420AU-BU5
Upgrade memory from 256 MSa to 512 MSa	M9420AU-M05
Add high output power	M9420AU-1EA
Add half duplex port	M9420AU-HDX
Add full duplex port	M9420AU-FDX

## Using a Non-Keysight Chassis

The M9420A VXT PXIe vector transceiver can be successfully installed in a non-Keysight PXI chassis. Please use the following guidelines.

- Ensure that the chassis has enough consecutive PXIe or PXI-H slots to accommodate the M9420A VXT PXIe vector transceiver.
- 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.

1. At the time of manufacture, the hardware related to many of these options was fully adjusted and the option performance was verified to be within its warranted specifications. Within one year of the initial calibration date of the analyzer, this option is fully calibrated with no further adjustment or verification testing.
2. If this analyzer has been adjusted as part of a repair or calibration during its first year, or if the analyzer is more than one year old, additional adjustment and performance verification tests are required to ensure that some newly installed options are functioning properly. However, the completion of these tests does not guarantee that the analyzer meets all warranted specifications.

## PC Requirements for M9420A VXT PXIe vector transceiver Control <sup>1</sup>

	One Module per Chassis	Two Modules per Chassis	Three or Four Modules per Chassis
Operation system	Win 7 (32 and 64-bit)	Windows 7 (64-bit) <sup>1</sup>	Windows 7 (64-bit) <sup>1</sup>
Processor Speed	1.86 GHz Single Core minimum	1.86 GHz Dual Core minimum	1.86 GHz Dual Core minimum
Available memory <sup>2</sup>	4 GB (8 GB recommended)	4 GB (8 GB recommended)	8 GB (16 GB recommended)
Available disk space on Drive C:	4 GB	4 GB	4 GB

1. For a 32-bit Windows 7 operating system, it is recommended to run only one M9420A application instance at one time. Note the minimum processor requirement listed above for the single module case.
2. For a list of computers compatible with the Keysight PXIe M9018A chassis, refer to the 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)
- M9420A VXT PXIe Vector Transceiver, Data Sheet (literature no. 5992-1088EN)
- 89600 VSA Software Brochure (literature no. 5990-6553EN)
- Signal Studio Software Brochure (literature no. 5989-6448EN)



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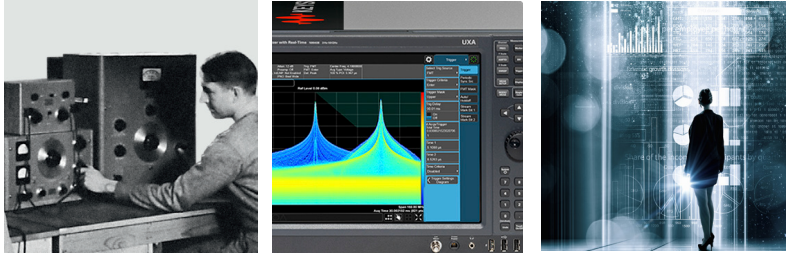
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United States	(800) 829 4444

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China	800 810 0189
Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

### Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
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Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
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	Opt. 3 (IT)
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For other unlisted countries:

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